DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII

AN APPROACH TOWARDS RURBANISATION

Utara Village

Surat District

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
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S.N.P.I.T. & R.C.,
UMRAKH

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YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad – 382424 Gujarat

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Chandkheda, Ahmedabad – 382424 Gujarat

CERTIFICATE

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

Detail Project Report for,
VILLAGE UATARA
DISTRICT SURAT

Under

Vishwakarma Yojana: Phase-VIII

In partial fulfilment of the project offered by

GUJARAT TECHNOLOGICAL UNIVERSITY, 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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Internal (Evaluator) Guide Name and Signature:	**ASSIST. PROF. MR. SANDIP MISHTRY, ASSIST. PROF. MR. ASHISH PATEL**
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ABSTRACT

I would say that if the village perishes India will perish too. India will be no more India. Her own mission in the world will get lost. The revival of the village is possible only when it is no more exploited.

- M. K. Gandhi

The developmental work in villages that could undertake as per the need of the village. This entails hard work, many strenuous visits to the village and long discussions with the various stake-holders.

Our assigned village, which is UTARA village. UTARA village is located at 9.4 km from Bardoli and 45 km from Surat. Bardoli is nearest town of UTARA village. The MINDHOLA river pass near the between the UTARA. The local language is Guajarati. Total population of the village is 546 as per census 2011.

Village is having gram panchayat building and bus stand. The village elevated reservoir and sump for water storage. There is 24*7 electricity supply for residential use and 8 hours for agricultural use. There are no management for collect and damping of garbage. There are many facilities which are lack in UTARA village like health centres, proper road, disposal of drainage water, solid waste management plant, and recreational centres. There are no facilities for the public toilet.

Main occupation of the UTARA village is farming. 70% people of UTARA village depend on farming while 20% people are doing dairy and milk production and remaining 10% people are in labour work. Literacy rate of UTARA is 68.10%. The village has primary school and milk production business. Village has poor drainage system.

Our view for village development is to reduce urban city Pressure and lower the migration rate by developing village with a 'rural soul' but with all urban amenities that a city may have. The developmental work in villages that could undertake as per the need of the village in particular includes Physical, Social and Renewable infrastructure Facilities.

Scope for Improvement The primary area to improve should be providing employment in rural areas and improving the productivity of the agricultural sector. The dwindling literacy rates in rural India, especially for females, are a major matter of concern. There is a need for land and technical reforms

Key Words: **Rurbanization, People's Participation, Planning, Village Development Planning, Development of village, Infrastructure, Sustainable development, Renewable energy.**

ACKNOWLEDGEMENT

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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We express our sincere thanks to **Commissionerate of Technical Education, Gujarat State** for appreciating and acknowledging our work.

We express our sincere thanks to **DDO, TDO, Sarpanch, Talati and staff members of Ahmadabad** District for providing us with requisite data whenever we approached them. Especially our thanks are to all villagers and stake holders for their support during Survey.

We are also thankful to our **Prof**. (**Dr.) PIYUSH JAIN Principal**, faculties of our colleges for their encouragement and support to complete this project work.

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Mr. ASSIST. PROF. MR. SANDIP MISTRY, ASSIST. PROF. MR. ASHISH A. PATEL from college S.N.P.I.T. & R.C., UMRAKH for their invaluable guidance, constant inspiration and active involvement in our project work.

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ABBREVIATIONS

SR. NO.	SHORT NAME / SYMBOL	FULL NAME
1	PURA	Provision of Urban Amenities in Rural
2	PHC	Public Health Centre
3	TDO	Taluka Developer Officer
4	DDO	District Developer Officer
5	NGO	Non-government Organization
6	PPP	Public Privet Partnership
7	DRDA	District Rural Development Agency
8	MNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
9	NRUM	National Ruben Mission
10	RCC	Reinforced Cement Concrete
11	G. L	Ground Level
12	P. L	Plinth Level
13	CM	Cement Mortar
14	PHC	Primary Health Centre
15	ATM	Automated Teller Machine
16	AGRSARI	Academy of Grass Road Studies and Research of India
17	CCTV	Closed Circuit Television
18	TRC	Tax Residency Certificate
19	PUC	Pollution Under Control
20	RO	Reverse Osmosis
21	LED	Light Emitting Diode
22	WBM	Water Bound Macadam
23	RCC	Reinforced cement concrete
24	IIT	Indian institute of technology
25	SWOT	Strength, Weakness, Opportunities, Threats
26	NSSO	National Sample Survey Organization
27	SC	Scheduled Caste
28	ST	Scheduled Tribe
29	UDPFI	Urban Development Plans, Formations and Implementations

CHAPTER 1: IDEAL VILLAGE (UMRAKH VILLAGE) VISIT FROM YOUR DISTRICT OF GUJARAT STATE

1.1 BACKGROUND AND STUDY AREA LOCATION:

Our ideal village is UMRAKH which is situated in Bardoli Taluka in Surat District of Gujarat State, India. It is located 30 KM from Surat. According to Census 2011 information the location code or village code of Umrakh village is 524286. Umrakh village is located in Bardoli Tehsil of Surat district in Gujarat, India. It is situated 3km away from sub-district headquarter Bardoli and 35km away from district headquarter Surat. As per 2009 stats, Umrakh village is also a gram panchayat.

The total geographical area of village is 726.8 hectares. Umrakh has a total population of 1,496 peoples. There are about 337 houses in Umrakh village. Bardoli is nearest town to Umrakh which is approximately 3km away. Nearby Villages of Umrakh; Pardi Kadod, Ruwa, Varad, Isanpor, Kharvasa, Astan, Panada, Rajpura Lumbha, Rayam, Khoj and Palsod.

TABLE 1.1: POPULATION OF UMRAKH VILLAGE	
TOTAL POPULATION	1496
MALE POPULATION	767
FEMALE POPULATION	729

TABLE 1.2: CONNECTIVITY OF UMRAKH	
TYPE	**STATUS**
PUBLIC BUS SERVICE	AVAILABLE WITHIN VILLAGE
PRIVATE BUS SERVICE	AVAILABLE WITHIN < 5 KM DISTANCE
RAILWAY STATION	AVAILABLE WITHIN < 5 KM DISTANCE

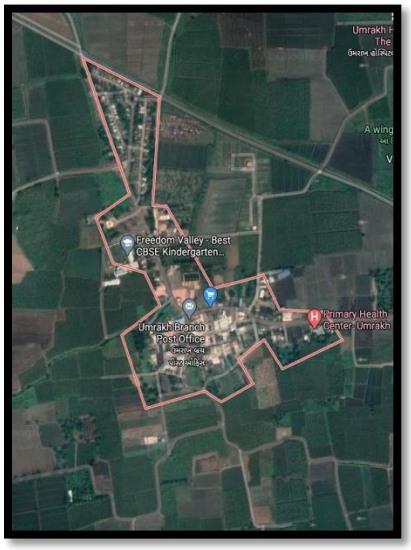


FIG 1.1: MAP OF UMRAKH VILLAGE

➢ **STUDY AREA LOCATION:**

- Gram Panchayat: Umrakh
- Block / Tehsil: Bardoli
- District: Surat
- State: Gujarat
- Pin code: 394345
- Area: 726.8 hectares
- Population: 1,496
- Households: 337
- Nearest Town: Bardoli (3 km)

1.2 CONCEPT OF IDEAL VILLAGE:

The concept of an ideal village is that it has good system of sanitation and drainage. Because filth and rubbish of the village should be regularly removed away into the compost pits. An ideal village has very good drains so that the dirty water of the village is properly drained away. The dwelling-house in an ideal village are very neat and clean. The villagers grow food for themselves and fodder for their cattle.

An ideal village should have good supply of drinking water. People of an ideal village are good farmers and good artisans. There are Primary schools, High schools and craft schools in an ideal village. Primary education is free and compulsory. In an ideal village, there are clinical facilities for men and the domestic animals. Hence, there are dispensaries and veterinary dispensaries. We can find post-office, public library, playground, gymnasium and club-house there.

People of an ideal village are very neat and clean. They are quite enlightened. They have a sense of discipline and co-operation. They have a spirit of service and sacrifice. They follow the principles of plain living and high thinking. They are never idle. They are active and cheerful. Constant labour is their chief motto. An ideal village makes all possible provision for the all-round development of her people. It is our main duty that we should lift every village of India to much higher level. The idea of an ideal village will certainly help us in discharging our duty.

1.2.1 OBJECTIVES OF IDEAL VILLAGE:

Today, villages are like the backbone of a country. Some of the objectives of an ideal village are:

- Good connectivity is one of the most essential requirements of an ideal village. The streets and lanes of the village should also be well maintained so that people can easily commute from one part to another.
- The houses should be neat and clean. They should be well-ventilated to allow free flow of light and air.
- There should be good arrangement for proper sanitation and drainage system.
- An ideal village have good supply of clean drinking water.
- An ideal village have good system of sanitation and drainage so that dirty water and waste can be easily drained out.
- Almost every villager living in a village keeps cattle. There should be enough paster land for grazing of their cattle.
- The villagers grow food and vegetables not only for themselves but also for the urban people. They also grow fodder for their cattle.
- There should be provision for wholesale market in the village itself so that the villagers can sell their surplus products there at reasonable rates and get good return.
- An ideal village have well-established small cottage industries so that the artisans and small farmers can utilize their skills and extra time to produce articles necessary for day-to-day use and earn a handsome profit by selling them in the market.

- An ideal village have proper facilities taking care of the health of the villagers as well as of their cattle and poultry.
- There should be Primary schools and High schools so that the little children need not go out of the village for education.
- There should also be soft skills training centres and preferably an adult education centre for the elders who want to get education.

1.2.2 EXAMPLE / LIVE CASE STUDY OF IDEAL VILLAGE OF INDIA / GUJARAT:

1. Anathasagar of Chinnakodur Mandal of Medak District of Andhra Pradesh:

Anathasagar of Chinnakodur Mandal of Medak District of Andhra Pradesh is the proud recipient of NGP. It was like any other village prior to TSC program, a place where all use to defecate in open, water born disease were very prominent.

The Gram Panchayat took a stand that if they find anybody henceforth going in open defecation would be charged penalty. In order to change the mindsets of the community members IEC activity were taken up.

Traditional folk media Kalajathara and door to door campaign, wall paintings, parents meeting in school, rallies and other programs for generating awareness were carried out. In order to sustain the program school sanitation committee for toilet complex in schools, wash committee, environment and health committees were also formed.

2. Nirmal Gram Puraskar: K. Rayavaram Panchayat:

K. Rayavaram is a small village having population 1312 with 306 households. The joint efforts of GP and community have begged them honors of receiving NGP for 2005-06. Like other villages K. Rayavaram also mobilized community members, it had rounds of meeting with the GP and community members to achieve 100% total sanitation.

The GP also imposed fine for small violations. The Panchayat has passed unanimous resolution to keep the village free from mosquito and housefly.

They were also successfully in carrying out campaign against the use of plastic bags and imparting knowledge on solid waste management. The "Sugathara Thiruvizha" sanitation festival is conducted every month.

Another unique feature of K. Rayavaram is that they have not only maintained the individuals' toilets properly, but they have a sense of community ownership amongst them which has led to successful maintenance of Women Sanitary Complex.

3. Doburji from Ludhiana, Punjab:

There is a tiny little village called Doburji about 35km from Ludhiana, Punjab, that has quietly been turning itself into a haven for its people. Not only have the residents been fighting actively against social evils such as drug intake and female feticide, they have also focused on making technological advances so the village can comfortably exist in the 21st century.

Perhaps that's why the village has been endowed with Panchayat Sashaktikaran Puraskar, a national award that recognizes work done by Panchayats across the country. One of the reasons as to why the village, which has a population of just 1,450, has developed so much in the recent times is said to be its Sarpanch, Sukhvir Kaur, a 39-year-old woman.

After having been elected in 2013, Sukhvir, who has a Master's degree in English, swiftly implemented a number of developmental projects and hit the ground running. Some of the campaigns like 'Save the Girl Child' were implemented with great success. She also ensured that medical camps were organized on a regular basis. Today, the village sports solar lights, has clean ponds, and its roads are mostly concrete thanks to the efforts of all involved.

In a report from the Times of India, Sukhvir and her family are not done with their efforts to modernize the village. Soon, with money raised from NRIs from the village, they are planning to buy an ambulance that will cater to the medical emergencies to anyone from the village. There are also plans underway to install water purifiers in every household. Sukhvir has proudly noted that nearly 90% of the development projects she had planned for when she was elected have already been implemented!

4. Balipaka village in Mayurbhanj district, Odisha: Protecting the Forest Deity

At a time when incidences of fire have reduced invaluable forest wealth to ashes across Odisha due to soaring temperature since March this year, forests around villages in Mayurbhanj and Kandhamal districts have surprisingly remained unaffected so far.

What these villages have been successful in doing is that they have taken up the task of checking the spread of forest fires in their districts.

"Forests house our living deities. They are found in forms of plants, rocks and animals. If forests catch fire, it is we who will be the biggest losers. Moreover, the forest is the biggest source of our livelihood and food. We always wish that forests remain intact," said Maheswar Naik, president of Conservation and Management Committee formed under the CFR, Balipaka village in Mayurbhanj district.

This initiative of the villagers is clear evidence that the Government and its Forest Department by themselves cannot manage issues in large and complex forest eco-systems the way that villagers who are closely connected with it can.

The residents of Balipaka village inside Similipal National Park have constituted two teams to keep a tab on forest fire. "As soon as anyone notices smoke in a forest, other villagers are immediately alerted. The squad rushes to the spot. Subsequently, a fire line is drawn between the affected and unaffected area to prevent its spread," Mr. Naik said.

5. Godilanaka village of East Godavari:

Godilanka is situated in Allavaram Mandal in East Godavari District with a population of 1712 individuals as per 2001 census. In order to carry out TSC program on massive level IEC activities were conducted. In order to create awareness wall paintings were done on both the side where people use to go for open defecation.

Rallies were carried out in village involving key leaders, school children, community leaders, DWACRA women and Panchayat members. The system of tow dust bin garbage collection method was adopted and each household were given two plastic bins to control garbage problem. Traditional folk media was also used to mobilize people and which has brought the results today when we received the NGP says Shri Gosangi Venkanna Chairman PRI.

1.2.3 THE IDEA OF MODEL / SMART VILLAGE:

Smart Village is a concept adopted by national, state and local governments of India, as an initiative focused on holistic rural development, derived from Mahatma Gandhi's vision of Adarsh Gram (Ideal Village) and Swaraj (Self Reliance).

Smart villages will serve as complementary engines of economic growth to smart cities producing goods and services for local rural markets as well as high-value-added agricultural and rural industry products for both national and international markets. Smart Village based development has become a trend of city development around the world. The development of Smart Village is not just to improve the efficiency of the bureaucracy by utilizing information and communication technology (ICT), but also how to develop the community by making ICT infrastructure and facility as supporting factors or enablers.

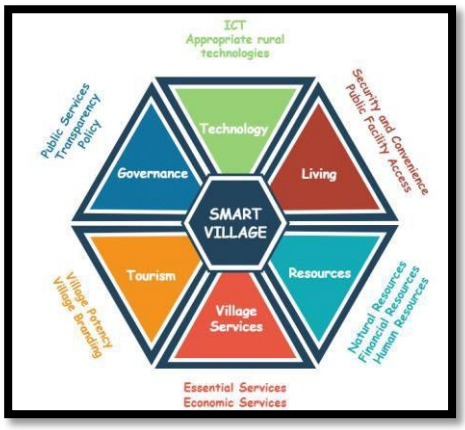


FIG 1.2 MODEL OF SMART VILLAGE

Smart city is defined as an innovative city on the use of Information and Communication Technology (ICT) and other means to improve its quality of life, efficiency of urban services, and competitiveness, as well as sustainability.

The vision of smart village is that modern energy access can act as catalyst for development in education, health, productive enterprise, clean water, sanitation, environmental sustainability and participatory democracy which helps to support further improvement in access to energy.

Initially the concept of development of village is of Mahatma Gandhi i.e., Swaraj and Suraj village. But now days it is newly termed as smart village. We know that, India is a developing nation, with the help of smart village we can make India as a SS nation. Now days, our government also gives strong focus on smart village. Government implements so many schemes on smart village.

1.2.4 ANCIENT HISTORY CIVIL / ELECTRICAL CONCEPT ABOUT INDIAN VILLAGE / OTHER COUNTRIES PERSPECTIVE ABOUT VILLAGE AND ITS NEW DEVELOPMENT:

Villages in Ancient India:

During the period of Chandragupta Maurya, the villages were divided into three categories according to their size: Jyeshtha (the biggest), Madhyama (medium sized) and Kanishtha (smaller ones). In terms of land revenue, these villages were put into four categories:

1. **Gramagra:** Ordinary villages paying tax in cash.
2. **Pariharak:** Revenue free, given to priests and teachers, who would collect the tax from the villagers and use it as their salary for spreading education and pursuing a religious life.

3. **Ayudhuja:** Revenue free, for supplying soldiers during a war
4. **Anya:** Villages allowed to pay tax in kind in the form of agricultural products, minerals or labor the villages have remained the administrative units of various princely states. The maharajas or maharanas appointed jagirdars or zamindars and collected revenues, called lagaan, through them. The practice of giving a village to a priest or not charging any lagaan from an agriculturist family continued until recently. In Rajasthan, such lands or villages were called Mafi ki Zameen or Mafi ke Gaon.

Villages Today:

There were 580,781 villages in India, according to the 1991 Census. Of these; the largest number (390,093) consisted of small-sized villages with a population of less than 1,000. In the category of 1,000-2,000 population are another 114,395 villages.

Taken together, they represent 86 per cent of the villages of India. Villages with 2,000-5,000 population total 62,915, and those having a population of between 5,000-10,000 numbers 10,597. The highest concentration of very large villages, with more than 10,000 people, is to be found in the state of Kerala, which has 1,007 (of the 2,779) large villages.

At the time of the 2001 Census, the number of villages had gone up to 638,691. Like the 1991 Census, Uttar Pradesh (UP) continues to have the largest number of villages, although the state has become somewhat smaller with the state of Uttaranchal carved out of it. UP has 107,452 villages and Uttaranchal, 16,823, making a combined total of 124,275.

It is obvious that the number of villages in a given state is dependent upon the size of the state and the proportion of population dependent on agriculture. In this context, it will be useful to understand two concepts, namely that of 'agricultural crowding' and 'Village group'.

Agricultural crowding means the number of persons dependent on agriculture per square mile of cultivated land. In India, the average agricultural crowding was 432 in 1931; it rose to 535 in 1941, when it was greatest in Bengal (769) and least in Bombay Province (186).

This difference coincides with the geography of the area. In dry or hilly areas, agricultural crowding is expected to be the least as compared to plain areas, where there is extensive agriculture. The Census of India, 1951, developed the concept of the village group.
It divided the entire territory of India into squares of five miles into five miles (an area of 25 sq. miles), numbering 47,074 squares. All villages falling in a given square were called a village group.

1.3 DETAIL STUDY OF IDEAL VILLAGE / SMART VILLAGE:

DETAIL STUDY OF IDEAL VILLAGE (UMRAKH):

FIG 1.3 UNITY HALL

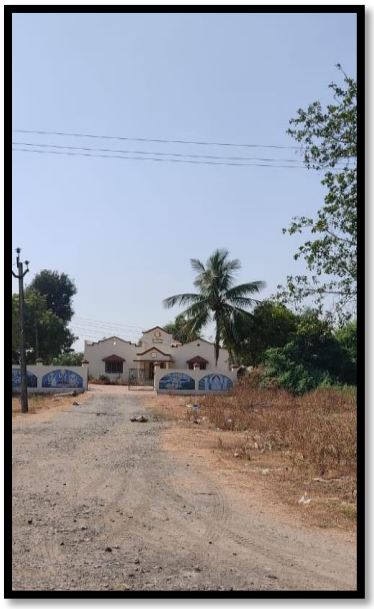


FIG 1.4: TEMPLE

FIG 1.5: OVERHEAD TANK

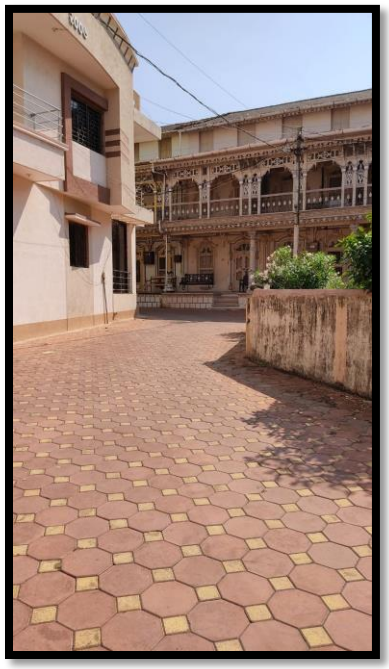


FIG 1.6: BLOCKED READ

FIG 1.7: ELECTRIC POLE

FIG 1.8: CONCRETE ROAD

FIG 1.9: POST OFFICE

FIG: 1.10: PUBLIC TOILET

FIG 1.11: PRIMARY SCHOOL

FIG 1.12: SOLAR PANEL ON ROOF

FIG 1.15: INTERSECTION

FIG 1.14: MODERN HOUSE

FIG 1.16: AGRICULTURAL LAND

FIG 1.17: OPEN DRAINAGE

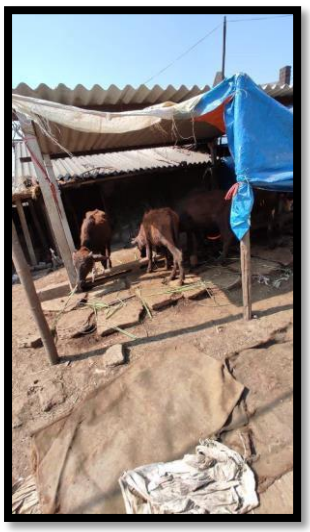


FIG 1.18: CATTLE HOUSE

FIG 1.19: SERVICE TOWER

FIG 1.20: HOUSE CONSTRUCTED BY PRADHAN MANTRI AAVAS YOJANA

FIG 1.21: RELEVANT MESSAGE DRAWN ON WALLS

FIG 1.22: PAVED ROAD

FIG 1.23: GAS LINE

FIG 1.24: ROOFED HOUSE

FIG 1.25: POST OFFICE

FIG 1.26: WATER DISTRIBUTOR

FIG 1.27: VIDHYABHARTI SCHOOL AND COLLEGE

FIG 1.28: R. O. PLANT

FIG 1.29: GRAM PANCHAYAT

DETAIL STUDY OF SMART VILLAGE (MOTA):

According to Census 2011 information the location code or village code of Mota village is 524263. Mota village is located in Bardoli Tehsil of Surat district in Gujarat, India. It is situated 7 KM away from sub-district headquarter Bardoli and 42 KM away from district headquarter Surat. As per 2009 stats, Mota village is also a gram panchayat.

The total geographical area of village is 2175.23 hectares. Mota has a total population of 7,203 peoples. There are about 1,542 houses in Mota village. Bardoli is nearest town to Mota which is approximately 7 KM away.
Nearby Villages of Mota:

- Movachhi
- Moti Falod
- Bharampor
- Vaghecha Kadod
- Bhamaiya
- Uchharel

TABLE 1.3: POPULATION OF MOTA VILLAGE		
Total Population	**Male Population**	**Female Population**
7,203	3,679	3,524

TABLE 1.4: CONNECTIVITY OF MOTA VILLAGE	
TYPE	**STATUS**
Public Bus Service	Available Within Village
Private Bus Service	Available Within 5-10 Km Distance
Railway Station	Available Within 5-10 Km Distance

FIG 1.30: ENTRANCE GATE OF MOTA

FIG 1.31: STATUE OF SARDAR PATEL

FIG 1.32: GUJARATI MEDIUM SCHOOL

FIG 1.33: RAILWAY STATION

FIG 1.34: ENGLISH MEDIUM SCHOOL

FIG 1.35: EDUCATION AND HEALTH CLUB

FIG 1.36: TEMPLE

FIG 1.37: SARDAR CHOWK

1.4 SWOT ANALYSIS OF IDEAL VILLAGE/SMART VILLAGE:

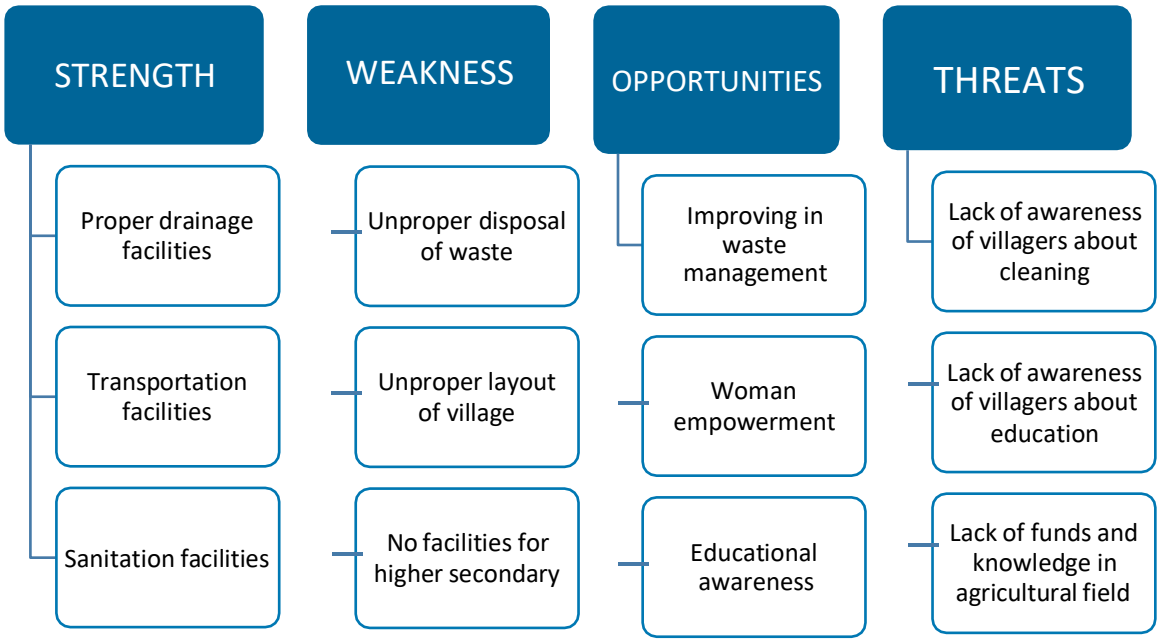


FIG 1.38: SWOT ANALYSIS

1.5 FUTURE PROSPECTS OF DEVELOPMENT OF IDEAL VILLAGE / SMART VILLAGE:

- For future prospect, the village can use more advanced technologies for agricultural prospect and for other requirements also.
- They can also provide biogas plant in the village.
- To provide an infrastructure facility like, water harvesting system, renewable energy source, water conservation system, etc.
- Converting the village with the Wi-Fi facility.
- Segregation of waste i.e., Plastic and other garbage is going to be planned for the effective waste management.
- A mechanism to use sewage water for plantation.
- Reduce the Illiteracy rate.
- Increase Source for high wages.
- In this village also maintains for the primary school, elderly people gathering, bus stand, public toilet, should be provided and drainage facilities etc. in existing public facilities are need in this village.

1.6 BENEFITS OF VISITS OF IDEAL VILLAGE/SMART VILLAGE:

We visited Umrakh village, Baben by the visit of the village Umrakh, we got an idea about an ideal village. We had seen much kind of new technologies which can be used in village that are being used in the urban area. By this visit of this village, it has improved our communication skills and we knew how to interact with the different peoples.

- To improvement allocated village.
- To understand needs and wants of village people.
- To understand allocated village condition.
- We understand some of the requirements of villagers.

1.7 ELECTRICAL / CIVIL ASPECTS REQUIRED IN IDEAL VILLAGE / SMART VILLAGE:

Civil Aspect in Ideal / Smart Village: Smart village is an "Ideal Village with Technology". Ideal village deals with the proper availability of service to people to their means regardless of achieving their means while in smart village conceptualization it is needed to properly define role of technology for sustainable development for various achievement of goals for village development.

- To provide global means to local needs to make village Rurban consisting of Rural Soul and Urban Facilities.
- To use the potential of IT to maximize the benefits for the rural community.
- Analysis of the villages on various socio-economic parameters at a micro as well as macro level.
- Improving the literacy rate of the villages by reducing the dropout rate.
- Maximizing the Employment Potential by providing the profiles of rural youth to the potential employers in India and abroad.
- 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.
- Disseminating the information about various Argo-based Schemes and connectivity to the initiatives like AGRIS-NET, AGMARK-NET etc.
- Web-based Career Counselling for the rural community by providing information on various courses.
- Providing databases on demand to the manufacturing organizations dealing in Agro-based products
- To share integrated development process with urbanization trends.

- To set up a Global Rural Development Grid (GRDG) by sharing information, ideas and solutions.

Electrical Aspects Required in Ideal Village / Smart Village: Electrification typically begins in cities and towns and gradually extends to rural areas; however, this process often runs into obstacles in developing nations. Expanding the national grid is expensive and countries consistently lack the capital to grow their current infrastructure.

Additionally, amortizing capital costs to reduce the unit cost of each hook-up is harder to do in lightly populated areas (yielding higher per capita share of the expense). If countries are able to overcome these obstacles and reach nationwide electrification, rural communities will be able to reap considerable amounts of economic and social development. In Smart village very good side for the electrical. Many benefits like safety, solar system, 24 hours electricity, security like CCTV camera in village. In ideal village electrical pole not good condition and safety issues. Like

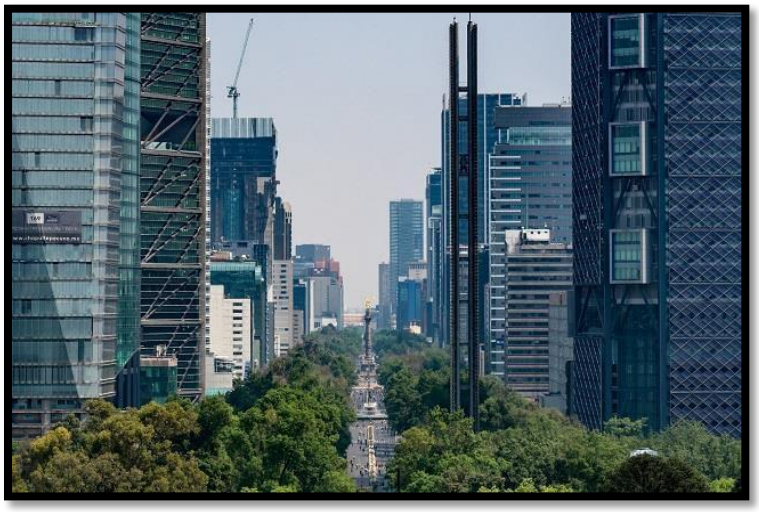
FIG 1.39: RURAL ELECTRIFICATION

In ideal village required to all safety protection of equipment. electrical pole around to civil work like concrete and close of any wood door only electrician enter

CHAPTER 2: VILLAGE LITERATURE REVIEW (CIVIL & ELECTRICAL CONCEPT)

2.1 INTRODUCTION: URBAN & RURAL VILLAGE CONCEPT:

URBAN VILLAGE:



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.

Urban villages are seen to provide an alternative to recent patterns of urban development in many cities, especially decentralization and urban sprawl.

They are generally purported to:

- Reduce car reliance and promote cycling, walking and transit use
- Provide a high level of self-containment (people working, recreating and living in the same area)
- Help facilitate strong community institutions and interaction

The concept of urban villages was formally born in Britain in the late 1980s with the establishment of the Urban Villages Group (UVG). Following pressure from the UVG, the concept was prioritized in British national planning policy between 1997 and 1999. Urban villages also come in the form of suburbs of metropolitan areas that are politically designated as villages.

Urban village ideals have been applied to new greenfield and brownfield developments and urban renewal projects. The concept has been widely adopted in many countries and used by both government development agencies as well as private enterprise as a guiding concept for many projects.

The limitations of the urban village concept to achieve sustainability in urban areas have also been studied in developing countries, which further emphasizes the institutional barriers against such an application in the case of the developing countries.

RURAL VILLAGE:

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.

In general, a rural area or a countryside is a geographic area that is located outside towns and cities. The Health Resources and Services Administration of the United States Department of Health and Human Services defines the word rural as encompassing "...all population, housing, and territory not included within an urban area. Whatever is not urban is considered rural."

Typical rural areas have a low population density and small settlements. Agricultural area commonly comes under rural, as are other types of area such as forest. Different countries have varying definitions of rural for statistical and administrative purposes.

2.2 IMPORTANCE OF RURAL DEVELOPMENT:

Rural development is important not only for the majority of the population residing in rural areas, but also for the overall economic expansion of the nation.

Rural development is considered to be of noticeable importance in the country today than in the olden days in the process of the evolution of the nation.

It is a strategy that tries to obtain an improved and productivity, higher socio-economic equality and ambition, and stability in social and economic development. The primary task is to decrease the famine that exists in roughly about 70 percent of the rural population, and to make sufficient and healthy food available. The secondary task is to ensure the availability of clothing and footwear, a clean environment and house, medical attention, recreational provision, education, transport, and communication.

It focuses upon the upliftment and development of the sections of rural economies, that experience grave poverty issues and effectively aims at developing their productivity. It also

emphasizes the need to address various pressing issues of village economies that hinder growth and improve these areas.

2.3 ANCIENT VILLAGES / DIFFERENT DEFINITION OF RURAL AND URBAN VILLAGES:

ANCIENT VILLAGES:

In India cities exist from ancient times. We in ancient Indian history read the names of cities like Ayodhya, Pataliputra, Magadha, Taxila, Ujjayini. The word 'Pura' originally meaning a fortified place came to denote later on a city. Even in our own day many a city carries 'Pura' as a suffix after their names, e.g., Nagpur, Manipur, Muzaffarpur.

However, the number of cities was not very large in ancient times. The cities were administered by royal officers called often Nagrakas. Urban self-government was practically lacking in ancient India.

With the pace of industrialization, the number of cities began to grow. In India, too, like other parts of the world the cities have increased mainly by immigration from villages. In 1961, the urban population was 79 million, twenty years later (1981) it had gone up to 160 million and was estimated authoritatively to have reached 217 million in 1991 and is expected to touch about 350 million by the end of the century.

In the last five years of this century (1996-2001) the annual population growth rate in urban India as a whole is expected to be of the order of 3.4 per cent and for rural India 0.7 per cent. The increase in urban population has resulted in the increase in the number of urban areas. According to the Census Report of 1971, urban India comprised 1921 towns including 69 urban agglomerates. In 1991, there were 3301 urban settlements.

Compared to England where the ratio of urban population rose to 73.6 in 1931 from 15 per cent of the pre-industrial revolution days and to United States wherein 1950 the ratio was 64 percent; we find that in India it is a small population that lives in cities. There are 218 distinctively urban

localities which have a population of one lakh and over. The heavily populated cities are Greater Calcutta, Greater Bombay, Madras and Delhi.

DIFFERENT DEFINITION OF RURAL AND URBAN VILLAGES:

1. **Urban:** Constituents of urban arca are Statutory Towns, Census Towns and Outgrowths.
2. **Statutory Town (ST):** All places with a municipality, corporation, cantonment board or notified town area committee etc.
3. **Census Town (CT):** Places that satisfy the following criteria are termed as Census Towns (CT) (a) A minimum population of 5000 (b) At least 75% of the male main working population engaged in non-agricultural pursuits (c) A density of population of at least 400 per sq.km
4. **Out Growth (OG):** Out Growth should be a viable unit such as a village or part of a village contiguous to a statutory town and possess the urban features in terms of infrastructure and amenities such as pucca roads, electricity, taps, drainage system, education institutions, post offices, medical facilities, banks, etc. Examples of OGs are Railway colonies, University campuses, Port areas, that may come up near a city or statutory towns outside its statutory limits but within the revenue limit of a village or villages contiguous to the town or city
5. **Urban Agglomeration (UA):** It is a continuous urban spread constituting a town and its adjoining urban outgrowths (OGs) or two or more physically contiguous towns together and any adjoining urban out-growths of such towns.
6. **Rural:** All area other than urban are rural. The basic unit for rural areas is the revenue village.

2.4 SCENARIO: RURAL / URBAN VILLAGE OF INDIA POPULATION GROWTH:

Rural / urban India & Gujarat as per census 2011 Agenda of census of India is to release of provisional population totals-Rural urban distribution. Population of Rural and Urban area (in crore).

TABLE 2.1: POPULATION OF RURAL/URBAN AREA

	2001	2011	DIFFERENCE
INDIA	102.9	121.0	81.1
RURAL	74.3	83.3	9.0
URBAN	28.6	37.7	9.1

2.5 SCENARIO: RURAL / URBAN VILLAGE OF GUJARAT AS PER CENSUSN 2011:

For the first in since independence, the absolute increase in population is more in urban areas that in rural areas. Rural-Urban Distribution: 68.84% and 31.16 Level of urbanization increased from 27.81% in 2001 census to 31.16% in 2011.

TABLE 2.2: LITERACY RATES IN RURAL AND URBAN AREA			
	2001	**2011**	**DIFFERENCE**
INDIA	64.8	74.0	+9.2
RURAL	58.7	68.9	+10.2
URBAN	9.9	85.0	+5.1

2.6 RURAL DEVELOPMENT ISSUES – CONCRENS – MEASURES:

Rural development is the national necessity and it has following issues and concerns:

- People are directly or indirectly dependent on agriculture and a large number of landowners have small and medium-sized landholding.
- Economy of the people living in rural areas is low.
- The price the farmers get for their produces less than in relation to the work they put in
- People have to migrate to the urban areas due to unavailability of education.
- The other rural problems are due to the fact that since the rural people do not live-in concentrated masses, the availability of specialized service to them is minimum.
- Very less people are employed in the rural areas.
- Lack of physical facilities in rural areas.
- Lack of recreational facilities.
- Farmers are not having market area for selling their goods directly to the market.
- Lower living standards.
- No transportation facility.
- Less awareness.
- Less income opportunity.

Rural development is the national necessity and it has following measures:

- To develop rural area as whole in terms of culture, society, economy, technology and health.
- To develop living slandered of rural mass.
- To develop rural youths, children and women.
- To develop and empower human resource of rural area in terms of their psychology, skill, knowledge, attitude and other abilities.
- To develop infrastructure facility of rural area.

- To provide minimum facility to rural mass in terms of drinking water, education, transport, electricity and communication.
- To develop rural institutions like Panchayat, cooperatives, post, banking and credit.
- To provide financial assist to develop the artisans in the rural areas, farmers and agrarian unskilled labour, small and big rural entrepreneurs to improve their economy.
- To develop rural industries through the development of handicrafts, small scaled industries, village industries, rural crafts, cottage industries and other related economic operations in the rural sector.
- To develop agriculture, animal husbandry and other agricultural related areas.
- To restore uncultivated land, provide irrigation facilities and motivate farmers to adopt improved seed, fertilizers, package of practices of crop cultivation and soil conservation methods**.**

There are many challenges that these places face including poor road connectivity, primary healthcare system, educational infrastructure and affordable housing.

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

Various infrastructure guidelines for village:

1. **Waste management system:** If Prime Minister Narendra Modi's Clean India Campaign has to succeed, then the small towns of India will need an efficient waste management system. This is a key infrastructure required to improve sanitation and prevent outbreak of diseases. At present, wastes from households are mostly disposed in city outskirts by municipalities. There is an urgent need to set up recycling facilities as a lot of times the waste often ends up in rivers polluting them. Also, drainage facilities are a major problem with most towns getting flooded during the monsoons.
2. **Power:** The government has electrified over 7,000 villages in 2015-16 which stands 37 per cent higher than the previous three years. But this may not necessarily mean that all houses in the villages have access to electricity. This is because it takes time to set up the infrastructure such as transformers and power lines needed to distribute the electricity to every house. According to a study, the delay in actual electrification ranged from two years (in the case of Jharkhand and Bihar, which saw a recent wave of electrification) to more than 25 years in Odisha and about 15 years in the case Madhya Pradesh and Uttar Pradesh.
3. **Roads:** There is a positive relationship between connectivity and development in smaller towns and villages in India. With better roads and highways, there can be a better flow of business, trade and communication that will eventually enhance growth. Mountainous areas and remote villages are cut off from the network of roads, which need to be connected. The government has allocated thousands of crores for building a strong transport network that can link different cities and small towns with regional hubs. However, several projects across the

country have seen slow progress over the years severely impacting the economic progress of the small towns.

4. **Bridges:** India has had a bad history of bridges collapsing in both rural and urban areas, endangering people's lives because of weak construction. On March 16, Vivekananda flyover in Kolkata collapsed killing 27 people and injuring 80. Similarly, on August 3, Mahad bridge on Mumbai-Goa highway collapsed. In the Gujarat town of Junagadh, earlier this year, another bridge had collapsed due to poor materials that were used in its construction. In smaller towns with rivers, bridges are very crucial for children and workers to travel to school or their work site.
5. **Schools:** Many small towns lack basic educational infrastructure. Most schools don't have proper toilets, electricity, and proper buildings with roofs. There is also lack of drinking water. The condition of government schools is also not satisfactory, according to many reports. There have been several cases of poisoning due to poor quality mid-day meals in government schools.
6. **Hospitals:** The number of hospitals and medical dispensaries need to be pumped up in rural India. The government hospitals in most parts of the country are not up to the mark and medicines not readily available. According to a study, rural public health facilities have a hard time ensuring a regular presence of medical professionals, trained doctors and pharmacists. In addition, there is a high level of absenteeism of those already employed
7. **Affordable Housing:** Owning a house is an aspiration for a lot of middle-class Indians but the cost of buying a property is extremely high. Banks offer home loans for purchase, which has to be paid back in monthly instalments. High EMI rates and low earnings builds pressure on the people. The present government has acknowledged this problem and announced the "Housing for All by 2022" scheme. However, considering the present market conditions, many industry experts call it a far-fetched idea. In an interview to the Business Insider, global real estate company JLL India's country head Anuj Puri told the Business Insider said that making 2 crore urban houses and 4 crore rural houses available is a huge undertaking in itself, and will require not only sustained government interest and investment but also substantial private sector investment and involvement.
8. **Tele-com:** According to the Ministry of Telecommunications, India is the fastest growing telecom market with progressive reforms and policies. However, India is nowhere close to China and USA in terms of network connectivity because of low penetration in rural areas due to lack of telecom infrastructure.

   Some of the weaknesses highlighted in the same government report are lack of indigenous telecom manufacturing and low broadband reach in rural areas.
9. **Water Supply:** Among the 122 countries that are ranked in quality of portable water, India falls at 120, despite having 4 per cent of the world's water resources. There is inadequate piped water supply across rural India and the houses that receive water are mostly untreated. During years of bad monsoon, crops suffer because of the lack of irrigation facilities. By 2017, the government aims to bring piped water supply to at least 50 per cent of rural households.

10. **Sanitation Facilities:** Open defecation is a major issue in rural and semi-rural India despite the many governmental schemes and awareness programmers. According to a United Nations report in 2010, out of a total of 2.5 billion people worldwide that defecate openly, 665 million belong to India. And what is more alarming is the fact that some 88 per cent of diarrheal deaths worldwide are attributable to unsafe water, inadequate sanitation and poor hygiene.

2.8 ANCIENT / EXISTING ELECTRICAL CONCEPT STUDY AS A LITRETURE REVIEW FOE VILLAGE DEVELOPMENT:

The first demonstration of electric light in Calcutta (now Kolkata) was conducted on 24 July 1879 by P.W. Fleury & Co. On 7 January 1897, Kilburn & Co secured the Calcutta electric lighting license as agents of the Indian Electric Co, which was registered in London on 15 January 1897. A month later, the company was renamed the Calcutta Electric Supply Corporation.

The control of the company was transferred from London to Calcutta only in 1970. The introduction of electricity in Calcutta was a success, and power was next introduced in Bombay (now Mumbai). The first electric lighting demonstration in Mumbai was in 1882 at Crawford Market and the Bombay Electric Supply & Tramways Company (BEST) set up a generating station in 1905 to provide electricity for the tramway.

The first hydroelectric installation in India was installed near a tea estate at Sidrapong for the Darjeeling Municipality in 1897. The first electric street light in Asia was lit on 5 August 1905 in Bangalore. The first electric train in the country ran on the Harbour Line between Bombay's Victoria Terminus and Kurla on 3 February 1925. On 18 August 2015, Cochin International Airport became the world's first fully solar powered airport with the inauguration of a dedicated solar plant.

India began using grid management on a regional basis in the 1960s. Individual State grids were interconnected to form 5 regional grids covering mainland India, the Northern, Eastern, Western, North Eastern and Southern Grids. These regional links were established to enable transmission of surplus electricity between states in each region. In the 1990s, the Indian government began planning for a national grid. Regional grids were initially interconnected by asynchronous high-voltage direct current (HVDC) back-to-back links facilitating the limited exchange of regulated power. The links were subsequently upgraded to high-capacity synchronous links.

The first interconnection of regional grids was established in October 1991 when the North Eastern and Eastern grids were interconnected. The Western Grid was interconnected with these grids in March 2003. The Northern grid was also interconnected in August 2006, forming a Central Grid that was synchronously connected and operating at one frequency. The sole remaining regional grid, the Southern Grid, was synchronously interconnected to the Central

Grid on 31 December 2013 with the commissioning of the 765 kV Raichur-Solapur transmission line, establishing the National Grid.

By the end of the calendar year 2015, despite poor hydroelectricity generation, India had become a power surplus nation with huge power generation capacity idling for want of demand. The calendar year 2016 started with steep falls in the international price of energy commodities such as coal, diesel oil, naphtha, bunker fuel, and liquefied natural gas (LNG), which are used in electricity generation in India. As a result of the global glut in petroleum products, these fuels became cheap enough to compete with pit head coal-based power generators. Coal prices have also fallen. Low demand for coal has led to coal stocks building up at power stations as well as coal mines. New installations of renewable energy in India surpassed installations of fossil fuel for the first time in 2016-17.

On 29 March 2017, the Central Electricity Authority (CEA) stated that for the first time India has become a net exporter of electricity. India exported 5,798 GWh to neighbouring countries, against a total import of 5,585 GWh. The Government of India launched a program called "Power for All" in 2016. The program was accomplished by December 2018 in providing the necessary infrastructure to ensure uninterrupted electricity supply to all households, industries, and commercial establishments. Funding was made through a collaboration between the Government of India and its constituent states.

2.9 OTHER PROJECTS / SCHEMES OF GUJARAT / INDIAN GOVERNMENT:

Different ministries of the government of India formulate various development schemes not to raise the profit but to maximize the welfare of the people. Some schemes like National Rural Livelihood Mission, MGNREGA, Bharat Nirman etc. are made by the government for rural development of India.

1. **Deen Dayal Upadhyay Grameen Kaushal Yojna:**
   - This is a placement linked skill development scheme for rural poor youth.
   - It was launched by on 25 September 2014 by Union Ministers Nitin Gadkari and Venkaiah Naidu on the occasion of 98th birth anniversary of Pandit Deendayal Upadhyaya.
   - It aims to target youth, under the age group of 15–35 years.
   - A total of 52000 candidates have been skilled under this programme till 2014-15.
2. **Roshni: Skill Development Scheme for Tribals:**
   - The Ministry of Rural Development on 7 June 2013 launched a new skill development scheme designed to offer employment to tribal youth in 24 Naxal -affected districts.
   - The scheme, which is named Roshni is supposed to provide training and employment to an anticipated 50000 youth in the 10-35 years age group, for a period of three years.
   - As per the Ministry 50 per cent of the beneficiaries of the scheme will be women only.

- The scheme is designed in light of the Himayat project model, which was launched in Jammu and Kashmir has been implemented in Sukma, Chhattisgarh, and West Singhbhum, Jharkand, on a pilot basis over the last 18 months.

3. Pradhan Mantri Gram Sadak Yojna:

- Initially it was 100% centrally funded scheme, launched on the December 25, 2000.
- After the recommendation of 14th finance commission report now expenditure will be shared by the centre and state at ratio of 60:40.
- The main aim of this scheme is to provide all weather road connectivity to the rural areas whose population is more than 500 persons and in terms of hilly areas it is 250 persons.
- This scheme is launched by the Ministry of Rural Development.

4. Training to Rural Youth for Self-Employment (TRYSEM):

- This centrally sponsored programme was started on august 15, 1979.
- The main target of this scheme was to provide technical and business expertise to rural BPL people who are in the age group of 18-35.
- This programme has been merged with Swarn Jayanti Gram Swarojgar Yojna on April1, 1999

5. Antyodaya Anna Yojna (AAY):

- The scheme was launched by the Prime Minister Atal Bihari Bajpayi on the 25 December 2000.
- The scheme provides food grains to around 2 cr. Below Poverty Line (BPL) families at a very subsidized rate.
- Total 35 kgs of food grains is provided to a family. Rice is provided at the rate of Rs. 3/kg and wheat at 2 Rs.2/kg.

6. Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS):

- National Rural Employment Guarantee Act 2005, was launched on the 2nd Feb.2006. Now the new name of this scheme is "Mahatma Gandhi National Rural Employment Guarantee Act" (or, MGNREGA).
- This scheme is an Indian labour law and social security measure that aims to provide ‘right to work' to the people falling Below Poverty Line.
- It guarantees 100 days employment in a year to the village people.
- Fifty percent workers should be women.
- Its 90% funding is borne by the central government and 10% by the state government.

CHAPTER 3: SMART VILLAGE CONCEPT IDEA AND ITS VISIT (CIVIL & ELECTRICAL CONCEPT)

3.1 INTRODUCTION CONCEPTS, DEFINITION AND PRACTICES:

Smart Village is a concept adopted by national, state and local governments of India, as an initiative focused on holistic rural development, derived from Mahatma Gandhi's vision of Adarsh Gram (Ideal Village) and Swaraj (Self Reliance). Smart village means all the necessaries facilities is developed in the village and no need to moves in city for any kind of requirement. In Smart Villages access to sustainable energy services acts as a catalyst for Development – enabling the provision of good education and healthcare, access to clean water, sanitation and nutrition, the growth of productive enterprises to boost Incomes, and enhanced security, gender equality and democratic engagement.

3.2 VISION-GOALS, STANDARDS AND PERFORMANCE MEASURE-MENTS INDICATORS:

Smart Villages are communities in rural areas that use innovative solutions to improve their resilience, building on local strengths and opportunities. They rely on a participatory approach to develop and implement their strategy to improve their economic, social and/or environmental conditions, in particular by mobilizing solutions offered by digital technologies. Smart Villages believes that people in remote villages in the developing world deserve the same opportunities as everyone else. Smart Villages benefit from cooperation and alliances with other communities and actors in rural and urban areas. The initiation and the implementation of Smart Village strategies may build on existing initiatives and can be funded by a variety of public and private sources.

3.3 TECHNOLOGICAL OPTIONS:

There are key technologies that make a smart village work. Here are the top six:

1. SMART ENERGY:

Both residential and commercial buildings in smart village are more efficient, using less energy, and the energy used is analyzed and data collected. Smart grids are part of the development of a smart city, and smart streetlights are an easy entry point for many villages, since LED lights save money and pay for themselves within a few years, as reported previously by TechRepublic.

"Lighting is ubiquitous--it's everywhere that people work, travel, shop, dine, and relax. Digital communications and energy-efficient LED lighting are revolutionizing urban lighting infrastructures already in place, transforming them into information pathways with the capacity to collect and share data and offer new insights that enable, and really drive, the smart city," said Susanne Seitinger, PhD., Philips Lighting, professional systems.

2. SMART TRANSPORTATION:

A smart city supports multi-modal transportation, smart traffic lights and smart parking. "One of the key areas that we have seen a lot of activity on has to do with mobility. Anything around transportation, traffic monitoring, parking," said Sanjay Khatri, director of product marketing and IoT services for Jasper. "These are areas where village are seeing a very fast return on investment. It not only helps to reduce the cost of monitoring parking and making sure that they are collecting fines, it's also reducing congestion."

By making parking smarter, people spend less time looking for parking spots and circling city blocks. Smart traffic lights have cameras that monitor traffic flow so that it's reflected in the traffic signals, Khatri said.

Even city buses are becoming connected, so that people have real time information on when a bus will arrive at a bus stop. In Australia, traffic lights are prioritized based on the bus schedules so that traffic flows more freely during rush hours, Khatri said.

3. SMART DATA:

The massive amounts of data collected by a smart village must be analysed quickly in order to make it useful. Open data portals are one option that some villages have chosen in order to publish city data online, so that anyone can access it and use predictive analytics to assess future patterns. Companies such as CommunityLogiq are working with village to help them analyse data, and they're in the Start-up in Residence (STiR) program for the city of San Francisco.

"The pervasiveness of technology and the expansion of open data policies is about to unleash an economic growth engine for urban innovation that we have never seen. We are moving from analysing data that exists within city hall, to generating new data from sensors that are deployed

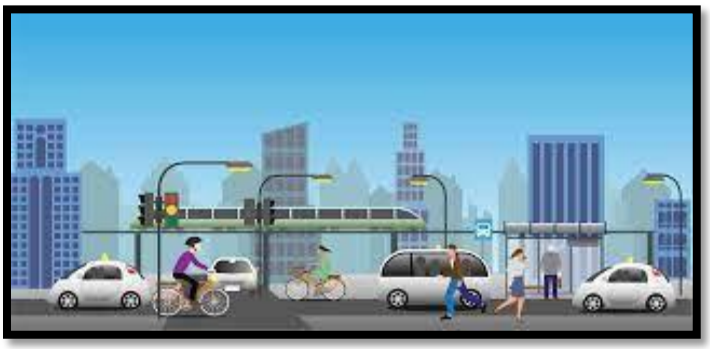
all across village for use by multiple departments and people for multiple uses," said John Gordon, chief digital officer at Current, powered by GE.

Even the data collected by streetlights can be used to benefit citizens. "Hidden within the exponential volumes of data collected from connected lighting systems and other IoT devices are valuable insights and information about how citizens interact with cities. For instance, traffic data captured by streetlights can uncover a prime location for a new restaurant in a revitalized neighbourhood. Predictive analytics helps cities filter and translate data into relevant and actionable information that makes city life better, easier, and more productive," Seitinger said.

4. SMART INFRASTRUCTURE:

Villages will be able to plan better with a smart village's ability to analyse large amounts of data. This will allow for pro-active maintenance and better planning for future demand. Being able to test for lead content in water in real time when the data shows a problem is emerging could prevent public health issues, Chandi said. Having a smart infrastructure means that a city can move forward with other technologies and use the data collected to make meaningful changes in future city plans.

5. SMART MOBILITY:



"Mobility refers to both the technology and the data which travels across the technology. The ability to seamlessly move in and out of many different municipal and private systems is essential if we are to realize the promise of smart village. Building the smart city will never be a project that is "finished."

Technology needs to be interoperable and perform to expectations regardless of who made it or when it was made. Data also needs to be unconstrained as it moves between systems, with all due attention to intellectual property, security and privacy concerns. For this, public policy and legal technology needs to be state of the art," said Tom Blewitt, director of principal engineers, UL.

6. SMART IOT DEVICES:

And finally, one of the key components that ties everything together in a smart city is IoT devices.

"Whether we like it or not, sensors and actuators in our village are here to stay. Fusing sensor information into our daily life and integrating it all with third party social networks will knit the fabric of society closer together, while leaving city leaders to grapple with serious privacy and security challenges," said Carl Piva, vice president of strategic programs at TM Forum.

Sensors are essential in a smart city, said Scott Allen, CMO of Free Wave Technologies. Allen said that a smart city has "a wide range of reporting devices such as sensors, visibility devices and other end points that create the data that makes a smart city work."

Each of these technologies work together to make a smart city even smarter. As the world's population grows, and more people move into urban areas, the need for smarter villages will increase to make the best use of available resources.

3.4 ROAD MAP AND SAFE GUARDS:

By defining acceptable risks and implementing a risk management framework, city officials can substantially reduce the downside risk of some technologies, according to the report.

First and foremost is paying attention to cybersecurity by buying secure devices and using the network to enforce security and incident handling.

The second is ensuring cyber resilience with fail-safe systems that are protected by strong cybersecurity and includes redundancy.

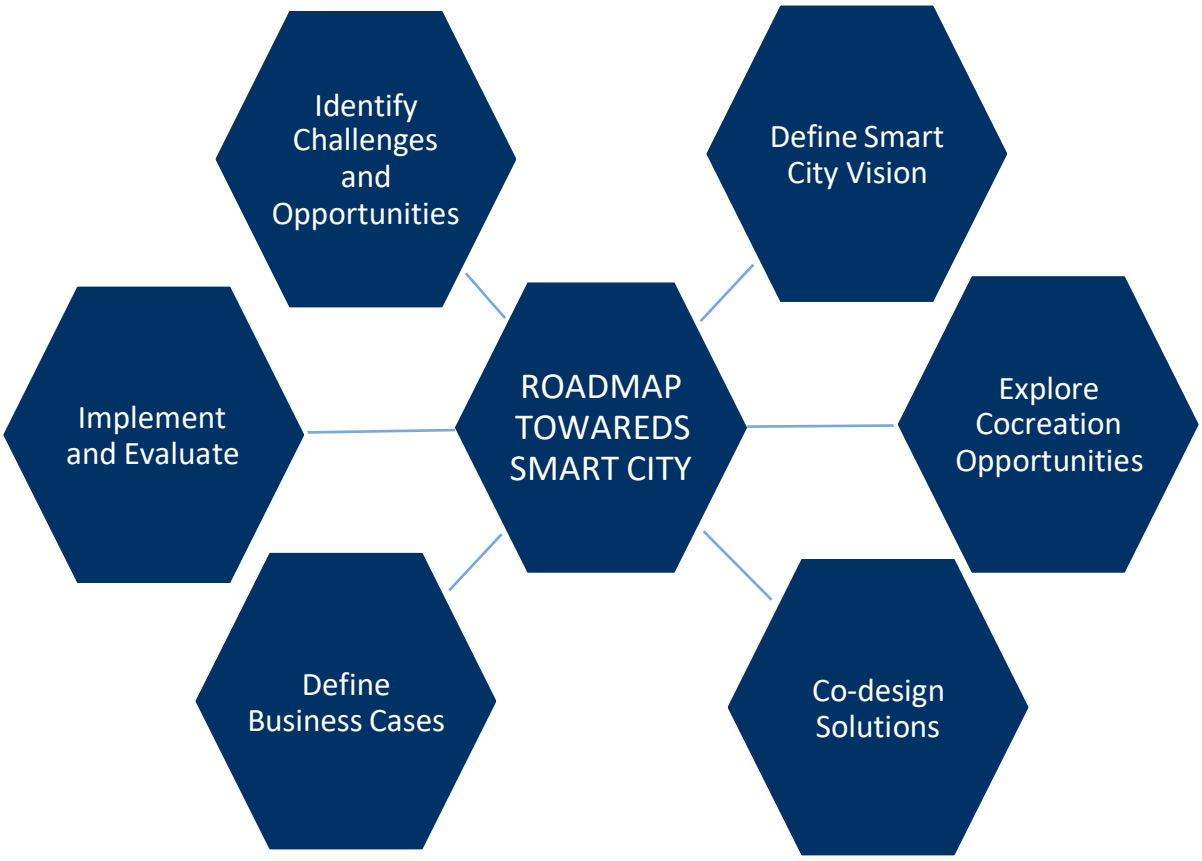
The third is managing privacy and data responsibly to protect data and ensure the public's trust. One way to do this is by enhancing transparency by hiring a chief privacy officer with regular reporting on the state of privacy and data protection, and also by creating a privacy and data protection charter.

The fourth and final area of technology management covered in the report is for government to coordinate and collaborate with the deployment of platforms, by engaging citizens, and by communicating about decisions and the reasons behind them.

All of these combined create a road map for implementing security and resilience into a smart city. The road map should do the following:

- Identify a smart city vision
- Map critical risk and interdependencies
- Define adequate levels of security and resilience
- Ensure informed investment decisions
- Ensure broad stakeholder participation
- Mitigate risk and ensure benefit realization
- Adapt governance structures

By having such a road map, decisions are made in advance instead of as an afterthought. By staying ahead of the curve, it will be possible for cities to be safer and defend against technical failures and cybercrime.



3.5 ISSUES AND CHALLENGES:

Issues facing by smart cities:

Insufficient funds

Funding is the biggest challenge to implementing a smart city strategy. Making cities smart means deploying smart, complex infrastructure for implementing digital technologies. Besides, tons and tons of smart devices have to be integrated for data collection. In addition, to ensure smart city success, governments have to hire enough tech experts and city planners. Further, network requirements have to be rightly met. Moreover, the hardware installed has to be audited frequently for maintenance. All of these eat up a lot of money. Governments should consider devising a strategy to create appropriate revenue models for their smart city initiatives.

Lack of experienced professionals

Another most-pressing challenge for smart cities is the lack of skilled professionals. For preparing a strategy to achieve smart city project success, identifying areas for implementation of technologies, and operating these tools, tech experts are required. The government and the concerned stakeholders should take the count of professionals required and hire them before they start with their project plans.

Inconsistent network connectivity

For the smart management of a municipality, several sensors, cameras, and actuators are installed everywhere. These sensors gather and send large volumes of data in real time. Analysis and processing of the collected data should happen almost instantaneously for efficient management of city operations. And for instant processing, high-speed Internet connectivity is mandatory. Currently, 4G mobile coverage systems are available, which aren't effective enough for high-speed data transfer. This issue should, therefore, be mandatorily taken into account.

Cybersecurity risks

Smart city devices are estimated to top 1 billion units by 2025, according to the IHS report. These Internet-connected devices will transmit huge chunks of data in real time. Though this data help in providing efficiency at municipality functions, it presents serious security risks that can't be ignored. Data from parking lots, CCTV cameras, EV charging stations, and GPS systems contains confidential information of citizens. Not every connected device is cyber-resilient, as of now. If that’s the case, criminals can easily gain access to the data and use it for illegal intent. Hence, governments and IT professionals should strengthen the security borders of smart devices and the supporting infrastructure. Identifying and solving the challenges for smart cities is a collaborative approach. Not only governments but also IT specialists, private organizations, and citizens should come together to work for a common goal - smart city success.

Challenges’ cities are facing:

1. Ensuring that all members of the community benefit from technological improvements
2. Providing first-mile and last-mile service for transit users
3. Combining and streamlining payment systems, including for those without smartphones
4. Integrating the sharing economy into a suite of mobility options

5. Enhancing trip planning services to help users make efficient choices
6. Determining the current state of travel conditions
7. Improving bicyclist and pedestrian safety
8. Facilitating the movement of goods into and within a city
9. Coordinating data collection and analysis across systems
10. Reducing inefficiency in parking systems and payment
11. Limiting the impacts of climate change and reducing carbon emissions
12. Improving traffic signal operations
13. Increasing avenues to partners & adapting to new business models

3.6 SMART INFRASTRUCTURE – INTELLIGENT TRAFFIC MANAGEMENT:

Intelligent Traffic Management Systems (ITMS):

In present-day times, the number of vehicles has increased drastically, but in contrast, the capabilities of our roads and transportation systems still remain underdeveloped and as a result, fail to cope with this upsurge in the number of vehicles. As a consequence, traffic jamming, road accidents, increase in pollution levels are some of the common traits that can be observed in our new age cities. With the emergence of the Internet of Things and its applicability in Smart Cities, creates a perfect platform for addressing traffic-related issues, thus leading to the establishment of Intelligent Traffic Management Systems (ITMS).

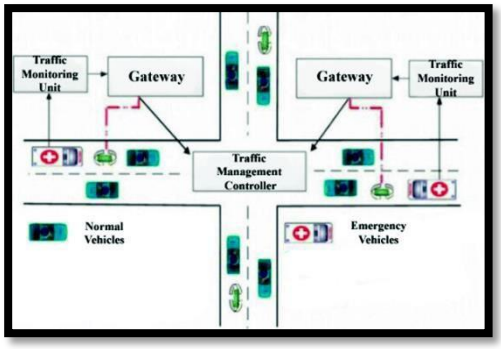


FIG 3.1 INTELLIGENT TRAFFIC MANAGEMENT SYSTEMS

FIG 3.2: A TRAFFIC ENFORCEMENT CAMERA SYSTEM

A traffic enforcement camera system, consisting of a camera and a vehicle-monitoring device, is used to detect and identify vehicles disobeying a speed limit or some other road legal requirement and automatically ticket offenders based on the license plate number. Traffic tickets are sent by mail. Applications include:

- Speed cameras that identify vehicles traveling over the legal speed limit. Many such devices use radar to detect a vehicle's speed or electromagnetic loops buried in each lane of the road.
- Red light cameras that detect vehicles that cross a stop line or designated stopping place while a red traffic light is showing.

A traffic enforcement camera system:

- Bus lane cameras that identify vehicles traveling in lanes reserved for buses. In some jurisdictions, bus lanes can also be used by taxis or vehicles engaged in carpooling.
- Level crossing cameras that identify vehicles crossing railways at grade illegally.
- Double white line cameras that identify vehicles crossing these lines.
- High-occupancy vehicle lane cameras that identify vehicles violating HOV requirements.

Variable speed limits:

FIG 3.3 VARIABLE SPEED LIMIT

Communication cooperation on the road includes car-to-car, car-to-infrastructure, and vice versa. Data available from vehicles are acquired and transmitted to a server for central fusion and processing. These data can be used to detect events such as rain (wiper activity) and congestion (frequent braking activities). The server processes a driving recommendation dedicated to a single or a specific group of drivers and transmits it wirelessly to vehicles. The goal of cooperative systems is to use and plan communication and sensor infrastructure to increase road safety.

3.7 CYBER SECURITY IN SMART CITY:

Smart cities are evolving fast. Currently, many cities in the world rely on a wide network of sensors, technologies, and interconnected data-gathering portals to operate smoothly. In the future, the number of connected technologies in use will skyrocket.

Cyber Vulnerabilities:

- Internet of Things technologies are particularly vulnerable, and while it's possible to patch any exposed areas, hackers can do lasting damage. This damage may leave vast swaths of infrastructure, both physical and digital, in need of replacement.
- Here are some of the many attacks that could damage smart city infrastructure:
- **Asset, data, and identity theft –** Data theft is arguably the most well-known cyber-crime. Hackers can infiltrate data banks and steal personally identifiable information (PII).
- **Hijacking devices –** Device hijacking is one of the more frightening aspects of cyber-crime. Using security vulnerabilities, attackers can take control of a device and use it to disrupt a process. Traffic lights and road signals are particularly vulnerable.
- **Man-In-The-Middle attacks –** An MitM is when a hacker can interrupt communication between two devices and pose as the sender, sending false information to cause trouble. For example, a hacker may gain access to a mobility platform and report public transport delays,

which could lead to more people taking a car to work, causing an influx in traffic that brings a city to a standstill.

- **Distributed Denial of Service** – DDoS attacks are simple. A hacker can overwhelm a system by bombarding it with requests, blocking the service for those who need it. With real-life users unable to access a service, city systems will fail to support their citizens.
- **Ransomware** – All of the above could be used to hold a city to ransom. Hackers, or hacktivists, use these to compromise a process or release confidential data unless certain demands are met. Paying a ransom would set a dangerous precedent.
- **Physical disruption –** Old-fashioned physical force can also be used to compromise a complex connected network. As many systems rely on intricate processes and feedback from networks of sensors, physical damage to any component could cause a chain-reaction of damage.

Smart City Security Solutions:

Cities can minimize cyber security risks by taking several precautions and by enlisting the right kind of help. There are two ways of doing this. The first involves hiring a third-party security company to try and infiltrate and find flaws in a network. Essentially, third-party firms will simulate attacks and try to exploit any weaknesses.

After an attack, the security company will explain any vulnerabilities, and suggest realistic protection measures. This kind of penetration testing is excellent, though it's better to develop infrastructure that's impregnable from day one. The second security measure that cities can do is ensure that their connected infrastructure is safe from hackers even if they manage to gain entry.

To keep smart cities protected, it's advised that the following features should be a regular part of a city's cyber security program:

- **Encrypted data –** Data should always be encrypted. Encryption is a method of scrambling data so that it's useless and unreadable, except for those with an encryption key that can decipher it. Two-factor authentication should also be used with the encryption key too. As smart city infrastructure deals with very sensitive data, encryption should be used as standard. This way, if hackers gain access to sensitive PII data, they have no way of using it.
- **Constant security monitoring –** Security monitoring requires a dedicated team that can keep an eye on traffic and searches for any anomalies. This can be automated with security software that can analyze bulk data and scout for indicators of compromise. Upon detection, potential risk areas can be isolated, preventing any data breaches.
- **A far-reaching support platform –** Any new support platform should be able to provide security to a wide range of connected environments and devices. As smart cities are made up of disparate networks, SaaS, IaaS, and cloud environments, one over-arching security system should be deployed to ensure that all aspects of an interconnected city are protected.

3.8 RETROFITTING-REDEVELOPMENT-GREENFIELD DEVELOPMENT DISTRICT COOLING:

Retrofitting (city improvement): existing structures to remain largely intact, but supporting infrastructure upgraded

Redevelopment (city renewal): replacement of existing built environment with new layout and enhanced infrastructure using mixed land use and increased density

Greenfield Development (city expansion): develop previously vacant area using innovative planning financing and implementation

The strategic components of area-based development in the Smart Cities Mission are city improvement (retrofitting), city renewal (redevelopment) and city extension (green-field development) plus a Pan-city initiative in which Smart Solutions are applied covering larger parts of the city.

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. In retrofitting, an area consisting of more than 500 acres will be identified by the city in consultation with citizens.

Redevelopment will affect a replacement of the existing built-up environment and enable co-creation of a new layout with enhanced infrastructure using mixed land use and increased density.

Redevelopment envisages an area of more than 50 acres, identified by Urban Local Bodies (ULBs) in consultation with citizens.

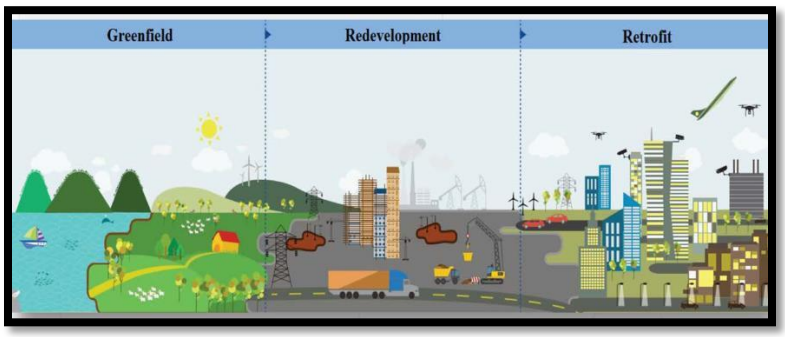


FIG 3.4 RETROFITTING – REDEVELOPMENT - GREENFIELD

Greenfield development will introduce most of the Smart Solutions in a previously vacant area (more than 250 acres) using innovative planning, plan financing and plan implementation tools (e.g., land pooling/ land reconstitution) with provision for affordable housing, especially for the poor.

Greenfield developments are required around cities in order to address the needs of the expanding population.

District Cooling:

District cooling covers the generation and distribution of refrigeration streams in district networks. The development of smart district cooling systems aims to improve the management and use of energy demands. The creation of digital appliances and innovations has been of crucial importance in the advancement of energy management in residential areas. In addition,

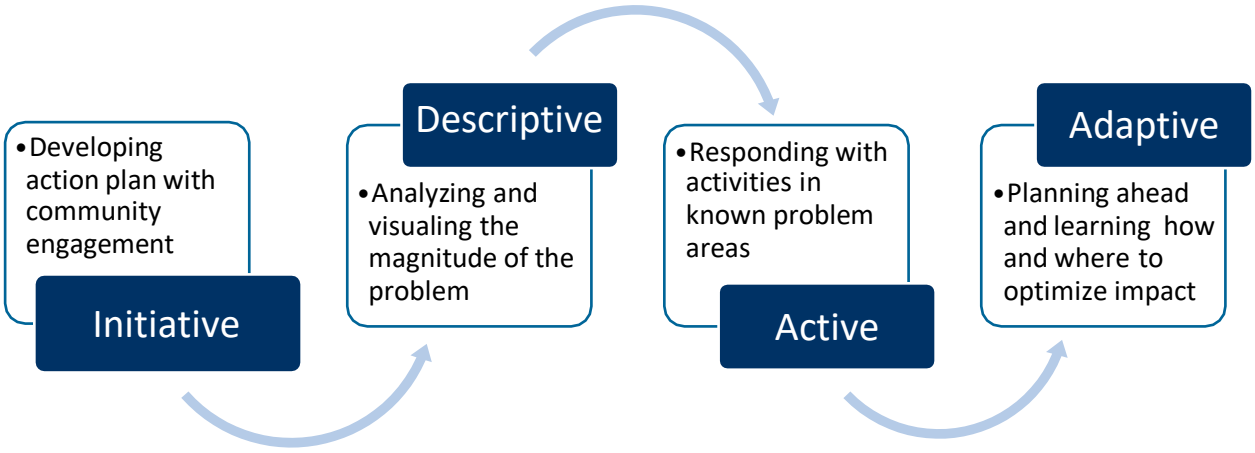
the application of new technologies (Internet & digital solutions) has influenced the optimization of thermal energy resources in temperature meters and chiller substations. During the last few years, important efforts have been made in different areas of research and development (R&D) related to smart district cooling, such as: the development of new materials for components and technologies, evolution in the management of supply and distribution systems, ICT applied to smart metering or new urban planning solutions, among others.

Delving further into cooling supply, smart district cooling networks will manage supply needs through the intelligent use of new innovations like adsorption or absorption chillers, and through appropriate control systems using information treatment through two-way telecommunication networks and other smart components. Those systems, taking into account the availability of stored energy, residual cooling streams and power generation, will be capable of balancing the heating and cooling available.

FIG 3.5 SOLAR PANEL GRID

Furthermore, recent advances in Artificial Intelligence and machine learning, as well as big data management, are leading way to new projects and pilot tests focused on exploiting waste heat and cool streams from industries, municipal facilities or private consumers, to use as energy sources to enhance efficiency in the use of district cooling. In this sense, new, more efficient models are being studied that can be applied to smart cities. One of these models, which is being applied in a pilot mode in New York City, is based on 'Microgrids'; that is, a group of interconnected loads and distributed energy resources that act as a single, controllable entity with respect to the grid, and that can connect and disconnect from the grid to enable it to operate in both grid-connected or island mode. In other words, the model aims to turn electricity consumers into producers, optimizing the power supply systems. Microgrids combined with district cooling networks could be a powerful system to optimize power consumption and involve the citizen in changing from the current city model to the future smart city model.

3.9 STRATEGIC OPTIONS FOR FAST DEVELOPMENT:



3.10 INDIA'S URBAN WATER AND SANITATION CHALLENGES AND ROLE OF INDIGENOUS TECHNOLOGIES:

URBAN WATER AND SANITATION CHALLENGES:

Urban sanitation in India faces many challenges. Nearly 60 million people in urban areas lack access to improved sanitation arrangements, and more than two-thirds of wastewater is let out untreated into the environment, polluting land and water bodies.

To respond to these environmental and public health challenges, urban India will need to address the full cycle of sanitation, i.e., universal access to toilets, with safe collection, conveyance and treatment of human excreta. Priorities for policy and financing for urban sanitation in India are discussed, and the paper concludes with an examination of key policy initiatives in the last decade, assessing the extent to which these priorities are gaining attention. **Role of Indigenous Technologies:**

- Attain technological competence and self- reliance, to reduce vulnerability, particularly in strategic and critical areas, making the maximum use of indigenous resources.
- Provide the maximum gainful and satisfying employment to all strata of society, with emphasis on the employment of women and weaker sections of society.
- Use traditional skills and capabilities, making them commercially competitive.
- Ensure the correct mix between mass production technologies and production by the masses.
- Ensure maximum development with minimum capital outlay.
- Identify obsolescence of technology in use and arrange for modernization of both equipment and technology

- Develop technologies which are internationally competitive, particularly those with export potential.
- Improve production speedily through greater efficiency and fuller utilization of existing capabilities, and enhance the quality and reliability of performance and output.
- Reduce demands on energy, particularly energy from non-renewable sources.
- Ensure harmony with the environment, preserve the ecological balance and improve the quality of the habitat.
- Recycle waste material and make full utilization of by-products.

3.11 INITIATIVES IN VILLAGE DEVELOPMENT BY LOCAL GOVERNMENT:

- Conservation Unit needs to place at least in the bigger urban local bodies.
- Town Panchayaths and city corporations requires regular energy audit supports.
- DPCs can initiate more proactive measures in energy conservation.
- Technical support staff need to be strengthened in each Urban Local Bodies and a dedicated Energy.
- The ULBs are the competent authorities to enforce all energy saving measures in their jurisdiction, they need an enforcement unit with statutory powers.

3.12 SMART INITIATIVES BY SURAT MUNICIPAL CORPORATION:

- **Promoting mixed land use in area-based developments —** planning for 'unplanned areas' containing a range of compatible activities and land uses close to one another in order to make land use more efficient. The States will enable some flexibility in land use and building bye-laws to adapt to change.
- **Housing and inclusiveness —** expand housing opportunities for all.
- **Creating walkable localities —** reduce congestion, air pollution and resource depletion, boost local economy, promote interactions and ensure security. The road network is created or refurbished not only for vehicles and public transport, but also for pedestrians and cyclists, and necessary administrative services are offered within walking or cycling distance.
- **Preserving and developing open spaces —** parks, playgrounds, and recreational spaces in order to enhance the quality of life of citizens, reduce the urban heat effects in Areas and generally promote eco-balance.
- **Promoting a variety of transport options —** Transit Oriented Development (TOD), public transport and last mile para-transport connectivity.
- **Making governance citizen-friendly and cost effective** — increasingly rely on online services to bring about accountability and transparency, especially using mobiles to reduce

cost of services and providing services without having to go to municipal offices; form e-groups to listen to people and obtain feedback and use online monitoring of programs and activities with the aid of cyber tour of worksites.

- **Giving an identity to the city —** based on its main economic activity, such as local cuisine, health, education, arts and craft, culture, sports goods, furniture, hosiery, textile, dairy, etc Applying Smart Solutions to infrastructure and services in area-based development in order to make them better. For example, making Areas less vulnerable to disasters, using fewer resources, and providing cheaper services.

3.13 ANY PROJECTS CONTRIBUTED WORKING BY GOVERNMENT / NGO / OTHER DIGITAL COUNTRY CONCEPT:

Pradhan Mantri Jan Dhan Yojna (PMJDY):
PMJDY is a government scheme for poor and needy with a National Mission for Financial Inclusion, particularly to provide access to financial services such as savings and deposit accounts, remittance, credit, insurance, pension, etc. at affordable rates. The scheme was announced on the eve of Independence Day, in 2014 by Prime Minister Narendra Modi.

What has changed?

- 29.43 crore bank accounts opened so far
- Rs 65, 532.77 crore balance in these accounts
- 1.26 lakh Bank Mitras delivering branchless banking services in Sub-Services Areas and counting
- Nearly 25 crore Jan Dhan accounts in the country, of which nearly 5.8 crore are zero-balance accounts.

Benefits

- The government plans to offer 1 lakh accident insurance cover, and Rs. 30,000 life insurance cover for those who opened bank accounts before January 26th
- 4% interest per annum on money deposit
- No criteria for minimum balance
- Money can be transferred to any account in India
- You can get money of government schemes directly in your bank account
- Overdraft facility up to Rs. 5,000 is available after operating bank account for 6 months

3.14 HOW TO IMPLEMENT OTHER COUNTRIES SMART VILLAGE PROJECTS IN INDIAN VILLAGE CONTEXT:

ANALYSE AND PLAN:

Step 1: Learn from past experiences and initiatives.
Step 2: Establish guiding principles.

DESIGN AND DEVELOP:
Step 1: Adopt an integrated approach.
Step 2: Involve citizens actively in smart village design.
Step 3: Assess the market and demand for digital applications and services.
Step 4: Establish digital infrastructure.
Step 5: Design integrated SDG digital services
Step 6: Ensure appropriate data privacy and security.
Step 7: Establish systems for fair procurement.
Step 8: Establish a smart village organisational model.

DEPLOY AND IMPLEMENT:
Step 1: Invest in management and leadership capacity.
Step 2: Build sustainable partnership.
Step 3: Mobilise resources sustainably.
Step 4: Market initiative successfully.
Step 5: Manage service providers and third-party contractors.
Step 6: Implement in phases.

MONITOR AND EVALUATE:
Step 1: Design a monitoring and evaluation framework.
Step 2: Implement the monitoring and evaluation plan.
Step 3: Apply lessons from the monitoring and evaluation plan.

3.15 ELECTRICAL CONCEPT (DESIGN IDEAL AND PROTOTYPE MODEL):

Continuous power supply is a major element in the smart city development. For a continuous supply of power in the smart city it is very essential to have strong and smart transmission and distribution (T&D) systems but today's T&D systems seems to be inadequate to meet the increasing power demand therefore leaving a question on T&D's ability to supply adequate power to the upcoming smart cities. Supplying power to the smart cities will be a challenging task and how the masters of the power sector are going to address these challenges will be a thing to watch. On this note, the article will discuss about the requirements of achieving smart power in a smart city. It will also inform about ways to address the T&D challenges.

Requirement of smart power in a smart city:

The objective of a smart city is to use digital communication and technology to optimise the usage of resources such as energy, water, and roads and infrastructure and improve governance, transportation, health care and waste management. "From energy perspective, a smart city will be able to optimise the electricity consumption of the city by being able to record the real-time data pertaining to different residential, commercial and industrial spaces. A smart city is

equipped with smart grids which facilitate this collection and transferring of electricity related data throughout the city, free from all hassles and wouldn't even require manual labour," informs Harish Agarwal, CEO, Supreme & Co. Pvt. Ltd.

"So, an individual living in a smart city essentially would have excellent control over his or her electricity consumption and ultimately would be able to optimise the expenses incurred on the electricity bills. This not only would help curtail the uncontrolled electricity consumption but also ease the enormous pressure on the sources of electricity," adds Agarwal. As mentioned in the policy document from Government of India, promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of smart solutions. The focus is on sustainable and inclusive development.

"A smart city is more or less an urban vision that includes many modern needs such as integration of multiple platforms of products and services with communication technologies and Internet of Things to manage the township in general. The prerequisite to all of this is power as all of this equipment can function only when power supply is efficient," states Rajesh Nandwani, VP & Business Unit Head-Switchgear, Anchor Electricals.

He adds, "While smart power on one hand includes usage of renewable energy to produce electricity, smart management of that power is equally essential." Multiple dimensions can be looked into for example, power storage is one area, and power carrying accessories is another. It is hence imperative that the electrical accessories become more energy-efficient and user-friendly as the technology takes new strides."

Sharing his views on the requirements of achieving smart power in smart city Neil Savant, Managing Director, Intuit Things says, "To achieve smart power infrastructure level changes are needed to be done to be able to remotely control as well as monitor the power consumption. This is where the discussion moves toward Internet of Things solutions. Smart home is the first step towards the infrastructure changes. Then data that is generated from each home has to be used effectively and intelligently for predictive control of power which can help save the excessive and wasteful power consumption on a city level as well as giving huge monetary saving."

Smart cities are aimed at providing a better standard of living via improved and automated mechanisms by embedding latest technologies which entail incessant supply of power. "The core of smart cities is based on the availability of reliable, affordable and consistent supply of electricity which mandates augmented generation coupled with the development of a robust transmission and distribution infrastructure, a critical success factor in achieving smart power," states Vimal Kejriwal, MD & CEO, KEC International Ltd.

Challenges with existing power distribution network:

India faces huge power crisis due to poor power distribution network. Let us understand what the challenges that disturbs the power distribution network. While India is making a steady headway on the transmission front and the sector has witnessed commendable growth over the last few years with substantial capacity additions, evacuation of power is still a concern in India.

Kejriwal believes that India's T&D network is poor in meeting the power demands and is plaguing the sector for years. He says, "The existing T&D network is inadequate to meet the increasing demand and load patterns. In addition, T&D losses are plaguing the sector since a long time. These losses inherent to T&D systems include losses incurred while transmitting power from sources of supply to points of distribution and ultimately to final consumers; commercial losses also being accounted for in this."

In India, T&D losses account for as high as 23 per cent of the total electricity generated as compared to countries like Singapore, Malaysia and other developed countries wherein the losses are as low as ranging from 5-8 per cent. "These losses can be reduced by strengthening and upgrading the T&D infrastructure combined with proper tracking and auditing which would definitely ensure reduced loss levels," opines Kejriwal.

Pointing out on the challenges with existing power distribution network Agarwal says, "With existing power distribution network, there is a lot of power that is not being used, which can be used by those regions which have a shortage of power supply. On the other hand, there may be a system failure in another power distribution network, when the actual power consumption is consistently around the total capacity provided to that region, and sometimes even crosses the maximum capacity."

Existing power distribution network used either an electromechanical meter (with a rotating disk to record the electricity consumption) or an electronic meter (with digital figures) at our houses, offices or any other property to measure our electricity usage. Typically, at the end of the month (or months) a representative of the utility comes to the property, observes the reading in the meter and subsequently we get the bill for the units of electricity we have used in that period of time.

"As far as the customers are concerned, there does not seem to be any problem with this mechanism. But still, since manual labour is involved, there are bound to be some errors and irregularities. In order to minimise the chances and number of mistakes and maximise the efficiency and performance of the whole system, smart meters step in the picture," suggests Agarwal. As per Savant current challenges include physically unsecured network, virtually unsecured network against internet hacks, over burdening the existing legacy network infrastructure to meet ever increasing demand, last mile coverage of the network to provide power to each household in rural India.

On the other hand, Nandwani believes, the existing power distribution network has huge gaps in terms of power and infrastructure management. The main challenge involves power distribution, especially in peak hours. At the onset of summer itself, one sees power-cuts. While lack of proper infrastructure and scarcity of resources is one problem, other involves conserving energy overall. The government's initiatives such as promoting LED, impetus and importance given to optimise renewable energy will definitely progress the situation soon. This will ensure that maximum parts of the country get access to grid electricity as well.

How to address these challenges?

Every problem has its solution. In order to have smart T&D network it is necessary to solve issues relevant to it. On this note, experts have suggested on how these issues will be addressed. Agarwal believes that smart grids present an elegant solution to this problem.

Since the whole process of power transmission and data collection is automated, when a smart grid observes that there is a skewness in the electricity consumption of the two regions, it automatically re-distributes the power according to the usage of the regions, thereby removing any imbalance in the electricity distribution and consumption and saving a lot of energy, by minimising the scope of wastage. Interconnection planning and analysis activities create greater certainty with respect to future generation, including identifying transmission requirements under a broad range of alternative electricity futures (e.g., intensive application of demand-side technologies) and developing long-term interconnection-wide transmission expansion plans.

"Smart grids have the demand response capacity to strike a balance between power consumption and supply. Besides this, smart grids can integrate new energy sources like solar and wind with traditional sources. This will enable the citizens of smart cities to eventually integrate their solar or wind systems with the grid and start feeding unused power into the grid," adds Agarwal. Smart meters facilitate real-time pricing, automated recording of the electricity consumption and a complete abolition of errors due to manual readings and reduce labour cost and enable instant fault detection.

Kejriwal observes that the government is taking efforts and doing a lot of investments as well. He says that the good part is that, a lot of progress is unfolding as dedicated efforts are being undertaken by the Indian government for improving the transmission network in India. PGCIL which mainly owns and operates inter-state lines has already made huge investments for the development of inter-state networks and is managing these lines efficiently. On the other hand, the development of intra-state lines is under progress with huge CAPEX planned by many of the SEBs. The sector is also witnessing enhanced private participation. Further, in order to strengthen and upgrade the transmission network numerous schemes have been devised like Integrated Power Distribution Scheme for rural and semi-urban areas and Deen Dayal Upadhyaya Gram Jyoti Yojana for feeder separation for agricultural populace. A series of conducive policies and measures are rolled out as well as efforts are on towards achieving the mission of 'One Nation, One Grid, One Price'.

"Significant improvements are also transpiring on project execution front resulting into lowering of the execution timelines for T&D projects from the traditional 36 months to 12-18 months, which is a remarkable achievement. Some our recent projects have a stipulated condition of project completion in a time span of 12 months," Kejriwal. Albeit, on the ground level some issues still prevail, like the pace of execution of some T&D projects has been impacted due to various factors such as ROW issues, end users (like power plants) not being ready etc, which leads to delay in project completion schedules. This creates an additional burden on the contractors by way of time and cost overruns, mobilisation issues etc. There has to be a mechanism in place which will resolve these ground level issues.

The Indian government is conscious of this fact and there have been changes in the approval processes for environmental clearances whereby the first stage approvals have been eased. Also,

compensation levels have been enhanced for land cost which has provided some relief to the land acquisition issue. However, more thrust is required in this area. Some suggestions would be awarding projects by way of plug and play mode where all the approvals are secured before the project is awarded, adopting alternate and improved technologies like Gas Insulated Lines etc.

In conclusion, though the sector has gained significant momentum, for fast tracking the pace of its development, it is imperative that more steps are taken for speedy resolution of the issues. Advising on how to solve the T&D issue Savant says, "To address these issues we need to start first from the last mile coverage in rural India. Creating and providing clean and sustainable energy is the need of the hour. Once we produce clean energy wastage needs to be reduced considerably with the help of automation. That is where things get into smart power control and regulation. Also, it is very important to be able to measure and monitor the power distribution network parameters to be able to take prognostic decisions before or while something's goes wrong. This data needs to be stored for mining for future predictive behaviour and planning."

According to Nandwani the smart way to address these challenges is to make use smart switchgears. He says, "As the saying of 'A penny saved is a penny earned' applies in this domain too. Using energy-efficient appliances and electrical accessories will pave a way towards conserving power. Switchgear can be used to control heavy appliances effectively ensuring their security of operations. Smart switchgear and control gear is the next leg to the current switchgear industry where switchgear functions would be more intuitive as well."

Domain experts:

Panasonic is known for manufacturing most advanced switchgear range. In 2012, Anchor has introduced some switchgear products under Panasonic brand such as MCBs, RCCBs, isolators and now also distribution boards. Panasonic MCB boasts three level indication features, on-off and trip making it easier to identify circuit fault. Anchor will be introducing a new range of products for the commercial premises soon.

KEC International Ltd is $ 1.4 billion Infrastructure EPC company and major in power transmission space. The company has been powering significant infrastructure development across India and has played a vital role in the development of critical evacuation infrastructure including HVDC transmission line projects of up to 1,200 kV. Its strong project management capabilities, robust engineering and design credentials, exceptional manufacturing expertise and outstanding testing prowess reap in benefits like accelerated project deliveries leading to expediting the socio-economic progress and development of the region in concern.

Some noteworthy projects, endorsing the company's credentials in India include:

The company pioneered the use of covered conductor technology in India by executing a 66 kV covered conductor project in Bengaluru for Karnataka Power Transmission Corporation ltd. The company completed the 400 kV transmission line for Indo-Bangladesh Cross Border Interconnection 5 months ahead of its scheduled completion time, in record 7 months, despite numerous challenges including logistics and severe monsoon conditions, it successfully completed the project.

The company is currently executing projects at numerous locations in Jammu & Kashmir amidst severe challenges like extreme weather conditions, high altitude and difficulties in logistic arrangements. It is successfully executing these projects as per the required timelines. KEC International completed the 230 kV Hybrid GIS substation in Thiruverkadu, Chennai for TANTRANSCO in record 9 months, one month ahead of its schedule completion. Another challenging project which was also one of the most outstanding projects executed by KEC was the Haldia River crossing project in West Bengal.

Power outages due to Transmission tower failures and DT failures can be resolved by Supreme & Co. Pvt. Ltd ERS (Emergency Restoration System) Towers and MSS (Mobile Substation). These solutions will help to reduce the down time and provide reliable power to the consumer effectively. It will also help the dynamic upgrading of power infrastructure with minimal downtime. Compact Transmission Line (CTL) solution is another area of expertise where it will help the smart cites to cope up with the need of excess power requirement using the same footprint transmitting power at higher voltage. Solutions being provided for CTL are pole type structures, insulated cross-arm, HTLS conductor and interphase spacer.

Intuit Things is a smart IOT solutions company that have domain expertise in monitoring, control and regulation of power. It is an end-to-end solutions company that is agile in the solutions that it offers. The company understand the requirements and design and implement solutions for smart monitoring and control of power. Intuit Things log data and study the pattern to make predictive analysis which helps in taking pre-emptive actions by programming a rule engine. It also creates hardware that senses and control, create a cloud solution as well as user interface for being able to provide a solution for the smart power problem statements.

Gearing up for smart city projects:

Industry players are in queue for working in smart city projects. Whereas some have already started working on it. Sharing his views on the contribution for smart city Nandwani says, “We are members of smart city council and looking actively at the smart city projects for some of our state-of-the-art range of products in the energy generation and smart lighting.”

Smart grid project implementation at Puducherry by installation of smart meters was the first step by Supreme & Co. Pvt. Ltd towards smart grid. It has also developed remote monitoring system which can feed data from various smart instruments installed in the T&D line at remote location to integrate with the central server and SCADA. The company has done extensive work on GIS and worked on GIS based indexing of electricity consumer and codified asset database on the electrical system network for smart city project Puducherry.

“Renewable energy integration through rooftop solar and smart street lightning system is key area of focus for us. We are also doing research on introducing and implementing LVDC system both grids connected as well as off grid since most of the power equipment and storing devices run on DC voltage system,” informs Agarwal. Intuit Things has started work with a progressive builder who is keen on a zero-emission sustainable smart city where it is supporting in power monitoring of their model building for them to able to estimate and plan the sustainable and

clean sources of power for their township. Next steps would be to have the homes installed with its smart home system to be able to monitor, control and hence regulate power under a desired limit remotely and automatically.

This will regulate power not just at apartment level but also at the society level and in turn at city level thereby putting less burden on the source as well as distribution network. This will also help in monitoring the source as well as destination power consumption thereby guesstimating if there is loss of power efficiency above a limit where corrective actions can be taken to improve the loss the efficiency.

"When we are able to monitor the power generation as well as consumption and control it as well, we get a total control of the power system and hence possibilities of large-scale monitory as well as greenhouse savings opens up and can help in slowing down the rapidly increasing climate changes that could have higher devastating effects on planet earth," says Savant. Smart cities clearly appear to be a good opportunity for KEC International's civil, cabling, solar and power transmission and distribution businesses. It is keenly watching the developments in this space and as and when there is good opportunity the company will tap it.

CHAPTER 4: ABOUT UTARA VILLAGE

4.1 INTRODUCTION:

4.1.1 INTRODUCTION ABOUT UTARA VILLAGE DETAILS:

Utara is our allocated village. According to Census 2011 information the location code or village code of Utara village is 524307. Utara village is located in Bardoli Tehsil of Surat district in Gujarat, India. It is situated 3km away from sub-district headquarter Bardoli and 40km away from district headquarter Surat. As per 2009 stats, Utara village is also a gram panchayat. The total geographical area of village is 634.04 hectares. Utara has a total population of 546 peoples. There are about 139 houses in Utara village. Bardoli is nearest town to Utara which is approximately 3km away.

4.1.2 JUSTIFICATION / NEED OF THE STUDY:

To development of village compare to the city area in the basic facility to needed for people and their amenities and to study whole village. For development the basic needed and their requirement. It should development gram-panchayat, Anganvadi, road, drainage, school, hospital, etc...

- To reduce migration from rural to urban areas.
- To provide basic and sustainable facilities to rural area to reduce the pressure on urban areas.
- Giving urban touch to the rural soul
- For making the village source of income for other nearby villages.

4.1.3 STUDY AREA:

Utara is a Village in Bardoli Taluka in Surat District of Gujarat State, India. It is located 39 KM towards East from District headquarters Surat. 3 KM from. 280 KM from State capital Gandhinagar. Utara Pin code is 394355 and postal head office is Varad. Vadhava (2 KM), Dhamdod Lumbha (2 KM), Rajpura Lumbha (3 KM), Sankri (4 KM), Moti Bhatlav (4 KM) are the nearby Villages to Utara. Utara is surrounded by Valod Taluka towards East, Palsana Taluka towards west, Mahuva Taluka towards South, Kamrej Taluka towards west. Vyara, Navsari, Surat, Songadh are the nearby Cities to Utara.

4.1.4 OBJECTIVES OF THE STUDY:

1. To analysing the existing conditions.
2. To find out the problems of Utara village.
3. To analysing existing social and physical amenities, public buildings as well as infrastructure.
4. To collect socio-economic data through techno-economic survey.
5. To propose the comprehensive planning suited for ideal village.
6. To provide all the facilities the villagers.

4.1.5 SCOPE OF STUDY:

1. To achieve enhanced production and productivity in rural areas,
2. To bring about a greater socio-economic equity,
3. To bring about a spatial balance in social and economic development,
4. To bring about improvement in the ecological environment so that it may be conducive to growth
5. And happiness of villagers and
6. To develop broad based community participation in the process of development.

4.1.6 METHODOLOGY FRAME WORK FOR DEVELOPMENT OF VILLAGE:

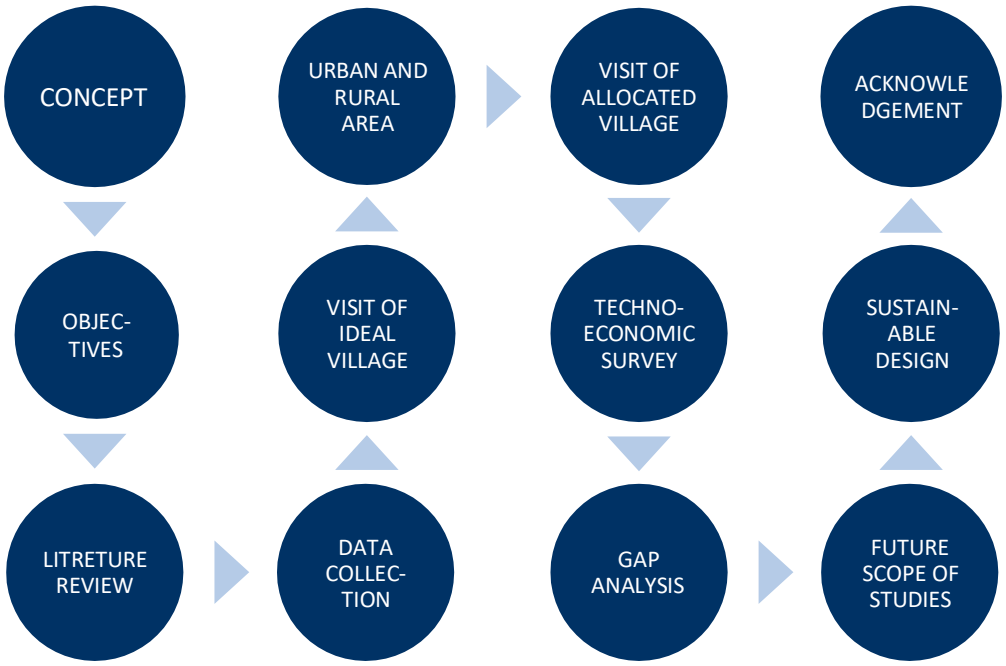


FIG 4.1 METHODOLOGY FOR DEVELOPMENT OF VILLAGE

4.1.7 AVAILABLE METHODOLOGY FOR DEVELOPMENT OF RELATED TO CIVIL / ELECTRICAL:

Methodology adopted for village planning will have to be different from urban planning:

1. **Holding Exploratory meeting with Panchayat for** briefing about the project, defining aim and objectives, scope, value addition to village, planning & development, process

methodology to be followed for implementation and consent for going ahead with the project.

2. **Approval in principle of approach from Panchayat**
3. **Calling meeting of Gram Sabha involving all residents for** explaining the project, understanding their vision, its benefits, role of residents, understanding the problems, identifying needs and priorities, promoting participatory mechanism, sourcing suggestions and obtaining approval of the residents.
4. **Creating a Think Tank comprising elders, NGO, Panchayat for aiding/advising about plan preparation and implementation. Carrying out a SWOT Analysis**
5. **Carrying out a socio-economic and demographic survey** asking for priorities of development/infrastructure/ skill up-gradation, improving opportunities for employment.
6. **Creating a physical map of the village defining;** location/conditions of houses community buildings, public buildings sewerage, roads, storm/waste water drainage, network street lights (if any) etc.
7. **Preparing inventory of** problems, deficiency in infrastructure, amenities, additional facilities needed etc existing employment opportunities
8. **Making projections/forecast for next 10 years** for population, need for housing, employment, skill up-gradation and other infrastructure, services etc
9. **Preparing Draft Master/Development Plan of Village based on** studies made, analysis carried out, vision and priorities defined, problems identified, understanding needs/ requirements of village, projections made for development / amenities / services/employment and rough estimates / cost of development
10. **Sharing the Draft Master/ Development Plan with** Panchayat for approval in principle for placing before the Gram Sabha.

4.2 UTARA VILLAGE STUDY AREA PROFILE:

4.2.1 STUDY AREA LOCATION WITH BRIEF HISTORY LAND USE DETAILS:

Brief history on Utara village:

Utara Village is situated near Bardoli and Surat District of Gujarat State, India. Villagers are very welcoming, heart warmed and wholesome people. Utara Total area is 509.99 hectares, Non-Agricultural area is 114.44 hectares and Total irrigated area is 458.8 hectares. Agriculture is the main profession of this village.

Sugarcane, Banana and Vegetables are agriculture commodities grow in this village. Village is fully depending on an agriculture. Treated Tap Water Supply all-round the year and in summer also available. Hand Pump is other Drinking Water sources. No Drainage System Available in this Village. There is system to Collect garbage on street. Drain water is discharged into sewer plant. This Village has a Power supply with 24-hour power supply.

Public Bus service available in this village. Nearest Railway Station is in less than 5 km. Autos Available in this Village. Animal Driven Carts are there in this Village. No Nearest National Highway in less than 10 km. Nearest State Highway is in less than 5 km. Nearest District Road is in less than 5 km. Pucca road and Foot Path are other Roads and Transportation within the village.

TABLE 4.1: UTARA VILLAGE OVERVIEW	
Gram Panchayat	Utara
Block / Tehsil	Bardoli
District	Surat
State	Gujarat
Pin Code	394355
Area	634.04 hectares
Population	546
Households	139
Nearest Town	Bardoli (3 km)

TABLE 4.2: UTARA VILLAGE LAND USE DETAILS		
SR. NO.	**DESCRIPTIONS**	**INFORMATION / DETAIL**
1.	Area of Village (Approx.) (In Hector)	634.04
2.	Forest Area (In Hector)	-
3.	Agricultural Land Area (In Hector)	424.80
4.	Residential Area (In Hector)	126.81
5.	Other Area (In Hector)	94.80
6.	Non-Agricultural Area (In Hector)	114.44

4.2.2 BASE LOCATION MAP, LAND MAP, GRAM TAL MAP:

FIG 4.2: MAP OF UTARA VILLAGE – 1

FIG 4.3: MAP OF UTARA VILLAGE – 2

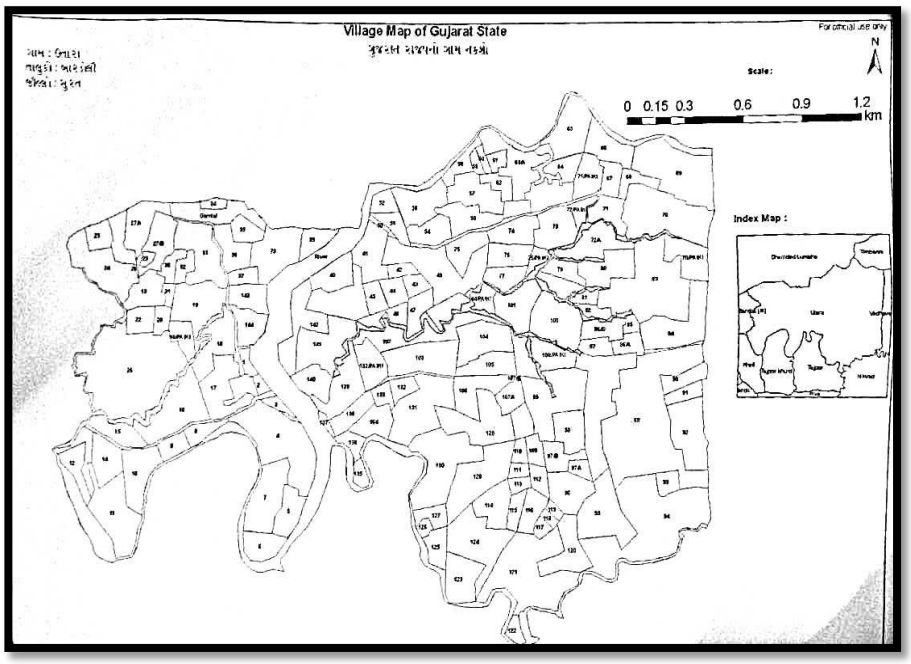


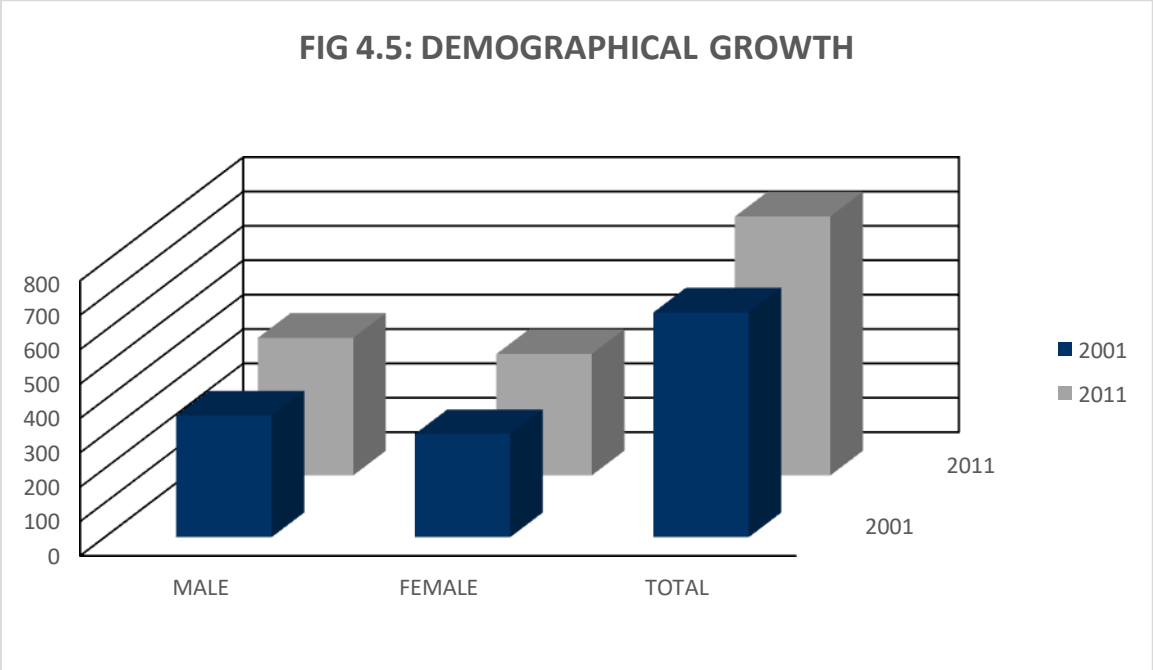
FIG 4.4: LAND MAP OF UTARA VILLAGE

4.2.3 PHYSICAL & DEMOGRAPHICAL GROWTH:

Physical growth:

- 1 Primary School
- Aanganwadi
- Bus-Stand
- State Bank of India
- 2 Privet Clinics
- Water Tanks

TABLE 4.3: DEMOGRAPHIC DATA OF UTARA VILLAGE	
CENSUS PARAMETER	**CENSUS DATA**
Total Population	546
Total No of Houses	139
Female Population %	50.9 % (278)
Total Literacy rate %	66.5 % (363)
Female Literacy rate	32.8 % (179)
Scheduled Tribes Population %	79.7 % (435)
Scheduled Caste Population %	0.0 % (0)
Working Population %	61.4 %
Child (0 - 6) Population by 2011	64
Girl Child (0 - 6) Population % by 2011	46.9 % (30)



4.2.4 ECONOMIC GENERATION PROFILE / BANKS:

The main occupation of Utara village is farming, which 61.4 % is of households of village. Other people are working as labouring or do dairy. The crops grown in this village are Sugarcane, Banana and Vegetables are agriculture commodities grow in this village. 8 hours agricultural power supply in summer and 8 hours agricultural power supply in winter is available in this village. Total irrigated area in this village is 458.8 hectares from Boreholes/Tube wells 325.35 hectares is the Source of irrigation. Dairy and milk production also the prime source of income.

4.2.5 ACTUAL PROBLEM FACED BY VILLAGERS AND SMART SOLUTION:

In the Utara village, RCC road is in a poor condition and it is very difficult to drive on this road in rainy season. So, it is necessary to redevelopment of RCC road. Drainage condition is underground in Utara village but it is not efficient in the heavy rain. So, it is necessary to make efficient drainage system. In the Utara village, there are no facilities to disposal of drainage water. Drainage water is disposed in KHARI River near the village. So, it should be necessary to provide connection of drainage in the main line of drainage system. There no facilities for collecting and damping of wastage coming from resident. Its only solution that provides dustbin at some interval and collect timely.

4.2.6 SOCIAL SCENARIO- PREVENTION OF TRADTIONS, FESTIVALS, CUISINE:

Majority of the villagers are from Hindu religion and celebrate all Hindu festival like Uttrayan, Holi, Diwali, Navratri, etc. The most celebrated festival in Gujarat is commemorated gleefully in other parts of India as well. Three things sum up Navratri; Dandiya, Garba and lots of fun. Navratri is a festival of nine nights and on the tenth day, Goddess Durga, who is worshipped throughout the nine days, is immersed in holy water after performing a pooja. Loud music, exciting competitions, flea markets and exhibitions, delicacies that are a treat for your tongue and large crowds dressed in the most beautiful, most lively clothes is what you will witness during Navratri in Gujarat. Janmashtami celebrates Lord Krishna's birth in an exhilarating manner. You must have seen a group of people forming a human pyramid, and then one amongst them climbs to the top to break the Dahi handi and the crowd cheers. This famous religious festival in Gujarat is known for its Dahi handi ceremony, devotional singing, dances and feeding Lord Krishna his favourite food, butter.

4.2.7 MIGRATION REASONS / TRENDS:

The major population is got income through the farming and there are no other job opportunities. The major crops produced in the village are cotton, Millets and wheat. It was found that all the people of this village are not very much connected with today's technology environment rather than their main major working area. The education is limited to Primary school. People are migrating from rural to urban area to get employment, better education, better health care and other recreation facilities. Now the young generation does not want to live in village and they need more facilities that they cannot get from village.

4.3 DATA COLLECTION OF UTARA VILLAGE (PHOTOGRAPH / GRAPH / CHARTS / TABLE):

4.3.1 DESCRIBE METHODS FOR DATA COLLECTION:

1. **House hold for population:**
   A household, as defined in the survey, refers to a person or group of people usually living and eating together and jointly running the household's economy (de jure population). ... Women 15-49 years of age, who are the main TDHS respondents, constitute about one-half of the de facto household population: 51 percent
2. **Occupational survey:**
   The Occupational Requirements Survey (ORS) is a product of the Bureau of Labor Statistics (BLS). The ORS provides job-related information regarding physical demands; environmental conditions; education, training, and experience; as well as cognitive and mental requirements for jobs in the U.S. economy.
3. **Transportation survey:**
   Transportation surveys are carried out for the identification of current transportation system of particular area or region including the points of future development, needs and priorities. Surveys are much essential for recording the facts and finding out the ground realities of remote regions.

4. **Educational survey:**
   An education survey allows you to gather feedback and opinions from both the learner and educator, and then use these findings to drive continual improvement across any number of educational areas
5. **Techno economic survey:**
   Techno-economic assessment or Techno-economic analysis (abbreviated TEA) is a methodology framework to analyse the technical and economic performance of a process, product or service. TEA normally combines process modelling, engineering design and economic evaluation.

In short, data collection related to village is the most important first step for development of any village. Without data we cannot identify what is the future requirement for development of village. The following data was collected by various means like: Office record of concerned office department like- R&B Department, Talati office etc. Interaction with Sarpanch, Upsarpanch, villagers etc. Visit to different parts of village.

4.3.2 PRIMARY DETAILS OF SURVEY:

Utara Village Gram Panchayath name is Utara. Utara is 3 km distance from Sub District Headquarter Bardoli and it is 40 km distance from District Headquarter Surat. Nearest Statutory Town is Bardoli in 3 km Distance. Utara Total area is 634.04 hectares, Non-Agricultural area is 114.44 hectares and Total irrigated area is 424.8 hectares.

4.3.3 AVERAGE SIZE OF THE HOUSE – GEO – TAGGING OF HOUSE:

The construction of the houses was made of stone, cement, sand, bricks and concrete. In this village kachha houses are more than the pakka houses.

FIG 4.6: GEO TAGGING OF UTARA VILLAGE

4.3.4 NUMBER HUMAN BEING IN ONE HOUSE:

According to sarpanch and our survey there are average 4 persons per household in village.

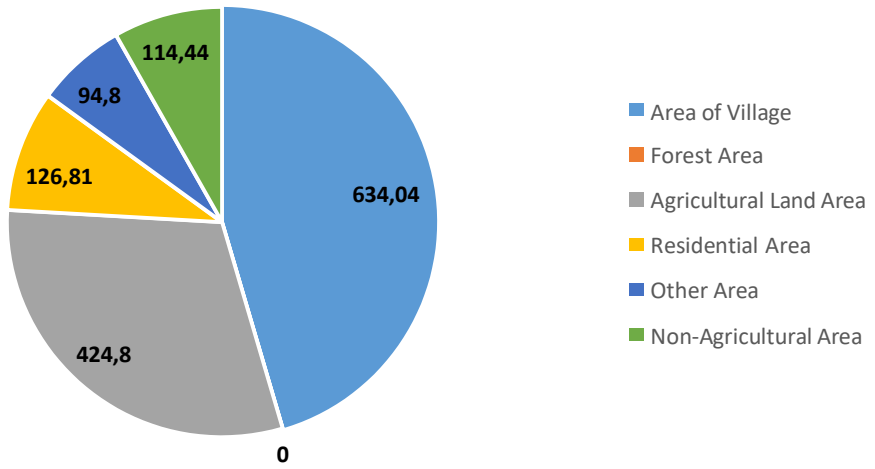
4.3.5 MATERIAL AVAILABLE LOCALLY IN THE VILLAGE AND MATERIAL OUT SOURCED BT THE VILLAGERS:

The construction of the houses was made of stone, cement, sand, bricks and concrete. In this village katchha houses are more than the pucca houses. Major economic option of the village is farming so there are no more locally material available like standard bricks, aggregates, concrete and reinforcements. So, this material is brought from nearest city for construction of the houses. In the village 10 to 12 % people doing labour work for money. They either work in the village or go to the nearest city for some labour work.

4.3.6 GEOGRAPHICAL DETAILS:

TABLE 4.4: GEOGRAPHICAL DETAILS OF UTARA VILLAGE	
Locality name	Utara
Sub District	Bardoli
District	Surat
State	Gujarat
Language	Gujarati
Area (In Hector)	634.04
Government	Panchayat
Pin code	394355

FIG 4.7: DETAILS OF TOTAL GEOGRAPHICAL AREA (IN HECTOR)



4.3.7 DEMOGRAPHICAL DETAIL - CAST WISE POPULATION DETAILS / WHICH ID PROOF USING BY VILLAGERS:

TABLE 4.5: DEMOGRAPHIC DATA OF UTARA VILLAGE	
CENSUS PARAMETER	**CENSUS DATA**
Total Population	546
Total No of Houses	139
Female Population %	50.9 % (278)
Total Literacy rate %	66.5 % (363)
Female Literacy rate	32.8 % (179)
Scheduled Tribes Population %	79.7 % (435)
Scheduled Caste Population %	0.0 % (0)
Working Population %	61.4 %
Child (0 - 6) Population by 2011	64
Girl Child (0 - 6) Population % by 2011	46.9 % (30)

TABLE 4.6: MALE / FEMALE DETAILS			
PARTICULAR	TOTAL	MALE	FEMALE
POPULATION	546	268	278
CHILD (0-6)	64	34	30
LITERACY	75.31%	78.63%	72.81

TABLE 4.7: CAST WISE POPULATION OF UTARA	
Particular	Total
Population	546
General	0
Schedule Caste	0
Schedule Tribe	435

Villager are use Aadhaar card and Voter ID card as their id proof.

4.3.8 OCCUPATIONAL DETAILS:

In this village 80 to 85 % people connected with agriculture activities it's the villages main source of income. But village has the milk production business so that's an income of source too there are approx. 5 to 10 % people are connected with milk production and other are doing labor work for money.

4.3.9 AGRICULTURAL DETAILS / ORGANIC FARMING / FISHERY:

Main source of income in this village is farming. Sugarcane, Banana and Vegetables are agriculture commodities grow in this village. 8 hours agricultural power supply in summer and 8 hours agricultural power supply in winter is available in this village. Total irrigated area in this village is 458.8 hectares from Boreholes/Tube wells 325.35 hectares is the Source of irrigation.

4.3.10 PHYSICAL INFRASTRUCTURE FACILITIES:

- Anganwadi
- Community Hall
- Gram Panchayat Building
- Overhead Tank
- Primary School
- Public Toilets

4.3.11 TOURISM DEVELOPMENT AVAILABLE IN THE VILLAGE:

No tourism in this village

4.4 INFRASTRUCTURE DETAILS (WITH EXITING VILLAGE PHOTOGRAPH):

4.4.1 WATER MANAGEMENT FACILITES:

Overhead tank is 15,000 litre capacities. Drinking water is adequate and also has a storage capacity. For domestic and drinking purpose Panchayat collect water from dug well and lake.

4.4.2 DRAINAGE NETWORK / SANITATION FACILITIES:

Village has good condition of drainage network. Closed drainage system available in village. Village have two public toilets in village.

4.4.3 TRANSPORTATION & ROAD NETWORK:

Village are covered with all-weather road and its internal street road R.C.C. road. Transportation network needs maintenance in village. Railway station near Bardoli 3 km away from village. There is one bus station in the village. People use owns two-wheeler or public transportation used for travelling through main road.

FIG 4.8: MAIN R.C.C. ROAD

FIG 4.9: BUS STAND

4.4.4 HOUSING CONDITION:

In this village katchha houses are more than the pucca houses.

Houses have basic facility like water supply tap, own toilet, clean house, electricity line etc.

FIG 4.10: HOUSE

4.4.5 SOCIAL INFRASTRUCTURE FACILITIES, HEALTH, EDUCATION, COMMUNITY HALL, LIBRARY:

In village a community hall is there.

4.4.6 EXISTING CONDITION OF PUBLIC BUILDINGS & MAINTENANCE OF EXISTING PUBLIC INFRASTRUCTURES:

In village existing public building are panchayat building, Gokul gram yojana building, etc. all the structure needs to reconstruction and maintenance.

FIG 4.10 GRAM PANCHAYAT

FIG 4.11: GOKUL GRAM YOJANA

4.4.7 TECHNOLOGY MOBILE/ WIFI / INTERNET USAGE DETAILS:

In village 65 to 70% use smart phone. 20 to 25% use a normal phone and rest of people are not use phone.

4.4.8 SPORTS ACTIVITY AS GRAM PANCHAYAT:

No activity of sports is conducted by gram panchayat but school are conducted a sport activity during a sport week or any function.

4.4.9 SOCIO-CULTURAL FACILITIES, PUBLIC GARDEN / PARK / PLAYGROUND:

There is no availability of any socio-cultural facility like public library, public garden, and cinema hall etc. inside the village so Socio-cultural Facility is required. There is no playground, park and public garden in the village.

4.4.10 OTHER FACILITIES:

One public food distribution shop available in the village. Primary school and secondary school and a water tanks for drinking purpose are available in village.

FIG 4.13: PRIMARY SCHOOL

4.5 ELECTRICAL CONCEPT:

Smart villages capture many of the benefits of urban living while retaining valued aspects of rural life and ensuring balanced development at the national level. This enables villagers to attain healthy and fulfilling lives, achieve their development potential, earn a viable living and be connected to the wider world, giving them a real choice between the traditional route of migration to a city, or life in a smart village. Smart villages will be connected to towns and cities through information and communication technologies (ICT) enabled by access to energy. Such technologies will enhance education and health services by providing links to the world's knowledge base and opportunities for distance learning, as well as supporting initiatives in m-health (mobile health, also known as telemedicine). Connectivity will also open up participation in governance processes at local, regional and national levels. Smart villages will serve as complementary engines of economic growth to smart cities, producing goods and services for local rural markets as well as high-value-added agricultural and rural industry products for both national and international markets. And they will act as stewards for the environment as well as, in some cases, functioning as ecotourism hubs.

4.5.1 RENEWABLE ENERGY SOURCE PLANNING PARTICULARLY FOR VILLAGERS:

Concept of Smart villages is a global modern approach for off-grid communities. Vision behind this concept is to assist the policy makers, donors and socio-economic planner for rural electrification worldwide, with special focus on Asian and African countries. Smart villages concept is engaged in efforts to combat the real barriers to energy access in villages, particularly in developing countries with technological, financial and educational methodology.

4.5.2 IRRIGATION FACILITIES:

Irrigation is the process of applying controlled amounts of water to plants at needed intervals. Irrigation helps to grow agricultural crops, maintain landscapes, and revegetate disturbed soils in dry areas and during periods of less than average rainfall. Irrigation also has other uses in crop production, including frost protection, suppressing weed growth in grain fields and preventing soil consolidation. In contrast, agriculture that relies only on direct rainfall is referred to as rain-fed.

4.5.3 ELECTRICITY FACILITIES WITH AREA:

Electrical Services is composed of three units: Electrical, Electronic Low Voltage, and High Voltage. The Electrical Unit maintains secondary voltage power distribution systems, performing such utility functions as: installation of new electrical circuits; maintenance and repair of building switchboards; repair of indoor and outdoor lighting systems; general troubleshooting and repair of electrical distribution systems. The Electronics and Low Voltage Unit installs and maintains permanent systems such as fire alarms, clocks, and bell systems. The High Voltage Unit operates and maintains extensive high voltage power distribution systems. This unit performs such functions as: Repair or replacement of underground or overhead distribution lines; Rerouting of power distribution to back-up circuits during emergencies.

4.6 EXISTING INSTITUTION LIKE – VILLAGE ADMINISTRATION – DETAIL PROFILE:

4.6.1 BACHAT MANDLI:

No, there is no bachat mandali yet.

4.6.2 DUDH MANDALI:

No, there is no dudh mandali yet.

4.6.3 MAHILA MANDALI:

No, there is no mahila mandali yet.

4.6.4 PLANTATION FOR THE AIR POLLUTION:

No, there is no plantation for air pollution yet.

4.6.5 RAIN WATER HARVESTING – WASTE WATER RECYCLING:

There are no facilities for rain water harvesting in Utara village. Rain water is directly flow in drainage. So, villagers are not used rain water for agriculture and domestic use.

4.6.6 AGRICULTURAL DEVELOPMENT:

Main source of income in this village is farming. Sugarcane, Banana and Vegetables are agriculture commodities grow in this village. 8 hours agricultural power supply in summer and 8 hours agricultural power supply in winter is available in this village. Total irrigated area in this village is 458.8 hectares from Boreholes/Tube wells 325.35 hectares is the Source of irrigation.

4.6.7 ANY OTHER:

There is Mindhola river near the village.

FIG 4.14: MINDHOLA RIVER

CHAPTER 5: TECHNICAL WITH CASE STUDIES.

5.1 CONCEPT (CIVIL):

5.1.1 ADVANCE SUSTIANABLE CONSTRUCTION TECHNIQUES / PRACTICE AND QUALITY SURVEYING:

The most sustainable way is to not make things. The second most sustainable way is to make something very useful, to solve a problem that hasn't been solved.

~ Thomas Sigsgaard

Green construction can be used interchangeably with green building or sustainable construction. Therefore, green construction means the use of resource-efficient and environmentally responsible processes in construction to ensure the lifetime sustainability of the building.

Primarily, the sustainability context of the building implies building operations, site design, maintenance, repair, and demolition with the least harm on the environment. The process requires close collaboration of the construction engineers, the client, and the architects in the entire construction project.

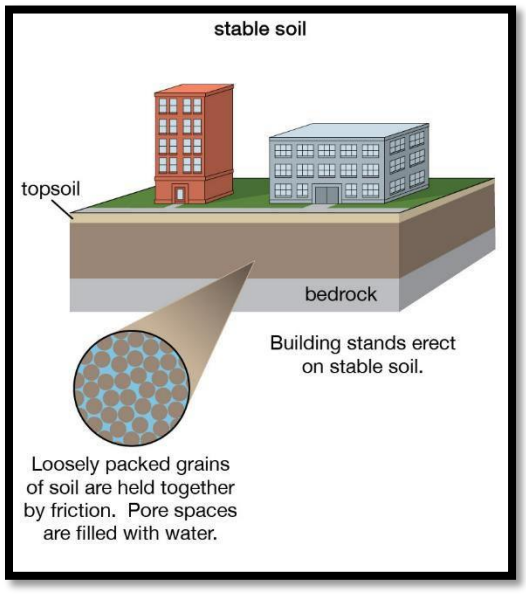
The aim is to ensure the building and construction methods are cost-effective, durable, and reduce the overall effects on the environment and human health with a central focus on efficient use of energy and resources, water preservation, improved occupational health, and reducing pollution and wastage.

"Green building (also known as green construction or sustainable building) refers to both a structure and the application of processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from planning to design, construction, operation, maintenance, renovation, and demolition.

This requires close cooperation of the contractor, the architects, the engineers, and the client at all project stages. The Green Building practice expands and complements the classical building design concerns of economy, utility, durability, and comfort"

Any building or any type of structure can be a structure of green construction, better called green building. Characteristics such as unique cultures & traditions, typical climatic conditions, diverse building types, or a wide range of social, environmental, and economic priorities tend to vary in countries and/or regions. All these fix their approach to green building.

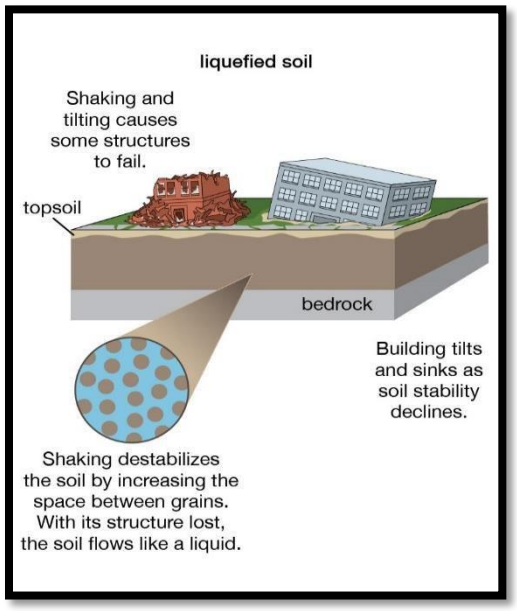
5.1.2 SOIL LIQUEFACTION:



Soil liquefaction, also called earthquake liquefaction, ground failure or loss of strength that causes otherwise solid soil to behave temporarily as a viscous liquid. The phenomenon occurs in water-saturated unconsolidated soils affected by seismic S waves (secondary waves), which cause ground vibrations during earthquakes.

Although earthquake shock is the best-known cause of liquefaction, certain construction practices, including blasting and soil compaction and vibro-flotation (which uses a vibrating probe to change the grain structure of the surrounding soil), produce this phenomenon intentionally. Poorly drained fine-grained soils such as sandy, silty, and gravelly soils are the most susceptible to liquefaction.

8Granular soils are made up of a mix of soil and pore spaces. When earthquake shock occurs in waterlogged soils, the water-filled pore spaces collapse, which decreases the overall volume of the soil. This process increases the water pressure between individual soil grains, and the grains can then move freely in the watery matrix. This substantially lowers the soil's resistance to shear stress and causes the mass of soil to take on the characteristics of a liquid. In its liquefied state, soil deforms easily, and heavy objects such as structures can be damaged from the sudden loss of support from below.

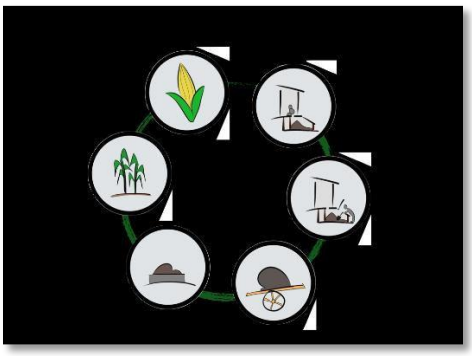


Buildings constructed on loose soil pitch and tilt easily when liquefaction occurs, since the soil no longer supports the structures' foundations. In contrast, structures anchored to bedrock or stiff soils in earthquake-prone areas suffer less damage, because less vibration is transmitted through the foundation to the structure above. In addition, buildings anchored to bedrock have a reduced risk of pitching and tilting.

Liquefaction may also contribute to sand blows, which are also known as sand boils or sand volcanoes. Sand blows often accompany the liquefaction of sandy or silty soil. With the collapse of the soil's granular structure, the density of the soil increases. This increased pressure squeezes the water out of the pore spaces between the soil grains and expels wet sand from the ground.

Sand blows have been observed in the aftermath of several earthquakes, including the New Madrid earthquakes of 1811–12, the Tangshan earthquake of 1976, the San Francisco–Oakland earthquake of 1989, and the Christchurch earthquakes of 2010–11. In addition, liquefaction may also cause landslides. For example, during the Alaska earthquake of 1964, the liquefaction of a sandy layer of soft clay beneath Turnagain Heights, a suburb of Anchorage, caused a landslide in the mass of ground above that destroyed approximately 75 homes and disrupted utilities.

5.1.3 SUSTAINABLE SANITATION:



The main objective of a sanitation system is to protect and promote human health by providing a clean environment and breaking the cycle of disease. To qualify as sustainable sanitation, a sanitation system has to be economically viable, socially acceptable, technically and institutionally appropriate, and protect the environment and natural resources. Most sanitation systems have been designed with these aspects in mind, but they fail far too often because some of the criteria are not met. In fact, there is probably no system which is absolutely sustainable. The concept of sustainability is more of a direction than a state to reach. Nevertheless, it is crucial that sanitation systems are evaluated carefully with regard to all dimensions of sustainability.

Since appropriateness to the context is such a core criterion for sustainable sanitation, there is no one-size-fits-all sanitation solution. However, taking into consideration the entire range of sustainability dimensions, it is important to observe some basic principles when planning and implementing a sanitation system

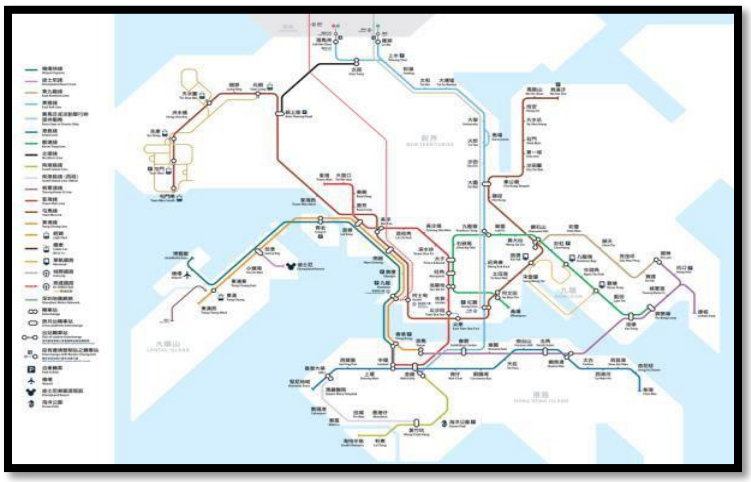
The following principles for planning and implementing sanitation systems:

1. Human dignity, quality of life and environmental security at household level should be at the centre of any sanitation approach.
2. In line with good governance principles, decision making should involve participation of all stakeholders, especially the consumers and providers of services.
3. Waste should be considered a resource, and its management should be holistic and form part of integrated water resources, nutrient flow and waste management processes.
4. The domain in which environmental sanitation problems are resolved should be kept to the minimum practicable size (household, neighbourhood, community, town, district, catchments, city).

5.1.4 TRANSPORT INFRASTRUCTURE / SYSTEM (HONG KONG):

Mass Transit Rail: The MTR: The MTR is a system of underground railways (like the London Underground and the New York Subway). The first line opened in 1979 (Springer, 2016) and

continues to grow, with a length of 231km (GovHK, 2019) and new lines, extensions and stations constantly under construction.



It is very efficient, with trains running on-time for 99.9% of the time (Kuo, 2018). The growth in the number of lines has been steady since 1979. Reasons for growth include the difficulty of building above-ground transport routes – Hong Kong is a mainly mountainous region. Furthermore, the government doesn't want to encourage private transport because the roads are already heavily congested.

Road transport: Tunnels: Highways create a high-speed road system around the main urban areas, but Hong Kong has a very coastal and mountainous environment which makes it very difficult to build roads connecting places.

Hong Kong has therefore built tunnels through mountains and under the harbour, and also built enormous bridges to connect the city with the airport. The cross-harbour tunnels that link Hong Kong Island with Kowloon are not actually cut through the rock under the sea, but 'immersed tube' designs, as shown in the photograph. These sections of tunnel are built above ground, then floated into position on the surface of the water before being sunk.

When they are securely on the seabed, they are connected together forming a long tube through which vehicles can drive. There are 16 road tunnels in Hong Kong.

Other transport: trams, ferries and buses: Hong Kong has several light-rail systems, mainly in the New Territories where they serve the population of new towns. As well as the Peak Tram (which is really a tourist attraction, as it carries people up to the Peak above the Central Business District), one of the most famous of the trams is the line running along the northern side of Hong Kong Island.

This tram system has been in operation since 1904. It is 16km long and carries over 170,000 passengers per day. (GovHK, 2019). Ferries are another iconic means of transport in Hong Kong. Many people live on outlying islands such as Lamma and Cheung Chau, which are only

accessible by ferry. The most famous ferry service is the Star Ferry established in 1898, which runs two routes across Hong Kong's Victoria Harbour.

Bus routes have also been developed and carry millions of passengers a day. The Hong Kong government provides licences to bus companies which all use an integrated payment method (along with the MTR) called the Octopus system.The KMB bus company carries 2.76 million passengers per day; the New World First Bus company carries 454000; and the Citybus company carries 502000. (Source: GovHK, 2018). There is also an extensive system of minibuses (shown in the photograph at the top of this page). These small buses usually carry no more than 16 people and are popular because they can travel up the narrow and steep streets of Hong Kong.

An integrated payment system: Octopus

One of the secrets of Hong Kong's successful transport system is the Octopus card. Hong Kong was the first city in the world to introduce an integrated means of payment for all public transport (ferries, trams, buses and MTR) in 1997 (Octopus, 2019). This type of payment card is now common in many cities.

Passengers add money to a card which is then tapped against a card reader at the point of entry and exit from public transport. In Hong Kong, the system has expanded to be a commonly used form of payment in many shops, so 95% of the population carry an Octopus card (Szuc, 2008) and it has moved the city towards being a truly cashless society. One of the main benefits is that it is speeds up transactions which reduces transport delays.

Cost: Construction began in September 1997 and was completed in September 2001 at a cost of HK$3.1 billion.

5.1.5 VERTICAL FARMING:

Seoul is about to see its first-ever "vertical farm," an eco-friendly agricultural production system inside a skyscraper.

Ecologist Dickson Despommier first introduced the concept of vertical farming at Columbia University in 1999, claiming that a 30-story vertical farm could grow enough food to feed 50,000 people, according to the Hankyoreh.

This form of urban agriculture allows crops to cultivate in controlled environmental conditions, including light, temperature, humidity and CO2 density. In 2012, Sky Greens developed the world's first commercial vertical farm in Singapore, which now grows Chinese cabbage, spinach, lettuce and several Asian leafy greens.

The Seoul government announced on Monday that a redeveloped apartment complex in Yangcheon district will be the city's first vertical farm building. The farm will be built three stories high, with the second and third stories designated for cultivating leafy vegetables and other plants, said Jung Gwang-hyeon, manager of Seoul's public livelihood and economy department.

Since vertical farms still lag behind in terms of productivity and require a large amount of seed money, the Seoul government emphasized that purpose of Yangcheon's farm is to promote the development of new technology and expertise in the area instead of achieving commercial success. In 2009, South Korea attempted to build its first vertical farm in the city of Namyangju in Gyeonggi Province. However, plans fell through when the city failed to secure the necessary funds.

Vertical farming is the practice of growing crops in vertically stacked layers. It often incorporates controlled-environment agriculture, which aims to optimize plant growth, and soilless farming techniques such as hydroponics, aquaponics, and aeroponics. Some common choices of structures to house vertical farming systems include buildings, shipping containers, tunnels, and abandoned mine-shafts. As of 2020, there is the equivalent of about 30 ha (74 acres) of operational vertical farmland in the world.

The modern concept of vertical farming was proposed in 1999 by Dickson Despommier, professor of Public and Environmental Health at Columbia University. Despommier and his students came up with a design of a skyscraper farm that could feed 50,000 people.

Although the design has not yet been built, it successfully popularized the idea of vertical farming. Current applications of vertical farming coupled with other state-of-the-art technologies, such as specialized LED lights, have resulted in over 10 times the crop yield than would receive through traditional farming methods.

The main advantage of utilizing vertical farming technologies is the increased crop yield that comes with a smaller unit area of land requirement. The increased ability to cultivate a larger variety of crops at once because crops do not share the same plots of land while growing is another sought-after advantage.

Additionally, crops are resistant to weather disruptions because of their placement indoors, meaning less crops lost to extreme or unexpected weather occurrences. Because of its limited land usage, vertical farming is less disruptive to the native plants and animals, leading to further conservation of the local flora and fauna.

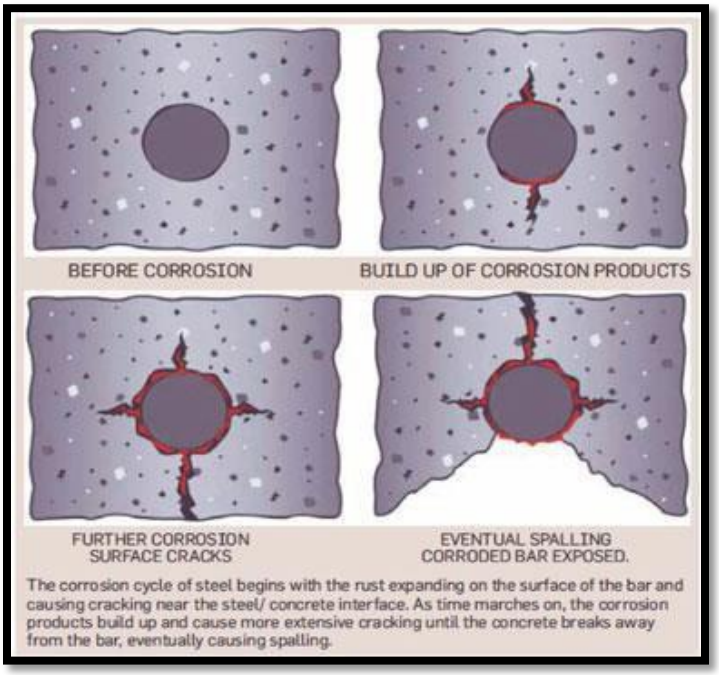
Vertical farming technologies face economic challenges with large start-up costs compared to traditional farms. In Victoria, Australia, a "hypothetical 10 level vertical farm" would cost over 850 times more per square meter of arable land than a traditional farm in rural Victoria. Vertical farms also face large energy demands due to the use of supplementary light like LEDs. Moreover, if non-renewable energy is used to meet these energy demands, vertical farms could produce more pollution than traditional farms or greenhouses.

5.1.6 CORROSION MECHANISM, PREVENTION AND REPAIR MEASURES OF RCC STRUCTURE:

The durability of concrete structures is influenced by various factors, for example, ecological presentation, electrochemical responses, mechanical stacking, affect harm and others. Of all of these, consumption of the fortification is likely the primary driver for the disintegration of steel strengthens cement (RC) structures. Consumption administration is ending up progressively important because of the developing number of maturing foundation resources (e.g., spans, burrows and so on.) and the expanded prerequisite for impromptu upkeep with a specific end goal to keep these structures operational all through their outline life (and usually, past).

The primary RC repair, restoration and recovery approaches by and large utilized can be extensively arranged under, ordinary, surface medications, electrochemical medicines and outline arrangements. The overall point of this examination was to recognize the key consumption administration strategies and embrace exact examinations concentrated on full-scale RC structures to explore their long-haul execution.

To accomplish this, singular research bundles were recognized from the above expansive five approaches for repair, substitution and recovery. These were; Patch repairs and nascent anodes, Impressed Current Cathodic Protection, Galvanic Cathodic Protection, and Hydrophobic medications.



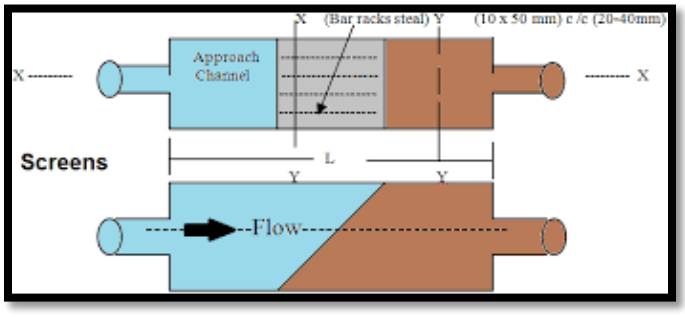
The determination of the above research bundles depended on over a wide span of time use by the development industry to repair, renovate and restore RC structures. Investigations on how particular medications and materials perform. Investigations on the viability of existing techniques for estimations and creating options, Changes to the current hypothesis of consumption commencement and capture furthermore. Changes to administration system methodologies. Macro-cell movement seems, by all accounts, to be a result instead of a reason for beginning anode development in repaired solid structures, as has beforehand been exhibited; ICCP has industrious defensive impacts even after the interference of the defensive current. Discrete galvanic anodes introduced in the parent concrete encompassing the fix repair are an achievable contrasting option to galvanic anodes inserted inside the fix repairs of RC structures.

5.1.7 SEWAGE TREATMENT PLANT:

Treatment of sewage: The sewage treatment consists of many processes to remove different parameters present in waste water. The degree of treatment depends upon the characteristics of the raw sewage or influent and the required effluent characteristics. Sewage treatment processes are classified as:

1) Preliminary Treatment
2) Secondary Treatment
3) Primary Treatment
4) Tertiary Treatment

Screens and grit chamber:



The purpose of screens is to remove large floating material and coarse solids from wastewater. Screens regularly comprise of wedge wire. It is done in two stages. In the first stage also called coarse screening, the measure of the opening is 20 mm to 30 mm. It catches the large articles.

In the second stage called fine screening the openings differ between 1.5 mm to 6.4 mm. The cross-segment range of the screens is commonly 1 m2. For a daily flow rate 22.2 MLD feed of

waste water the pollutants removed this stage are almost 0.2 MLD. At the point when the head loss over the tank exceeds 0.6 M. The screens should be cleaned. Grit removal chambers are the sedimentation tanks placed before the fine screen to remove inorganic particles having specific gravity 2.65 like sand, egg shells and other non-putrescible materials may damage pumps due to abrasion. The grit basin is intended to scour the lighter particles while the heavier grit particles remain settled down.

Primary sedimentation:

Sedimentation is the process of removing solid particles heavier than water by gravity settling i.e., the particle size less than 0.2 mm and specific gravity 2.65. In wastewater treatment, sedimentation is used to remove both inorganic and organic materials which are settle able in continuous-flow conditions. The sedimentation tank comprises of a tank with 2 settling pipes where solid waste settles down. Baffles are provided to improve the settling process. At this stage the removal percentage of suspended solids are 60% to 65% and BOD from sewage is 30% to 35%. Skimmers are used to remove the floating impurities like grease and oil on the water surface during sedimentation.

Biological treatment:

The biological unit process of sewage is a secondary treatment in which colloids and dissolved solids of sewage, from primary sedimentation. The attached growth process, i.e., trickling filter, the microorganisms containing aerobes remain attached with filter media [16]. The effective size of the particle of filter media is of plastic material 25 cm to 75 cm, with a filter depth commonly 2 M to 3 M. The larger stones of size 8 cm to 10 cm placed in 15 cm to 20 cm thick and small size stones 2.5 cm at the base. 30% to 35% of BOD is removed from sedimentation, in this reactor, nearly 90% of sewage is removed.

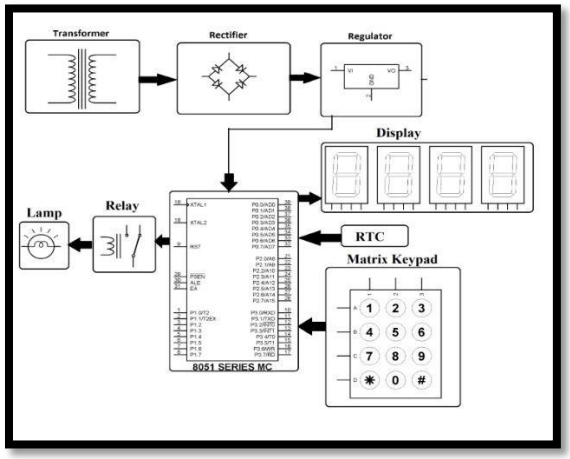
Sludge digestion:

The solids sediment from different units might be dried and disposed of. It also involves the treatment of highly concentrated wastes in the absence of oxygen by anaerobic bacteria. Sludge thickening used at medium to large plants is gravity thickening, dissolved air flotation, and centrifugation. Sludge dewatering is also known as sludge drying in which sand bed consists of a coarse sand 15 cm to 25 cm in depth. The drying period is 10-15 days and moisture content are 60% to 70% in sludge cake.

5.2 CONCEPT (ELECTRICAL):

5.2.1 PROGRAMMABLE LOAD SHEDDING:

Block Diagram:



The project is an automatic load operation system that controls load operation, multiple numbers of times according to programmed instruction. The project eliminates the manual ON/OFF switching of load. A real time clock (RTC) is used to track the time and automatically switch ON/OFF the load. This project is required for load shedding time management which is used when the electricity demand exceeds the supply and there comes a need for manually switching ON/OFF the electrical devices in time.

Hence this system eliminates the manual operation by automatically switching the load ON/OFF. A matrix keypad is interfaced with the microcontroller from where the specified time is input to the microcontroller. When this input time equals to the real time, based on the commands the microcontroller initiates that particular relay to switch ON/OFF the load. The time is displayed on a seven-segment display.

5.2.2 RAILWAY SECURITY SYSTEM USING IOT / ANY OTHER METHDOLOGY:

This section will introduce a specific scenario (IRIS) around which we are going to propose an architecture and implement a prototype. The scenario envisioned a continuous monitoring of trains and railway infrastructure. The scenario puts forward the interoperability of security requirement and this section will explain this issue.

Scenario Description: The purpose of this scenario is twofold (i) detecting any unusual condition such as high temperature of components, vibrations and unexpected movement, and (ii) transferring and making available such information to different actors (i.e., train operator, rail infrastructure owner, consumer) involved in the rail system both automatically and in a request/response demand-based passive mode. The train is equipped with several heterogeneous computing devices such as sensors, actuators, GPS receiver, and gateway-embedded computer for detection of such conditions. These devices interact using heterogeneous protocols for sensing the information in their vicinity and send it to the gateway. As an intelligent device, the gateway figures out any irregularity, and it sends the details to the smart train operator. If the irregularity information is related with rail infrastructure, then the infrastructure owner and provider will also be interested to know the information.

The gateway sends this information to all concerning actors, but they also need monitoring and periodically checking about the condition of the train and the rail infrastructure. The gateway embedded-computer is geared with the proposed IoT virtualization framework that exposes the

train sensors as services for enabling on-demand remote monitoring application. outlines the main elements of the IRIS scenario where the third-party service providers can access the sensor data collected from the railway infrastructures. It is required to ensure the secure access and interoperability of security when they are transferred from one administrative domain (the Railway) to another administrative (any Service Provider). In this paper, we are concerned with the following two aspects: – access to sensors and sensor data – interoperable security between different administrative domains. In order to facility sensor integration and interoperability, this work makes use of the standardized machine-to-machine (M2M) technology as suggested by ETSI.

5.2.3 MANAGEMENT THROUGH ENERGY HARVESTING CONCEPT:

HARVESTING THEORY: This section develops some useful abstractions for energy sources and energy consumers, in order to analyse the requirements for energy-neutral operation. Note that the concept of lifetime is not identical to that in a battery-powered system, since even a node which exhausted, its battery may start operating again at the next available energy-harvesting opportunity. Thus, we use a different metric—energy-neutral operation. Intuitively, energy-neutral operation can be expected in situations where energy used by the system is less than the energy harvested from the environment. A more precise statement of this requirement, however, requires considering the exact system constraints under which energy is used.

Power Management in Energy Harvesting Sensor Networks:

Energy sources may be classified into the following types:

1. Uncontrolled but predictable: Such an energy source cannot be controlled to yield energy at desired times but its behaviour can be modelled to predict the expected availability at a given time within some error margin. For example, solar energy cannot be controlled. However, models for its dependence on diurnal and seasonal cycles are known and can be used to predict availability. The prediction error may be improved using commonly available weather forecasts for the region where a system is deployed.
2. Uncontrollable and unpredictable: Such an energy source cannot be controlled to generate energy when desired and yields energy at times which are not easy to predict using commonly available modelling techniques or the when the prediction model is too complex for implementation in an embedded system. For example, vibrations in an indoor environment may be harvested to yield energy using methods such as Roundy et al. [2004], but predicting the vibration patterns may be impractical.
3. Fully controllable: Energy can be generated when desired. For example, consider self-power flashlights, which the user may shake to generate some energy whenever needed.
4. Partially controllable: Energy generation may be influenced by system designers or users but the resultant behaviour is not fully deterministic. For example, an RF energy source may be installed in a hall and multiple harvesting nodes, such as RFID's, may extract energy from it. However, the exact amount of energy produced at each node depends on RF propagation characteristics within the environment and cannot be controlled.

- **Conditions for Energy-Neutral Operation**

  Let us now consider the loads which use the energy source. Suppose the power output from the energy source is Ps(t) at time t, and the energy being consumed at that time is Pc(t). The following three cases can be separated to model the energy behaviour of a load and write the physical condition on energy conservation. These conditions will help us derive requirements on Ps(t) and Pc(t), which allow energy-neutral operation to be guaranteed.

- **Harvesting system with no energy storage:**

  The first case considers a harvesting system that has a transducer to extract energy from the environment and this energy is directly used by the load. There is no facility to store energy. For example, consider the device in Paradiso and Feld Meier [2001], which generates energy from the press of a button and this energy is used to transmit a radio packet during the button press itself. A water-powered flour mill is another example: the mill operates while the water is flowing. For such harvesting devices, the device can operate at all t when,

  $$Ps(t) \geq Pc(t) \quad \ldots\ldots (1)$$

  A. Any energy received at times when $Ps(t) < Pc(t)$ is wasted. Also, when $Ps(t) \geq Pc(t)$, the energy, $Ps(t) - Pc(t)$ is wasted.

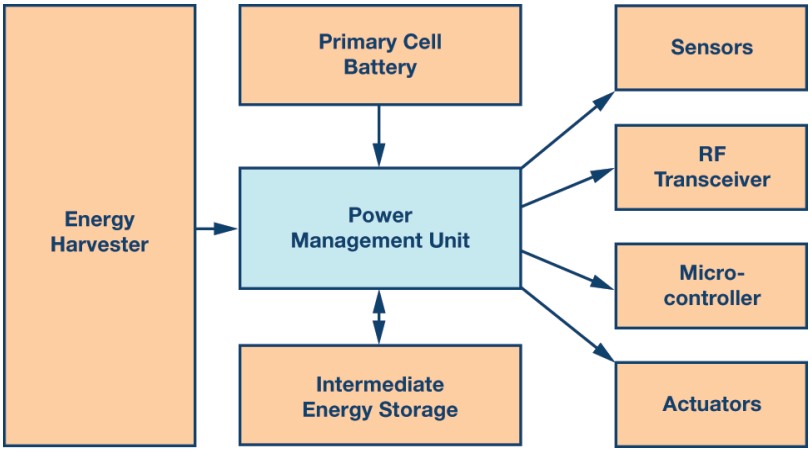
- **Harvesting system with ideal energy buffer**

  In many instances, the energy generation profile may be very different from the consumption profile. To help support this scenario, consider a device that has an ideal mechanism to store any energy that is harvested. The stored energy may be used at any time later. The ideal energy buffer is defined to be a device that can store any amount of energy, does not have any inefficiency in charging, and does not leak any energy over time. For this case, the following equation should be satisfied for all non-negative values of T:

  $$T\ 0\ Pc(t)\ dt \leq T\ 0\ Ps(t)\ dt + B0\ \forall\ T \in [0, \infty) \quad \ldots\ldots (2)$$

  where B0 is the initial energy stored in the ideal energy buffer.

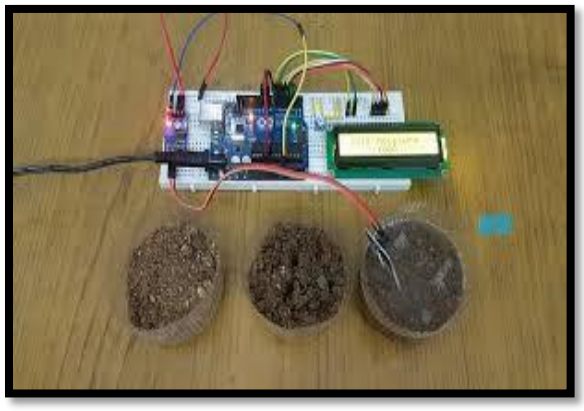
Diagram



5.2.4 MOISTURE MONITURING SYSTEM:

Materials and Methods: The SKU: SEN0193 capacitive soil moisture sensor, with dimensions of 9.8 × 2.3 cm (L × W) was used for this study. The SKU: SEN0193 sensor can be powered from a voltage source in the range of 3.3 to 5.5 V. Thus, it can be interfaced with low-power microcontrollers. In addition, the sensor is made of corrosion-resistant material which increases durability. In parallel, SM-200 a well-established commercially available soil moisture sensor was used for comparison to evaluate the accuracy of the SKU: SEN0193 sensor. The SM-200 sensor operates at 100 MHz, which measures a material (soil, water, air) response to polarization in an electromagnetic field (i.e., permittivity). The permittivity of the soil can be detected as a voltage output corresponding to the soil moisture content. The measuring accuracy is ±0.3% for volumetric water content, θ from 0 to 0.50 m3 m−3. The SM-200 sensor has been used in studies as a reliable soil moisture sensor to determine the soil moisture content in the plant root zone [and as a reference sensor to compare the accuracy of other capacitive-type soil moisture sensors. In addition, the SHT30 temperature and humidity sensor was used to obtain the temperature and humidity of the air. Commercially available organic-rich gardening soil was obtained from a local producer (Gardening. Pro, Maruki, Japan), hereafter referred to as organic-rich soil. This soil was originally obtained from the surface of the kanto loam layer (Black soil, Kanuma city, Tochigi Prefecture, Japan). The measured organic matter content and mineral content were 24.8 and 75.2%, respectively. The air-dried soil was sieved through a 2 mm mesh to remove aggregated soil clumps, and the <2 mm fraction of the soil was used in this study. In addition, a laboratory soil mixture was prepared by mixing the organic-rich soil with vermiculite in a 1:1 ratio. This soil mixture was used as a growing medium for laboratory plants.

Data Acquisition and Analysis via an Internet-Based Platform: The data acquisition system used in this study consisted of two main components called the microcontroller unit and the Wi-Fi module. The main microcontroller STC89C52RC was operated at a speed of 11.0592 MHz A software-implemented I2C bus was used to interface a 16 × 2 LCD (1602 character-type liquid crystal display) module, an ADS1115 16-bit analog-to-digital converter (ADC), and temperature and humidity sensor with the microcontroller. An ESP8266-12E low-cost serial-to-Wi-Fi module was interfaced through STC89C52RC inbuilt UART.



The analog data output pin of the SKU: SEN0193 sensor was connected to the ADS1115 with a full-scale range of ±4.096 V. The ADS1115 converted the voltage of SKU: SEN0193 sensor to raw counts (raw). Thing Speak API, an open IoT (Internet of Things) platform, was used to collect and analyse data with MATLAB@ analytics. The assembly program for the microcontroller was written by using Keil µVision 5 IDE, and AT commands were used to control the Wi-Fi module.

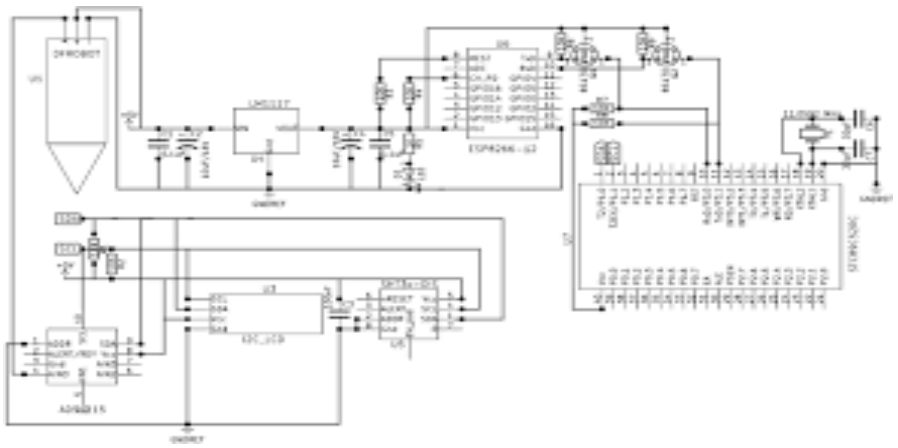


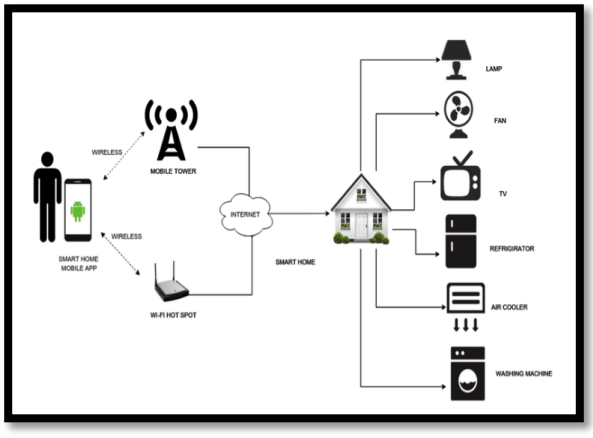
DIAGRAM SHOW CONNECTION OF MOISTURE MONITORING SYSTEM

Importance of agriculture: It helps to farmers in their farm.

Cost:

SR. NO.	EQUIPMENTS	PRICE (Rs.)
1	LED Display	300
2	Microcontroller	500
3	Wi-Fi Module	250
4	A/D Converter	350
5	Sensor	200
6	Wire	120
The total cost of moisture monitoring system is Rs. 1720		

5.2.5 HOME AUTOMATION USING IOT/ANY OTHER METHODOLOGY:



Easy Home or Home automation plays a very important role in modern era because of its flexibility in using it at different places with high precision which will save money and time by decreasing human hard work. Prime focus of this technology is to control the household equipment's like light, fan, door, AC etc. automatically. This research paper has detailed information on Home Automation and Security System using Arduino, GSM and how we can control home appliances using Android application.

Whenever a person will enter into the house then the count of the number of persons entering in the house will be incremented, in Home Automation mode appliances will be turned on whereas in security light will be turned on along with the alarm. The count of the number of persons entering the house is also displayed on the LCD screen. In Home Automation mode when the room will become empty i.e., the count of persons reduces to zero then the appliances will be

turned off making the system power efficient. Moreover, a person can control his home appliances by using an android application present in his mobile phone which will reduce the human hard work. At the same time if anyone enters while security mode is on a SMS will be sent to house owner's mobile phone which will indicate the presence of a person inside the house. The alarm can be turned off using SMS or Android application.

5.2.6 PC BASED ELECTRICAL LOAD CONTROL:

Automation system is mostly depending upon the power systems in industrial, residential or commercial, which needs remote controlling and monitoring. By employing wireless technologies, it is more competent to execute a suitable technology depending upon the requirements of the proposed system like speed, cost, and distance.

For distant controlling and monitoring of different loads and by means of efficient power usage through real time power spending with the help of a PC based graphical user interface application. The progress of technology equipment is becoming simpler and easier for us. Automated systems have more benefits over manual system. PC based electrical load-controlled systems are highly reliable, precise and time conserving systems. They give number of features like rapid data storage, transfer data and data securities.

FIG 5.1: PC BASED ELECTRICAL LOAD CONTROL

5.2.7 ELECTRICAL PARAMETERS MEASUREMENTS:

Electrical measurements are the methods, devices and calculations used to measure electrical quantities. Measurement of electrical quantities may be done to measure electrical parameters of a system. Using transducers, physical properties such as temperature, pressure, flow, force, and many others can be converted into electrical signals, which can then be conveniently measured and recorded.

FIG 5.2: ELECTRICITY METER AND CURRENT AND VOLTAGE MESURMENT METER

CHAPTER 6: SWATCHH BHARAT ABHIYAN (CLEAN INDIA)

Swachh Bharat Mission is a mass movement for cleanliness launched on 2nd October 2014 by the Prime Minister of India. The Swachhta Abhiyan has turned into a National Movement with citizens now becoming active participants in cleanliness activities across the nation. The dream of a Clean India on seen by Mahatma Gandhi is being realized with millions of people across the country joining the cleanliness initiatives of the government departments, NGOs and local community centers to make India clean as a part of this.

6.1 SWATCHHTA NEEDED IN ALLOCATED VILLAGE - EXISTING SITUATION WITH PHOTOGRAPH:

FIG 6.1: EXISTING SITUATION PHOTOGRAPH - 1

FIG 6.2: EXISTING SITUATION PHOTOGRAPH - 2

FIG 6.3: EXISTING SITUATION PHOTOGRAPH - 3

As village every Indian village has its own cleanliness techniques like dumping the wastes into the open ground or storing in their backyard and collecting the wastes by the sweepers and dumping into the dustbins near the village. In a village waste collection system is good and people of village have proper place to throw that waste and maintain hygiene in village. Everything in village is pretty much clean.

6.2 GUIDELINES – IMPLEMENTATION IN ALLOCATED VILLAGE:

- The Swachh Bharat Mission is split into two sub–Missions Swachh Bharat Mission (Gramin) and Swachh Bharat Mission (Urban).
- Swachh Bharat Mission (Gramin), Gram Panchayats and Zilla Parishads will work on war footing to make sure that all households in all villages have functional water supply and toilet facilities. Productive use of night soil as bio-fertilizers is also on the cards.
- A project proposal shall be prepared by the district, scrutinized and consolidated by the State Government into a State Plan. The State Plan with district wise details will be shared with the Government of India (Swachh Bharat Mission-Ministry of Drinking Water and Sanitation). This Plan will include a 5-year Plan along with 5 independent Annual Plans which merge into the 5-year Plan. These plans shall be approved by the Ministry each year.
- On the basis of formative research and consultation rounds, the State shall develop a tailor-made Communication Strategy, a Communication Plan, and material and will train community mobilisers to use these tools. Funds are to be made available for these preliminary IEC works including for triggering behaviour change.
- This will endeavour to reach every household in every community and shall disseminate information regarding the need for safe sanitation, the ill effects of open defecation, and getting the population oriented towards satisfying their felt-needs.
- The provision of Incentives for individual household latrine units to the rural households is available to States that wish to provide the same. This may also be used to maximize coverage so as to attain community outcomes.

6.3 ACTIVITIES DONE BY STUDENTS FOR ALLOCATED VILLAGE:

We give awareness about following things:

- 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.
- Stop your friends if they are making such mistakes.
- Spread awareness to keep our village clean.

CHAPTER 7: VILLAGE CONDITION DUE TO COVID-19

India has overtaken Brazil and become the second-worst affected country in the world by the coronavirus pandemic, with more than 4 million cases. COVID-19 had mostly remained in India's cities, but the disease is now spreading to rural India – an area with over 850 million people and far worse healthcare. The reason for this shift appears to be migrant workers who have been returning to their villages since lockdown was eased at the end of June. The medical response to stop the spread and treat those infected has been inadequate, according to media reports.

With one trained doctor for every 1,497 people, against the World Health Organization recommended one per 1,000, and public health expenditure for 2018 at just 1.3% of GDP, India faces an uphill struggle in dealing with the pandemic. While two-thirds of India's population lives in rural areas, there are almost four times as many health workers per person in cities. Most rural communities rely on untrained health workers. Over two-thirds of these rural health providers have no formal medical training, but remain the only option of medical support for most of the rural population.

7.1 TAKEN STEPS IN ALLOCATED VILLAGE RELATED EXISTING SITUATION:

This situation is worsened by the stigma and misinformation that surrounds COVID-19 in India. Fear of the virus has led to widespread mistrust of trained healthcare professionals. Indian doctors have reported being evicted from rented accommodation and others have been violently targeted in some slum communities.

The misconception is that health professionals are sources of infection and that they will force people to be removed from their families into quarantine centres. These centres are viewed with suspicion and fear. The stigmatization of those infected or suspected to have COVID-19 is likely to result in unreported cases. And, indeed, some reports suggest that this is taking place. This means the situation can only get worse for COVID-19 victims and is undermining efforts to mitigate the pandemic.

In the long term, it threatens India's recovery and progress, with the potential for many people to become debilitated with illness and economic hardship. In rural India, basic preventative measures of washing hands pose challenges because of the lack of access to clean running water. Trust in and cooperation with the state, health professionals, or law enforcement agencies is key in the context of a pandemic. This is evidenced in countries such as Germany, South Korea and Taiwan, where trust is high, as well as the Indian state of Kerala and India's biggest slum Dharavi in Mumbai, where citizens have cooperated and followed the guidelines. In each of these examples, the spread of the virus has been halted and controlled by a rigorous approach of test, track and trace. In a parliamentary democracy, the bedrock of this approach is the willingness of the people to cooperate, accept responsibility and have confidence in the system. These three pillars, in turn, are anchored in the trust citizens have in the government machinery

delivering public services. India's pandemic response has made it clear how feeble such trust really is.

Trust in a pandemic:

The situation in India has highlighted the weaknesses of public healthcare provision. India requires more resources to expand the pool of trained doctors accessible to its majority rural population and improve the trust people have in them.

Perhaps making careful use of informal health practitioners could be one way to do this. While the treatment they provide is often unsafe, most are usually trusted. My research into a women's self-help network, conducted over eight years between 2009-17 in rural Bihar, India, suggests that many rural people have unreserved trust in their local village informal health practitioner. This is also echoed in other states of India.

These practitioners are not trained, and often patients end up being taken to the city at great expense. The villagers in my research were aware of these limitations but valued the support and immediate access, which can be lifesaving. I witnessed an informal practitioner removing a bone from the throat of an elderly man using crude iron tongs. The man had been taken for dead by his family after severely choking as he ate.

I think that this faith in the informal practitioner could be harnessed, allowing the trust gap between people and the agencies delivering public health services to be bridged. With correct messaging, this could help overcome stigmatization of COVID-19, compliance with public health measures and belief in medical professionals. My in-depth interviews with informal practitioners showed that many of them would like further professional training.

There is scattered evidence of informal practitioners leading COVID-19 preventative measures in some villages. A coordinated effort to train village practitioners, and creating a network of informed health workers that have community trust, could boost pandemic support in rural India. Others have suggested this, but using trust as a key pillar to improve public health within scarce resources offers a novel approach. In the long run, this network of trained public health workers could improve healthcare in rural India.

7.2 ACTIVITIES DONE BY STUDENTS FOR ALLOCATED VILLAGE:

Proactive measures are needed on the part of the government and civil society to safeguard rural populations from the economic fallout of this pandemic. These could include:

1. Continuing the supply chain of midday meals and Anganwadi meals, and delivering them to the families' doorsteps (like Kerala has done), so that children and pregnant mothers get at least one meal a day.
2. Supplying free ration to rural households through the public distribution system.

3. Supporting rural households with 30-50 days' worth of labor wages, from the MGNREGA budget.
4. Leveraging the SHG network and ASHA workers to disseminate IEC material.
5. Extending Village Organizations (VOs) to provide soft loans to households that lose wage days and/or incur COVID-19-related health expenses—State Rural Livelihood Missions may consider extending the use of the Vulnerability Reduction Fund (VRF) to the VOs for this purpose.
6. Rescheduling bank loan repayment cycles for SHGs and individual agricultural debtors.

7.3 ANY OTHER STEPS TAKEN BY STUGENTS / VILLAGERS:

The current crisis is one which we are not fully equipped for, nor know enough about. Preparing and empowering the rural population would go a long way in this fight. We provide awareness, safety measures and precautions regarding COVID-19.

FIG 7.1: SOCIAL DISTANCING

FIG 7.2: HAND SANITIZATION

CHAPTER 8: SUSTAINABLE DERIGN PLANNING PROPOSAL (PROTOTYPE DESIGN) PART – I

8.1 DESIGN PROPOSALS:

8.1.1 SUSTAINABLE DESIGN (DRAINAGE SYSTEM):

Drainage is the method of removing surface or sub-surface water from a given area. Drainage systems include all of the piping within a private or public property that conveys sewage, rainwater, and other liquid waste to a point of disposal. The main objective of a drainage system is to collect and remove waste matter systematically to maintain healthy conditions in a building. Drainage systems are designed to dispose of wastewater as quickly as possible and should prevent gases from sewers and septic tanks from entering residential areas.

Residential Drainage Systems: Residential drainage systems remove excess water from residential areas. This system helps whisk water away from walkways, driveways, and roofs to avoid flooding.

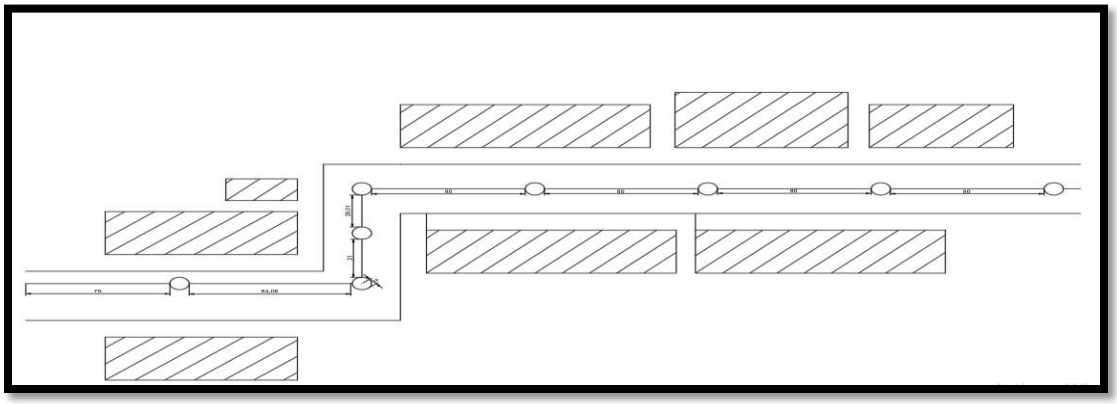
1. **Surface Drainage Systems:** Surface drainage systems contain shallow ditches dug in a parallel pattern, which act as canals for run-off water. Theses ditches lead the water into the main drain to avoid water pooling and flooding.
2. **Subsurface Drainage Systems:** A subsurface drainage system is also known as a French drain. Subsurface drains are placed beneath the top layer of soil to remove excess water at the root level. Subsurface drains require the digging of deep ditches and the installation of underground pipes. A large collector drain is installed to collect water from the pipes.
3. **Slope Drainage Systems:** Slope drains allow water to flow downward from a structure with the aid of pipes moving down a slope. A pipe is installed and anchored into a small incline, which causes water to flow through the pipe and away from the structure.
4. **Downspout and Gutter systems:** Downspouts collect water from gutters and divert it to the ground. A downspout is typically connected to a gutter system on a building and carries water away from the roof down to the ground. Downspouts empty out the water on a slope so that the water does not pool at the base of the downspout.

We know the population of the Utara village is 546 in 2011. The population increase rate of Utara
village is 1.41, Then we go for 30 years for that we go for the equation of population $P_n = n + i P_o$.
Then we got the population after 30years is 778. By the help of the equation. Where P_n is the future population n is decade (i) is the increase rate of population, P_o is the current population.
$P_n = n + i P_o$
$P_{(2041)} = 3 + (1.41*546) = 778$
Assume per capital demand = 135 LPCD
Avg. demand of village is =778*135 = 1.05*105 lit/ day.
Max. Daily demand = 1.5* Avg. Demand of village = 1.5*1.05*105 = 1.575*105 lit/day.
Waste water generation= 80% *1.575*105 =126000 lit/day =0.0014 m3/s

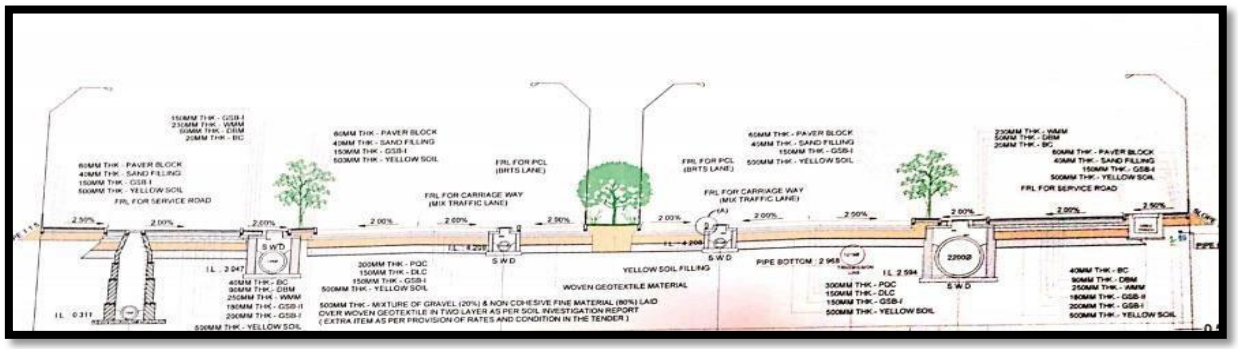
Max. Velocity= 2.0m/s
C/s area of pipe=A= Q/V= 0.0014/2= 0.0007
$(\pi/4) * d2=0.0007$
$D=\sqrt{((4*0.0007)/\pi)} = 0.029m = 0.03m = 30mm$

ABSTRACT SHEET OF DRAINAGE SYSTEM					
SR. NO.	**DESERIPTION**	**QUANTITY**	**RATES**	**PER**	**AMOUNT**
1.	Branch Pipe line 110MM PIPES	309	150	PIPE	46350
2.	T-JOINTS	37	100	PIPE	3700
3.	C-JOINTS	2	50	PIPE	100
4.	JOINTS	453	300	PIPE	135900
5.	Main Pipe line250MM PIPES	633	300	PIPE	189900
6.	45* ANGLE JOINTS	3	75	PIPE	225
7.	House pipe line 60MM PIPES	125	100	PIPE	12500
		Total			499675
		3% Contingency			14990
		2% Work Charge Establishment			9993.5
		Total			524658.5
		10% Contractor Profile			52465.9
		Grand Total			577124.4

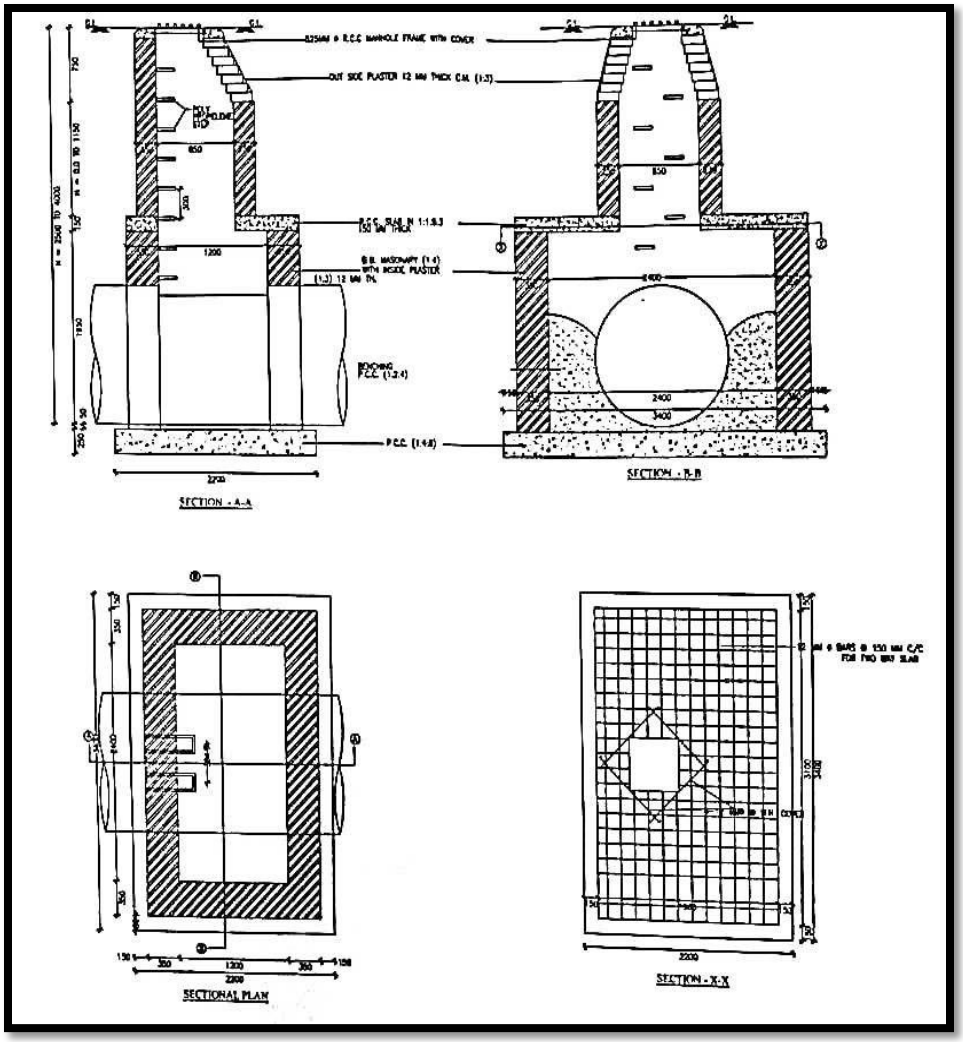
Provide pipe of 60mm diameter (for house)



PLAN OF DRAINAGE SYSTEM



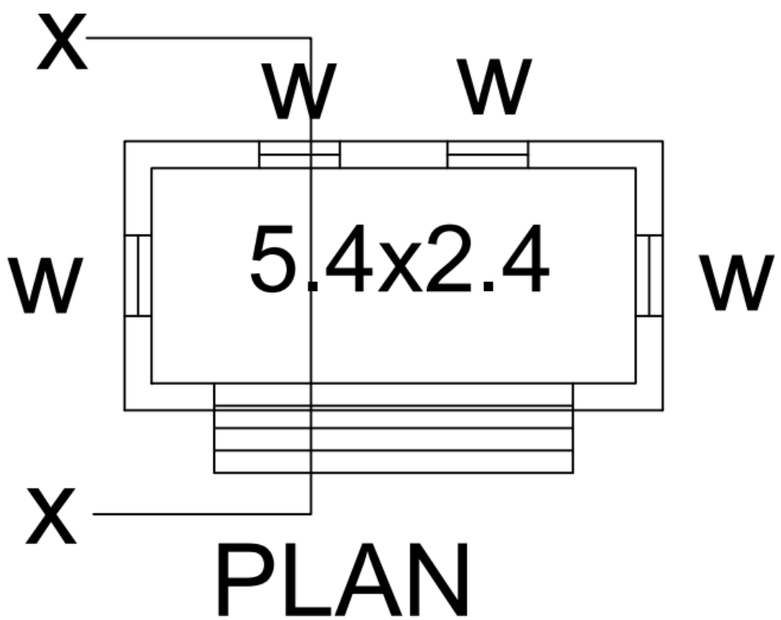
ELEVATION OF DRAINAGE SYSTEM



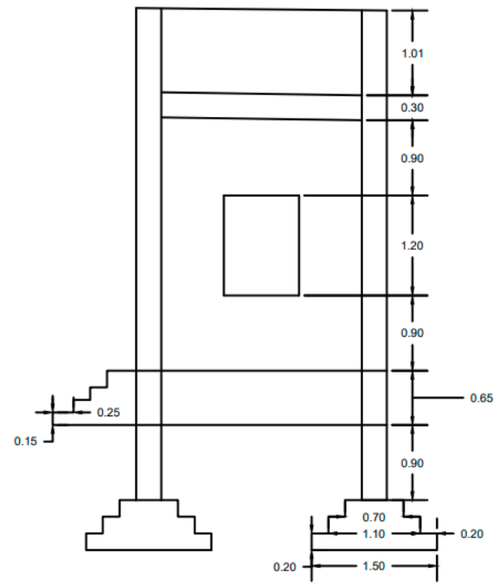
SECTION ELEVATION OF DRAINAGE

DRAINAGE LINE PROVIDED

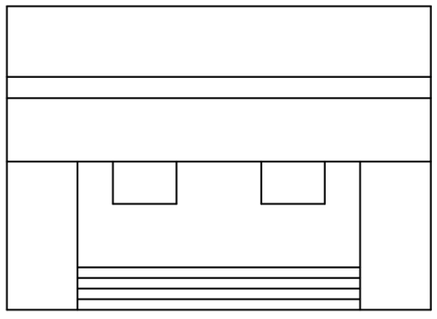
8.1.2 PHYSICAL DESIGN (BUS STAND DESIGN):



PLAN



SECTION X-X



ELEVATION

DESIGN NO.	**BUS STAND**
PREPARED BY	**TWINKLE CHAMPANERIA BHAVIK BHENSAL**
PROJECT NAME	**VISHWAKARMA YOJANA PHASE VIII RANASAR, GANDHINAGAR**
INSTITUTE	**S.N.P.I.T. & R.C., UMRAKH**
UNIVERSITY	**GUJARAT TECHNOLOGICAL UNIVERSITY**

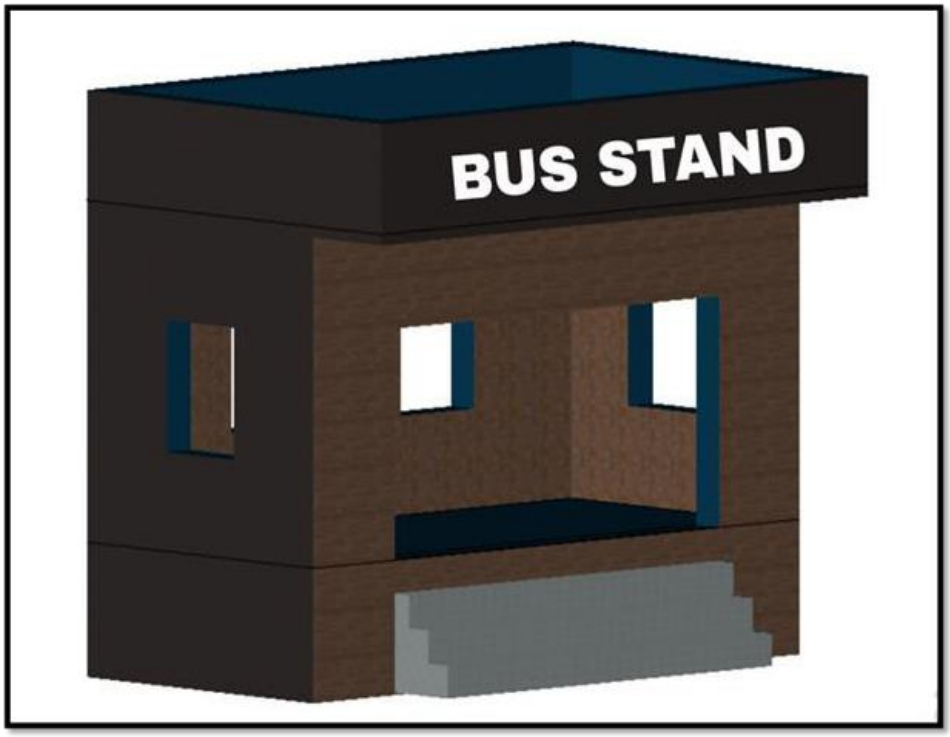


FIG 8.1: 3D VIEW OF PLAN OF BUS STAND

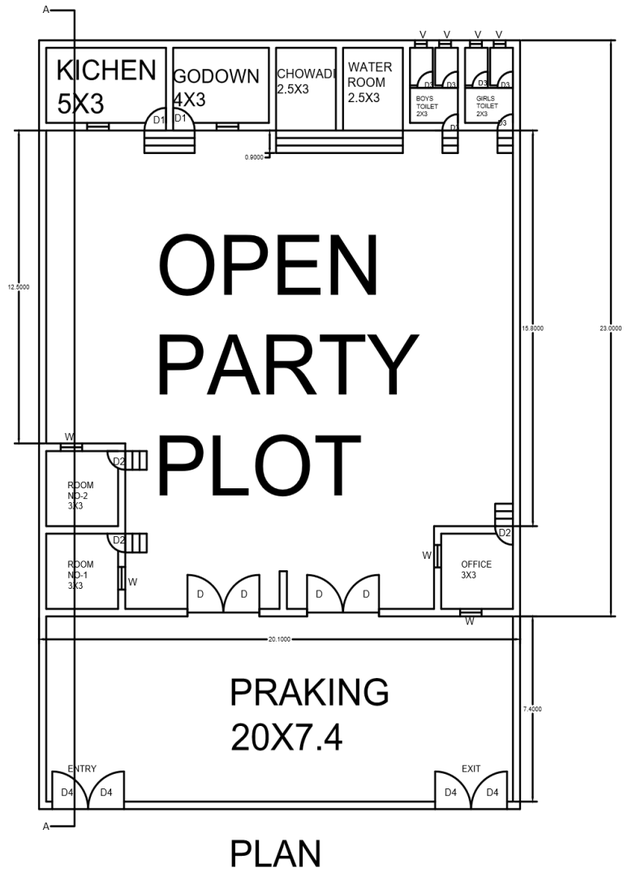
MEASUREMENT SHEET OF BUS STAND						
SR. NO.	**DESCRIPTION**	**NO.**	**L**	**B**	**H**	**QUANTITY**
	Total Centre line = (5.7 X 2) + (2.7 X 2)					
1.	Excavation for foundation up to 1.5 depth	1	16.8	0.90	0.90	13.61
	For steps: L=1.2+0.15=1.5m	1	1.50	0.60	0.15	0.13
				Total:		13.74 m^3
2.	Providing and laying PCC (1:4:8) for foundation	1	16.8	0.90	0.30	4.54 m^3
	Steps	1	1.50	0.90	0.15	0.20 m^3
				Total:		4.736 m^3
3.	First class brick masonry C:M (1:6) for foundation					
	Step:1 (60cm)	1	16.8	0.60	0.30	3.02
	Step:2 (50cm)	1	16.8	0.50	0.30	2.52
				Total:		5.544m^3
4.	Back filling in foundation =13.61-5.544=8.07m3					8.07m^3
5.	First class brick masonry G.L to P. L L=16.8m	1	16.8	0.4	0.575	3.864 m^3

	Step1.	1	1.2	0.3	0.15	0.054
	Step2.	1	1.2	0.3	0.30	0.108
	Step3.	1	1.2	0.3	0.45	0.162
				Total:		4.19 m^3
6.	DPC(2.5cmthick)	1	16.8	0.4	-	6.72 m^2
	Deduction: O	1	4.5	0.4	-	1.8
				Net total:		4.92 m^2
7.	First class brick masonry for superstructure L=16.8m	1	16.8	0.3	3	15.12m^3
	Deduction					
	(1) Lintel	1	16.8	0.3	0.15	0.756
	(2) Opening (O)	1	4.5	0.3	2.1	2.84
	(3) Window (W)	4	0.9	0.3	1.2	1.3
				Net total		10.224 m^3
8.	Providing and laying RCC (1:2:4) for slab, lintel					
	(1) Lintel L = 16.8 m	1	16.08	0.3	0.15	0.756
	(2) RCC Slab	1	6	3	0.1	1.8
				Total		2.56 m^3
9.	Providing mild steel reinforcement for RCC work including binding and bending and placing in position Quantity=1%of volume of concrete =2.56×78.54 =201.06kg Say=202kg			Total		202 kg
10.	12cm thick plaster					
	(A)Internal plaster					
	(1) Ceiling	1	5.4	2.4	-	12.96
	(2) Wall					
	(i)	2	5.4	-	3	32.4
	(ii)	2	2.4	-	3	14.4
				Total:		59.76 m^2
	(B)External wall up to parapet top					
	Lw	2	6	-	4.6	55.2
	Sw	2	3	-	4.6	27.6
	(1) Parapet top					
	Lw	2	6	0.2	-	2.4
	Sw	2	2.6	0.2	-	1.04
	(2) Parapet inside					
	Lw	2	5.6	-	0.9	10.1
	Sw	2	2.6	-	0.9	4.68
					Total:	101.02 m^2
	Deduction:					

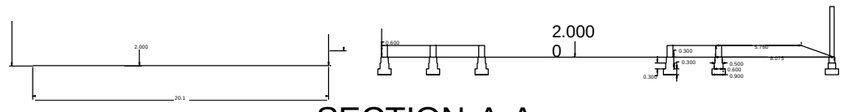
	(a)Opening (O)	1	4.5	-	2.1	9.45
	(b)Window (W)	1	0.9	-	1.2	1.08
				Total:		10.53
				Net Total		150.25 m^2
11.	5cm thick mosaic tiles flooring	1	5.4	2.4	-	12.96 m^2
12.	10 cm BBLC (1:2:4)	1	5.3	2.3	0.1	1.22 m^3
13.	Sand filling/murmur	1	5.3	2.3	0.45	5.49 m^3

ABSTRACT SHEET FOR BUS STAND					
SR. NO.	**DESCRIPTION**	**QUANTITY**	**RATE**	**PER**	**AMOUNT (Rs.)**
1.	Excavation for foundation upto1.5 m depth in ordinary soil	13.745	85	M^3	1168.33
2.	Providing and lying PCC for foundation	4.736	1500	M^3	7104
3.	1stclass brick masonry CM (1:6) for Foundation	5.544	1600	M^3	8870.4
4.	Back filling in foundation	8.07	50	M^3	403.5
5.	1^{st} class brick masonry from G.L to P. L	4.19	1600	M^3	6704
6.	Providing and lying DPC	4.92	150	M^2	738
7.	1^{st} class brick masonry CM (1:6) for Superstructure	10.224	1500	M^3	15336
8	Providing and lying RCC (1:2:4)	2.56	2500	M^3	6400
9	Providing mild steel reinforcement for RCC work	202	35	KG	7070
10	12 mm thick cement plaster	150.25	150	M^2	2253.75
11	5cmthickmosaictilesfloor	12.96	200	M^2	2592
12	10cm thick BBLC (1:2:4)	1.22	1000	M^3	1220
13	Sand filling/murrum filling	5.49	50	M^3	274.5
		Total			60134.5
		3% Contingency			1804.035
		2% Work Charges Establishment			1202.69
		Total			63141.22
		10% Contractor Profile			6314.12

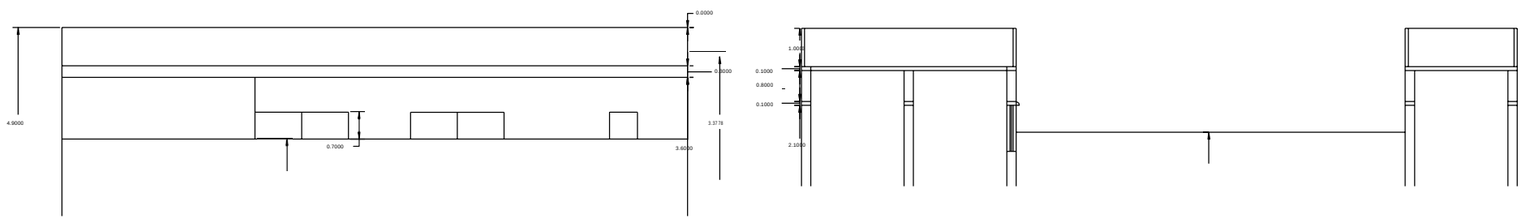
8.1.3 SOCIAL DESIGN (OPEN PARTY PLOT):



PLAN



SECTION A-A



ELEVATION

NAME	SIZE	QUANTITY
D	1.2 X 2.1	4
D1	0.9 X 2.1	2
D2	0.75 X 2.1	3
D3	0.65 X 2.1	6
D4	1.5 X 2.1	4
W	0.9 X 1.2	4
V	0.5 X 0.5	4

DESIGN NO.	**OPEN PARTY PLOT**
PREPARED BY	**TWINKLE CHAMPANERIA BHAVIK BHENSAL**
PROJECT NAME	**VISHWAKARMA YOJANA PHASE VIII RANASAR, GANDHINAGAR**
INSTITUTE	**S.N.P.I.T. & R.C., UMRAKH**
UNIVERSITY	**GUJARAT TECHNOLOGICAL UNIVERSITY**

MEASUREMENT SHEET OF OPEN PARTY PLOT						
SR. NO.	**DESCRIPTION**	**NO.**	**L**	**B**	**H**	**QUANTITY**
1.	Total Centre line = 22.7 x 2 + 19.8 x 3 + 3.3 x 4 + 6.6 + 3.3 x 5 = 141.1 m No. of T-junction = 9 Length = 141.1-(9×0.9÷2) = 137.45	1	137.45	0.9	0.9	111.33 m^3
	For steps: At door D_2 L=1.2M	3	1.2	0.6	0.15	0.324
	At door D_1, L= 1.5M	2	1.5	0.6	0.15	0.27
	At chowkadi, water room L = 6.6 m	1	6.6	0.6	0.15	0.594
	At toilet, L= 1.05m	2	1.05	0.6	0.15	0.189
				Total		112.70 m^3
2.	Providing and laying PCC (1:4:8) for foundation					
	Steps: D_1	2	1.5	0.9	0.15	0.405
	D_2	3	1.2	0.9	0.15	0.486
	D_3	2	1.05	0.9	0.15	0.283
	At chowakadi, water room	1	6.6	0.9	0.15	0.891
				Total		39.17 m^3
3.	First class brick masonry C:M (1:6) for foundation					
	Step: 1 (60 cm) L=138.4 m	1	138.4	0.6	0.3	24.91 m^3
	Step: 2 (50 cm) L=138.85 m	1	138.85	0.5	0.3	20.82 m^3
					Total	45.73 m^3
4.	Back filling in foundation =111.33 - 39.17 =72.16 m^3			Total		72.16 m^3
5.	First class brick masonry G.L to P. L L= 139.3 m	1	139.3	0.4	0.575	32.0.4 m^3
	At D_1 Step1.	2	0.9	0.3	0.15	0.081
	Step2.	2	0.9	0.3	0.30	0.162

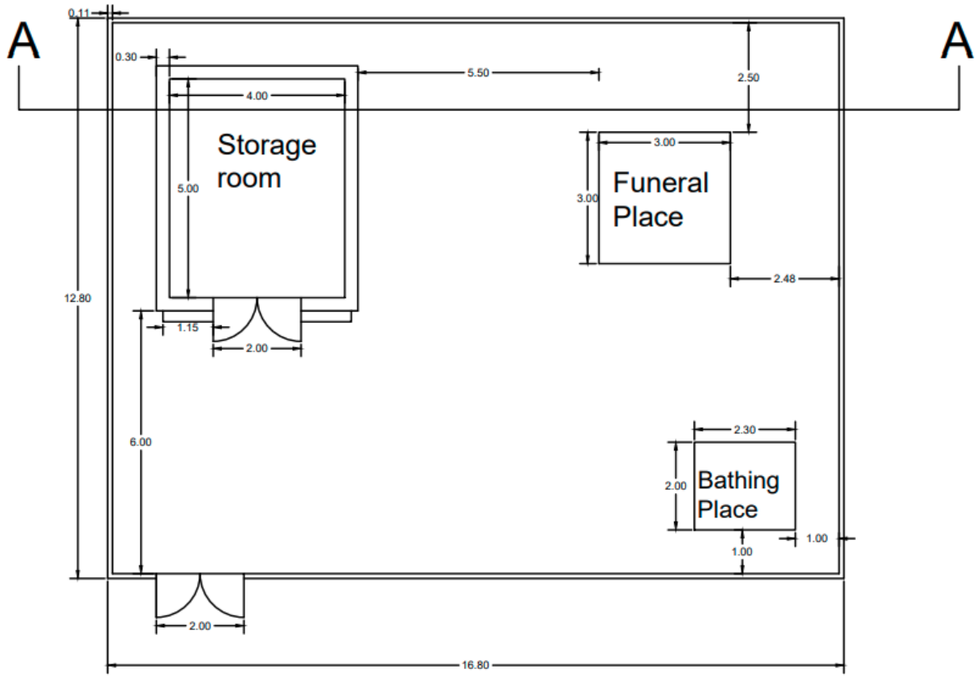
	Step3.	2	0.9	0.3	0.45	0.243
	At D_2 Step 1	3	1.2	0.3	0.15	0.162
	Step 2	3	1.2	0.3	0.30	0.324
	Step 3	3	1.2	0.3	0.45	0.486
	At chowkadi, water room Step 1	1	6.3	0.3	0.15	0.283
	Step 2	1	6.3	0.3	0.30	0.567
	Step 3	1	6.3	0.3	0.45	0.850
	At toilet, Step 1	2	0.75	0.3	0.15	0.0675
	Step 2	2	0.75	0.3	0.30	0.135
	Step 3	2	0.75	0.3	0.45	0.202
				Total		35.26 m^3
6.	DPC (2.5 cm thick)	1	139.3	0.4	-	55.72m^2
	Deduction: D	2	1.5	0.4	-	1.2
	D_1	2	1.2	0.4	-	0.96
	D_2	3	0.9	0.4	-	1.08
	D_3	2	0.75	0.4	-	0.6
				Net Total		51.88 m^2
7.	First class brick masonry for superstructure LW = 20.10m	2	20.10	0.3	3	36.18
	SW = 3m	7	3	0.3	3	18.9
	For room 1,2 LW = 3m	3	3	0.3	3	8.1
	SW = 6.9m	2	6.9	0.3	3	12.42
	For office, LW =3m	2	3	0.3	3	5.4
	SW = 3.6m	2	3.6	0.3	3	6.48
	For boundary, LW = 9.9m	1	9.9	0.3	2	5.94
	SW1= 15.80m	1	15.80	0.3	2	9.48
	SW2 =12.5m	1	12.50	0.3	2	7.5
	Deduction V	12	0.4	0.3	0.4	0.576

	At chowkadi, water room L = 3.3	1	3.3	0.3	3	2.97
	D	2	1.5	0.3	2	1.8
	D_1	2	1.2	0.3	2.1	1.512
	D_2	3	0.9	0.3	2.1	1.70
	D_3	2	0.75	0.3	2.1	0.94
	W	5	0.9	0.3	1.2	1.62
				Total		11.11 m^3
				Net total		99.28 m^3
8.	Providing RCC slab, lintel, chhajja					
	Lintel LW= 20.10	2	20.10	0.3	0.15	1.809
	SW = 3	7	3	0.3	0.15	0.945
	For room 1,2 LW = 3m	3	3	0.3	0.15	0.405
	SW = 6.9m	2	6.9	0.3	0.15	0.621
	For office, LW =3m	2	3	0.3	0.15	0.27
	SW = 3.6m	2	3.6	0.3	0.15	0.324
	Chhajja W	5	1.1	0.45	0.1	0.247
	RCC slab					
	For last portion	1	20.10	3	0.1	6.03
	For room 1,2	1	6.9	3	0.1	2.07
	For office	1	3.6	3.6	0.1	1.296
				Total		14 m^3
9.	Providing mild steel reinforcement in RCC work Quantity = 1% of volume of concrete =14×78.54 =1099.56kg			Total		1099.56kg

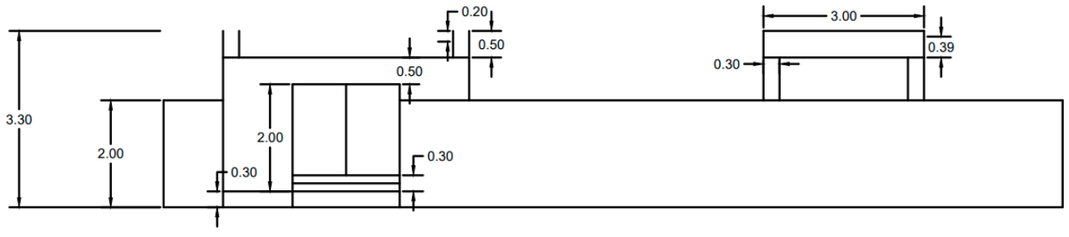
ABSTRACT SHEET OF OPEN PARTY PLOT					
SR. NO.	**DESCRIPTION**	**QUANTITY**	**RATE**	**PER**	**AMOUNT (Rs)**
1.	Excavation for foundation up to 1.5 m depth	112.70 m^3	100	M^3	11270

2.	Providing and laying PCC (1:4:8) for foundation	39.17 m^3	1500	M^3	58755
3.	First class brick masonry CM (1:6) for foundation	45.73 m^3	1600	M^3	73168
4.	Back filling in foundation	72.16 m^3	70	M^3	50512
5.	First class brick masonry GL to PL	35.26 m^3	1600	M^3	56416
6.	DPC (2.5 cm thick)	51.88 m^2	200	M^2	10376
7.	First class brick masonry for super structure	105.25 m^3	1500	M^3	157875
8	Half brick wall	16.575 m^2	1500	M^2	24862.5
9.	Providing and laying RCC (1:2:4)	14 m^3	2500	M^3	35000
10.	Providing mild steel reinforcement for RCC work including binding and	1099.56 kg	45	KG	49480.2
11.	12 mm thick plaster	712.59 m^2	150	M^2	106888.5
12.	5 cm thick mosaic tiles flooring	87 m^2	200	M^2	17400
13.	10 cm BBLC (1:2:4)	6.73 m^3	1000	M^3	6730
14.	Sand filling / murrum	30.25 m^3	60	M^3	1815
		Total			660548.2
		3 % Contingency			19816.45
		2 % Work Charge Establishment			13210.96
		Total			693575.61
		10 % Contractor Profit			69357.56
		Grand Total			762933

8.1.4 SOCIO-CULTURAL DESIGN (CEMETERY):

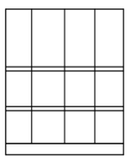


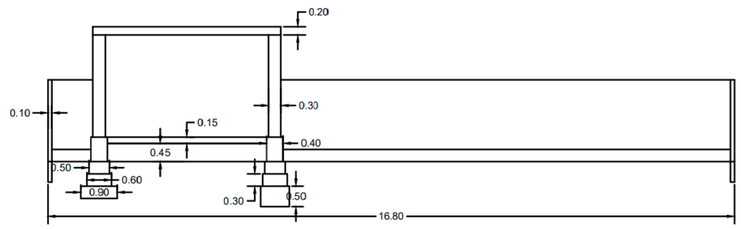
Plan



Elevation

Storage roof plan





Section A-A

DESIGN NO.	**CEMETRY**
PREPARED BY	**TWINKLE CHAMPANERIA BHAVIK BHENSAL**
PROJECT NAME	**VISHWAKARMA YOJANA PHASE VIII RANASAR, GANDHINAGAR**
INSTITUTE	**S.N.P.I.T. & R.C., UMRAKH**
UNIVERSITY	**GUJARAT TECHNOLOGICAL UNIVERSITY**

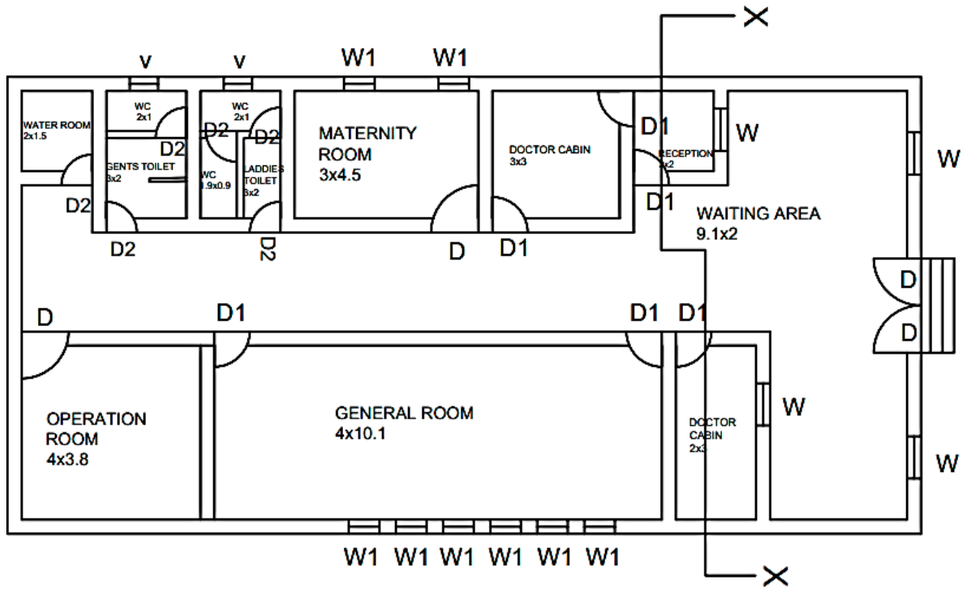
MEASUREMENT SHEET OF CEMETERY						
SR. NO.	**DESCRIPTION**	**NO.**	**L**	**B**	**H**	**QUANTITY**
	Total center line = (5.3 X 2) + (4.3 X 2) = 19.2 m					
1.	Excavation for foundation up to 1.5 m depth					
	Storage room	1	19.2	0.9	0.9	15.55 m^3
	Partition wall, LW	2	16.8	0.2	0.5	3.36
	SW	2	12.6	0.2	0.5	2.52
				Total		21.43 m^3
2.	Providing and laying PCC (1:4:8) for foundation Storage room	1	19.2	0.9	0.3	5.184 m^3
3.	First class brick masonry C:M (1:6) for foundation, Storage room Step 1 (60 cm)	1	19.2	0.6	0.3	3.46
	Step 1 (50 cm)	1	19.2	0.5	0.3	2.88
				Total		6.34 m^3
4.	Partition wall					
	Foundation to GL, LW	2	16.8	-	0.5	16.8
	SW	2	12.6	-	0.5	12.6
	GL to up to 2 m height, LW	2	16.8	-	2	67.2
	SW	2	12.6	-	2	50.4
	Deduction: Gate	1	2.5	-	2	5
					Total	142 m^2
5.	first class brick masonry GL to PL: Storage room	1	19.2	0.4	0.6	4.61 m^3
6.	Backfilling in foundation					
	Storage room 15.55 – 6.34 = 9.21 m3					9.21 m^3
	Other back filling	1	16.8	12.8	0.3	64.512
	Deduction	1	4.6	5.6	0.3	7.728

				Total		65.994 m^3
7.	First class brick masonry for super structure: Storage room	1	19.2	0.3	3	17.28
	Deduction: Lintel	1	19.2	0.3	0.15	0.864
	Door	1	2	0.3	2	1.2
				Total		15.22 m^3
8.	RCC for lintel	1	19.2	0.3	0.15	0.864 m^3
9.	Providing reinforcement for RCC work including binding and bending and placing position Quantity = 1% of volume of concrete = 0.864 X 78.54 = 67.86 kg Say 68 kg			Total		68 kg
10.	12 cm thick plaster					
	(A) internal wall plaster					
	(i) storage room LW	2	4	-	3	24
	SW	2	5	-	3	30
	(ii) partition wall LW	2	16.6	-	1.7	56.44
	SW	2	12.6	-	1.7	42.84
	(B) external wall					
	(i) storage room: LW	2	4.6	-	3.3	30.36
	SW	2	5.6	-	3.3	36.96
	(ii) partition wall: LW	2	16.8	-	2	67.2
	SW	2	12.8	-	2	51.2
	Deduction: (a) storage room door	1	2	-	2	4
	(b) main gate	1	2.5	-	2	5
				Total		330 m^2
11.	15 cm BBLC (1:2:4)					
	Funeral place	1	2	1.5	0.15	0.45
	Storage room	1	3.9	4.9	0.15	2.87

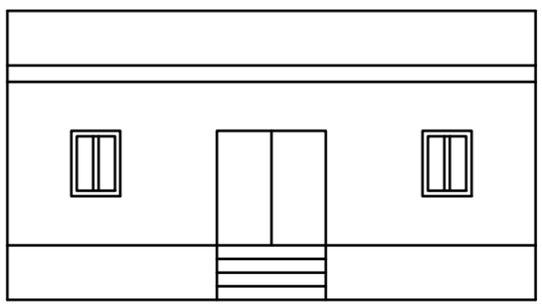
	Bathing place	1	1.9	2.29	0.15	0.65
				Total		3.97 m^3
12.	Sand filling / murum					
	Funeral place	1	2	1.5	0.45	1.35
	Storage room	1	3.9	4.9	0.45	8.6
	Bathing place	1	1.9	2.29	0.45	1.03
				Total		10.98 m^3
13.	Providing paver blocks Total area = 12.6 X 16.6 = 209.16 Deduction area Storage room = 4.6 X 5.6 = 25.76 Funeral place = 2 X 1.5 = 3 Bathing place = 2 X 2.3 = 4.6 Total 175.8 m2 = 1892.3 sq ft One block size = 0.215 sq ft No. of blocks = 1892.3 / 0.215 = 8801.4 Say 8802 nos.			Total		8802 nos.
14.	Asbestos providing: (i)	2	1.75	1.2	-	4.2
		2	2.25	1.2	-	5.4
		2	2	1.2	-	4.8
	(ii)	8	1.75	1.05	-	14.7
		2	2.25	1.05	-	4.725
		2	2	1.05	-	4.2
					Total	38.025 m^2

ABSTRACT SHEET OF CEMETERY					
SR. NO.	**DESCRIPTION**	**QUANTITY**	**RATE**	**PER**	**AMOUNT (Rs)**
1.	Excavation up to 1.5 m depth	21.43 m^3	100	M^3	2143
2.	Providing and laying PCC (1:4:8) for foundation	5.184 m^3	1500	M^3	7776
3.	First class brick masonry C:M (1:6) for foundation	6.34m^3	1600	M^3	10144
4.	Partition wall	142 m^2	1500	M^2	213000
5.	first class brick masonry GL to PL	4.61 m^3	1600	M^3	7376
6.	Backfilling in foundation	65.994 m^3	70	M^3	4619.58
7.	First class brick masonry for super structure	15.22 m^3	1500	M^3	22830
8.	RCC for lintel	0.864 m^3	2500	M^3	2160
9.	Providing reinforcement for RCC work including binding and bending and placing position	68 kg	45	KG	3060
10.	12 cm thick plaster	330 m^2	150	M^2	49500
11.	15 cm BBLC (1:2:4)	3.97 m^3	1000	M^3	3970
12.	Sand filling / murum	10.98 m^3	60	M^3	658.8
13.	Providing paver blocks	8802 nos.	25	BLOCK	220050
14.	Asbestos providing	38.025 m^2	140	M^2	5323.5
15.	Providing mild steel	2500.97 kg	45	KG	112543.65
		Total			665154.53
		3 % Contingency			19954.64
		2 % Work charge Establishment			13303.09
		Total			698412.26
		10 % Contractor Profit			69841.226
		Grand Total			768253.486

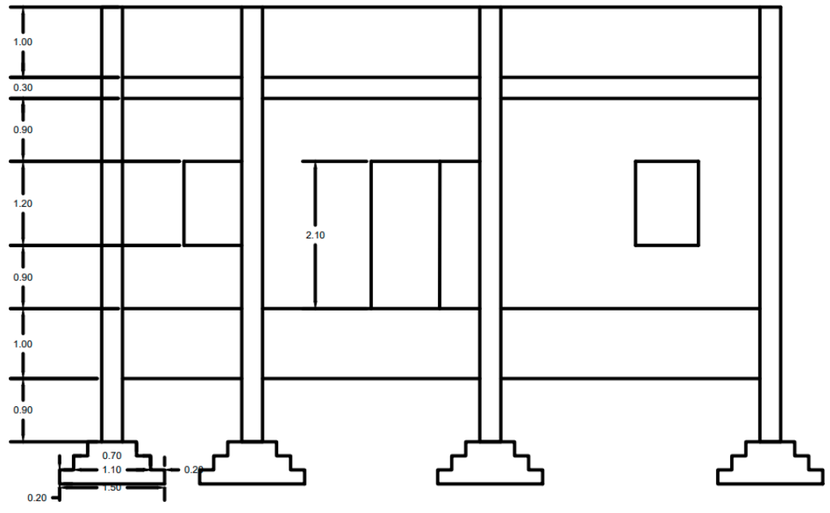
8.1.5 SMART VILLAGE DESIGN (PUBLIC HEALTH CENTRE):



PLAN



ELEVATION



SECTION X-X

DESIGN NO.	**PUBLIC HEALTH CENTER**
PREPARED BY	**TWINKLE CHAMPANERIA BHAVIK BHENSAL**
PROJECT NAME	**VISHWAKARMA YOJANA PHASE VIII RANASAR, GANDHINAGAR**
INSTITUTE	**S.N.P.I.T. & R.C., UMRAKH**
UNIVERSITY	**GUJARAT TECHNOLOGICAL UNIVERSITY**

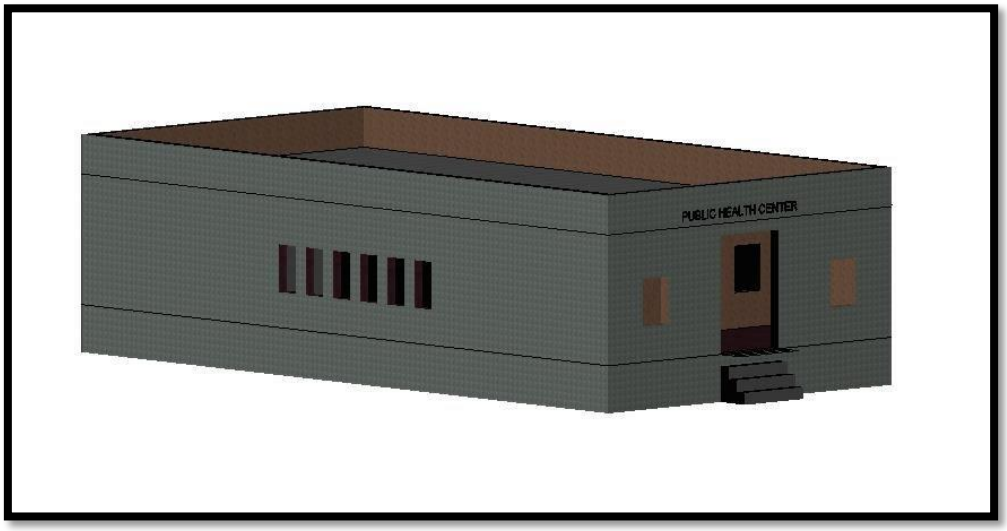


FIG 8.2: 3D VIEW OF PLAN OF PUBLIC HEALTH CENTRE

MEASUREMENT SHEET OF PUBLIC HEALTH CENTER						
SR. NO.	**DESCRIPTION**	**NO.**	**L**	**B**	**H**	**QUANTITY**
	Total Centre = (19.1×4) + 1.8 + (9.4x4) + (5.1x3) + 2.3 + 4.3 = 137.7 No. of T-junction = 34					
1.	Excavation for foundation up to 1.5 depth =137.7-(34×0.9÷2) =122.4	1	122.4	0.9	0.9	99.144 m^3
	For steps: L = 1.2 + 0.15 = 1.5m	1	1.5	0.6	0.15	0.135 m^3
				Total		99.279 m^3
2.	Providing and laying PCC (1:4:8) for foundation	1	122.4	0.9	0.3	33.048 m^3
	Steps	1	1.5	0.9	0.15	0.236 m^3
				Total		33.28 m^3
3.	First class brick masonry C:M (1:6) for foundation					
	Step:1 (60cm) L=103.55m	1	127.5	0.6	0.3	22.95 m^3
	Step:2 (50cm) L=104.85m	1	129.2	0.5	0.3	19.38 m^3
				Total		42.33 m^3
4.	Back filling in foundation = 80.72 - 34.37 = 46.35 m^3					
				Total		56.814 m^3
5.	First class brick masonry G.L to P. L					
	L=106.15m	1	130.9	0.4	0.575	30.107 m^3
	Step1.	1	1.2	0.3	0.15	0.054 m^3
	Step2.	1	1.2	0.3	0.3	0.108 m^3
	Step3.	1	1.2	0.3	0.45	0.162 m^3

				Total		30.43 m^3
6.	DPC(2.5cmthick)	1	130.9	0.4		52.36 m^2
	Deduction: D	2	1.2	0.4		0.96 m^2
	D1	2	1.5	0.4		1.2 m^2
	D2	6	0.9	0.4		2.16 m^2
	D3	3	0.75	0.4		0.9 m^2
				Total		5.22 m^2
				Net Total		47.14 m^2
7.	First class brick masonry for superstructure L=107.45m	1	132.6	0.3	3	119.34 m^3
	Deduction (1) Lintel	1	132.6	0.3	0.15	5.967 m^3
	(2) Door: D	2	1.2	0.3	2.1	1.512
	(a)D_2	6	0.9	0.3	2.1	3.402
	(b)D_3	3	0.75	0.3	2.1	1.42
	(c)D_1	2	1.5	0.3	2.1	1.89
	3)window W	11	0.9	0.3	1.2	3.564
	Ventilation	2	0.6	0.3	0.6	0.216
				Total		101.37 m^3
				Net Total		80.69 m^3
8.	Half brick partition wall in C:M (1:6)					
	PLW	2	2	-	3	12
	PSW	1	1.9	-	3	5.7
	Deduction: D_4	3	0.65	-	2.1	4.1
				Net Total		13.6 m^3
9.	Providing and laying RCC (1:2:4) for slab, lintel, chhajja					
	(1) Lintel L=132.6m	1	132.6	0.3	0.15	5.967
	(2) Chhajja					
	(a)W	9	0.9	0.45	0.1	0.364
	(b)D	2	1.2	0.45	0.1	0.108
	(3) RCC Slab	1	19.4	9.7	0.1	18.82
					Total	25.26 m^3
10.	Providing mild steel reinforcement in RCC work, Quantity = 1% of volume of concrete = 25.26 × 78.54 = 1983.92kg			Total		1983.92 kg
11.	12 cm thick plaster					
	(A) Internal plaster					
	(1) Ceiling					
	Waiting room.	1	9.1	2	-	18.2
	Reception	1	2	2	-	4
	Medical store	1	4	2	-	8
	Doctor cabin	1	3	3	-	9
	Toilet	2	2	3	-	12

	Maternity room	1	3	4.5	-	13.5
	General room	1	4	10.1	-	40.4
	Operation room	2	2	3	-	12
	Water room	1	2	1.5	-	3
	Passage				-	
	Front	1	2.5	2.3	-	5.75
	Middle	1	1.5	13	-	19.5
	Last	1	2.5	1.5	-	3.75
	Wall					
	Waiting room: I	2	2	-	3	12
	II	1	9.1	-	3	27.3
	III	1	2.3	-	3	6.9
	IV	1	4.3	-	3	12.9
	Reception	4	2	-	3	24
	Medical: I	2	4	-	3	24
	II	2	2	-	3	12
	Doctor cabin	4	3		3	36
	Toilet					
	(I) Gents: 1	2	1.9	-	3	11.4
	2	4	2	-	3	24
	3	2	1	-	3	6
	(II)Ladies: 1	2	1	-	3	6
	2	2	2	-	3	12
	3	4	1.9	-	3	22.8
	4	2	0.9	-	3	5.4
	5	2	1	-	3	6
	Maternity room: I	2	3	-	3	18
	II	2	4.5	-	3	27
	General room: I	2	4	-	3	24
	II	2	10.1	-	3	60.6
	Operation room: I	2	4	-	3	24
	II	2	3.8	-	3	22.8
	Water room: I	2	2	-	3	12
	II	2	1.5	-	3	9
	Passage: I	2	16.8	-	3	100.8
	II	2	1	-	3	6
				Total		705.2 m^2
	(B) External wall up to parapet top:					
	LW	2	19.4	-	4.6	178.48
	SW	2	9.7	-	4.6	89.24
	(1) Parapet top: LW	2	19.4	0.2	-	7.76
	SW	2	9.3	0.2	-	3.72
	(2) Parapet inside: LW	2	19	-	0.9	34.2
	SW	2	9.3	-	0.9	16.74

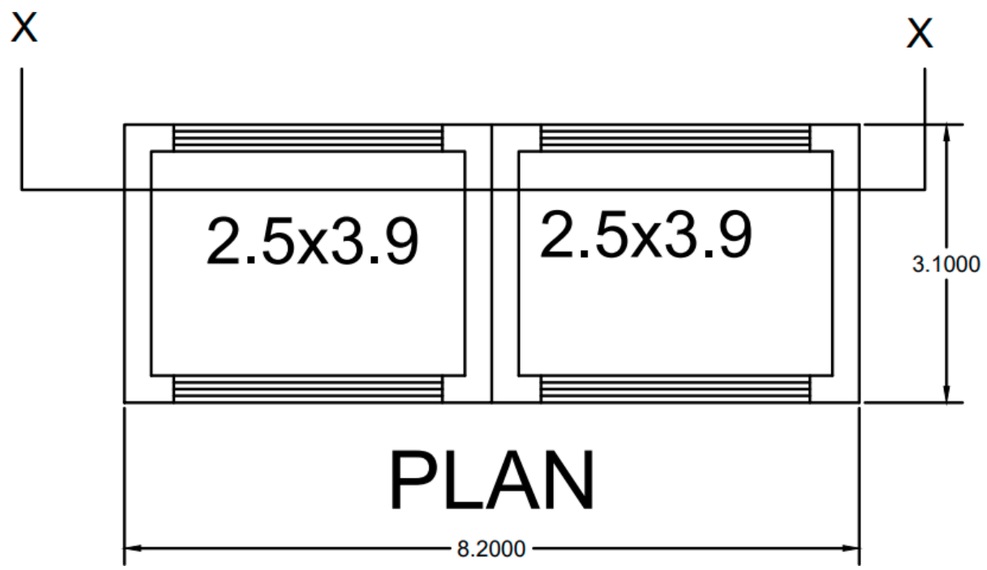
	(3) Chhajja: W	18	0.9	0.45	-	7.29
	D	4	1.2	0.45	-	2.16
	(4) Chhajja (front): W	9	0.9	-	0.1	0.81
	D	2	1.2	-	0.1	0.24
	(5) Chhajja (side): W	9	-	0.45	0.1	0.405
	D	2	-	0.45	0.1	0.09
				Total		341.135 m^2
	Deduction:					
	(a)Door: D	2	1.2	-	2.1	5.04
	D_1	2	1.5	-	2.1	6.3
	D_2	6	0.9	-	2.1	11.34
	D_3	3	0.75	-	2.1	4.725
	D_4	3	0.65	-	2.1	4.095
	(b)Window: W	11	0.9	-	1.2	11.88
				Total		43.38
				Net total		1002.96 m^2
12.	5cm thick mosaic tiles flooring					
	Waiting room.	1	9.2	2	-	18.4
	Reception	1	2	2	-	4
	Medical store	1	4	2	-	8
	Doctor cabin	1	3	3	-	9
	Toilet	2	1	1.9	-	3.8
	Maternity room	1	3	4.5	-	13.5
	General room	1	4	10.1	-	40.4
	Operation room	1	4	3.8	-	15.2
	Water room	1	2	1.5	-	3
	Passage: I	1	2.5	2.3	-	5.75
	II	1	1.5	1.5	-	19.5
	III	1	2.5	2.5	-	3.75
				Total		144.3 m^2
13.	10 cm BBLC (1:2:4)					
	Waiting room	1	9.1	1.9	0.1	1.729
	Reception	1	1.9	1.9	0.1	0.361
	Medical store	1	3.9	1.9	0.1	0.741
	Doctor cabin	1	2.9	2.9	0.1	0.941
	Toilet	2	2.9	1.9	0.1	1.102
	Maternity room	1	2.9	4.4	0.1	1.276
	General room	1	3.9	10	0.1	3.9
	Operation room	1	3.9	3.7	0.1	1.443
	Water room	1	1.9	1.4	0.1	0.266
	Passage: I	1	2.4	2.2	0.1	0.528
	II	1	1.4	12.9	0.1	1.806
	III	1	2.4	1.4	0.1	0.336
				Total		14.329 m^3

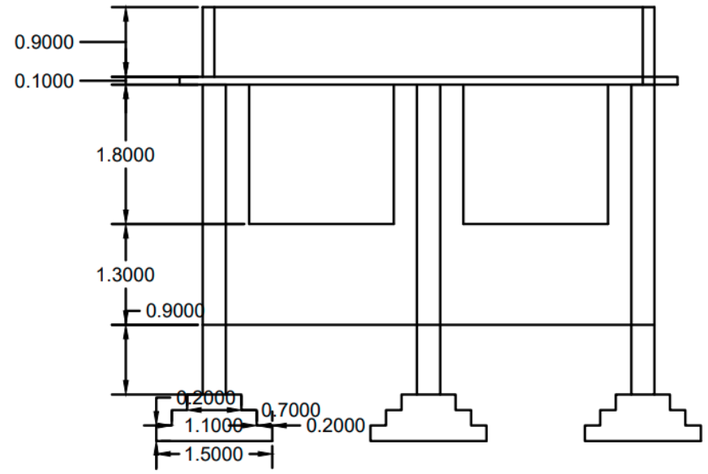
14.	Sand filling/murum					
	Waiting room.	1	9.1	1.9	0.45	7.78
	Reception	1	1.9	1.9	0.45	1.62
	Medical store	1	3.9	1.9	0.45	3.33
	Doctor cabin	1	2.9	2.9	0.45	3.78
	Toilet	2	2.9	1.9	0.45	4.96
	Maternity room	1	2.9	4.4	0.45	5.74
	General room	1	3.9	10	0.45	17.55
	Operation room	1	3.9	3.7	0.45	6.49
	Water room	1	1.9	1.4	0.45	1.20
	Passage: I	1	2.4	2.2	0.45	2.38
	II	1	1.4	12.9	0.45	8.13
	III	1	2.4	1.4	0.45	1.51
				Total		64.47 m^3
15.	Providing and laying white glazed tiles WC					
	(1) W.C.-1(i)	2	2	1	-	4
	(ii) wall(a)	4	1	-	2.1	8.4
	(b)	4	2	-	2.1	18.8
	(2) W.C-2(i)	1	1.9	0.9	-	1.71
	(ii) wall (a)	2	1.9	-	2.1	7.98
	(b)	2	0.9	-	2.1	3.78
	Deduction: D_4	3	0.65	-	2.1	4.1
				Net total		38.57 m^2
16.	Providing and laying skirting of mosaic tiles waiting room					
	(i)	1	9.1	-	-	9.1
	(ii)	2	2	-	-	4
	(iii)	1	2.3	-	-	2.3
	(iv)	1	4.3	-	-	4.3
	Receptionist	4	2	-	-	8
	Medical store: I	2	4	-	-	8
	II	2	2	-	-	4
	Doctor cabin	4	3	-	-	12
	Toilet passage: I	4	1.9	-	-	7.6
	II	4	1	-	-	4
	Maternity room: I	2	3	-	-	6
	II	2	4.5	-	-	9
	General room: I	2	4	-	-	8
	II	2	10.1	-	-	20.2
	Operation room: I	2	4	-	-	8
	II	2	3.8	-	-	7.6
	Water room: I	2	1.5	-	-	3
	II	2	2	-	-	4

	Passage I	2	16.8			33.6
	II	2	1			2
				Total		164.7 m
	Deduction: D	2	1.2	-	-	2.4
	D1	2	1.5	-	-	3
	D2	6	0 .9	-	-	5.4
	D3	3	0.75	-	-	2.25
	D4	3	0.65	-	-	1.95
				Net total		149.7 m

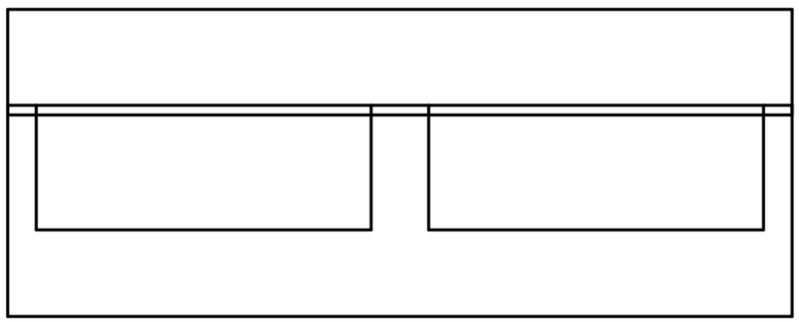
ABSTRACT SHEET OF PUBLIC HEALTH CENTRE					
SR. NO.	**DESCRIPTION**	**QUANTITY**	**RATE**	**PER**	**AMOUNT (Rs)**
1	Excavation for foundation upto1.5 m depth in ordinary soil	99.279	85	M^3	8438.72
2	Providing and lying PCC for foundation	33.28	1500	M^3	49920
3	1st class brick masonry CM (1:6) for Foundation	42.33	1600	M^3	67728
4	Back filling in foundation	56.81	50	M^3	2840.7
5	1st class brick masonry from G.L to P. L	30.43	1600	M^3	48689.6
6	Providing and lying DPC	47.14	150	M^2	7071
7	1st class brick masonry CM (1:6) for Superstructure	101.37	1500	M^3	152055
8	Half brick partition wall CM (1:3)	13.6	1500	M^2	20400
9	Providing and lying RCC (1:2:4)	25.26	2500	M^3	63150
10	Providing mild steel reinforcement for RCC work	1984	35	KG	69440
11	12 mm thick cement plaster	1002.96	150	M^2	150444
12	5cm thick mosaic tiles floor	144.3	200	M^2	28860
13	10cm thick BBLC (1:2:4)	14.329	1000	M^3	14329
14	Sand filling/murrum filling	64.47	50	M^3	3223.5
15	Providing and lying white glazed tiles W. C	38.57	200	M^2	7714
16	Providing and laying skirting of mosaic Tiles	149.7	250	M	37425
		Total			731728.52
		3% Contingency			21951.86
		2% Work Charge Establishment			14634.57
		Total			768314.95
		10% Contractor Profit			76831.495
		Grand Total			845146.45

8.1.6 HERITAGE VILLAGE DESIGN (CATTLE HOUSE):





SECTION X-X



ELEVATION

DESIGN NO.	**CATTLE HOUSE**
PREPARED BY	**TWINKLE CHAMPANERIA BHAVIK BHENSAL**
PROJECT NAME	**VISHWAKARMA YOJANA PHASE VIII RANASAR, GANDHINAGAR**
INSTITUTE	**S.N.P.I.T. & R.C., UMRAKH**
UNIVERSITY	**GUJARAT TECHNOLOGICAL UNIVERSITY**

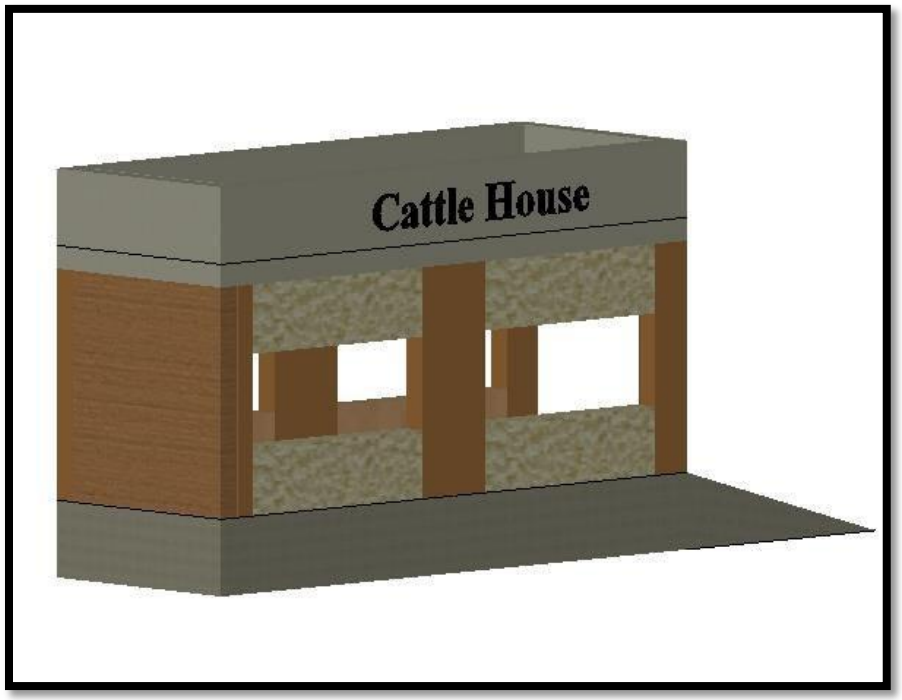


FIG 8.3: 3D VIEW OF PLAN OF CATTLE HOUSE

MEASUREMENT SHEET OF CATTLE HOUSE						
SR. NO.	**DESCRIPTION**	**NO.**	**L**	**B**	**H**	**QUANTITY**
	Total Centre line = (3.8 x 4) + (2.8 x 3) = 23.6 m No. of T-junction = 2					
1.	Excavation for foundation up to 1.5 depth = [23.6 - (2 × 0.9 ÷ 2)] = 22.7	1	22.7	0.9	0.9	18.39 m^3
2.	Providing and laying PCC (1:4:8) for foundation	1	22.7	0.9	0.3	6.13m3
3.	First class brick masonry C:M (1:6) for foundation					
	Step: 1 (60cm) L=23m	1	23	0.6	0.3	4.14 m^3
	Step: 2 (50cm) L=23.1m	1	23.1	0.5	0.3	3.47 m^3
	Step: 3 (40cm) L=23.2m	1	23.2	0.4	0.3	2.784 m^3
				Total		10.394 m^3

4.	Back filling in foundation =18.39-10.394 =7.996 m3			Total		7.996 m^3
5.	First class brick masonry for superstructure, L=23.3 m	1	23.3	0.3	3.1	21.67 m^3
	Deduction: Opening (O)	4	2.9	0.3	1.8	6.264
				Net total		15.41 m^3
6.	Providing and laying RCC (1:2:4) for slab	1	8.8	4	0.1	3.52 m^3
7.	Providing mild steel reinforcement for RCC work including binding and bending and placing in position Quantity = 1% of volume of concrete =3.52 × 78.54 =276.46kg Say 277kg			Total		277kg
8.	12cm thick plaster					
	(A)Internal plaster					
	(1) Ceiling	2	3.5	2.5		17.5
	(2) Wall: (i)	4	3.5		3	42
	(ii)	4	2.5		3	30
				Total		89.5 m^2
	(B) External wall up to parapet top					
	LW	2	7.9	-	4	63.2
	SW	2	3.1	-	4	24.8
	(1) Parapet (top): LW	2	7.9	0.2	-	3.16
	SW	2	2.7	0.2	-	1.08
	(2) Parapet inside: LW	2	7.5	-	0.9	13.5
	SW	2	2.7	-	0.9	4.86
	(3) Chhajja: LW	2	8.8	0.45	-	7.92
	SW	2	3.1	0.45	-	2.79
	(4) Chhajja (front): LW	2	8.8	-	0.1	1.76
	SW	2	3.1	-	0.1	0.62

				Total		123.69 m^2
	Deduction: Opening (O)	4	2.9	-	1.8	20.88
				Net Total		192.31 m^2
9.	Providing and laying PCC (1:4:8) for floor at ground level	2	3.5	2.5	0.1	1.75 m^3

ABSTRACT SHEET FOR CATTLE HOUSE

SR. NO.	DESCRIPTION	QUANTITY	RATE	PER	AMOUNT (Rs)
1.	Excavation for foundation up to 1.5 m depth in ordinary soil	18.39	85	M^3	1563.15
2.	Providing and lying PCC for foundation	6.13	1500	M^3	9195
3.	1st class brick masonry CM (1:6) for Foundation	10.394	1600	M3	16630.4
4.	Back filling in foundation	7.996	50	M3	399.8
5.	1st class brick masonry CM (1:6) for Superstructure	15.41	1500	M3	23115
6.	Providing and lying RCC (1:2:4)	3.52	2500	M3	8800
7.	Providing mild steel reinforcement for RCC work	277	35	KG	9695
8.	12mm thick cement plaster	192.31	150	M2	28846.5
9.	Providing and laying PCC (1:4:8) for floor at ground	1.75	200	M2	350
		Total			98567.85
		3% Contingency			2957.04
		2% Work Charge Establishment			1971.36
		Total			103496.25
		10% Contractor Profit			10349.625
		Grand Total			113845.88

8.1.7 ELECTRICAL DESIGN 1 (HOME AUTOMATION):

In nowadays, development and changes of technologies is happening daily as well as continuous improvement of people's living standards are increasing. The mobile phones are the inspirable part of human lives today. The mobile phone is the most important part of human lives today. With the help of this smart gadgets' human can do many works with or without internet like here we can make our home as well as organization smarter or more luxurious.

Here we proposed a new technology, so that mobile phones can be used to communicate with and control electrical appliances like Fans, A.C., Lights etc. using Android App and Wi-Fi module. The transmitter of Wi-Fi transmits the data given by the application using radio waves technology. The Wi-Fi works on radio waves technology, as the data to be passed through Wi-Fi is converted into the electromagnetic signal which is then sent using the antenna. This signal is passed to the Arduino controller. The Arduino further operates the received information and performs operations. This controller can be connected to the Relays of different switches to pass the current after generating the magnetic field. In future, we can use router for a wide range access like for the Smart City projects. New appliances can be added anytime to the system, which provides for the reliability of the system.

Automation is the most frequently spelled term in the field of electronics. The hunger for automation brought many revolutions in the existing technologies. These had greater importance than any other technologies due to its user-friendly nature. These can be used as a replacement of the existing switches in home which produces sparks and also results in fire accidents in few situations. Considering the advantages of Wi-Fi an advanced automation system was developed to control the appliances in the house.

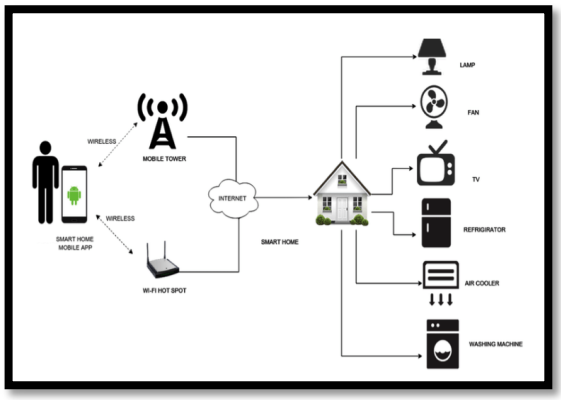


FIG 8.4: HOME AUTOMATION

Home Automation System Using Digital Control: The remote control used in home automation systems, is a wonderful feature that everyone would like to enjoy, if they were not expensive to install, maintain, and able to be used from long distance. The idea of the remotely controlled home automation systems. The home automation has many features makes the home owner remotely toggle appliances such as air conditioning and heating units, lamps or porch lights, landscape sprinkler timers, snow-melt systems, outdoor property lighting, and safety lighting. The mobile phones and Touch-Tone telephones use the Dual – Tone Multi Frequency (DTMF). That was developed initially for telephony signaling such as dialing and automatic redial. Each key-press on the phone keypad generates DTMF signal consists of two tones that must be generated simultaneously. Home automation is easy to control all equipment. Many advantages like security, electricity saving, etc. Digital information provided in your mobile or table. Too Easy to installation and maintenance less.

It will encourage us to consider bringing Home Automation into our own lives. The plugs in devices make an easy entry point to working with the technology. The received tone is processed with the help of DTMF decoder. The DTMF decoder then transmits the signal to the microcontroller to operate the relay. It provides the advantage of robust control, working range as large as the coverage area of the service provider. In this way, we have developed this which is capable of receiving & decoding the commands and control signals from the distant areas and can work according to our instructions.

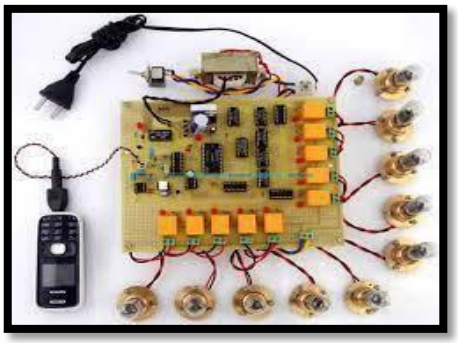


FIG 8.5: HOME AUTOMATION SYSTEM USING DIGITAL CONTROL

This home appliances control or home automation project also uses the same DTMF decoder circuit section with little modifications to control home and office electrical appliances. Just connect your cell phone headset (headphone) jack to the mobile phone and then mobile will control electrical appliances and electrical equipment through the DTMF key pad of your cell phone.

Home Automation Advantages:

- **Energy-saving:** Home automation manages control elements that contribute to saving water, electricity, and gas. That is, we can program all the devices to turn on or off at the necessary time. Home automation control of lighting and air conditioning controls the management of 70% of energy consumption. It is possible to guarantee that all the lights in the house are turned off and that the reference temperature of the air conditioning is in saving mode when nobody is in the house. When going to sleep, lights and blinds are switched off and the reference temperature is changed for the night. Detecting the presence or not in each area of the home can activate other savings policies. What produces effects in the domestic economy and contributes to being more ecological.
- **Security:** Another of its important advantages is being able to detect fires, intruders, gas leaks or a water leak. You can see everything that happens from anywhere through cameras and simulate presence by turning lights on and off remotely.
- **Communication:** It is essential nowadays to establish correct communication between people and housing. New technologies and the Internet are a natural part of home automation and become intuitive and practical tools. Even the recognition of voice or body movements can become a channel of communication with our home. With all these elements, the house can interact with people through the home automation elements of the installation, text messages, emails, and voice calls.
- **Comfort:** The tasks to be carried out in our homes are much easier, and you can do many actions comfortably from a screen.

- **Wellness:** Through home automation, we can automatically close the blinds, detecting the amount of sunlight that enters the rooms or the wind that causes it; control the degree of light in the different rooms, and be able to direct the different environments of the home.
- **Tele-care:** The system consists of a set of sensors that monitors the user's life habits, such as the time spent in bed, bath, taking medications. The parameters obtained by these sensors configure a profile that is stored on a central server supervised by healthcare professionals 24 hours a day.

Home Automation Disadvantages:

- **Initial cost:** The price of the home automation installation is still very high. The initial investment that must be made is very important since the entire home must be wired.
- **Maintenance:** In the event of some type of breakdown, its repair can be complex and expensive. In addition to this, it is possible that an important part of the system will be blocked and more functions will be cancelled. Therefore, the cost of any type of breakdown can be very high.
- **Data transmission speed:** Depending on the number of systems that are connected, when transferring a large amount of data, the network can become congested and decrease the transmission speed, causing the functions to slow down.

Cost:

TABLE 8.1: COST OF HOME AUTOMATION

SR.NO.	EQUIPMENT	PRICE
1	555 timer ic	500
2	Resister	200
3	Transister	200
4	Dieods	60
5	Led	30
6	Pushbuttons	600
7	Ic	400
8	Lamp	100
9	Demultiflixer	130
10	Cable	200
11	PCB	100
12	Transformer	500
13	Switch	50
14	Dtmfdecoder	110
15	Ic sockets	100
	Total	**3280**

IMPLEMENTATION: Home Automation System using digital control implement the water pump supply house, panchayat and control lights.

CONCLUSION: The proposed Home Automation System enhances mobility and supports monitoring and control of devices from any remote location within Wi-Fi range. Being a simple and user-friendly application, it serves as an application of great help to the old aged or physically disabled people. Thus, the Internet of Things based Home Automation System is better than all traditional existing Home Automation Systems.

8.1.8 ELECTRICAL DESIGN 2 (MOBILE TECHNOLOGY (GSM) BASED REMOTE MONITORING AND CONTROL OF DIGITAL ENERGY METER):

The purpose of this project is to remote monitoring and control of the Domestic Energy meter. This system enables the Electricity Department to read the meter readings regularly without the person visiting each house. This can be achieved by the use of Microcontroller unit that continuously monitors and records the Energy Meter readings in its permanent (non-volatile) memory location. This system also makes use of a GSM modem for remote monitoring and control of Energy Meter. The Microcontroller based system continuously records the readings and the live meter reading can be sent to the Electricity department on request. The electricity department can also send the bill through GSM message which will be displayed on the LCD display. This system also can be used to disconnect the power supply to the house in case of non-payment of electricity bills. A dedicated GSM modem with SIM card is required for each energy meter. The Microcontroller is programmed using Embedded C language.

Features:

- Provides Supports controlling of meter.
- Non-volatile memory-based energy-reading storing.
- The project provides the following learning's
- Conversion of AC supply to DC supply.
- LCD interfacing to Microcontroller.
- Embedded C programming.
- User friendly remote energy meter monitoring.
- Can be controlled anywhere in the world.
- Auto disconnect feature.
- Energy meter working.
- Interfacing energy meter to Microcontroller.
- GSM technology.
- PCB designing.

FIG 8.6: REMOTE MONITORING AND CONTROL OF DIGITAL ENERGY METER

The major building blocks of this project are:

- Regulated Power Supply.
- GSM Modem.
- Digital Energy Meter.
- Buzzer with driver.
- LED indicators.
- Microcontroller.
- Electromagnetic Relay and Relay Driver.
- LCD Display with driver.
- Crystal oscillator.

Applications:

- Electricity departments.
- Railway electrical systems.
- Remote controlling systems.
- Household Energy meter monitoring.
- Industrial Energy remote monitoring.

Software's used:

- PIC-C compiler for Embedded C programming.
- Express SCH for Circuit design.
- C kit 2 programmers for dumping code into Micro controller.
- Proteus for hardware simulation.

Regulated Power Supply:

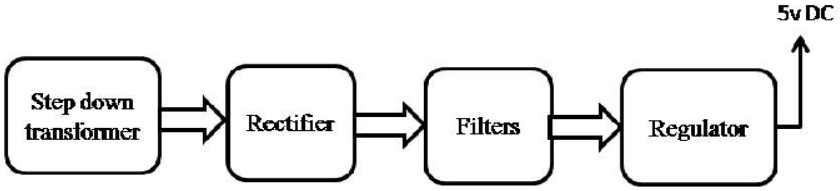


FIG 8.7: BLOCK DIAGRAM MOBLIE TECHNOLOGY (GSM) BASED REMOTE

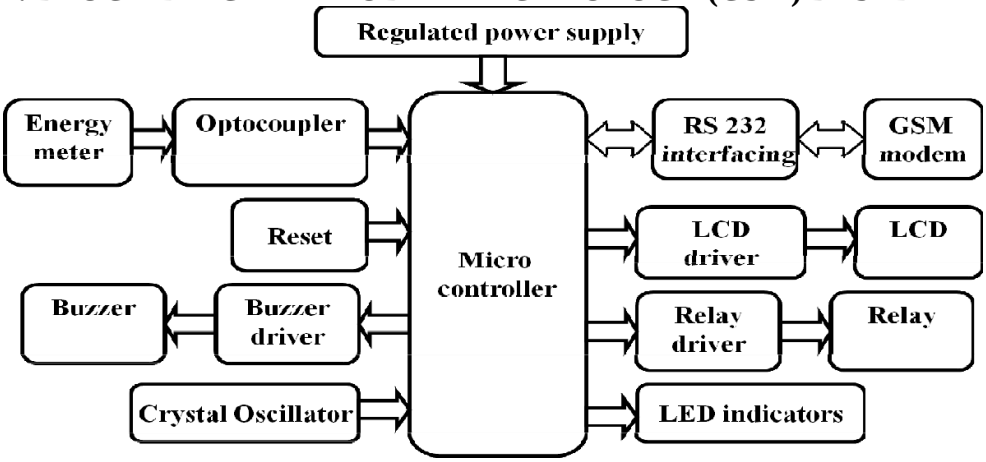


FIG 8.8: MONITORING AND CONTROL OF DIGITAL ENERGY METER

Cost: The cost Mobile technology (GSM) based remote monitoring and control of digital Energy meter circuit Price is 3000-4000.

8.1.9 ELECTRICAL DESIGN 3 (SOLAR PHOTOVOLTAIC (SOLAR PV)):

Solar Photovoltaic is a technology that converts the energy of the sun into electrical power. The technology has seen a dramatic cost reduction in recent years and prices are expected to continue to come down. In day time the sun can easily provide a more than sufficient amount of energy to meet the worldwide energy demand, providing that we have the appropriate solar energy-capturing devices. Solar PV systems usually supply only a certain share of a consumer's electricity need as a large part of the consumption takes place after sunset.

A solar cell is a semiconductor, solid-state electronic device that converts radiant energy directly into electrical energy by employing the photovoltaic effect. A solar panel's power output depends on the load resistance, irradiance and temperature. Several techniques can be employed to create a reliable energy output by attempting to control these three parameters. Buildings such as offices and schools, but also important economic sectors in rural areas including agriculture and industry, largely use electricity during the day.

FIG 8.8: SOLAR PHOTOVOLTAIC ARRAY

In those cases, solar PV can be especially attractive as systems can cover large parts of the overall electricity demand and provide electricity at the time it is needed. Solar Energy Measurement System is implemented in solar photovoltaic. Measure to solar energy. Solar energy is used as an efficient energy source in modern days. Solar panels are used to convert solar energy into electricity to power house lighting, appliances, etc. Solar panels are selected on the basis of a house's needs and also depending upon the position of the sun and weather conditions.

When a house uses solar panels to derive energy from the sun, it is measured in kWh. In this system kWh refers to the amount of energy that is produced by the solar panels. The amount of solar energy produced is represented as kWh per square meter of the surface of solar panels. The amount of energy generated by a system entirely depends upon the amount of solar rays that reached the solar panel. Solar energy is measured by using different parameters, such as the intensity of light, voltage, current and the temperature. Different components are used to measure these parameters of the solar cells.

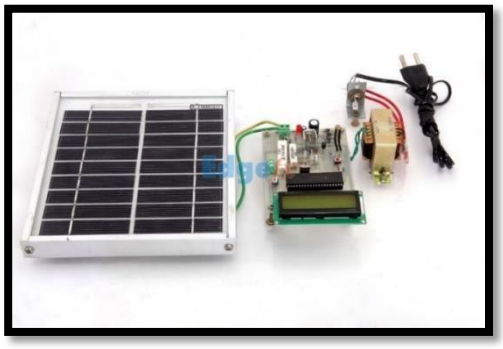


FIG 8.9: SOLAR ENERGY MEASUREMENT SYSTEM

The intensity of the light is measured by using an LDR sensor (Light dependent resistor); voltage is measured by using voltage divider; current by using a current sensor and temperature by using a temperature sensor. The sensors that are used to measure different parameters for calculating

solar energy are regulated by a PIC microcontroller (Programmable Interface Controllers) which has an in-built multi - channel ADC (Application delivery controller). The energy output of solar panels is greatly affected by factors such as shading and temperature. If a small portion of the solar panels is shaded and the rest is exposed to sunlight, it decreases the efficiency of the solar panels greatly. Similarly, high temperature reduces the efficiency of the solar panel system greatly. To avoid this wastage of energy sensors are attached to the system to make an efficient use of energy

COST:

TABLE 8.2: PRICE OF SOLAR PLATE		
SR.NO.	**WATT**	**PRICE(RS)**
1.	10	3000
2.	15	5000
3.	25	8000

TABLE 8.3: PRICE OF BATTERY AND INVERTER	
BATTERY	**PRICE(RS)**
200 Ah	14000
150 Ah	13000

Solar Energy Measurement System price is Rs.4000.
The total price of solar photovoltaic system is Rs 80000

8.2 REASON FOR STUDENTS RECOMMENDING THIS DESIGN:

Rural development usually refers to the method of enhancing the quality of life and financial well-being of individuals, specifically living in populated and remote areas. Traditionally, rural development was centered on the misuse of land-intensive natural resources such as forestry and agriculture. However today, the increasing urbanization and the change in global production networks have transformed the nature of rural areas.

Rural development still remains the core of the overall development of the country. More than two-third of the country's people are dependent on agriculture for their livelihood, and one-third of rural India is still below the poverty line. Therefore, it is important for the government to be productive and provide enough facilities to upgrade their standard of living. Rural development is a term that concentrates on the actions taken for the development of rural areas to improve the economy. However, few areas that demand more focused attention and new initiatives are:

- Education
- Infrastructure development (electricity, irrigation, etc.)
- Employment opportunities
- Facilities for agriculture extension and research
- Public health and Sanitation
- Women empowerment

8.3 ABOUT DESIGNS SUGGESTIONS / BENEFIT OF THE VILLAGERS:

DRAINAGE SYSTEM:

Drainage and sewerage system in rural areas is an important priority in Indian setting because of rapid rurbanization, industrialization, and population growth, along with increase in population and migration.

Treatment of wastewater is one of the important steps to prevent contamination of rural underground water. Because of unpredictable growth and regional shortage of water, rural areas may be monitored with semi-centralized supply and treatment system of wastewater.

The change from centralized to semi-centralized supply and treatment systems will minimize the grave discrepancy between the rapid rural growth and the provision of supply and treatment infrastructure. Despite the high potential economic, social, and environmental benefits, the adoption of the subsurface drainage technology is always questioned.

Sustainable drainage is a concept that includes long term environmental and social factors in decisions about drainage. It takes account of the quantity and quality of runoff, and the amenity and aesthetic value of surface water in the urban environment. Many existing urban drainage systems can cause problems of flooding, pollution or damage to the environment and are not proving to be sustainable in the context of wider challenges from climate change and rurbanization.

BUS STAND:

Transportation refers to any vehicle or activity that moves people and goods from one place to another. In India, key modes of transportation for people and goods include buses, trains, trucks, cars, airplanes, and other forms of motorized vehicles. However, transportation can also refer to bicycles, boats, and even pedestrian traffic.

Both public and private authorities can manage transportation systems, which can involve maintaining and updating infrastructure to ensure the system runs smoothly. Transportation infrastructure may include roads, bridges, bus stations, train tracks, airports, sidewalks, or ferry terminals.

Transportation plays a critical role in the livability of a community – the factors that influence a community's quality of life. Transportation allows for access to food, healthcare, educational opportunities, and employment.

Additionally, access to transportation increases rural residents' ability to access recreation, entertainment, and other activities that promote community engagement. Efficient and affordable transportation is an important driver in economic growth in rural areas and helps ensure that people can obtain services and participate in public life.

Rural residents are more reliant on personally owned, single driver automobiles for transportation than their urban counterparts. However, many rural residents are unable to rely on this mode of transportation. Personal vehicles can be expensive to purchase and maintain, and some residents may not have drivers' licenses.

Additionally, rural residents who have physical or mobility limitations may not be able to drive. Public transportation is a type of transit available for the public on a scheduled and continual basis. There are several differences in public transportation use between urban and rural areas.

PARTY PLOT:

Rural Development is the process of improving the quality of life and economic well-being of people living in rural areas, often relatively isolated and sparsely populated areas. Education, entrepreneurship, physical infrastructure, and social infrastructure all play an important role in developing rural regions.

Minimize impact of rapid urban development. Build environmental and cultural awareness and respect. Provide positive experiences for both visitors and hosts Provide direct financial benefit for conservation Provide financial benefits and empowerment for local people. Raise sensitivity to host countries' political, environmental, and social climate.

CEMETERY:

Cemetery, place set apart for burial or entombment of the dead. Reflecting geography, religious beliefs, social attitudes, and aesthetic and sanitary considerations, cemeteries may be simple or elaborate built with a grandeur that overshines the community of the living.

PUBLIC HEALTH CENTRE:

Public Health Centre (PHC) is the first contact point between village community and the medical officer. Access to healthcare services is critical to good health, yet rural residents face a variety of access barriers. Ideally, residents should be able to access services such as primary care conveniently and confidently, dental care, behavioral health, emergency care, and public health services.

Access to healthcare is important for:

- Disease prevention
- Overall physical, social, and mental health status
- Quality of life
- Detection, diagnosis, and treatment of illness
- Preventable death
- Life expectancy

Rural residents often encounter barriers to healthcare that limit their ability to obtain the care they need. For rural residents to have sufficient access, necessary and appropriate healthcare services must be available and obtainable in a timely manner. Even when an adequate supply of healthcare services exists in the community, there are other factors to consider in terms of healthcare access.

For instance, to have good healthcare access, a rural resident must also have:

- Financial means to pay for services, such as health or dental insurance that is accepted by the provider.
- Means to reach and use services, such as transportation to services that may be located at a distance, and the ability to take paid time off work to use such services.
- Confidence in their ability to communicate with healthcare providers, particularly if the patient is not fluent in English or has poor health literacy.
- Trust that they can use services without compromising privacy.
- Belief that they will receive quality care.
- Barriers to care, including workforce shortages and health insurance status.
- Transportation
- Health literacy
- Stigma associated with conditions in rural communities, such as mental health or substance abuse.

CATTLE HOUSE:

Proper housing which is conducive to good health, comfort and protection from inclement weather, and which would enable the animals to utilize their genetic ability and feed for optimal production. To protect from inclement weather and for safety and easy handling. Provisions for exercise. To improve the reproductive efficiency in the dairy farm.

In India, a great diversity exists in the design of dairy animal shelters. Traditional animal shelters have grown out of needs, resources, and ingenuity of farmers. Building design and construction materials largely affect the thermal comfort inside dairy shelters.

Efficiently designed sheds can help lessen the thermal stress thereby increasing feed intake, milk production and reproductive efficiency. Under varied climatic, geographical and economic conditions prevailing in India, designing an ideal set of building for dairy animals throughout the country is impossible.

CHAPTER 9: PROPOSING DESIGNS FOR FUTURE DEVELOPMENT OF THE VILLAGE FOT PART-II DESIGN

The study is aimed to know the basic scenario of village through techno economic survey and gap analysis form. Our master development plan might include provisions of all the facilities suggest by us, then our focus will be on the improvement in the existing amenities. Our aim is to work according to the new upcoming town planning scheme in UTARA village. Based on these plans, our next target will be to provide regular maintenance program, which helps in sustaining the structure for longer duration. Also, due to lack in maintenance, villagers avoid consuming it and which make the structures obsolete.

Vermicompost:

Vermicompost (vermi-compost) is the product of the decomposition process using various species of worms, usually red wigglers, white worms, and other earthworms, to create a mixture of decomposing vegetable or food waste, bedding materials, and vermicast. This process is called vermicomposting, while the rearing of worms for this purpose is called vermiculture.

Health centre:

In Utara village, there are no facilities of public health centre. So, we design a public health centre in our project Vishwakarma yojana. So, people get better facilities regarding the health.

Bio gas plant:

In future development bio gas plant require to produce energy from natural and from waste sources. So that people of can use this energy for fuel purpose with economic.

Sewage treatment plant:

There is problem of disposal of drainage water. Sewage waste is disposal in Khari River near village. So, if the village having sewage treatment plant for producing an electricity from the sewage waste and also connect the drainage line to the main line of municipal drainage.

Water tank:

In Utara village condition of water tank is very poor. So, re development of water tank is necessary for safety of villagers. Water tank is about 25 years old and existing water tank having less capacity of water for domestic purpose of villagers.

CHAPTER 10: CONCLUSION OF THE ENTIRE VILLAGE ACTIVITIES OF THE PROJECT

The motive of Vishwakarma Yojana is to uplift the lifestyle of the rural areas to its certain extent up to the level of an ideal village situated at the nearby location of that particular jurisdiction. It is an effective government scheme to develop the rural areas under economical cost with good workability and efficiency during its usage.

The project tends to improve the physical, social as well as socio-cultural aspects of the village by implementing and improvising various infrastructures with regards to lesser or least hindrance to its rural authenticity. Main Smart Aim: Developing village with a rural soul, but with all Smart urban amenities that a city may have‖.

This will help in developing Smart villages in sustainable manner, reduce migration from villages and prevent the cities from the urban pressure. This should lead to some rethinking about the meaning of efficiency beyond the usual conceptions of economic or technical efficiency. Indeed, employment expansion is at least as important as growth in productivity.

In a sense, both represent the utilization of labour as a resource. Why, then, does thinking about efficiency focus on one and neglect the other It is important to reflect on this question? The answer, which calls for change in both economics and politics, could make a real difference.

People of village migrate from rural to urban for better education, to get employment, to live standard life. To reduce the migration of people from rural to urban by providing all the general facilities in the villages like primary-secondary education, public health centre, skill development centre. Infrastructure facilities should be encouraging the people of the rural village to get sufficient livelihood and improve their standard of living.

Success in development of a village only can be achieved, if Sarpanch of that village wants to nourish it. Government of India has provided many schemes/programmes among the nation for the village and the villagers, but Sarpanch works as a bridge between Government and the villagers. All this can be fulfilled, by having little awareness and helpful working group in the village, perfect example is Ankodiya village. Also, it was awarded as cleanest village.

We had a desire for us as well as for the villagers that “united we stand and divided we fall” with this motto we have come so far and hope that we could complete all our wished projects within time. We faced problems but we have gathered our courage, self-motivation and team-motivation to complete the work on time.

CHAPTER 11: REFERENCES REFERRED FOR THIS PROJECT

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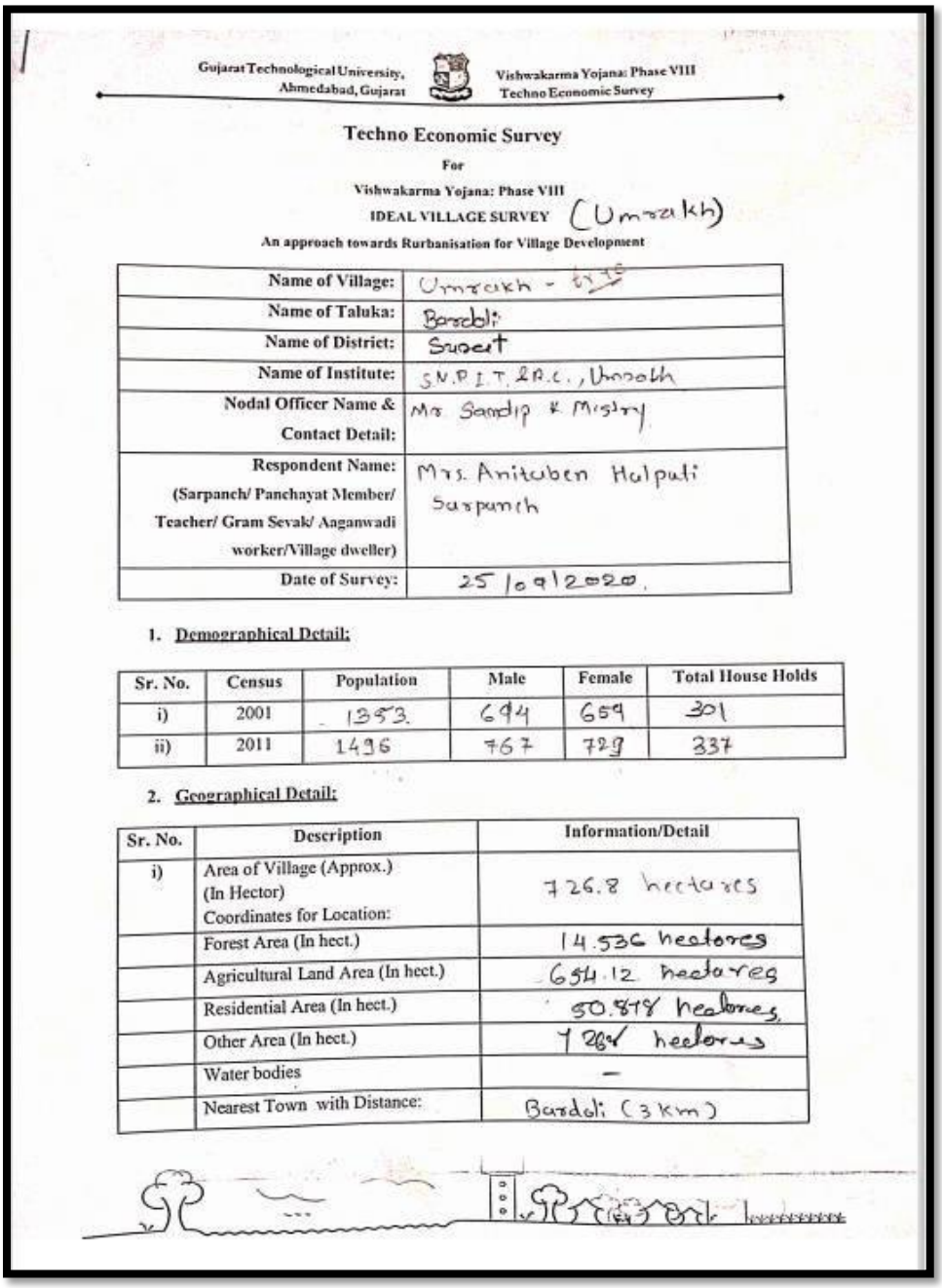
- Vishwakarma Guidelines
- Estimation and costing, B. N. Dutta, UBS publisher's Pvt. Ltd.
- Building planning, designing and scheduling by Gurcharan Singh, standard book
- house. New Delhi.
- Building construction by B.C. Punamia and Building planning by Charotar
- Publication.
- District census handbook.

CHAPTER 12: ANNEXURE ATTACHMENT

12.1 SURVEY FORM OF IDEAL VILLAGE (SCANNED COPY) ATTACHMENT IN THE REPORT FOR PART-1 SURVEY FORM IDEAL VILLAGE (ORIGINAL COPY) ATTACHMENT IN THE REPORT FOR PART-II:



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY (Umrakh)

An approach towards Rurbanisation for Village Development

Name of Village:	Umrakh - 6375
Name of Taluka:	Bardoli
Name of District:	Surat
Name of Institute:	S.N.P.I.T. & R.C., Umrakh
Nodal Officer Name & Contact Detail:	Mr Sandip K Mistry
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Mrs. Anitaben Halpati Sarpanch
Date of Survey:	25/09/2020.

1. Demographical Detail:

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	1353	694	659	301
ii)	2011	1496	767	729	337

2. Geographical Detail:

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	726.8 hectares
	Forest Area (In hect.)	14.536 hectares
	Agricultural Land Area (In hect.)	654.12 hectares
	Residential Area (In hect.)	50.818 hectares
	Other Area (In hect.)	7.264 hectares
	Water bodies	-
	Nearest Town with Distance:	Bardoli (3 Km)

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3. Occupational Details:

Name of Three Major Occupation groups in Village	1. Farming 2. Animal husbandary 3. Agri. work

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	→ Yes → 3/4, Nos	✓	✓ ✓ ✓ ✓	
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	50K2		
	Underground Sump	Capacity:	—		
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)		✓		
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	Closed	✓		
	If Open than Pucca / Kutchcha	-		✓	
	Whether drain water is discharged directly in to Water bodies/ Sewer plants			✓	
Suggestions if any:					

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E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road		✓		
	Main road		✓		
	Internal streets		✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.		✓		
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Bardoli			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Bus Stop too	✓		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	All is the	✓ available		
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	24 hrs	✓		
	Power supply for Domestic Use	24 hrs	✓		
	Power supply for Agricultural Use	8 hrs	✓		
	Power supply for Commercial Use	24 hrs	✓		
	Road/ Street Lights	No. nos	✓		

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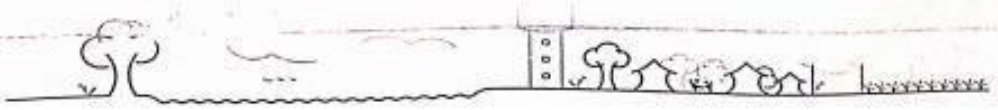
	Electrification in Government Buildings/ Schools/ Hospitals	Yes	✓		
	Renewable Energy Source Facilities (Y/ N)			✓	
	LED Facilities	40. Nos	✓		
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	None.		✓	
	Location Condition				
	Community Toilet (With bath/ without bath facilities)				
	Solid & liquid waste Disposal system available	Not		✓	
	Any facility for Waste collection from road	Itself			
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	Yes.	✓		
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	80% Pucca 20%	well Kutcha	maintain not good.	

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks



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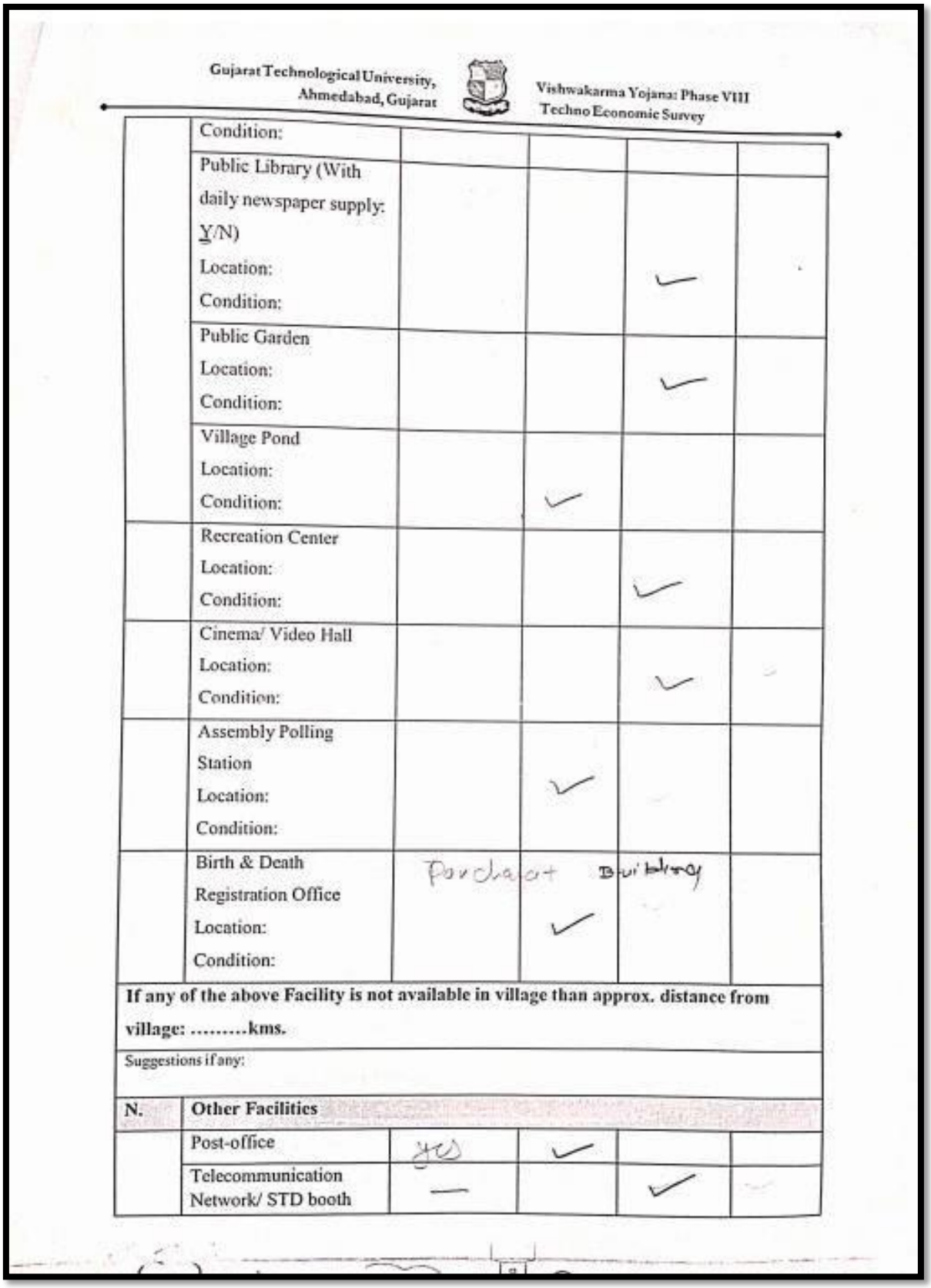
K.	**Health Facilities:**				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	1 Nos. -1 PHC.	✓ ✓		
	Private Clinic/Private Hospital/ Nursing Home	1 Nos Private Hospital	✓		
	If any of the above Facility is not available in village than approx. distance from village: ...2...kms.				
Suggestions if any:					
L.	**Education Facilities:**				
	Aaganwadi/ Play group	2 Nos			
	Primary School	1 to 8	✓		
	Secondary school	1) V Bharati	✓		
	Higher sec. School	2)	✓		
	ITI college/ vocational Training Center			✓	
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities			✓	
	If any of the above Facility is not available in village than approx. distance from village: ...2...kms.				
Suggestions if any:					
M.	**Socio- Culture Facilities**				
	Community Hall (With or without TV) Location:	Yes in good.	✓		



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	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:			✓	
	Public Garden Location: Condition:			✓	
	Village Pond Location: Condition:		✓		
	Recreation Center Location: Condition:			✓	
	Cinema/ Video Hall Location: Condition:			✓	
	Assembly Polling Station Location: Condition:		✓		
	Birth & Death Registration Office Location: Condition:	Panchayat Building	✓		

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

Suggestions if any:

N.	Other Facilities			
	Post-office	✓		
	Telecommunication Network/ STD booth	—	✓	

	General Market		✓		
	Shops (Public Distribution System)	Need	✓		
	Panchayat Building		✓		
	Pharmacy/Medical Shop			✓	
	Bank & ATM Facility			✓	
	Agriculture Co-operative Society			✓	
	Milk Co-operative Soc.			✓	
	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	Renewable Energy Sources	✓		
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	Yes Hard Copy

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Recent Projects going on for Development of Village	None
Any NGO working for village development	None

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)	School building Health center Panchayat building	✓ ✓ ✓
2.	Additional Information/ Requirement		

9. Smart Village Proposal Design

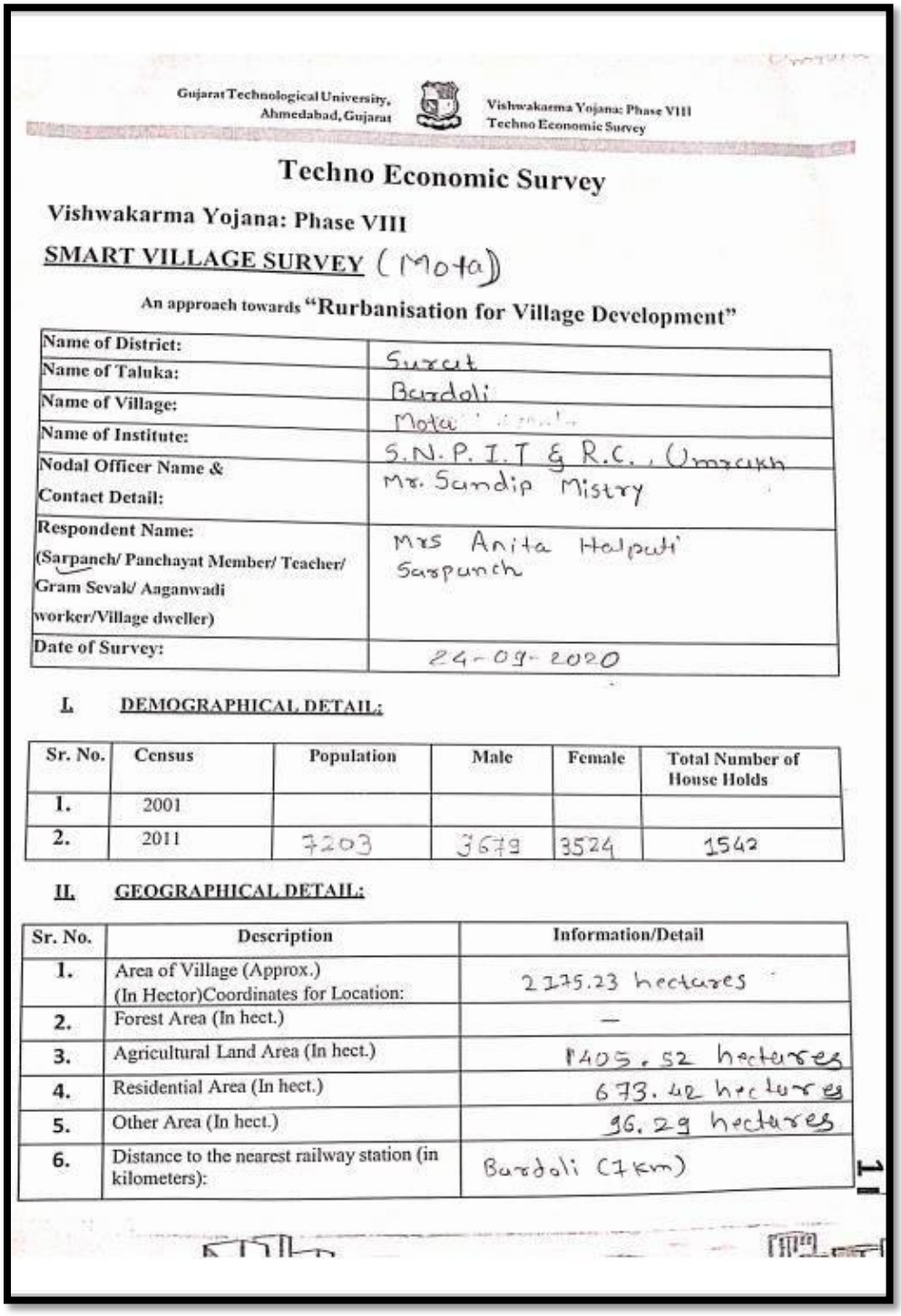
Sr. No.	Descriptions	Information/ Detail	Remarks
1.	New School Panchayat Office Water tank		

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
ગ્રામ પંચાયત ઉમરાખ
તા. બારડોલી, જી. સુરત

12.2 SURVEY FORM OF SMART VILLAGE (SCANNED COPY) ATTACHMENT IN THE REPORT FOR PART-1 SURVEY FORM IDEAL VILLAGE (ORIGINAL COPY) ATTACHMENT IN THE REPORT FOR PART-II:



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Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY (Mota)

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

Name of District:	Surat
Name of Taluka:	Bardoli
Name of Village:	Mota
Name of Institute:	S.N.P.I.T & R.C., Umrakh
Nodal Officer Name & Contact Detail:	Mr. Sandip Mistry
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Mrs Anita Halpati Sarpanch
Date of Survey:	24-09-2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	7203	3679	3524	1542

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	2275.23 hectares
2.	Forest Area (In hect.)	—
3.	Agricultural Land Area (In hect.)	1405.52 hectares
4.	Residential Area (In hect.)	673.42 hectares
5.	Other Area (In hect.)	96.29 hectares
6.	Distance to the nearest railway station (in kilometers):	Bardoli (7 km)

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7.	Name of Nearest Town with Distance:	Bardoli (8.2 km)
8.	Distance to the nearest bus station (in kilometers):	Bardoli (8.2 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.	
	3.	
Major crops grown in the village:	1.	Sugar cane
	2.	Rice
	3.	Vegetables

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER**	Yes	✓		
	Piped Into Dwelling			✓	
	Piped To Yard/Plot			✓	
	Public Tap/Standpipe			✓	
	Tube Well Or Bore Well				
2.	**DUG WELL**	Gwater wanted			
	Protected Well				
	Un Protected Well				
3.	**WATER FROM SPRING**				
	Protected Spring			✓	
	Unprotected Spring			✓	
	Rainwater			✓	
	Tanker Truck			✓	
	Cart With Small Tank			✓	
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/**		✓		
	Irrigation Channel			✓	
	Bottled Water			✓	
	Hand Pump	→ 12 ±			
	Other(Specify)**Lake/ Pond**			✓	

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Suggestions if any:

B.	Water Tank Facility					
	Overhead Tank	Capacity:	6			
	Underground Sump	Capacity:	-			

Suggestions if any:

C.	The Type of Drainage Facility				
	A. UNDERGROUND DRAINAGE	Yes	✓		
	1				
	2				
	B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	open and close.	✓		

Suggestions if any:

D.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road		✓		
	Main road	Yes	✓		
	Internal streets		✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.		✓		

Suggestions if any:

E.	Transport Facility				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Bardoli (8.2 km)			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Main - 8 nos within village			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	All in the ✓		villages	available

Suggestions if any:

F.	Electricity Distribution				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	24 hrs	✓		

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	Power supply for Domestic Use	24 hrs	✓		
	Power supply for Agricultural Use	8 hrs.	✓		
	Power supply for Commercial Use	-		✓	
	Road/ Street Lights	1000 Nos.	✓		
	Electrification in Government Buildings/ Schools/ Hospitals	100%	✓		
	Renewable Energy Source Facilities (Y/ N)			✓	
	LED Facilities	700 Nos	✓		

Suggestions if any:

G.	Sanitation Facility				
	Public Latrine Blocks If available than Nos.	4	In well	condition	
	Location Condition				
	Community Toilet (With bath/ without bath facilities)	2 with	bath ✓	and 2 without	bath.
	Solid & liquid waste Disposal system available			✓	
	Any facility for Waste collection from road	Door	to Door		

Suggestions if any:

H.	Main Source of Irrigation Facility:				
	TANK/POND	8 nos.	✓	✓	
	STREAM/RIVER			✓	
	CANAL			✓	
	WELL			✓	
	TUBE WELL			✓	
	OTHER (SPECIFY)				

Suggestions if any:

I.	Housing Condition:				
	Kutchha/Pucca (Approx. ratio)	100%	Well ✓	Maintained	

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	7 Nos	✓		
	Sub-Centre			✓	
	PHC	2 PHC	✓		
	BLOCK PHC			✓	
	CHC/RH			✓	
	District/ Govt. Hospital			✓	
	Govt. Dispensary			✓	
	Private Clinic	5 Nos	✓		
	Private Hospital/ Nursing Home			✓	
	AYUSH Health Facility			✓	
	sonography /ultrasound facility			✓	
	If any of the above Facility is not available in village then approx. distance from village: ..3.1..kms.				
	Suggestions if any:				
K.	**Education Facilities:**				
	Anganwadi/ Play group	7/1	✓		
	Primary School	1+1=2	✓		
	Secondary school	1 Private	✓		
	Higher sec. School	1	✓		
	ITI college/ vocational Training Center			✓	
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities			✓	
	If any of the above Facility is not available in village than approx. distance from village: ....1....kms.				

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Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	2 Nos.		✓	
	Public Library (With daily newspaper supply: Y/N)	1 Nos.		✓	
	Public Garden	2 nos.		✓	
	Village Pond	8 Nos		✓	
	Recreation Center	Public Garden		✓	
	Cinema/ Video Hall	–			✓
	Assembly Polling Station	4 Nos.	Within village	✓	
	Birth & Death Registration	Panchayat	Building ✓		

If any of the above Facility is not available in village than approx. distance from village: ...2....kms.

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office	good		✓	
	Telecommunication Network/ STD booth				✓
	General Market	once in a	week	✓	
	Shops (Public Distribution System)	good 60 nos & 2 govt		✓	
	Panchayat Building	1		✓	
	Pharmacy/Medical Shop	2		✓	
	Bank & ATM Facility	2-bank/ATM		✓	
	Agriculture Co-operative Society			✓	
	Milk Co-operative Soc.			✓	
	Small Scale Industries	3. Nos.		✓	
	Internet Cafes/ Common Service Center/Wi Fi			✓	
	Youth Club				✓
	Mahila Mandal				✓

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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 ?	Drainage line cleaned	

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
ગ્રામ પંચાયત ઉમરાખ
તા. બારડોલી, જી. સુરત

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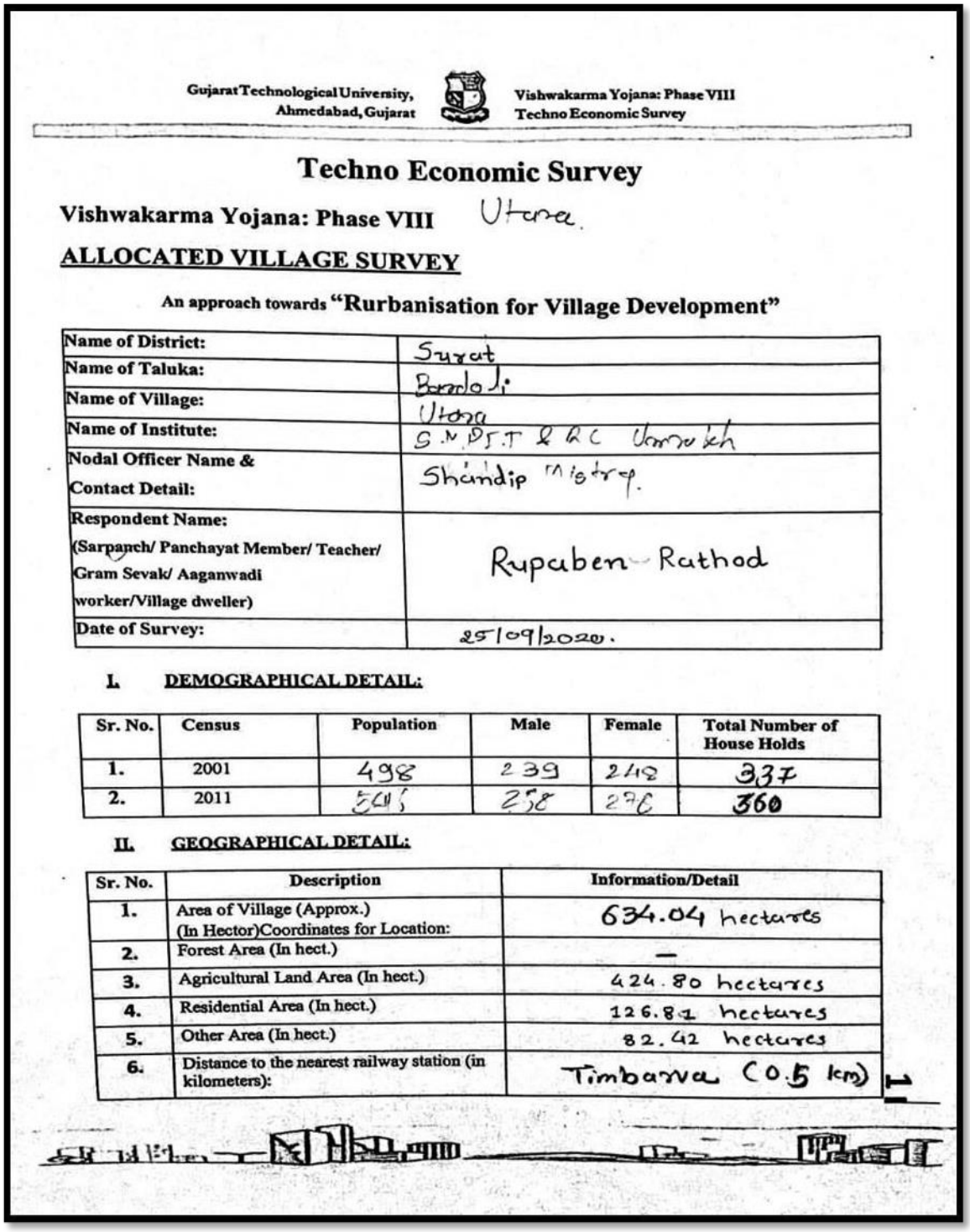
12.3 SURVEY FORM OF ALLOCATED VILLAGE (SCANNED COPY) ATTACHMENT IN THE REPORT FOR PART-1 SURVEY FORM IDEAL VILLAGE (ORIGINAL COPY) ATTACHMENT IN THE REPORT FOR PART-II:



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII Utara

ALLOCATED VILLAGE SURVEY

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

Name of District:	Surat
Name of Taluka:	Bardoli
Name of Village:	Utara
Name of Institute:	S.N.D.T & R.C Umrakh
Nodal Officer Name & Contact Detail:	Shandip Mistry.
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Rupaben Rathod
Date of Survey:	25/09/2020.

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	498	239	248	337
2.	2011	541	258	278	360

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	634.04 hectares
2.	Forest Area (In hect.)	—
3.	Agricultural Land Area (In hect.)	424.80 hectares
4.	Residential Area (In hect.)	126.81 hectares
5.	Other Area (In hect.)	82.42 hectares
6.	Distance to the nearest railway station (in kilometers):	Timbarva (0.5 km)

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7.	Name of Nearest Town with Distance:	Bardoli - (3 km)
8.	Distance to the nearest bus station (in kilometers):	Karanjvela (4.2 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.	Animal Husbandry
	3.	Agriculture Work

Major crops grown in the village:	1.	Sugar Cane
	2.	Banana
	3.	Vegetables

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	River	✓		
	Public Tap/Standpipe				
	Tube Well Or Bore Well	Bore	✓		
2.	DUG WELL	100 Nos.	✓		
	Protected Well			✓	
	Un Protected Well				
3.	WATER FROM SPRING				
	Protected Spring				✓
	Unprotected Spring				✓
	Rainwater	yes.	✓		✓
	Tanker Truck				✓
	Cart With Small Tank				
4.	SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/			✓	
	Irrigation Channel				✓
	Bottled Water				✓
	Hand Pump	10 Nos		✓	

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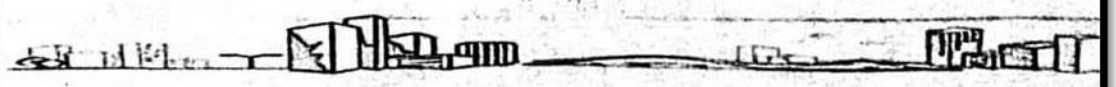
	Other(Specify)Lake/ Pond	-		✓	
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	15,000		Regd
	Underground Sump	Capacity:	-	-	-
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1	→ yes underground			
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	WBM			
	Main road	WBM			
	Internal streets	Utara Vadhra → Kutchha.			
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH:-53, Palsana-1, Kadod-bardoli			
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Bardoli (3 Kms)		✓	
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Bus Stop within village		✓	
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)			✓	
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Govt.		✓	



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	Power supply for Domestic Use	24 hrs	✓		
	Power supply for Agricultural Use	8 hrs.	✓		
	Power supply for Commercial Use			✓	
	Road/ Street Lights	8 Nos	✓		
	Electrification in Government Buildings/ Schools/ Hospitals		✓		
	Renewable Energy Source Facilities (Y/ N)		✓		
	LED Facilities	16 Nos	✓		
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes 2 Nos.	✓		
	Location Condition	good.			
	Community Toilet (With bath/ without bath facilities)	Yes.	✓		
	Solid & liquid waste Disposal system available	Nala -	Harvard Kuva.	✓	
	Any facility for Waste collection from road	None -	✓ Open Dump.		
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND	-		✓	
	STREAM/RIVER	-		✓	
	CANAL	-		✓	
	WELL	-		✓	
	TUBE WELL.	-		✓	
	OTHER (SPECIFY)	River - Mindhola, Bore well			
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	80% Pucca	20% Kutchha		

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	1 Nos			
	Sub-Centre	-			
	PHC	-			
	BLOCK PHC	-			
	CHC/RH	-			
	District/ Govt. Hospital	-			
	Govt. Dispensary	-			
	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: ....3....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	Yes - 1 No			
	Primary School	Yes - 1 No 5			
	Secondary school	—			
	Higher sec. School	—			
	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: ...3....kms.

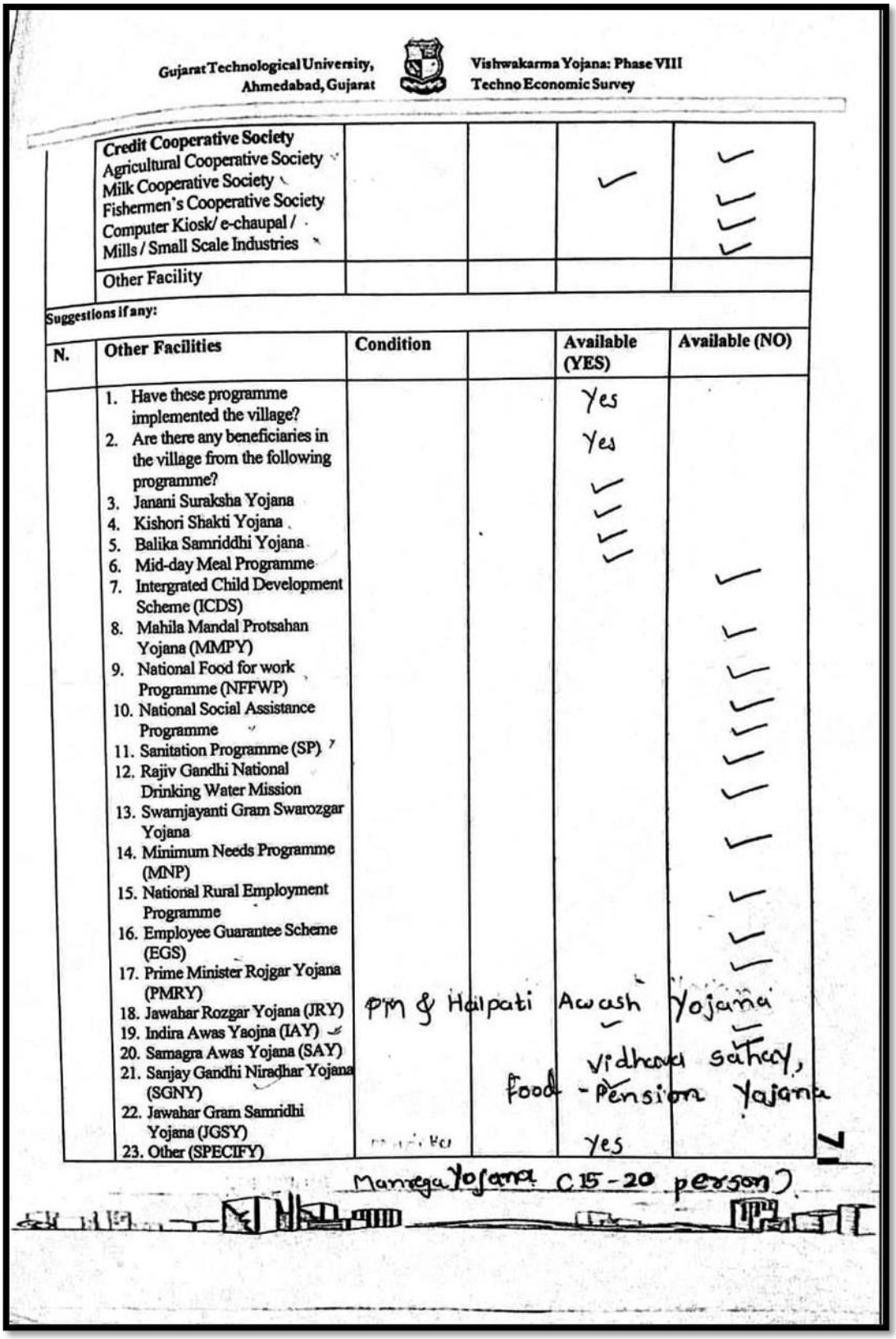
Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	Yes, need maintance.			
	Public Library (With daily newspaper supply: Y/N)	–			No.
	Public Garden	–			
	Village Pond	–			
	Recreation Center	–			
	Cinema/ Video Hall	–			
	Assembly Polling Station	School			
	Birth & Death Registration Office	Panchayat office.			

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				✓
	Telecommunication Network/ STD booth				✓
	General Market				✓
	Shops (Public Distribution System)	2 - Nos		✓	
	Panchayat Building			✓	
	Pharmacy/Medical Shop				✓
	Bank & ATM Facility				✓
	Agriculture Co-operative Society				✓
	Milk Co-operative Soc.			✓	
	Small Scale Industries			–	
	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			✓	✓ ✓ ✓ ✓
	Other Facility				

Suggestions if any:

N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village?			Yes	
	2. Are there any beneficiaries in the village from the following programme?			Yes	
	3. Janani Suraksha Yojana			✓	
	4. Kishori Shakti Yojana			✓	
	5. Balika Samriddhi Yojana			✓	
	6. Mid-day Meal Programme			✓	
	7. Intergrated Child Development Scheme (ICDS)				✓
	8. Mahila Mandal Protsahan Yojana (MMPY)				✓
	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				✓
	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)	PM & Halpati		Awash Yojana	
	19. Indira Awas Yaojna (IAY)				
	20. Samagra Awas Yojana (SAY)			Vidhava sahay,	
	21. Sanjay Gandhi Niradhar Yojana (SGNY)			Food - Pension Yojana	
	22. Jawahar Gram Samridhi Yojana (JGSY)				
	23. Other (SPECIFY)			Yes	

Manrega Yojana (15-20 person)

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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	Solar light	✓		
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	8 Nos	✓	✓ ✓ ✓	
3.	Any Other				

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Village Base Map Available: Hard Copy/Soft Copy	Hard Copy	✓		
2.	Recent Projects going on for Development of Village	PM Awas Yojana	✓		
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)	affected up to 2hrs.	✓		

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VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities,		
	School Building	Required	
	Health Center	Not required	
	Panchayat Building	Not required	
	Public Toilets & any other	Community Hall- required	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?	3 times 3 to 4 times	

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	Public toilet, Drainage line, Bank & ATM,	Bridge, Post office, Water tank

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

Rathod Rupal A.
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12.4 GAP ANALYSIS OF ALLOCATED VILLAGE:

VILLAGE GAP Analysis					
Village Facilities	**Planning Commission/UDPFI Norms**	**Village Name:**	**UTARA**		
		Population:	**1496**		
		Existing	**Required as per Norms**	**Smart Village / Cities / Heritage Future Projection Design**	**Gap**
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 population	1	NO	7	6
Primary School	Each Per 2500 population	1	NO	1	0
Secondary School	Per 7,500 population	0	YES	1	1
Higher Secondary School	Per 15,000 Population	0	NO	1	1
College	Per 125,000 Population	0	NO	0	0
Tech. Training Institute	Per 100000 Population	0	NO	0	0
Agriculture Research Centre	Per 100000 Population	0	NO	0	0
Skill Development Center	Per 100000 Population	0	NO	0	0
Health Facility					
Govt/Panchyat Dispensary or Sub PHC or Health					
Centre	Each Village	0	YES	2	2
Primary Health & Child Health Center	Per 20,000 population	0	NO	0	0
Child Welfare and Maternity Home	Per 10,000 population	0	YES	1	1
Multispecialty Hospital	Per 100000 Population	0	NO	0	0
Public Latrines	1 for 50 families (if toilet is not there in home, especially for slum pockets & kutcha house)	2	YES	4	2
Physical Infrastructure Facilities					
Transportation		Adequate			
Pucca Village Approach Road	Each village				
Bus/Auto Stand	All Villages connected				

provision	by PT (ST Bus or Auto)				
Drinking Water (Minimum 70 lpcd)		Adequate			
Over Head Tank	1/3 of Total Demand	1	YES	6	5
U/G Sump	2/3 of Total Demand	0	NO	0	0
Drainage Network - Open		Inadequate	YES	1	1
Drainage Network - Cover		Inadequate	YES	1	1
Waste Management System		Inadequate	NO	0	0
Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	1	YES	4	3
community hall and Public Library	Per 15000 Population	0	NO	1	1
Cremation Ground	Per 20,000 population	0	NO	1	1
Post Office	Per 10,000 population	0	YES	1	1
Gram Panchayat Building	Each individual/group panchayat	1	NO	1	0
APMC	Per 100000 Population	0	NO	0	0
Fire Station	Per 100000 Population	0	NO	0	0
Public Garden	Per village	0	YES	1	1
Police post	Per 40,000Population	0	NO	0	0
Shopping Mall		0	NO	0	0
Electrical Design					
Electricity Network		Adequate	NO	Adequate	0
Any Smart Village Facility					
Technology					
		ESR cap	0		
		Sump cap	0		
		Lat	0		

12.5 SUMMARY DETAILS OF ALL THE VILLAGE DESIGNS IN TABLE FORM PART-I AND PART-II:

VILLAGE NAME	BRANCH	DESIGN	
		PART - I	PART – II
Utara	Civil Engineering	Drainage System	Organic Composting Plant
		Bus Stand	Temple
		Party Plot	Bank With ATM
		Cemetery	Cheese Factory
		Public Health Centre	Banquet Hall
		Cattle House	Park
	Electrical Engineering	Underground Cable	Solar Tracker with Stepper Motor Using
		CCTV Camera	Microcontroller Auto Intensity Control of Street Light Electrical
		Solar Photovoltaic	Load Control System by Computer
Vdhava	Civil Engineering	Post office	Agriculture storage room
		Low-cost private toilet	Cybercafé
		Skill development centre	Funeral home
		Library	Primary shop
		Bio rock Treatment plan	Milk Dairy
		Party plot with plastic block	Bank
	Electrical Engineering	Solar street light designing	Auto Irrigation System Using Soil Moisture Sensor and PIC
		Solar crop dryer	Fire Alarm
		Prepaid energy meter	Underground Cable Fault Distance Locator
Nani-Bhatlav	Civil Engineering	Public toilet by plastic block	ATM
		Skill development centre by plastic block	Village Gate
		Public health centre by plastic block	Chabutaro
		Grocery shop	Panchayat Building
		Garden	Sports Club
		Primary school	Krushi Sheva Kendra
	Electrical Engineering	Earthling Product	Programmable Load
		MCB (Miniature Circuit Breaker)	Shedding
		Time switch specification	Home Automation

12.6 SUMMARY OF GOOD PHOTOGRAPHS IN TABLE FORMAT:

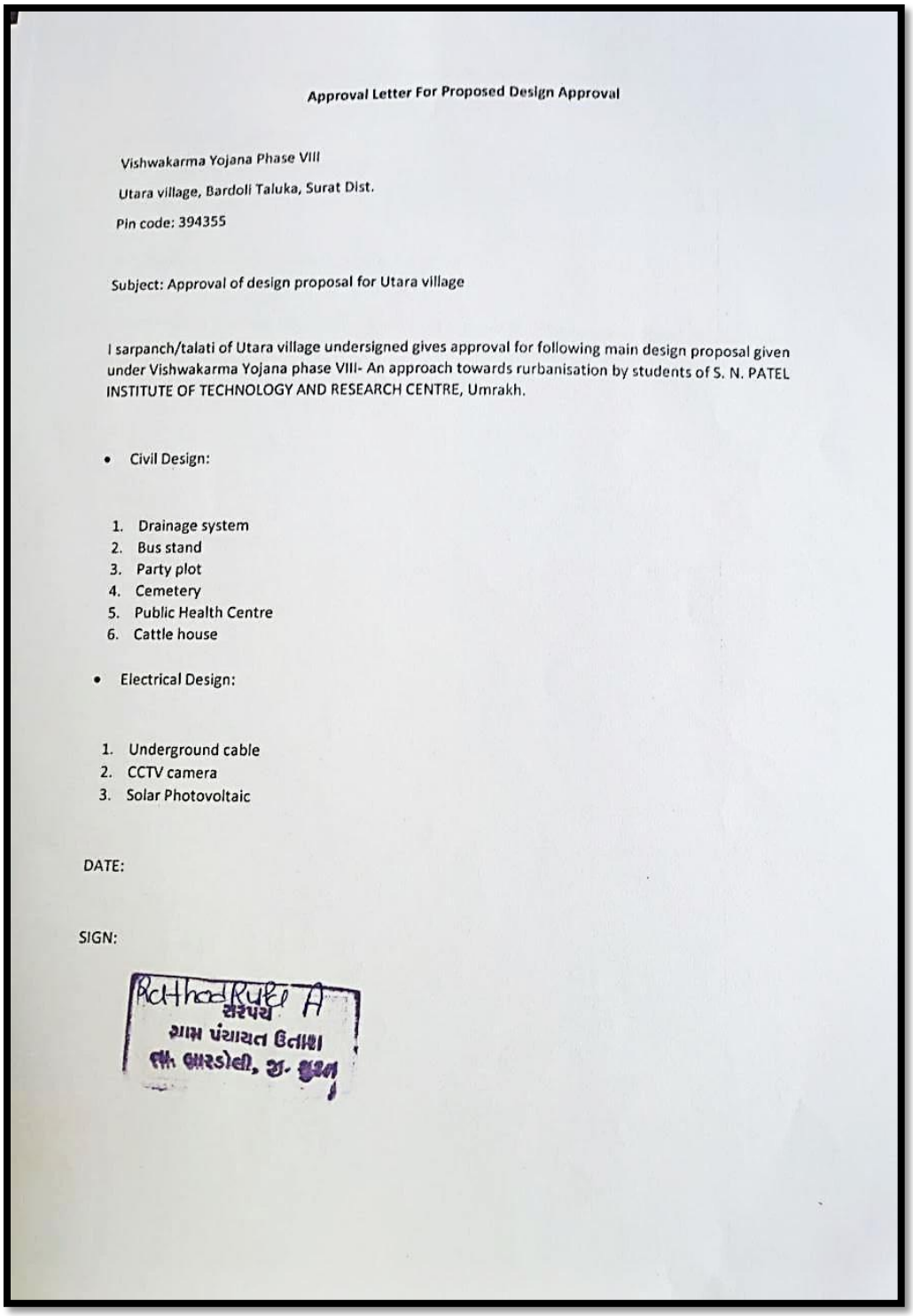
12.7 VILLAGE INTERACTION WITH SARPANCH REPORT WITH PHOTOGRAPH:

Techno economic survey forms give much information about village by interacting with Talati and Sarpanch. But interaction with village dwellers and observation of village condition is required.

We visited allocated village Utara and also visited ideal village and Smart village Mota. We met to Sarpanch Rupaben Rathod and Talati of Utara village. They both are very dynamic person and gave us the detailed information and data whenever we required.

We visited all the internal part of the village and interacted with villagers directly and ask them about the present situation of village. We conducted a Techno-economic survey of Utara village. After all, we analyzed the gap analysis and provided the necessary facilities to village.

12.8 SARPANCH LETTER GIVING INFORMATION ABOUT THE VILLAGE DEVELOPMENT:



Approval Letter For Proposed Design Approval

Vishwakarma Yojana Phase VIII

Utara village, Bardoli Taluka, Surat Dist.

Pin code: 394355

Subject: Approval of design proposal for Utara village

I sarpanch/talati of Utara village undersigned gives approval for following main design proposal given under Vishwakarma Yojana phase VIII- An approach towards rurbanisation by students of S. N. PATEL INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE, Umrakh.

- Civil Design:

1. Drainage system
2. Bus stand
3. Party plot
4. Cemetery
5. Public Health Centre
6. Cattle house

- Electrical Design:

1. Underground cable
2. CCTV camera
3. Solar Photovoltaic

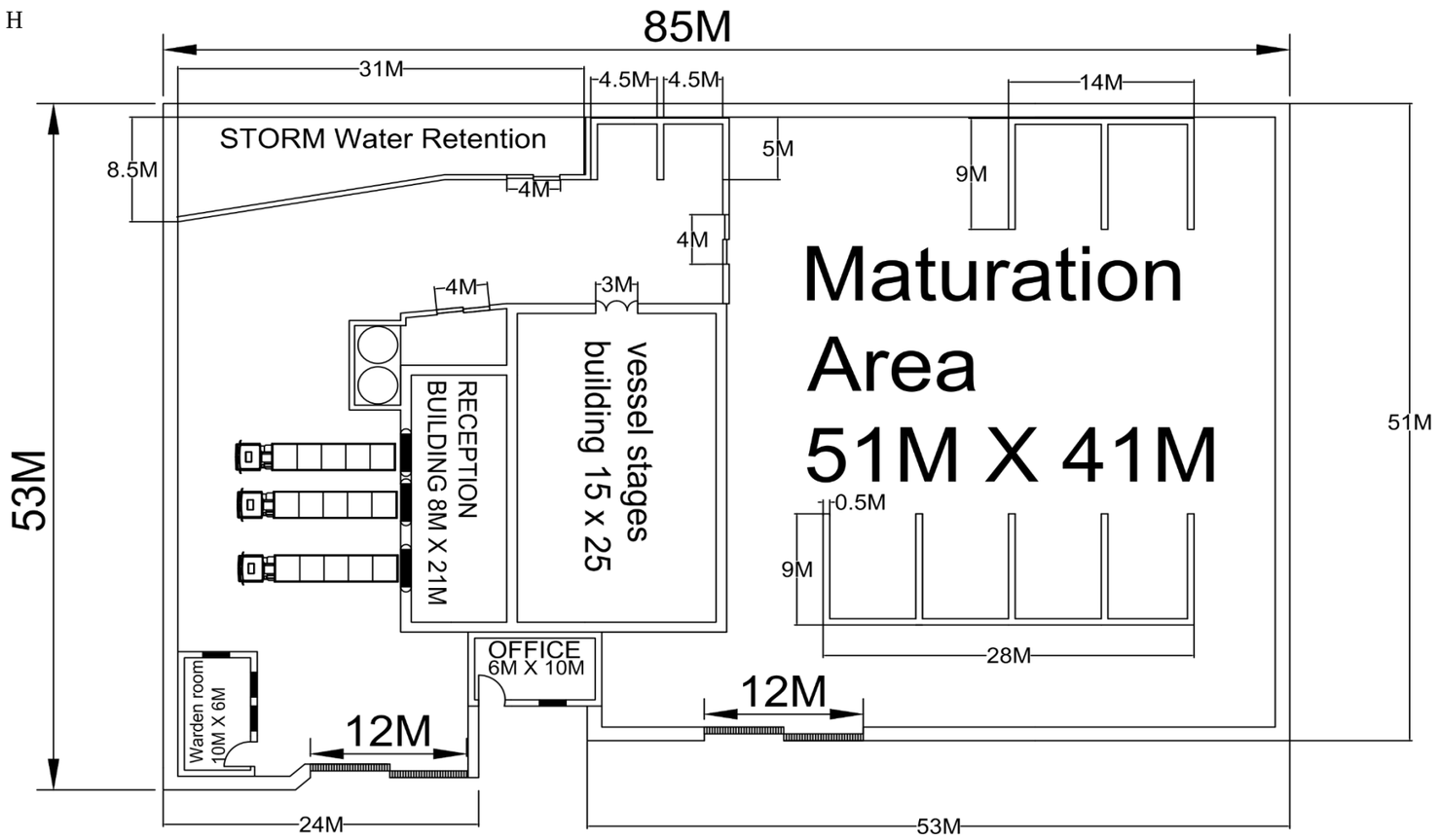
DATE:

SIGN:

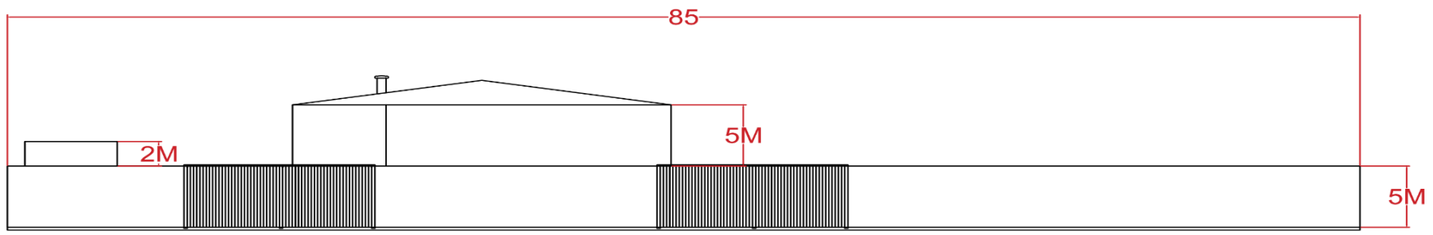
CHAPTER 13: FROM THE CHAPTER- 9 FUTURE DESIGNS OF THE ASPECTS

13.1 DESIGN PROPOSAL:

13.1.1 Civil Design 1 (ORGANIC COMPOSTING PLANT):



PLAN



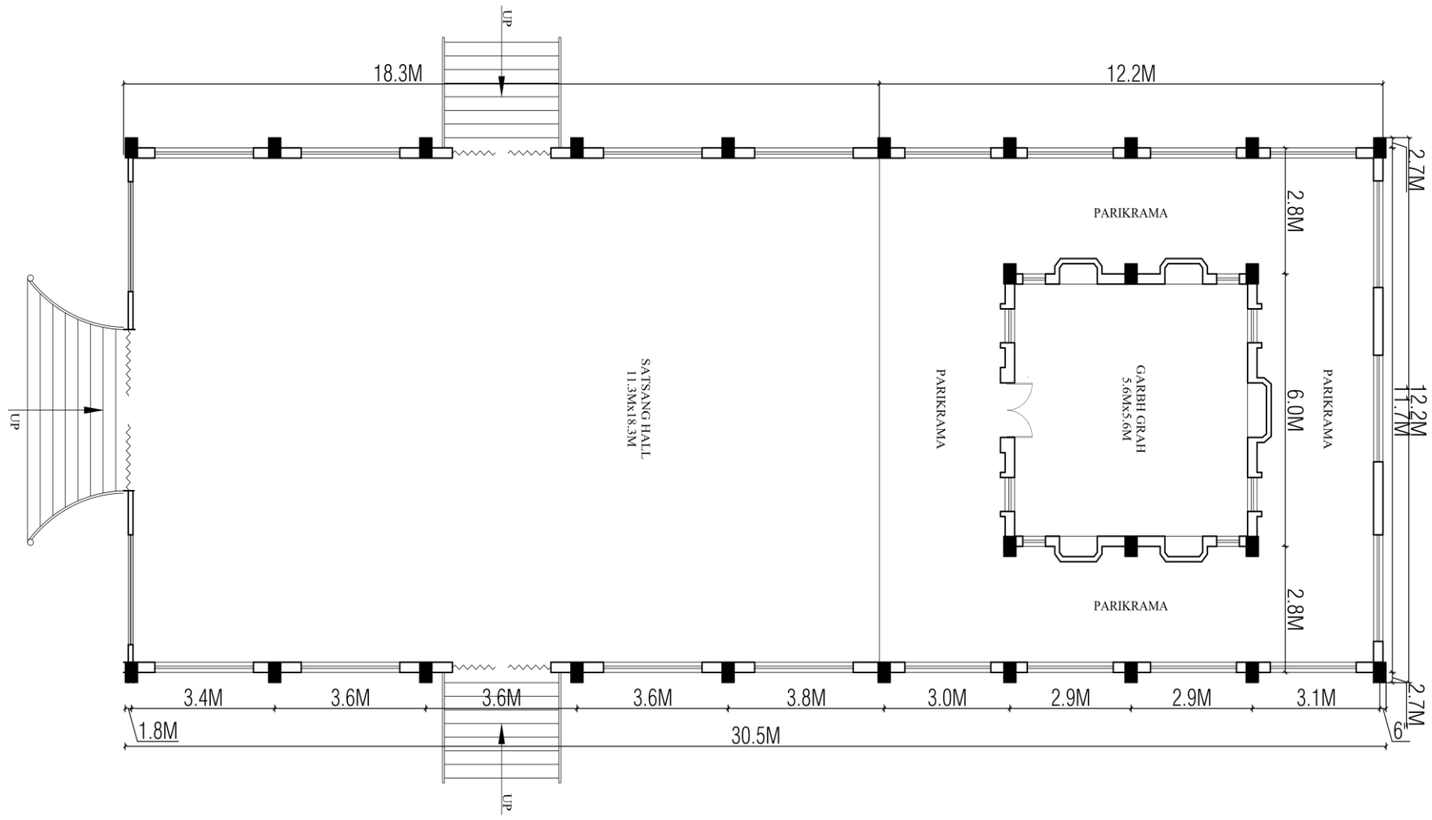
DESIGN NO.	**ORGANIC COMPOSTING PLANT**
PREPARED BY	**TWINKLE CHAMPANERIA** **BHAVIK BHENSAL**
PROJECT NAME	**VISHWAKARMA YOJANA PHASE VIII** **RANASAR, GANDHINAGAR**
INSTITUTE	**S.N.P.I.T. & R.C., UMRAKH**
UNIVERSITY	**GUJARAT TECHNOLOGICAL UNIVERSITY**

MEASUREMENT SHEET OF ORGANIC COMPOSTING PLANT						
SR. NO.	DESCRIPTION	NO.	L	B	H	QUANTITY
1.	Earthwork in excavation L = 348.50m No. of junction = 13 ∴ L = 341.30m	1	341.30	0.90	1.10	337.99 m^3
	Brick bat cement concrete (1:4:8)	1	341.30	0.90	0.20	61.43 m^3
2.	Brick masonry up to plinth in C.M. 1:1	1	337.50	0.50	0.30	449.92 m^3
				Total:		449.92 m^3
3.	Earth filling work in plinth					
	1. Maturation Area	1	51.00	41.00	1.00	2019.00 m^3
	2. Vessel Stages Building	1	15.00	25.00	1.00	375.00 m^3
	3. Reception Building	1	8.00	21.00	1.00	168.00 m^3
	4. Office	1	6.00	10.00	1.00	60.00 m^3
	5. Warden Room	1	10.00	6.00	1.00	60.00 m^3
				Total:		2754 m^3
`4.	Brick masonry in superstructure	1	344.50	0.50	5.00	861.25 m^3
5.	R.C.C. Slab	1	85.00	53.00	0.25	1126.25 m^3
6.	Plastering work (1:3)					
	1. Maturation Area					
	Horizontal wall	2	51.00	-	5.00	510.00 m^2
	Vertical wall	2	41.00	-	5.00	410.00 m^2
	2. Vessel Stages Building					
	Horizontal wall	2	15.00	-	5.00	150.00 m^2
	Vertical wall	2	25.00	-	5.00	250.00 m^2
	3. Reception Building					
	Horizontal wall	2	8.00	-	5.00	80.00 m^2
	Vertical wall	2	21.00	-	5.00	210.00 m^2
	4. Office					
	Horizontal wall	2	6.00	-	5.00	60.00 m^2
	Vertical wall	2	10.00	-	5.00	100.00 m^2
	5. Warden Room					
	Horizontal wall	2	10.00	-	5.00	100.00 m^2
	Vertical wall	2	6.00	-	5.00	60.00 m^2

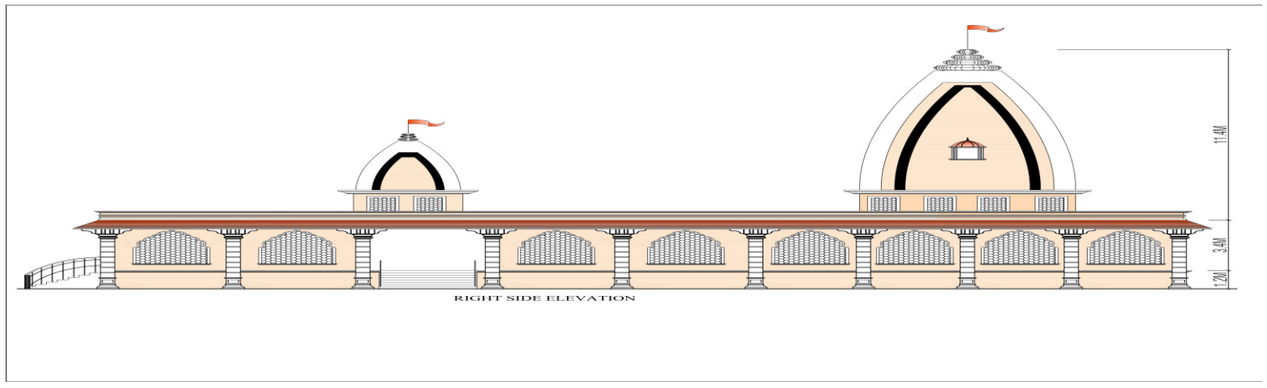
				Total:	1930.00 m^2

ABSTRACT SHEET OF ORGANIC COMPOSTING PLANT					
SR. NO.	DESCRIPTION	QUANTITY	RATE	PER	AMOUNT (Rs.)
1.	Excavation for foundation	151.34 m^3	100	M	44992
2.	Earthing work in plinth	83.80 m^3	75	M	206550
3.	Brick work in super structure frame	61.84 m^3	1500	M	1292625
4.	Laying of R.C.C. Slab	18.94 m^3	2500	M	2815625
6.	Plaster work (1:3)	419.73 m^3	150	M	289500
			Total amount:		4463398
		20% water charges			892679.40
		3% contingencies			133901.91
		2% work charge establishment			89268
		Total			5579246.31
		10% contractor profit			557924.63
		Grand total			61397170.95

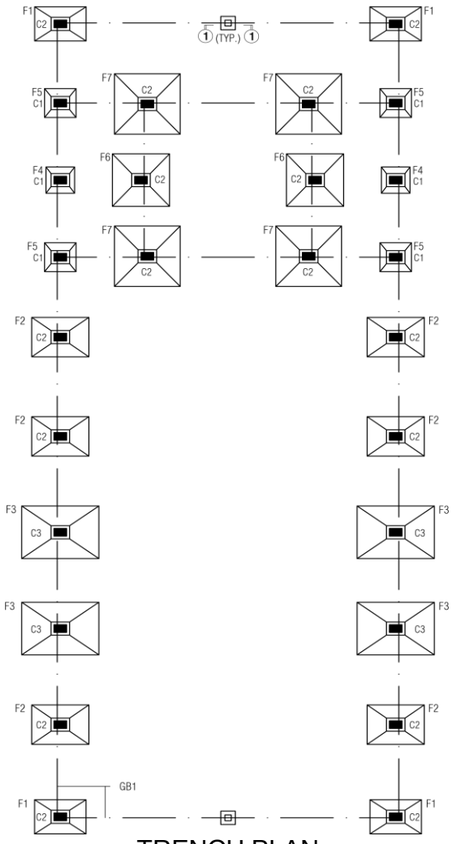
13.1.2 Civil Design 2 (TEMPLE):



PLAN



ELEVATION



TRENCH PLAN

DESIGN NO.	**TEMPLE**
PREPARED BY	**TWINKLE CHAMPANERIA BHAVIK BHENSAL**
PROJECT NAME	**VISHWAKARMA YOJANA PHASE VIII RANASAR, GANDHINAGAR**
INSTITUTE	**S.N.P.I.T. & R.C., UMRAKH**
UNIVERSITY	**GUJARAT TECHNOLOGICAL UNIVERSITY**

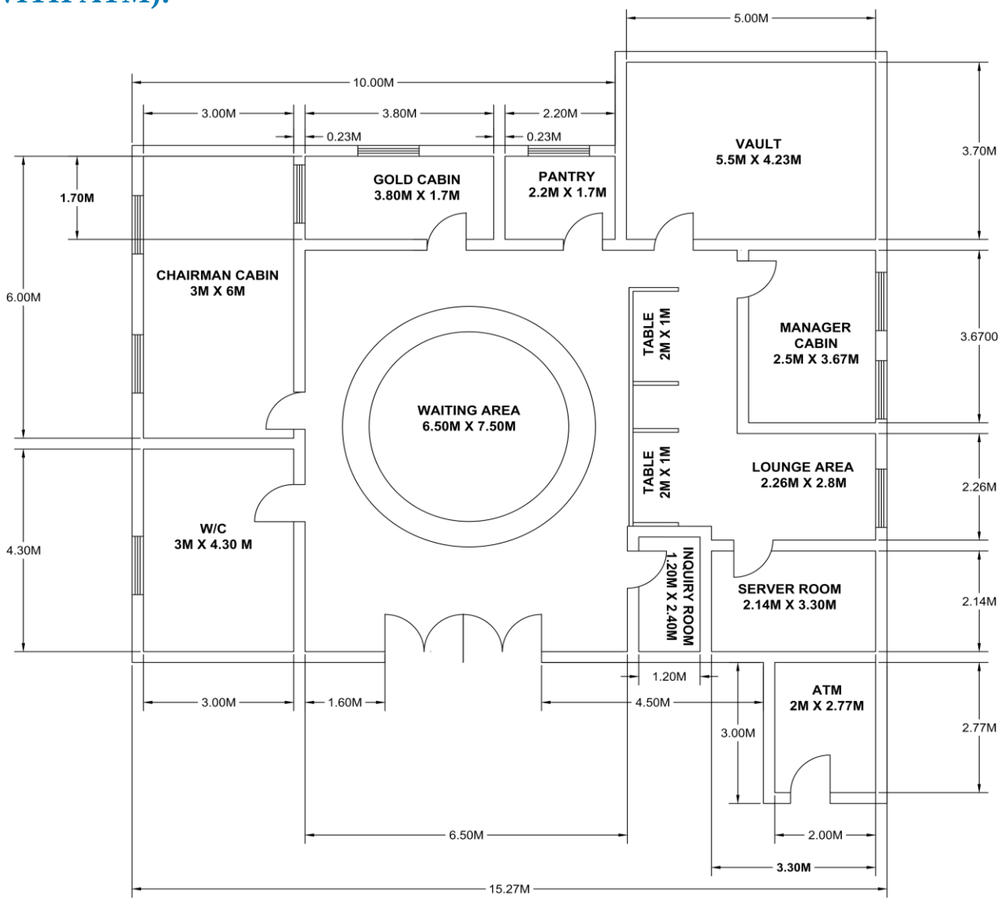
MEASUREMENT SHEET OF TEMPLE						
SR. NO.	DESCRIPTION	NO.	L	B	H	QUANTITY
1.	Earthwork in excavation for foundation:					
	F_1	4	1.80	1.20	1.00	8.64 m^3
	F_2	6	2.00	1.50	1.00	18.00 m^3
	F_3	4	2.70	2.00	1.00	21.60 m^3
	F_4	2	1.00	1.00	1.00	2.00 m^3
	F_5	4	1.10	1.10	1.00	4.84 m^3
	F_6	2	2.00	2.00	1.00	8.00 m^3
	F_7	4	2.30	2.30	1.00	21.16 m^3
				Total:		84.24 m^3
2.	P.C.C. in foundation:					
	F_1	4	1.80	1.20	0.10	0.86 m^3
	F_2	6	2.00	1.50	0.10	1.80 m^3
	F_3	4	2.70	2.00	0.10	2.16 m^3
	F_4	2	1.00	1.00	0.10	0.20 m^3
	F_5	4	1.10	1.10	0.10	0.48 m^3
	F_6	2	2.00	2.00	0.10	0.80 m^3
	F_7	4	2.30	2.30	0.10	2.12 m^3
				Total:		8.42 m^3
3.	R.C.C.					
	1. For F_1:					
	Part 1: Footing without slope	4	1.80	1.20	0.20	1.73 m^3
	Part 2: Footing with slope					3.08 m^3
	Part 3: Column up to G.L.	4	0.50	0.50	0.30	0.36 m^3
	Part 4: Column up to plinth	4	0.6	0.5	0.60	0.72 m^3
	Part 5: Column above P.L. up to slab	4	0.60	0.50	3.00	3.60 m^3
				Total:		9.48 m^3
	For F_2:					
	Part 1: Footing without slope	6	2.00	1.50	0.20	3.60 m^3

	Part 2: Footing with slope					8.33 m^3
	Part 3: Column up to G.L.	6	0.60	0.50	0.30	0.54 m^3
	Part 4: Column up to plinth	6	0.60	0.50	0.60	1.08 m^3
	Part 5: Column above P.L. up to slab	6	0.60	0.50	3.00	5.40 m^3
				Total:		18.95 m^3
	For F_3:					
	Part 1: Footing without slope	4	2.70	2.00	2.00	4.32 m^3
	Part 2: Footing with slope					8.13 m^3
	Part 3: Column up to G.L.	4	0.60	0.50	0.30	0.36 m^3
	Part 4: Column up to plinth	4	0.60	0.50	0.60	0.72 m^3
	Part 5: Column above P.L. up to slab	4	0.60	0.50	3.00	3.60 m^3
				Total:		17.13 m^3
	For F_4:					
	Part 1: Footing without slope	2	1.00	1.00	0.20	0.40 m^3
	Part 2: Footing with slope					1.44 m^3
	Part 3: Column up to G.L.	2	0.60	0.50	0.30	018 m^3
	Part 4: Column up to plinth	2	0.60	0.50	0.60	0.36 m^3
	Part 5: Column above P.L. up to slab	2	0.60	0.50	3.00	1.80 m^3
				Total:		4.18 m^3
	For F_5:					
	Part 1: Footing without slope	4	1.10	1.10	0.20	0.97 m^3
	Part 2: Footing with slope					3.22 m^3

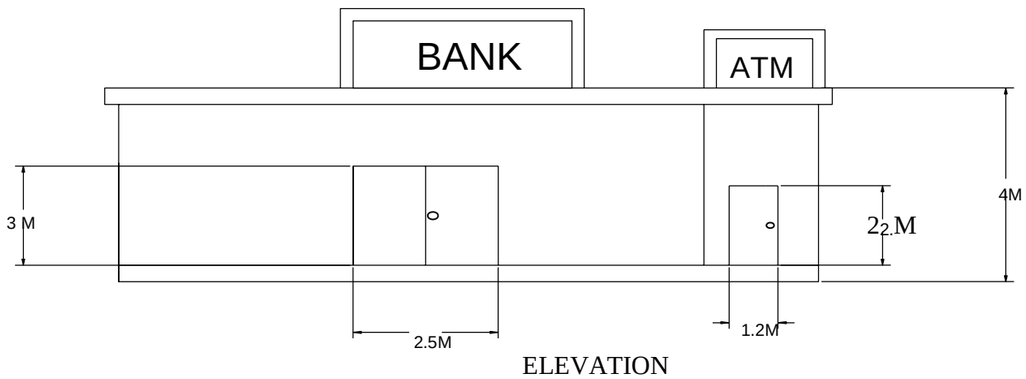
	Part 3: Column up to G.L.	4	0.60	0.50	0.30	0.36 m^3
	Part 4: Column up to plinth	4	0.60	0.50	0.60	0.72 m^3
	Part 5: Column above P.L. up to slab	4	0.60	0.50	3.00	3.60 m^3
				Total:		8.86 m^3
	For F_6:					
	Part 1: Footing without slope	2	2.00	2.00	2.00	1.60 m^3
	Part 2: Footing with slope					3.33 m^3
	Part 3: Column up to G.L.	2	0.60	0.50	0.30	0.18 m^3
	Part 4: Column up to plinth	2	0.60	0.50	0.60	0.36 m^3
	Part 5: Column above P.L. up to slab	2	0.60	0.50	3.00	1.80 m^3
				Total:		7.27 m^3
	For F_7:					
	Part 1: Footing without slope	4	2.30	2.30	0.20	4.23 m^3
	Part 2: Footing with slope					7.96 m^3
	Part 3: Column up to G.L.	4	0.60	0.50	0.30	0.36 m^3
	Part 4: Column up to plinth	4	0.60	0.50	0.60	0.72 m^3
	Part 5: Column above P.L. up to slab	4	0.60	0.50	3.00	3.60 m^3
				Total:		16.87 m^3
				Total R.C.C.:		82.75 m^3
4.	Steel for column footing:					
	For one foundation: 16mmØ - 6 NOS. L = 220m					
	∴ For 26 foundations	156	22	@	1.58	543.34 kg

	26 x 6 = 156 NOS				kg/m	
	12mmØ - 156 NOS vertical column bars L = 3.15m	156	3.15	@	0.89 kg/m	437.35 kg
	12mmØ footing cage bars @ 10cm c/c spacing L = 1.12m					
	∴ No of bars will be 20 for one foundation					
	∴ For 26 foundations 26 x 20 = 520	520	1.12	@	0.89 kg/m	518.34 kg
5.	Lateral ties for column 6mmØ links 15cm c/c	806	1.75	@	0.22 kg/m	310.31 kg
	L = 2 (A + B) + min hook					
	A = 0.6 – 2 X 0.05 – 2 X 0.006 ∴ A = 0.488					
	B = 0.5 – 2 X 0.05 – 2 X 0.006 ∴ B = 0.388					
	∴ L = 2 (0.488 + 0.388) ∴ L = 1.75m					
	No of lateral ties = 31 (For one column)					
	∴ 31 X 26 = 806 NOS					

13.1.3 Civil Design 3 (BANK WITH ATM):



PLAN



ELEVATION

DESIGN NO.	**BANK WITH ATM**
PREPARED BY	**TWINKLE CHAMPANERIA BHAVIK BHENSAL**
PROJECT NAME	**VISHWAKARMA YOJANA PHASE VIII RANASAR, GANDHINAGAR**
INSTITUTE	**S.N.P.I.T. & R.C., UMRAKH**
UNIVERSITY	**GUJARAT TECHNOLOGICAL UNIVERSITY**

MEASUREMENT SHEET OF BANK WITH ATM						
SR. NO.	DESCRIPTION	NO.	L	B	H	QUANTITY
	Total Centre line = 105.52m No. of junction = 18					
1.	Earthwork in excavation for foundation L = 97.42m	1	97.42	0.90	1.10	96.45 m^3
				Total:		96.45 m^3
2.	Brick masonry up to plinth in CM 1:6					
	a) First step: L = 101.02m	1	101.02	0.50	0.30	15.15 m^3
	b) Second step: L = 101.92m	1	101.92	0.40	0.30	12.23 m^3
	c) Third step: L = 102.82m	1	102.82	0.30	0.30	9.25 m^3
	Steps: (For steps size of door is 2.2m)					
	First step	1	2.20	0.90	0.15	2.28 m^3
	Second step	1	2.20	0.60	0.15	1.52 m^3
	Third step	1	2.20	0.30	0.15	0.76 m^3
				Total:		4.56 m^3
3.	Earth filling work in plinth					
	1. Chairman's Cabin	1	3.00	6.00	0.55	9.90 m^3
	2. W/C	1	3.00	4.30	0.55	7.10 m^3
	3. Waiting Area	1	6.50	7.50	0.55	26.81 m^3
	4. Inquiry Room	1	1.20	2.40	0.55	1.58 m^3
	5. ATM	1	2.00	2.77	0.55	3.05 m^3
	6. Server Room	1	2.14	3.30	0.55	3.88 m^3
	7. Lounge Area	1	2.26	2.80	0.55	3.48 m^3
	8. Table	2	2.00	1.00	0.55	2.20 m^3
	9. Manager's Cabin	1	2.50	3.67	0.55	5.05 m^3
	10. Vault	1	5.50	4.32	0.55	13.07 m^3
	11. Gold Cabin	1	3.80	1.70	0.55	3.55 m^3
	12. Pantry	1	2.20	1.70	0.55	2.06 m^3
	13. Space 1	1	2.77	1.03	0.55	1.57 m^3

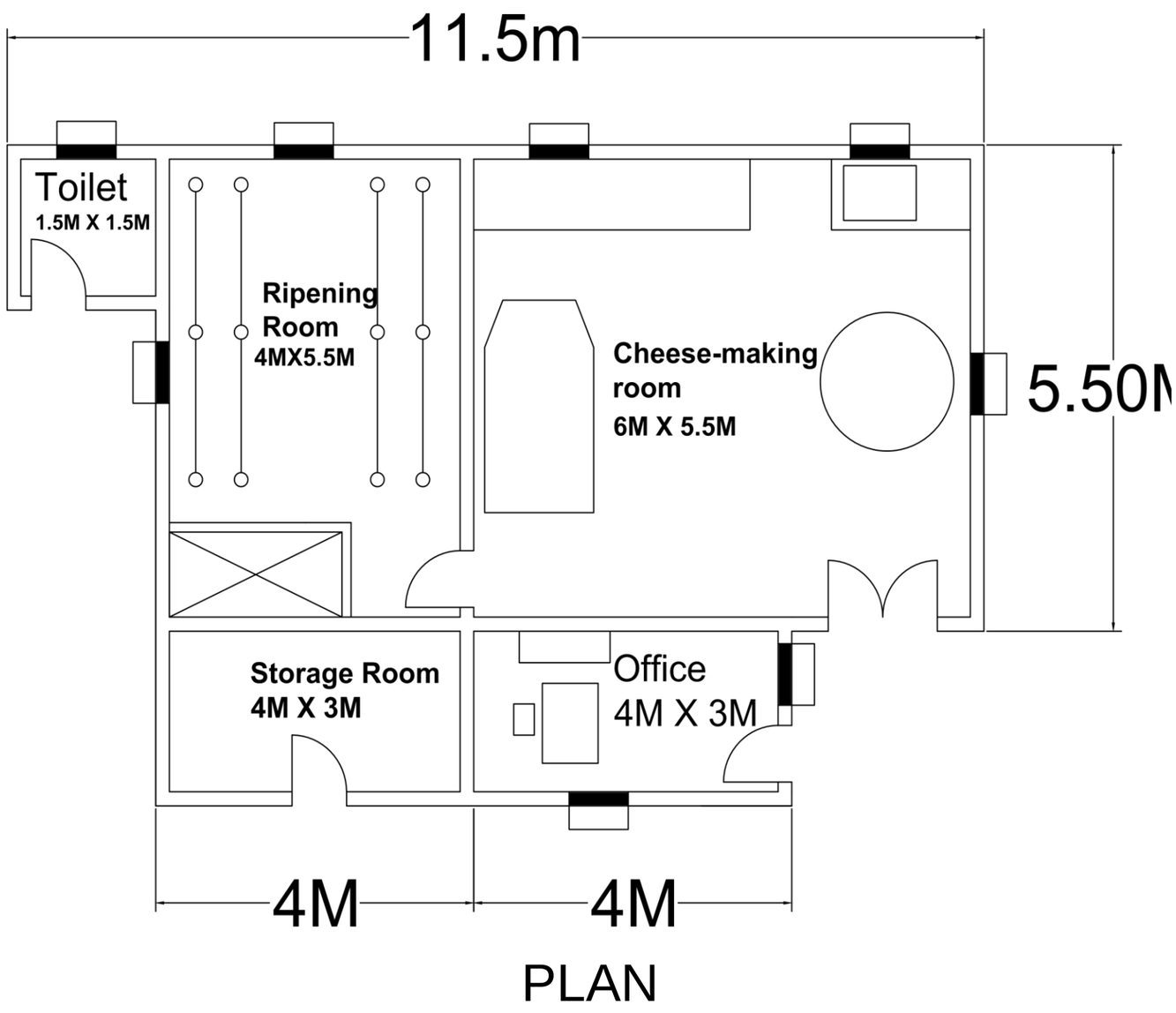
	14. Space 2	1	1	0.87	0.55	0.5 m^3
				Total:		83.79 m^3
4.	D.P.C. at plinth level L = 102.82m	1	102.82	0.30	-	30.82 m^2
5.	Brick masonry in super structure L = 103.45m	1	103.45	0.23	3.00	71.38 m^3
	Deduction of door and windows					
	D = 1.1x2.1	2	1.10	0.23	2.10	1.06 m^3
	D_1 = 1.0x2.1	9	1.00	0.23	2.10	4.35 m^3
	W = 1.1x1.4	9	1.10	0.23	1.40	3.19 m^3
				Total:		8.60 m^3
	Lintel Quantity and deduction					
	D	2	1.40	0.23	0.15	0.09 m^3
	D_1	9	1.30	0.23	0.15	0.41 m^3
	W	9	1.40	0.23	0.15	0.44 m^3
				Total:		0.94 m^3
6.	Brick work in super structure					61.94 m^3
7.	R.C.C. Slab: L = 15.46, 5.46, 2.46 B = 10.99, 2.23, 3 H = 0.10					
	For slab 1	1	15.46	10.99	0.10	16.99 m^3
	For slab 2	1	5.46	2.23	0.10	1.22 m^3
	For slab 3	1	2.46	3.00	0.10	0.74 m^3
				Total:		18.95 m^3
8.	Brick work in parapet wall					
	a) Horizontal walls:					
	Wall – 1	1	15.46	0.23	0.70	2.49 m^3
	Wall – 2	1	5.64	0.23	0.70	0.88 m^3
	Wall – 3	1	2.46	0.23	0.70	0.40 m^3
	b) Vertical walls:					
	Wall – 1	1	10.53	0.23	0.70	1.70 m^3
	Wall – 2	1	2.00	0.23	0.70	0.32 m^3
	Wall - 3	1	2.77	0.23	0.70	0.47 m^3

				Total:		6.26 m^3
9.	Plastering work (1:3) inside plaster					
	1. Chairman's Cabin					
	Horizontal wall	2	3.00	-	3.00	18 m^2
	Vertical wall	2	6.00	-	3.00	36 m^2
	2. W/C					
	Horizontal wall	2	3.00	-	3.00	18 m^2
	Vertical wall	2	4.30	-	3.00	25.8 m^2
	3. Waiting Area					
	Horizontal wall	2	6.50	-	3.00	39 m^2
	Vertical wall	2	7.50	-	3.00	45 m^2
	4. Gold Cabin					
	Horizontal wall	2	3.80	-	3.00	22.8 m^2
	Vertical wall	2	1.70	-	3.00	10.2 m^2
	5. Pantry					
	Horizontal wall	2	2.20	-	3.00	13.2 m^2
	Vertical wall	2	1.70	-	3.00	10.2 m^2
	6. Vault					
	Horizontal wall	2	5.50	-	3.00	33 m^2
	Vertical wall	2	4.23	-	3.00	25.38 m^2
	7. Manager's Cabin					
	Horizontal wall	2	2.50	-	3.00	15 m^2
	Vertical wall	2	3.67	-	3.00	22.02 m^2
	8. Lounge Area					
	Horizontal wall	2	2.26	-	3.00	13.56 m^2
	Vertical wall	2	2.80	-	3.00	16.8 m^2
	9. Server Room					
	Horizontal wall	2	2.14	-	3.00	12.84 m^2
	Vertical wall	2	3.30	-	3.00	19.8 m^2
	10. ATM					
	Horizontal wall	2	2.00	-	3.00	12 m^2
	Vertical wall	2	2.77	-	3.00	16.62 m^2
	11. Inquiry Room					
	Horizontal wall	2	1.20	-	3.00	7.2 m^2
	Vertical wall	2	2.40	-	3.00	14.4 m^2
	Deduction:					
	D	2	1.10	-	2.10	2.31 m^2

	D_1	9	1.0	-	2.1	17.85 m^2
	W	9	1.1	-	1.4	6.93 m^2
				Total:		27.09 m^2

ABSTRACT SHEET OF BANK WITH ATM					
SR. NO.	DESCRIPTION	QUANTITY	RATE	PER	AMOUNT (Rs.)
1.	Excavation for foundation	151.34 m^3	100	M	15133.40
2.	Earthing work in plinth	83.80 m^3	75	M	6284.69
3.	Brick work in super structure frame	61.84 m^3	1500	M	92758.80
4.	Laying of R.C.C. Slab	18.94 m^3	2500	M	47362.50
5.	Brick wall in parapet wall	6.26 m^3	500	M	3128
6.	Plaster work (1:3)	419.73 m^3	150	M	62959.50
7.	D.P.C. at plinth	90.85 m^3	1500	M	46275
			Total amount:		273902
		20% Water Charges			54780.40
		3% Contingencies			8217.06
		2% Work Charge Establishment			5478.04
		10% Contractor Profit			34237.75
		Grand Total			376656.81

13.1.4 CIVIL DESIGN 4 (CHEESE FACTORY):



PLAN

DESIGN NO.	**CHEESE FACTORY**
PREPARED BY	**TWINKLE CHAMPANERIA BHAVIK BHENSAL**
PROJECT NAME	**VISHWAKARMA YOJANA PHASE VIII RANASAR, GANDHINAGAR**
INSTITUTE	**S.N.P.I.T. & R.C., UMRAKH**
UNIVERSITY	**GUJARAT TECHNOLOGICAL UNIVERSITY**

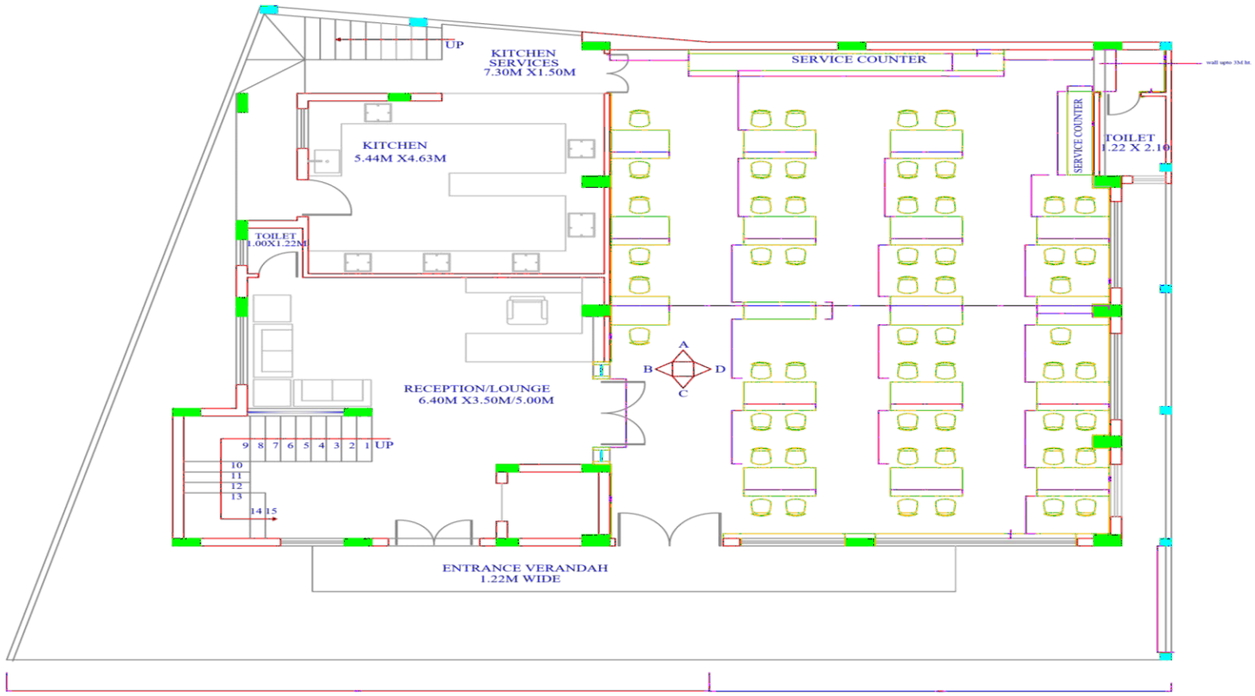
MEASUREMENT SHEET OF CHEESE FACTORY						
SR. NO.	DESCRIPTION	NO.	L	B	H	QUANTITY
	Total Centre line = 55.20m					
1.	Earthwork in excavation for foundation L = 97.42m	1	51.60	0.90	1.10	51.08 m^3
				Total:		51.08 m^3
2.	Brick masonry up to plinth in CM 1:6					
	a) First step: L = 101.02m	1	49.60	0.50	0.30	7.44 m^3
	b) Second step: L = 101.92m	1	53.60	0.40	0.30	6.43 m^3
	c) Third step: L = 102.82m	1	54.00	0.30	0.90	14.58 m^3
	Steps: (For steps size of door is 2.2m)					
	First step	1	1.10	0.90	0.15	0.50 m^3
	Second step	1	1.10	0.60	0.15	0.09 m^3
	Third step	1	1.10	0.30	0.15	0.05 m^3
				Total:		89.46 m^3
3.	Earth filling work in plinth					
	1. Office	1	4.00	3.00	0.55	6.60 m^3
	2. Cheese Making Room	1	6.00	5.50	0.55	18.15 m^3
	3. Ripening Room	1	4.00	5.50	0.55	12.10 m^3
	4. Toilet	1	1.50	1.50	0.55	1.25 m^3
	5. Storage Room	1	4.00	3.00	0.55	6.60 m^3
				Total:		44.7 m^3
4.	D.P.C. at plinth level L = 54.00m	1	54.00	0.30	-	16.20 m^2
5.	Brick masonry in super structure L = 54.00m	1	54.00	0.30	3.00	48.60 m^3
	Deduction of door and windows					
	D_1 = 2.10x2.10	1	2.10	0.23	2.10	2.04 m^3

	D_2 = 1.00x2.10	4	1.00	0.23	2.10	1.93 m^3
	W = 1.00x1.40	7	1.10	0.23	1.40	2.25 m^3
				Total:		6.22 m^3
	Lintel Quantity and deduction					
	D	1	1.40	0.23	0.15	2.78 m^3
	D_1	4	1.30	0.23	0.15	0.18 m^3
	W	7	1.40	0.23	0.15	0.31 m^3
				Total:		3.27 m^3
6.	Brick work in super structure					39.10 m^3
7.	R.C.C. Slab:					
	For slab 1	1	9.70	5.50	0.10	5.34 m^3
	For slab 2	1	8.90	3.30	0.10	2.94 m^3
	For slab 3	1	1.80	2.10	0.10	0.38 m^3
				Total:		8.65 m^3
8.	Brick work in parapet wall					
	a) Horizontal walls:	1	9.70	0.30	0.70	2.04 m^3
	b) Vertical walls:	1	4.90	0.30	0.70	1.03 m^3
				Total:		3.07 m^3
9.	Plastering work (1:3) inside plaster					
	1. Office					
	Horizontal wall	2	4.00	-	3.00	24.00 m^2
	Vertical wall	2	3.00	-	3.00	18.00 m^2
	2. Cheese Making Room					
	Horizontal wall	2	6.00	-	3.00	36.00 m^2
	Vertical wall	2	5.50	-	3.00	33.00 m^2
	3. Ripening Room					
	Horizontal wall	2	4.00	-	3.00	24.00 m^2
	Vertical wall	2	5.00	-	3.00	33.00 m^2
	4. Toilet					
	Horizontal wall	2	1.50	-	3.00	9.00 m^2
	Vertical wall	2	1.50	-	3.00	9.00 m^2
	5. Storage Room					
	Horizontal wall	2	4.00	-	3.00	24.00 m^2
	Vertical wall	2	3.00	-	3.00	18.00 m^2
	Deduction:					

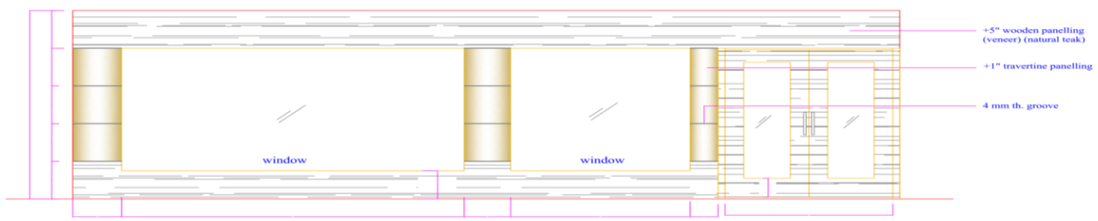
	D	1/2	2.10	-	2.10	2.20 m^2
	D_1	4/2	1.00	-	2.10	4.20 m^2
	W	7/2	1.00	-	1.40	4.90 m^2
				Total:		11.30 m^2

ABSTRACT SHEET OF CHEESE FACTORY					
SR. NO.	DESCRIPTION	QUANTITY	RATE	PER	AMOUNT (Rs.)
1.	Excavation for foundation	89.50 m^3	100	M	8950
2.	Earthing work in plinth	44.70 m^3	75	M	3352.50
3.	Brick work in super structure frame	39.10 m^3	1500	M	58654.50
4.	D.P.C. at plinth	16.2 m^3	2500	M	24300
5.	Laying of R.C.C. Slab	8.65 m^3	500	M	21637.5
6.	Brick wall in parapet wall	3.67 m^3	150	M	1835
7.	Plaster work (1:3)	216.69 m^3	1500	M	3204.25
			Total amount:		151233.80
		20% water charges			30246.80
		3% contingencies			4537.02
		2% work charge establishment			3024.68
		Total			189042.30
		10% contractor profit			18904.23
		Grand total			207946.53

13.1.5 CIVIL DESIGN (BANQUET HALL):



FLOOR BANQUET HALL PLAN
9.20M X 13.00M



ELEVATION OF WALL - C

DESIGN NO.	**BANQUET HALL**
PREPARED BY	**TWINKLE CHAMPANERIA BHAVIK BHENSAL**
PROJECT NAME	**VISHWAKARMA YOJANA PHASE VIII RANASAR, GANDHINAGAR**
INSTITUTE	**S.N.P.I.T. & R.C., UMRAKH**
UNIVERSITY	**GUJARAT TECHNOLOGICAL UNIVERSITY**

MEASUREMENT SHEET OF BANQUET HALL						
SR. NO.	DESCRIPTION	NO.	L	B	H	QUANTITY
	Total Centre line = 81.57m No. of junction = 7					
1.	Earthwork in excavation for foundation L = 78.42m	1	78.42	0.90	1.10	77.63 m^3
				Total:		77.63 m^3
2.	Brick masonry up to plinth in CM 1:6					
	a) First step: L = 79.82m	1	79.82	0.50	0.30	11.973 m^3
	b) Second step: L = 80.17m	1	80.17	0.40	0.30	9.62 m^3
	c) Third step: L = 80.52m	1	80.52	0.30	0.85	20.53 m^3
	Steps: (For steps size of door is 2.2m)					
	First step	1	1.10	0.90	0.15	0.15 m^3
	Second step	1	1.10	0.60	0.15	010 m^3
	Third step	1	1.10	0.30	0.15	0.05 m^3
				Total:		42.42 m^3
3.	Earth filling work in plinth					
	1. Toilet	1	1.22	2.10	0.55	1.41 m^3
	2. Kitchen Service	1	7.30	1.50	0.55	6.02 m^3
	3. Kitchen	1	5.44	4.63	0.55	13.85 m^3
	4. Toilet	1	1.00	1.22	0.55	0.67 m^3
	5. Reception/Lounge	1	6.40	3.50	0.55	12.32 m^3
	6. Cabin	1	1.60	1.60	0.55	1.41 m^3
	7. Hall	1	9.20	13.00	0.55	65.78 m^3
				Total:		101.46 m^3
4.	D.P.C. at plinth level L = 80.52m	1	80.52	0.30	-	24.16 m^2
5.	Brick masonry in super structure L = 80.77m	1	80.77	0.23	3	55.73 m^3

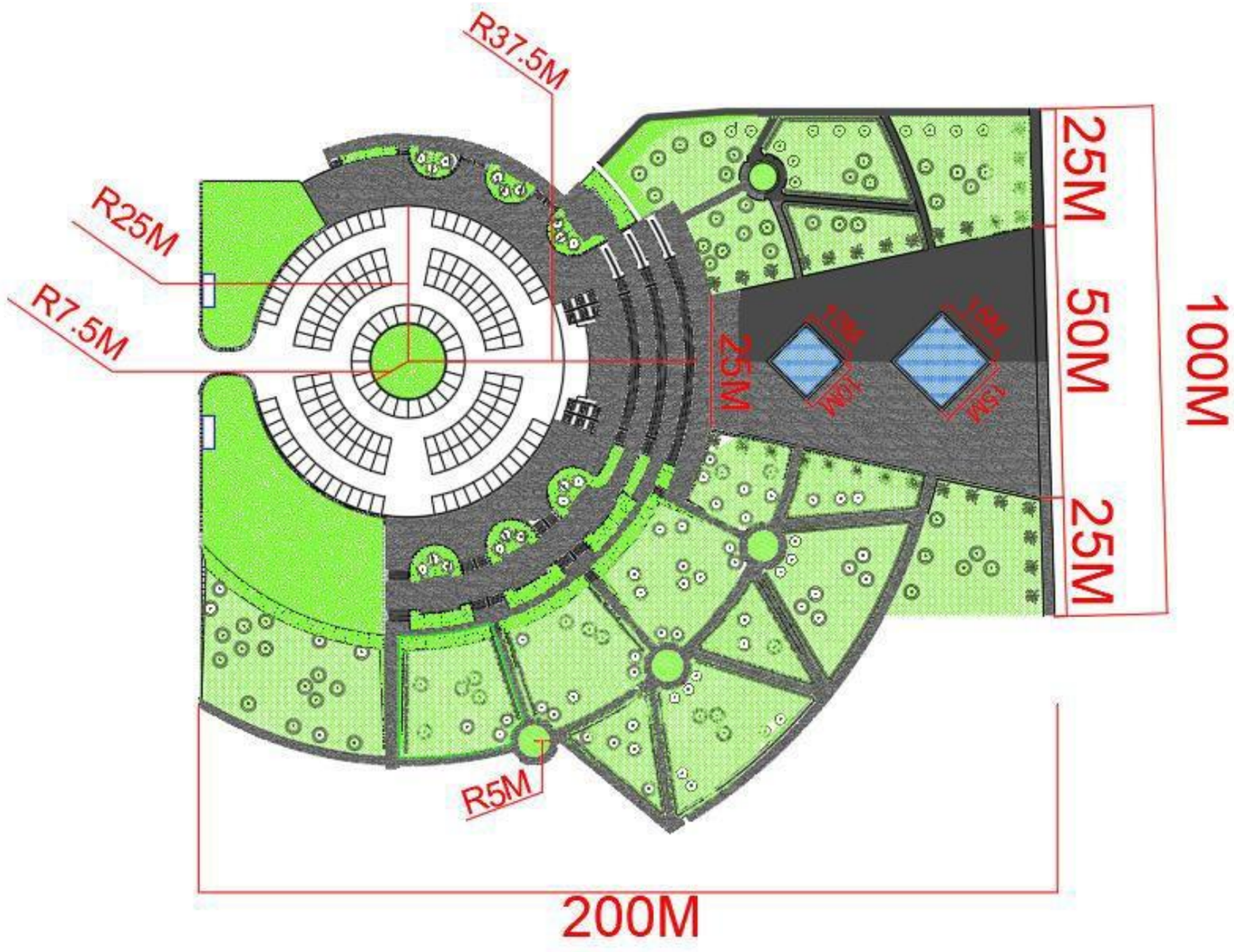
	Lintel Quantity and deduction					
	W_1	3	7.30	0.23	0.15	0.75 m^3
	W_2	5	4.30	0.23	0.15	0.74 m^3
	D_1	3	1.30	0.23	0.15	0.15 m^3
	D_1	2	1.80	0.25	0.15	0.14 m^3
				Total:		1.78 m^3
6.	Brick work in super structure					61.94 m^3
7.	R.C.C. Slab: L = 15.46, 5.46, 2.46 B = 10.99, 2.23, 3 H = 0.10	1	16.00	13.60	0.10	21.76 m^3
8.	Brick work in parapet wall					
	a) Horizontal walls: 16m	1	16.00	0.30	0.70	3.36 m^3
	b) Vertical walls: 13m	1	13.00	0.30	0.70	2.73 m^3
				Total:		6.09 m^3
9.	Plastering work (1:3) inside plaster					
	1. Kitchen					
	Horizontal wall	2	5.44	-	3.00	32.64 m^2
	Vertical wall	2	4.63	-	3.00	27.78 m^2
	2. Kitchen Service					
	Horizontal wall	2	7.30	-	3.00	43.80 m^2
	Vertical wall	2	1.50	-	3.00	9.00 m^2
	3. Reception/Lounge					
	Horizontal wall	2	6.40	-	3.00	38.40 m^2
	Vertical wall	2	3.50	-	3.00	21.00 m^2
	Vertical wall	2	5.00	-	3.00	30.00 m^2
	4. Hall					
	Horizontal wall	2	9.20	-	3.00	55.20 m^2
	Vertical wall	2	13.0	-	3.00	78.00 m^2
	5. Toilet					
	Horizontal wall	2	1.00	-	3.00	6.00 m^2
	Vertical wall	2	1.22	-	3.00	7.36 m^2
	6. Cabin					
	Horizontal wall	2	1.60	-	3.00	9.60 m^2
	Vertical wall	2	1.60	-	3.00	9.60 m^2

	7. Toilet					
	Horizontal wall	2	1.22	-	3.00	7.32 m^2
	Vertical wall	2	2.10	-	3.00	12.60 m^2
	Deduction:					
	D_1	3/2	1.10	-	2.10	3.15 m^2
	D_2	2/2	1.00	-	2.10	3.15 m^2
	W_1	3/2	7.00	-	2.10	22.05 m^2
				Total:		359.95 m^2

ABSTRACT SHEET OF BANQUENT HALL

SR. NO.	DESCRIPTION	QUANTITY	RATE	PER	AMOUNT (Rs.)
1.	Excavation for foundation	134.16 m^3	100	M	13415
2.	Earthing work in plinth	101.46 m^3	75	M	7508.04
3.	Brick work in super structure frame	45.35 m^3	1500	M	68037
4.	Laying of R.C.C. Slab	21.76 m^3	2500	M	54400
5.	Brick wall in parapet wall	6.09 m^3	500	M	3045
6.	Plaster work (1:3)	359.95 m^3	150	M	53992.50
7.	D.P.C. at plinth	24.16 m^3	1500	M	36240
			Total amount:		236637.54
		20% water charges			54780.40
		3% contingencies			8217.60
		2% work charge establishment			5478.64
					3055113.64
		10% contractor profit			30511.36
		Grand total			3355625

13.1.6 CIVIL DESIGN 6 (PARK):



	GRASS
	HATCH
	PAVING
	PLANTS
	POND
	ROAD
	STAIRS

DESIGN NO.	PARK
PREPARED BY	TWINKLE CHAMPANERIA BHAVIK BHENSAL
PROJECT NAME	VISHWAKARMA YOJANA PHASE VIII RANASAR, GANDHINAGAR
INSTITUTE	S.N.P.I.T. & R.C., UMRAKH
UNIVERSITY	GUJARAT TECHNOLOGICAL UNIVERSITY

- VOLUME OF CIRCLE GARDEN SECTION:

  $V = h * \pi * r^2$ (h = 15cm)

  Therefore,
  $V_1 = 0.15 * \pi * (37.50)^2 = 662.68\ m^3$
  $V_2 = 0.15 * \pi * (25.00)^2 = 292.53\ m^3$
  $V_3 = 0.15 * \pi * (7.50)^2 = 26.50\ m^3$

MEASUREMENT SHEET OF PARK						
SR. NO.	**DESCRIPTION**	**NO.**	**L**	**B**	**H**	**QUANTITY**
						$V = h\pi r^2$
1.	Circle – 1	1	Radius	37.50	0.15	662.68 m^3
	Circle – 2	1	Radius	25.00	0.15	292.53 m^3
	Circle – 3	1	Radius	7.500	0.15	26.50 m^3
				Total:		928.71 m^3
2	Steps	6	50	0.30	0.20	18.00 m^3
3.	Earth filling	1	200.00	100.00	0.50	10000.00 m^3
4.	Pond					
	Pond – 1	1	15.00	15.00	1.00	(-)225 m^3
	Pond – 2	1	10.00	10.00	1.00	(-)100 m^3
				Total:		9675.00 m^3

ABSTRACT SHEET OF PARK					
SR. NO.	**DESCRIPTION**	**QUANTITY**	**RATE**	**PER**	**AMOUNT (Rs.)**
1.	Excavation for foundation	10603.71	150	M	1590556.50
2.	Earth filling work in plinth	928.71	75	M	69653.25
3.	Laying of R.C.C.	928.71	1500	M	13930.65
			Total:		3053274.25
		20% Water Charges			610654.85
		3% Contingencies			91598.22
		2% Work Charge Establishment			61065.48
		Total			3816592.80
		10% Contractor Profit			381659.28
		Grand Total			4198252.10

13.1.7 ELECTRICAL DESIGN 1 (SOLAR TRACKER WITH STEPPER MOTOR USING MICROCONTROLLER):

Solar energy is rapidly advancing as an important means of renewable energy resource. Solar tracking enables more solar energy to be generated because the solar panel can maintain a perpendicular profile to the sun's rays. Though initial cost of setting up a solar tracking system is high, this paper proposes a cheaper solution. Design and construction of a prototype for solar tracking system with single degree of freedom, which detects the sunlight using Light Dependent Resistors (LDR), is discussed in this paper.

The control circuit for the solar tracker is based on an ATMega16 microcontroller. This is programmed to detect the sunlight through the LDRs and then actuate the stepper motor to position the solar panel where it can receive maximum sunlight. Compared with any other type of motor, the stepper motor is more controllable, more energy efficient, steadier and has high tracking accuracy and suffers little environmental effect. Theoretical analysis and research results have been shown in this paper to advocate that the designed system realized precise automatic tracking of the sun and can greatly improve the utilization of solar energy.

Energy is the prime factor for the development of a nation. An enormous amount of energy is extracted, distributed, converted and consumed in the global society daily. 85% of energy production is dependent on fossil fuels. The resources of the fossil fuels are limited and their use results in global warming due to emission of greenhouse gases. To provide a sustainable power production and safe world to the future generation, there is a growing demand for energy from renewable sources like solar, wind, geothermal and ocean tidal wave.

Solar panels directly convert solar radiation into electrical energy. Solar panel is mainly made from semiconductor materials. Si used as the major component of solar panels, which is maximum 24.5% efficient. Increasing the cell efficiency, maximizing the power output and employing a tracking system with solar panel are three ways to increase the overall efficiency of the solar panel. Improvement of solar cell efficiency is an ongoing research work and people throughout the world are actively doing research on this.

Maximizing the output power from solar panel and integrating solar tracking system are the two ways where electronic design methodology can bring success. Maximum power point tracking (MPPT) is the process to maximize the output power from solar panel by keeping the solar panel's operation on the knee point of P-V characteristics.

MPPT technology only offers the maximum power that can be received from a stationary array of solar panels at a particular time; it cannot, however, increase the power generation when the sun is not aligned with the system. Solar tracking is a mechanized system to track the sun's position that increases power output of solar panel 30% to 60% than the stationary system. This is far more cost-effective solution than purchasing additional solar panels.

LIGHT DEPENDENT RESISTOR THEORY:

A light sensor is the most common electronic component which can be easily found. The simplest optical sensor is a photon resistor or photocell which is a light sensitive resistor these are made of two types, cadmium sulfide (CdS) and gallium arsenide (GaAs). The sun tracker system designed here uses two cadmium sulfide (CdS) photocells for sensing the light.

The photocell is a passive component whose resistance is inversely proportional to the amount of light intensity directed towards it. It is connected in series with capacitor. The photocell to be used for the tracker is based on its dark resistance and light saturation resistance. The term light saturation means that further increasing the light intensity to the CdS cells will not decrease its resistance any further. Light intensity is measured in Lux, the illumination of sunlight is approximately 30,000 lux.

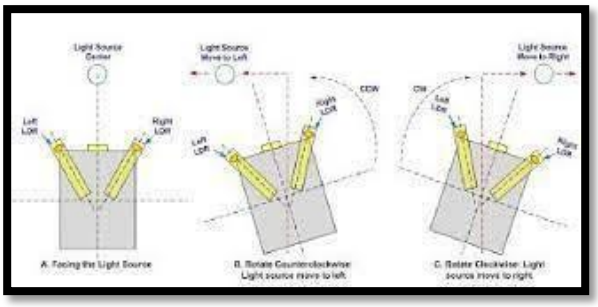


FIG 13.1: CONCEPT OF USING TWO LDRS FOR SENSING

Concept of using two LDRs for sensing is explained in figure 13.1. The stable position is when the two LDRs having the same light intensity (position A). When the light source moves, i.e., the sun moves from west to east, the level of intensity falling on both the LDRs changes and this change is calibrated into voltage using voltage dividers. The changes in voltage are compared using built-in comparator of microcontroller and motor is used to rotate the solar panel in a way so as to track the light source.

PROTOTYPE OF DESIGNED TRACKER: The major components those are used in the prototype are given below:

- Photo resistor
- Microcontroller
- Photo resistor
- Stepper motor

Cadmium sulfide (CdS) photo resistor is used in the designed prototype. The CdS photo resistor is a passive element that has a resistance inversely proportional to the amount of light incident on it. To utilize the photo resistor, it is placed in series with another resistor. A voltage divider is thus formed at the junction between photo resistor and another resistor; the output is taken at the junction point to pass the measured voltage as input to microcontroller.

MICROCONTROLLER: The ATMEGA16 microcontroller has been used in the prototype. ATMEGA16 microcontroller requires a 5volt regulated voltage supply. ATMEGA16 has some features such as analog comparator (AC), analog to digital converter (ADC), universal synchronous asynchronous receiver transmitter (USART), times etc. Utilization procedure of these features is given below:

1) Analog comparator: There are two pins which are known as analog input 0 (AIN0) and analog input 1 (AIN1). Two analog voltage signals coming from two junctions of photo resistor circuit are fed to these pins.

There is a bit called analog comparator output (ACO) which is set to either 1 or 0 and can be defined as,

ACO =0 (VAIN1 is more than V AIN0) else it is 1

2) Analog to digital converter:

Among 8 analogs to digital converter input pins ADC0 and ADC1 have been used, where VADC0 greater than VADC1 is expected.

Differential input is converted into digital value and the most 8 significant bits are defined as ADC result to compare with threshold.
ADC result = [VADC0 – VADC1] digital
This threshold value, set according to the photo resistor response against the solar radiation intensity, is provided, since ADC result alone might be insufficient for rotation of motor.
And if ADC result > Threshold; motor rotates one step.

C. Stepper motor: Stepper motors are commonly used in precision positioning control applications. Five characteristics of the stepper motor have been considered while choosing stepper motor for the solar tracker prototype. Stepper motor is brushless, load independent, has open loop positioning capability, good holding torque and excellent response characteristics.

A typical controller for a hybrid stepper motor includes:

a) Logic Sequence Generator: Generates programmed logic sequence required for operation of stepper motor.

b) Power Drivers: These are power switching circuits which ensure a fast rise of current through the phase windings which are to be turned on at a particular step in the logic sequence. ULN2003 stepper motor driver has been used in the prototype.

c) Current limiting circuits: These are meant to ensure a rapid decay of current in phase winding that is turned off at a particular step in the logic sequence.

OPERATION OF THE SOLAR TRACKER: Solar tracker provides three ways of operation and control mechanism through the programmed written in microcontroller.

A. Normal day light condition: Two photo resistors are used in the solar tracker to compare the output voltages from two junctions. As the sun rotates from east to west in the daytime, AIN0 needs to provide higher voltage than AIN1 to sense the rotation of the sun. This condition is considered as normal day light condition and tracker rotates the panel 3.75° after every 15 minutes.

B. Bad weather condition: - When the sky gets cloudy, there will be less striking of light on both the photo resistors and so sufficient voltages might not be available at junction point. The difference of voltage at junction point will not be greater than the threshold value to rotate the tracker. At the meantime, sun continues rotating in the western direction. To solve this problem, a short delay is provided which will check for voltage input from junction point in every 1.5 minutes. Microcontroller will use the variable Count to check for consecutively

10 times to make the 'wait' state equal to 15 minutes (moderate delay) to rotate the stepper motor one step.

C. **Bidirectional rotation:** At daytime, the solar tracker will rotate in only one direction from east to west. Variable I will count the total rotation in daytime and that is approximately calculated as 40 rotations considering 150° rotation. When the sun sets, no more rotation is needed in western direction. For the next day, the solar panel needs to go to the initial position in the morning to track the sun's position again. To do so, the variable I that counts the number of rotations in the daytime will work out.

When the variable (I) shows value greater than 40, the tracker stops rotating in the western direction and rotates reversely in the eastern direction to set the tracker to the initial position for the next day. When it goes to initial position, power supply to the tracker will be turned off and the tracker will be in stand by till sunlight in the next morning.

FEATURES OF THE DESIGNED TRACKER:

The attractive feature of the constructed prototype is the software solution of many challenges regarding solar tracking system. The designed prototype requires only two photo resistors to sense the light, which lessens the cost of the system. Power consumption of the system is negligible

FIG 13.2: DESIGNED WORKING PROTOTYPE OF SOLAR TRACKER

CONCLUSION AND FUTURE SCOPE:

- As the proposed prototype is a miniature of main system, it has some limitations which can be mitigated through future developments.
- A small cardboard is rotated in the system and 12v solar panel is used for analysis.
- As a miniature system, it works out well.
- Larger Solar panel must be integrated with the system to prepare better result and cost analysis.
- It has been proven through our research and statistical analysis that solar tracking system with single-axis freedom can increase energy output by approximately 20%.
- Further mechanical enhancement can be done to the prototype, to implement dual-axis tracking.

13.1.8 ELECTRICAL DESIGN 2 (AUTO INTENSITY CONTROL OF STREET LIGHT):

Auto Intensity Control of Street Lights is a simple project where the intensity of the streetlights is automatically controlled based on the sunlight conditions. Generally, streetlights are turned on during evening time and will continue to glow till morning.

This might result is unnecessary usage of power as the lights will be glowing at full intensity all the time. But using the Auto Intensity Control of Street Lights using Arduino project, you can control the intensity based on the ambient lighting conditions. As an additional power saving feature, I have used LEDs for streetlights. Before going into the circuit diagram, components, and code, I want to talk a little bit about the idea behind the project Auto Intensity Control of Street Lights using Arduino.

I won't compare it with any other projects but just dive into the concept. I have used a combination of RTC Module (DS3231) and LDR for controlling the streetlights. This combination is not something new but the way it is implemented is. Basically, there are two modes of operation of this project: RTC Mode and LDR Mode. In RTC Mode, the streetlights turn on automatically based on the ON Time set in the code and turn off based on the OFF Time. In the LDR Mode, the streetlights have an intensity control based on the ambient light near the LDR.

CIRCUIT DIAGRAM: The following image shows the circuit diagram of the Auto Intensity Control of Street Lights using Arduino project.

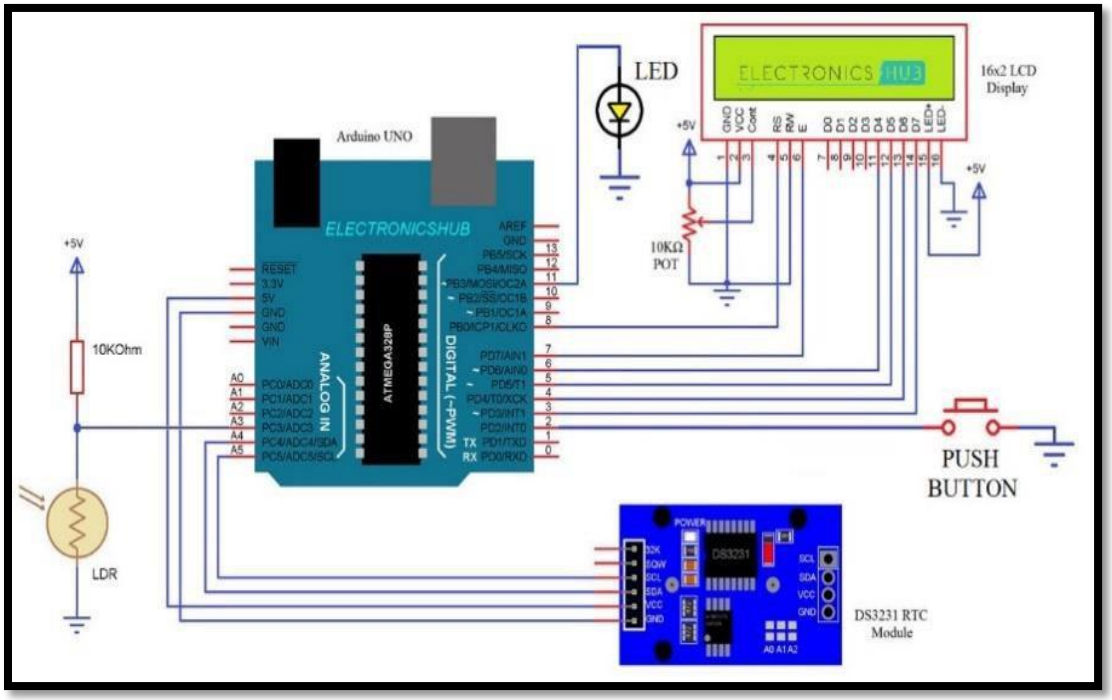
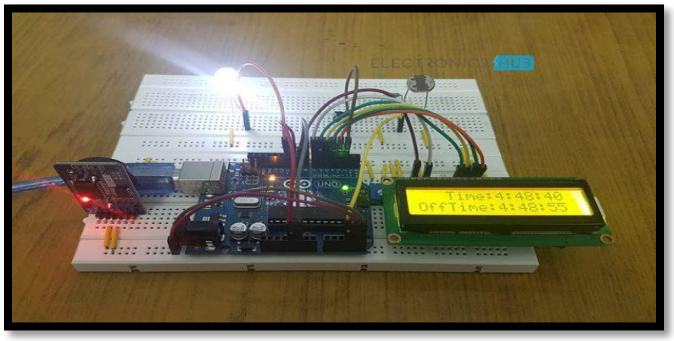


FIG 13.3: CIRCUIT DIAGRAM

WORKING:

After making the connections and uploading the code to Arduino, turn on the Power supply to the project. Initially, the Arduino runs in RTC Mode where there are two times set in the code: the ON TIME and the OFF TIME. Arduino compares the ON TIME with the time from RTC

Module and when they match, the LED is turned ON. After this, the Arduino waits for the OFF TIME and once the time from RTC Module reaches the OFF TIME, the LED is turned OFF.



During anytime of this operation, if the button (connected as an external interrupt to Pin 2) is pushed, the Arduino enters LDR Mode. In this mode, the Arduino reads the value of the LDR from A3 and based on the value, it adjusts the intensity of the LED. To switch back to RTC Mode, all you have to do is push the button.

Conclusion: A simple project for saving power is implemented using Auto Intensity Control of Street Lights using Arduino. With slight modifications and enhancements, this project can be applicable for real time use.

TABLE 13.1: COST OF COMPONENTS

SR. NO.	COMPONENTS	PRICE (Rs.)
1.	Arduino UNO	500
2.	DS3231 RTC Module	300
3.	LDR	50
4.	LCD Display	150
5.	Potentiometer	60
6.	Resister	30
7.	Breadboard	120
8.	Connecting wires	60
NOTE: The cost of auto intensity control of street-light 1500.		

13.1.9 ELECTRICAL DESIGN 3 (ELECTRICAL LOAD CONTROL SYSTEM BY COMPUTER):

Automation system is mostly depending upon the power systems in industrial, residential or commercial, which needs remote controlling and monitoring. By employing wireless technologies, it is more competent to execute a suitable technology depending upon the requirements of the proposed system like speed, cost, and distance.

For distant controlling and monitoring of different loads and by means of efficient power usage through real time power spending with the help of a PC based graphical user interface application. The progress of technology equipment is becoming simpler and easier for us. Automated systems have more benefits over manual system. PC based electrical load-controlled systems are highly reliable, precise and time conserving systems.

They give number of features like rapid data storage, transfer data and data securities. The PC based electrical load control system can be built with 8051 series Microcontroller, Level Shifter

IC, DB Connector, Relays, Relay Driver, Transformer, Diodes, Capacitors, Resistors, LED, Crystal, Lamps, Keil compiler and Language: Embedded C or Assembly.

Keil an ARM Company makes C compilers, macro assemblers, real-time kernels, debuggers, simulators, integrated environments, evaluation boards, and emulators for ARM7/ARM9/Cortex-M3, XC16x/C16x/ST10, 251, and 8051 MCU families. Compilers are programs used to convert a High-Level Language to object code. Desktop compilers produce an output object code for the underlying microprocessor, but not for other microprocessors. i.e., the programs written in one of the HLL like 'C' will compile the code to run on the system for a particular processor like x86 (underlying microprocessor in the computer).

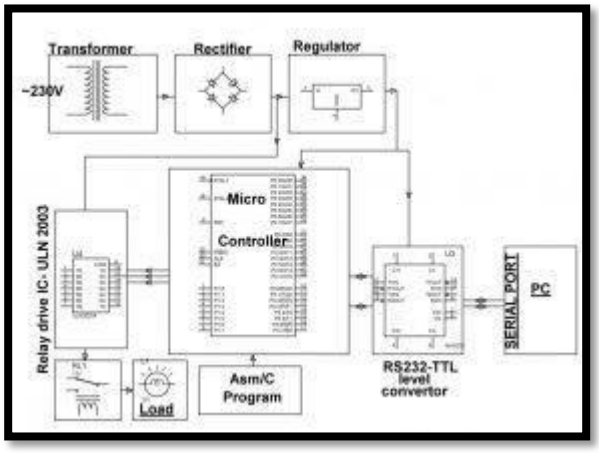


FIG 13.4: PC BASED ELECTRICAL LOAD CONTROL SYSTEM BLOCK DIAGRAM

For example, compilers for Dos platform is different from the Compilers for Unix platform So if one wants to define a compiler then compiler is a program that translates source code into object code.

Working: The main goal of this project is to control the electrical load through a PC (personal computer). For example, lighting in the theatre can be controlled form the PC for superior stage management. At present, they are physically controlled which makes it complex to organize the lighting with the scene.

By employing this system, one can manage the electrical load ON/OFF by just being seated at one place using a PC. This system is incorporated with the electrical loads and also associated to the PC where centralized control takes place. It uses an MAX 232 protocol from the microcontroller to communicate with the PC. To switch the appliances, we employ Hyper Terminal on personal computer. Once the connection is established with the PC, then the system begins working. The 8051-family microcontroller is used in this project.

FIG 13.5: PC BASED ELECTRICAL LOAD CONTROL SYSTEM PROJECT KIT

Cost: The cost of the PC Based Electrical Load Control approximately 1500 around.

13.2 REASON FOR STUDENTS RECOMMENDING THIS DESIGN:

The primary area to improve should be employed in rural areas and improving the productivity of the agricultural sector. Often villages in our countries are not in sync with the urban areas because of bad connectivity. Eventually, this leads to segregation and a social divide between urban and rural areas. In essence, the infrastructure of rural areas should drastically improve. Even after so many years of Independence, stigmas like the caste system still have a grip on rural people.

Quality education can help in achieving the goal of eradication of such social evils. The dwindling literacy rates in rural India, especially for females, are a major matter of concern. There is a need for land and technical reforms. Modern technologies like organic farming should be incorporated to improve outputs and profits. Lastly, people should be given access to easy credit and loans by improving the banking system in rural areas.

It can be easily concluded, that the development of an economy in both rural and urban areas needs to be focused upon. Rural areas need drastic changes in areas like infrastructure, credit availability, literacy, poverty eradication, etc. The schemes that are already in place with the aim of rural development need a new outlook and proper updating. Accordingly, the government needs to act for the upliftment of rural India.

13.3 ABOUT DESIGNS SUGGESTIONS / BENEFIT OF THE VILLAGERS:

BANK WITH ATM:

ATMs serve as an economic lubricant, facilitating trade by offering cash nearly everywhere. One of the most significant benefits of ATMs is their ability to provide cardholders access to their money 24×7. ATMs save cardholders transport costs and time by bringing self-service banking into convenient, non-branch locations near to where they live, work and shop.

This convenience not only enables the rural population to make retail purchases, it also results in increasing their spending capacity, and pumps more money into the rural economy. Moreover, ATMs play a vital touchpoint to reach the unbanked and underbanked through basic bank accounts for low-income groups linked to an ATM card – an important step towards greater financial literacy for the poor.

The fact remains that ATMs are an extremely popular and trusted global technology which are at the forefront of retail-based economies. Besides, cash continues to be the preferred mode of payments in semi-urban and rural economies and ATMs are the main distribution channel for cashing out money. An increased stakeholder collaboration between RBI, banks, and WLA operators is needed to boost the number of ATMs in rural India and unleash their potential to augur the cash led Rural economy.

TEMPLE:

Visiting temple is one of the most popular culture in our religion. Unlike our previous generations, who are aware of the benefits of visiting temple regularly.

- **Charging Center:** Temple is a place where people go to pray to God and share their pain/sorrow. People usually start with negative things and slowly it all gets converted into positive ones. When we see a lot of happy faces around us in temple, we get happy and thus it acts as a charging station for us.
- **Mind Concentration:** Temple is a place where people usually go to pray to God. Because it has a very silent environment, you can learn to increase your power of concentration. You can also sit and spend some time alone and think about all good things happened to you. This way you will not just build concentration power but would also be grateful about yourself.
- **Increasing Good Deeds:** Temple is a place where we can donate for people who cannot afford and feed people who are outside it. This is one of the best ways to increases our good deeds in life. Afterall, you just don't want to be rich by money, but would also want to be rich by heart.
- **Positivity Around:** Temple is a place where lot of people come and pray for their family wellbeing. When they start praying, they usually start with their pains and sorrows, but after some time, they get so much of positive vibes that they slowly start forgetting about their sorrows. And when they go to their home, they are always filled with lots of positive energy.
- **Sense of hope:** One of the major reasons why people visit temple is not just to complain to God about what is happening around them, but to also get a sign of relief and hope. In life, whenever we get into problems, we always need someone who believe us truly and would never leave us. We might have lot of people around us, but the greatest of all is God. Because we know the fact that God is always with us, we get hope to smile even in our bad days.

ORGANIC WASTE COMPOSTING PLANT:

Organic wastes can represent a large proportion of the solid waste stream in any rural community. Furthermore, farm households generate large amounts of manure that can pose a threat to the environment, especially watercourses, if not well managed because of nutrient overloading. Much concern about air, water and soil quality has been expressed in the past about the direct application of raw manure to agricultural land. Animal producers are being increasingly pressed upon to move towards environmental sustainability in managing the nutrients in the manure.

Composting the organic portion of solid wastes has multiple benefits, such as a reduction in the quantity of wastes to be disposed, a reduction in environmental impacts resulting from manure storage and production of a material safe to use in agriculture. Advantages of composting also include killing of pathogens, fly larvae and weed seeds and improving the handling of manure and other residues by reducing their volume and weight.

The need to increase soil organic matter in certain countries, such as those in the Asian continent, is an important reason for recycling organic waste in view of returning the nutrients to the soil. Composting plays an important role in organic farming practices as well as in improving soil fertility. Among other benefits, the use of compost can improve access to food in rural communities with higher yields of vegetables and fruit obtained from a more fertile soil.

Farm households have many reasons for joining a composting programmed, as they possess almost all the basic requirements for composting. Feedstocks, air, water, land and labour are present already on the farm although the scale of composting would be an important determinant of the resources available. The resulting composting product is a resource for the farmer and can be an additional source of revenue. The compost produced can be used on farm or sold to other farmers and community members. Like any product, compost must be marketed adequately and issues about producing a high-quality material need to be addressed if the farmer expects to get revenue from the composting operation.

BANQUET HALL:

Partying and participating, in any event, is enjoyable. But organizing a successful event is no small feat to achieve. From planning the guest lists until the day of your function, you are engrossed in the minutest of details so that everything goes perfectly on that day. With lots of friends, relatives, colleagues to attend your event, you would desire an event without any glitch.

But executing such a mammoth task by oneself is just next to impossible. With the plethora of options available you are bound to get confused and forget a thing or two at the time. Such a malady could be easily solved with the help of banquet halls who not only provide you a fabulous venue but also help you out in managing the event with proficiency.

A breath-taking view is what you wish to deliver for your guests in earnest. Banquet Halls have loads of themes and decorative ideas that can bring life to your event. Lightning styles, color combinations, buffet arrangement add glamour and enhances the grace. You get to have an array of preferences on designs that go with your budget and is well-suited to your event.

Organizing your event at a banquet hall will explicitly save you a lot of money. The collaborative investment is highly beneficial rather than ordering for separate caterers, event planners, photographers that will sum up to higher cost. Thus, banquet hall gives you all in one go.

With a banquet hall, you have the privilege to entertain hundreds of guests under one roof. With the large number of invitations, you have mailed, your home is not an ideal place to run an event. With the organized seating arrangements and round the clock service, a banquet hall is more equipped for occasions.

As compared to your homes or any outdoor wedding setup, banquet halls have the advantage of luxurious and modernized bathrooms or washrooms, dressing rooms for the bride and groom, changing room or powder rooms and even vanity parlors to provide a comprehensive facility to the families and friends of both the parties. Furthermore, having multiple bathrooms is a must when you must cater the needs of hundreds of guests at a time. With multiple bathrooms, you get to avoid queues and hustle that might happen at your residence.

CHEESE FACTORY PLANT:

Any consideration of farming system's potential to contribute to a local development process in rural areas must be approached from a multifunctional point of view, in which, in addition to the agrarian activity's productive functions, its territorial and environmental functions must also be considered.

This consideration is especially important in economically depressed and mountainous areas, where the development processes currently underway, and which quite often focus on tourist activities, do not always take agriculture or livestock rearing into account, nor do they accord it an active role; and this occurs, not because its importance is not recognized, but because of the difficulty in elaborating short-to-mid-term strategies to boost and to modernize traditional farming systems that are frequently in a state of constant prostration and crisis, the causes of which can be physical (slopes, erosion, aridity, etc.), socio-demographic (rural exodus, population ageing, etc.) or economic (marginality, lack of productive efficiency and adaptation to the new markets, etc.).

In the process of generating quality product, the best approach for the dairy farmer is to operate his dairy farm that gives greatest benefits to the end organization using his produce. Additionally, it should also be able to sustain the impact of dairy farms on situations and creatures for an extended period.

Mountain livestock systems in general, and those based on rearing small ruminants, are a good example of this crisis, which has caused livestock rearing, once the mainstay, in many cases, of mountain communities' economies, to become marginal in the context of the local socio-economic system; and consequently, all livestock activities are in regression.

PARK:

Create a space for community members to congregate safely by adding a park. By providing a safe place for kids to play and parents to bring their little ones, cities can enjoy more beautiful areas surrounding the parks. Residents get a safe place for physical activity in addition to elevated property values in the immediate vicinity.

Parks serve as the heart of their communities. As such, these recreation areas should be a high priority for community planners. The importance of parks and recreation goes beyond adding green space to beautify the community. Residents, kids, and the local government all benefit from having a nearby park or play space.

When people interact with each other, they create friendships that form the basis of community. People who were once individuals and separate family's bond together into a collective with the aims of helping their neighbors and their area. In a 2016 study, communities that dedicated more land to parks had residents who reported higher levels of community wellbeing.

Public parks give developers the chance to plant indigenous flora and entice native fauna to the area. Residents get to see what plants grow naturally in the region while caretakers reap the benefits of needing to provide less care to plants adapted to the climate.

CHAPTER 14: TECHNICAL OPTIONS WITH CASE STUDIES

14.1 CIVIL ENGINEERING:

14.1.1 ADVANCED EARTHQUAKE RESISTANT:

Four years have passed since the 2011 Great East Japan Earthquake. Efforts to apply the lessons learned to disaster prevention in the future are underway in a variety of fields. Shimizu Corporation (president: Yoichi Miyamoto) is no exception, having finished construction on and begun operations at the Advanced Earthquake Engineering Laboratory built on the premises of the Shimizu Institute of Technology (Koto-Ku, Tokyo), with the goal of applying the lessons learned to research in earthquake countermeasures as soon as possible. With two of the most advanced shaking tables in the industry installed, research is being carried out on both technical and human-based aspects, through experiments in these cutting-edge facilities and risk analyses of the experimental data. According to Shimizu, Japanese construction standards are strict from an international perspective, but buildings built before the Buildings Standards Act was significantly revised in 1981 are insufficiently earthquake resistant or reinforced

. Many of the buildings damaged in earthquakes such as the 1995 Great Hanshin Earthquake belong to this category. Shimizu has been researching earthquake countermeasures since the 1970s, but after the Great East Japan Earthquake "exceeded expectations," construction began on a new research facility in June 2013 that could carry out high-level experiments on all kinds of possible earthquakes, massive or otherwise.

FIG 14.1: THE ADVANCED EARTHQUAKE ENGINEERING LABORATORY'S TWO SHAKING TABLES, THE E-BEETLE (FOREGROUND) AND THE E-SPIDER (BACKGROUND)

The newly completed research facility includes two shaking tables, the E-Beetle (large-scale shaking table, 7 m × 7 m) and the E-Spider (large-stroke shaking table, 4 m × 4 m) *. The E-Beetle can reproduce earthquakes with acceleration and displacement greater than any earthquake observed so far worldwide, as well as different types such as inland earthquakes and subduction-zone earthquakes. It will aid in discovering the mechanisms of building collapse, and the earthquake resistance properties of building fixtures and features such as ceilings. The E-Spider can reproduce long-period, large-stroke motions in three dimensions (horizontal, vertical, and rotational). This makes it possible to study how super-high-rise buildings sway and the movement of furniture inside rooms. By mounting a cabin on the shaking table that people can enter, it is also possible to study the effects of earthquakes on human psychology and behavior. Data from these experiments will be incorporated into future construction methods.

*The 'Beetle' in the name comes from the table's powerful, beetle-like appearance, and 'Spider' is from that table's shape and movements. The 'E' in both names refers to the first letters of Earthquake, Examination, Enhance, and Excellence.

FIG 14.2: EXPERIMENT USING E-BEETLE (LARGE-SCALE SHAKING TABLE)

On March 4, the new research facility was opened to foreign media and experiments were held using the two shaking tables. The experiment with the E-Beetle used a miniaturized model (3.8 m, 13 t) of a 150 m, 40-story super-high-rise building, and reproduced the shaking (Japan Meteorological Agency seismic intensity of 6-lower) observed in Miyagino, Sendai during the Great East Japan Earthquake. It was clear that sections of the model shifted more the higher up they were (see photos above).

The E-Spider reproduced four types of earthquake motions:

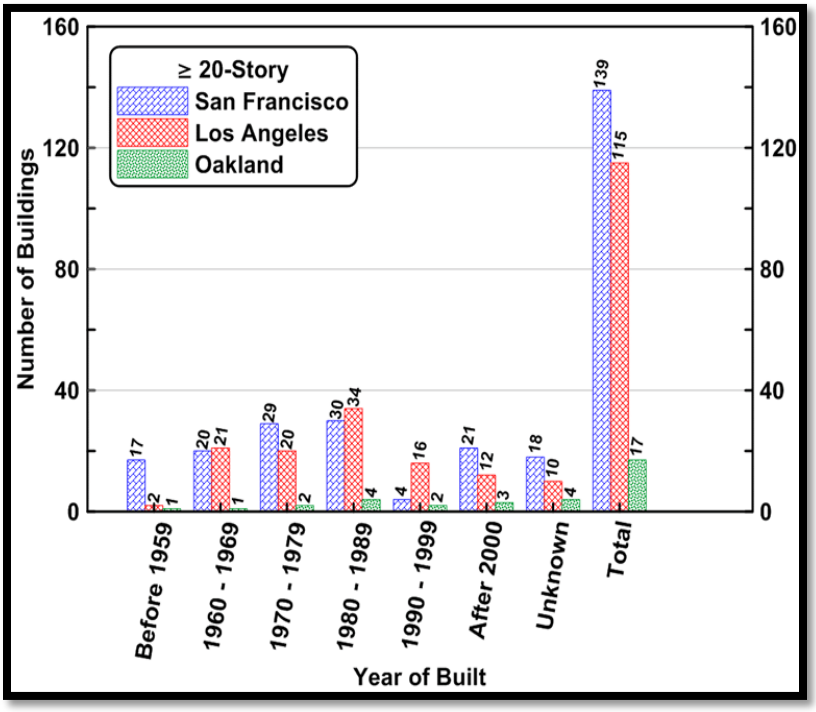
1) Intensity 3 and 4 (on the ground),
2) Intensity 6-upper (5th floor of a non-seismic isolated apartment),
3) Intensity 6-upper (5th floor of a seismic isolated apartment), and
4) The great east Japan earthquake in Tokyo (24th floor of a super-high-rise building).

By providing these earthquake simulations, Shimizu hopes to contribute to disaster-prevention awareness.

FIG 14.3: EARTHQUAKE SIMULATIONS USING THE E-SPIDER (LARGE-STROKE SHAKING TABLE)

14.1.2 SEISMIC RETROFITTING OF BUILDINGS:

Seismic Evaluation and Retrofit of Existing Tall Buildings in California Case Study of a 35 - Storey Steel Moment-Resisting Frame Building in San Francisco:



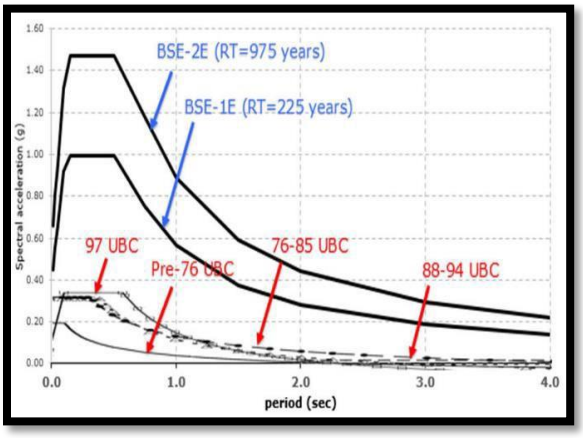
Seismic performance of tall new buildings located in regions of high seismic hazard has been recently investigated by Pacific Earthquake Engineering Research Center (PEER) under its Tall Buildings Initiative (TBI) program. This program has now expanded to assess the seismic performance of existing tall buildings. Buildings being considered are 20 stories or more in height and were constructed on the west coast of the U.S. between about 1960 and 1990. During that period, several hundred tall buildings were constructed in California, but earthquake resistant design procedures were not as fully developed as they are today.

A 35-storey steel building located in San Francisco and designed in 1968 is selected as the subject of the detailed seismic evaluations presented in this report. Results from several three-dimensional (3D) nonlinear dynamic analyses are presented to examine the potential seismic performance of this structure in future earthquakes. Two primary earthquake hazard levels are used for these evaluations. Several different numerical models are developed for the building to represent different behavior characteristics for the as-built structure, as well as for the building following various retrofits. The models were developed in accordance with recommendations of ASCE 41-13 and other relevant guidelines, and simulations were carried out using the analysis framework Open Sees. Analysis results for the as-built and upgraded structure are interpreted considering the methodologies and performance criteria suggested in ASCE 41-13, FEMA 351, and FEMA P-58.

With an understanding of the building's potential seismic vulnerabilities, the sensitivity of its behavior to ground motion and structural characteristics, and the capabilities of different guidelines, several retrofit strategies are identified and explored, focusing on modification of the existing structure and the addition of fluid viscous dampers (FVDs). In terms of the evaluation of seismic response, performance objectives based on ASCE 41 were used; i.e., damage control under the BSE-1E hazard and limited safety under the BSE-2E hazard. The evaluations conducted indicate that the as-built case-study structure does not satisfy these objectives.

Three major seismic deficiencies are identified as part of the ASCE 41 Tier 3 evaluations conducted:

1) the case-study building tends to form weak-story regions in the lower third of the building;
2) pre-Northridge beam-to-column connection details result in a high percentage of connection failures under BES-2E events; and
3) there is a high probability of brittle failures of column splices under BSE-1E and BSE-2E hazard-level excitations.



Considering the oriented evaluation approach and performance criteria presented in FEMA 351, the case-study building in its as-built condition is found to be unable to achieve the global collapse prevention performance goal at the 90% confidence level for either a BSE-1E or BSE- 2E hazard-level event. Several retrofit scenarios are explored wherein modifications were made to the existing structure. These included replacing the heavy exterior cladding with a lightweight curtain wall system, retrofitting the column splices, and retrofitting the beam-to-column connections. Additional analyses are then carried out to assess enhanced retrofit schemes that introduce Fluid Viscous Dampers (FVDs) over the full or partial height of the building. In the studies presented, the FVDs improve the performance at the BSE-1E and BSE-2E hazard levels. They reduce the peak drift ratios, residual drift ratios, and localized connection fractures; in addition, they help suppress floor accelerations and lead to more rapid decay of seismic vibrations.

However, the analysis results indicate that large damper force capacities are needed to achieve the desired improvement in performance, especially in the most deformed stories. To obtain equal or better improvements in performance, and to reduce the number and size of the damping devices, a simplified optimization method is used to identify several more retrofit schemes that consider different damper properties, distribution of damper properties, and damper placement configurations.

A simplified performance-based evaluation of the incremental costs and likely loss reductions is then made for the final retrofit strategies as well as for the as-built structure. Retrofit of the building is found to be very beneficial, but additional study is recommended to better estimate costs of implementing the retrofits, including costs associated with disruption of function during retrofit and business interruption losses following earthquakes.

Recommendations are offered for changes that should be considered in developing future editions of ASCE 41 and for further research to improve the certainty with which response of existing tall buildings—in their as-built and retrofit condition—might be predicted. Because only a single structure is evaluated herein, it is finally recommended that other tall buildings be evaluated, and that a group of researchers and practitioners be gathered to develop improved guidelines for assessing and retrofitting existing tall buildings.

14.1.3 ADVANCE PRACTICES IN CONSTRUCTION FIELD IN MODERN MATERIAL, TECHNIQUES AND EQUIPMENT'S:

Advanced construction technology:

The construction industry is repeatedly criticized for being inefficient and slow to innovate. The basic methods of construction, techniques and technologies have changed little since Roman times. But the application of innovation in the construction industry is not straight forward.

Every construction project is different, every site is a singular prototype, construction works are located in different places, and involve the constant movement of personnel and machinery. In addition, the weather and other factors can prevent the application of previous experience effectively.The term 'advanced construction technology' covers a wide range of modern techniques and practices that encompass the latest developments in materials technology, design procedures, quantity surveying, facilities management, services, structural analysis and design, and management studies.

Incorporating advanced construction technology into practice can increase levels of quality, efficiency, safety, sustainability and value for money. However, there is often a conflict between traditional industry methods and innovative new practices, and this is often blamed for the relatively slow rate of technology transfer within the industry. The adoption of advanced construction technology requires an appropriate design, commitment from the whole project team, suitable procurement strategies, good quality control, appropriate training and careful commissioning.

Advanced construction technologies are commonly described as including (amongst many others) advanced forms of: 3D printing, Materials, Building information modelling (BIM), Cladding systems, Computer aided design and computer aided manufacturing (CAD/CAM), Computer numerical control, Construction Innovation Hub, Construction plant, Modern methods of construction, Modular construction, Offsite manufacturing, Prefabrication and preassembly,

Research and development, Site investigations and surveying, Substructure works, Water engineering, Temporary works, Smart technology, Robotics, GPS controlled equipment, etc.

❖ 3D PRINTED OFFICE DUBAI:

- 3D Printed Office of the Future, Dubai, United Arab Emirates.
- Client: The Prime Minister's Office of Dubai.
- Project Manager: PMK International Consult LLC.

Context:

Construction in the UAE is a $44 billion industry that employs approximately 34% of the population and the Dubai Government is continually looking for ways to innovate and improve its efficiency.
By 2030, the Dubai Future Agenda, aims to have 25% of Dubai's construction made by 3D printed technology. Globally, 3D printed technology is estimated to add $300 billion to the world economy by 2025.

The Office of the Future is the world's first 3D printed office building. 3D printing is an innovative method that has been adapted for construction and was used here for the first time in a commercial project.
The project consists of approximately 350sqm of office space, printed layer by layer, using a 20-foot-tall 3D printer, located in, Shanghai, China. Each structural component was built using innovative 3D printing technology, combining a mixture of Special Reinforced Concrete (SRC) and recycled construction material.

Now complete, the building serves as the management office for the 'Museum of the Future' project and provides a headquarters for the Dubai Future Foundation, an organisation that will help to deliver smart technologies to the Emirates, including driverless cars and other cutting-edge technologies.

Delivery:

One benefit of the 3D printing methodology was the speed at which the building was completed. After the design model had been prepared, it took only seventeen days to print the entire structure, and installation on site took just two days.

The speed of installation significantly reduced the number of personnel involved in the site phase. The labour involved in the printing process included just one staff member to monitor the functioning of the printer and seven operatives to install the building components on site. As a result, the labour cost was cut significantly compared to conventional buildings of similar size, which has clear advantages for the future of construction.

RESULTS AND BENEFITS:

The international significance of the delivery of this building cannot be underestimated. 3D printing of buildings can be likened to the early mobile phone technology of the 1980's and 1990's. The first mobile phone was the size of a small family car, heavy and impractical. If Motorola had not had a vision for how this technology would develop in the future, the smartphones of today might not exist. From a practical perspective, an inspirational office building has been created.

This is fundamental for the creative space in which the Dubai Future Foundation will collaborate and foster innovative ideas and concepts for design and application in the future. The result of this project is a unique, futuristic and compact office building. The interior of the building follows a minimalistic design that encourages collaborative working and creative thinking. Features include interactive idea walls, open plan communal areas with natural foliage, and large glass windows for natural light. In addition, there are fully-automated building management systems to regulate temperature, lighting, solar shading and audio-visual equipment.

Conclusion: Fundamentally, the project has demonstrated that it is possible to design, create and build a 3D printed office building. This has generated valuable data and a realistic benchmark for time frames for future 3D printed building projects. The project represents one of the most exciting research and development construction projects anywhere in the world.

Rotor-shaped Residence:

This 3D printed house sits about 60 miles south of Moscow and was one of the most popular 3D printing-related projects at its completion.

What makes Apis Cor's project unique is that all of the main components were fabricated on-site. This allowed reduced transportation and assembly costs. On top of that, the total 3D printing time amounted to just 24 hours.

Using a mixture of solid elements and liquid polyurethane, Apis Cor was also able to create all of the heating insulation material on-site. The interior of this rotor-shaped residence has a contemporary style with wood flooring and is furnished with appliances from Samsung.

Estimation: The result is a modern, round-walled home. According to Apis Cor, the entire construction cost around $10,000 and can withstand temperatures as low as minus 35 °C. Since then, the American company has gone on to create more 3D printed structures, as we'll see later the list.

14.1.4 ENGINEERING ASPECTS OF SOIL MECHANICS - ENVIRONMENTAL IMPACT ASSESSMENT:

Tamil Nadu is one of the states in India suffering from power deficit. The demand of energy is expected to increase by 5% requiring an additional capacity of 2058 MW within the next five years. Out of the existing installed capacity of 8249 MW, 64% is contributed by the government sector while the remaining 12% and 24% are contributed by private sectors and central government. Under the framework of power policy of Government of Tamil Nadu, involvement of private sector entrepreneurs is encouraged to develop power in order to reduce the power shortage in the State. This proposal is one of the responses of the policy under which the private-sector proponent has proposed to install Combined Cycle Power Plant (CCPP) to generate 52.8 MW at Vazhuthur of Ramanathapuram district. The cost for the proposed project is estimated to be 246 corers. However, environmental clearance is required and therefore, a Comprehensive Environmental Impact Assessment (CEIA) and Environmental Management Plan (EMP) of the proposed project have been conducted. The major focuses of the study are:

- Identification of baseline status of the environment.
- Identification and quantification of potential significant impacts due to operations of the proposed project.
- Critical evaluation of impacts on environmental quality.
- Recommendation of the impact abatement measures.

- Formulation of environmental management plan for the mitigation of adverse impacts; and
- Recommendation of post-project monitoring programs.

Major issues identified during scoping are follows:

- Topography and Land use.
- Air Quality.
- Water Availability and Water Usage.
- Ecology including Marine Ecology.
- Climatic Conditions.
- Water Resources.
- Socio-economic Conditions.
- Noise Quality.

Process and Procedure:

Policy & Regulatory Review: The initiatives on environmental protection including policy in India dates back to the fourth Five Year Plan (1969-74) subsequent to which an initial legislation was promulgated in 1974 with the goal of protecting water quality.

- **Environment Protection Act, 1986:** This is an umbrella legislation to provide for the protection and improvement of environment and for matters connected therewith. This act gives specific definitions, which are to be used in all rules enacted under this act. It provides power to the Central Government to take all such measures as it deems necessary in protecting and improving the quality of environment and preventing and abating environmental pollution.
  The penalties set under this act are imprisonment, which may extend up to 5 months and/or fines up to rupees hundred thousand. In case of continuing offences, fines of Rs. 5000 per day may be charged.
- **Minimum National Standards (MINAS):** The rules under the Environment Protection Act provide specific standards for industry (total of 79 industry sectors) and general standards of discharge of environmental pollutants in Inland Surface water i.e., like lakes and rivers, public sewers, land for irrigation and coastal areas. Minimum National Standards for thermal power plants have been formulated for pollution control in India.
- **The Environmental Impact Assessment Notification, 1994:** The Ministry of Environment and Forests, Government of India notified the Impact (EIA) Notification, 1994 under the Environment (Protection) Act, 1986. As per the notification, 30 types of industries scheduled therein have to obtain the environmental clearance from the Government of India.
- **The Water (Prevention and Control of Pollution) Act, 1974:** The Water Act established the general standards for effluent discharge into receiving water in order to prevent water pollution. The major responsibilities of SPCBs under the Act include granting consent to establish and operate facilities, restricting areas of operation, conducting surveys, and determining the use and misuse of streams and wells within its jurisdiction.
- **The Air (Prevention and Control of Pollution) Act, 1981, as amended in 1987 to 99:** The general legislative conditions of this act are similar to the Water Act in terms of obligations, responsibilities and penalties. The primary responsibility for controlling air pollution resides

with the SPCB. Under the Air Act, the state governments are authorized to designate any area or areas within the state as an air pollution control area, after consulting with the SPCB and notifying the official gazette. Depending upon the quality of air in the designated area(s), the SPCB may set air emission standards in the notified area. The standards set by the SPCBs shall not be more lenient than the ambient air standards set by the CPCB. Any industry to be established in the air pollution control area must acquire the consent to establish and consent to operate from the state.

- **Noise Pollution (Control and Regulations) Rules, 1999:** This rule is to reduce the noise pollution from various sources, inter-alia, industrial activities, public address systems, generator sets, construction activity, that may affect the physical and psychological well-being of the people. Ambient noise standards for different areas have been specified in Annexure of these rules. The Central Government or its designated authorities may categorize areas into industrial, commercial, residential or silence zones for the purpose of implementation of noise standards for different areas. An area up to 100 meters around hospitals, educational institutions and courts and sensitive areas (i.e., forests) shall be declared as a silence zone for the purpose of these rules.

Other rules, which may be applicable from case to case, are as follows:

- The Hazardous Waste (Management & Handling) Rules, 1989.
- The Manufacture, Storage and Import of Hazardous Chemical Rules (MSIHC), 1989 (amended in October 1994 and January 2000).
- Public Liability Insurance Act, 1991.
- The National Environmental Tribunal Act, 1995.
- Chemical Accidents (Emergency Planning, Preparedness & Response) Rules, 1996.
- The Factories Act, 1948, (amendment in 1976 and 1987).
- The Petroleum Act, 1934 and rules framed there under.
- The Motor Vehicles Act (amended in 1988).
- Gas Cylinder Rules, 1981.

Environment Impact Assessment and Mitigation Measures:

Battelle Environmental Evaluation System consisting of a checklist comprising of 44 parameters were identified for this project. The checklist consists of selected environmental parameters. Parameters have been given Importance Weights based on the usage of the rank wise comparison techniques. The predicted values of each parameter are converted to a 0-1 scale of environmental quality using value function graphs. Battelle value graphs are being prepared by taking linear relation between weight factors and concentration of various parameters.

Possible Impact on Marine Ecology:

- **Fly Ash:** The dumping of fly ash slurry into the sea resulted not only into filing up of an extensive portion of the bay but also into letting out of ash directly into the open sea. The

ash, on being carried far into the sea caused irreversible extensive damage to the sedimentary biota, Algal beds. Chank, Corals, Pearl oysters, and to all the biota connected with Reefs.

- **Heavy Metal contamination:** In the proposed power project, there is no usage of water and thereby generation of effluent is negligible. Hence, the potential source of metallic contamination from the effluents such as Cadmium, Lead, Zinc and Mercury is totally ruled out.
- **Oil Pollution:** Normally, various activities responsible for oil pollution in the coastal environment are oil exploration, oil refining, oil transport, oil spills etc. In the proposed power project, none of the activities are involved. The let-out water from compressor and waste oil generated are collected and sold out to authorized dealers. Hence, the chance of oil pollution in the coastal region is eliminated.
- **Pesticide Pollution:** There is no possibility of generation of effluents containing pesticides from the operation of proposed project.
- **Microbiological Pollution:** Sewage containing human excreta is the major source of pathogenic bacteria. The state of the coastal waters is judged based on the number of E-coli present in it. In addition to it, discharge of untreated domestic sewage, industrial wastes to the coastal waters are the factors responsible for the microbiological pollution of coastal waters. At present, the domestic effluents generated is around 21.5 MLD only and the effluent will be suitably treated to meet the standard prescribed by the statutory authorities before it is used for gardening within the industrial complex.
- **Environmental Pollution: The** proposed project runs in eco-friendly manner by using Natural gas as a fuel and it will not generate any trade effluent. The wastewater generated will come from the domestic usage, evaporative cooler, WHRB etc. However, such effluents will be treated to meet the standard.

  The effect on ambient air quality will be minimum. Natural gas will not contribute to the suspended particulates. A marginal increase in the gaseous pollutants such as SO2 and NOx, is expected. The proposed project does not have any impact over the land use and on the buffer zone.

  The proposed project does not have any impact on the soil chemistry, soil erosion, and soil fertility. Noise pollution due to the movement of vehicles during construction activities is expected. However, the following measures will minimize the noise level:

  » Maintenance of vehicle, plying in the project area,
  » Development of thick canopy of plantation around project premises,
  » Instalment of modern generator with less noise.
- **Aesthetics:** The proposed power plant will not change any topographic feature. The proposed greenbelt development around the site will enhance the diversity of vegetation. Noise level will be marginally increased due to increased activity. The anticipated composite effect due to the proposed power plant has most overall positive impacts from aesthetic point.
- **Human Interest:** There will be several job opportunities available to the local people during the constructional stage and after commissioning qualified person belonging to this region will be given priority.

TABLE 14.1: SUMMARY OF THE ENVIRONMENTAL IMPACTS								
Potential Impact Areas	**Constructional Phase**				**Operational Phase**			
	High Impact	**Medium Impact**	**Low/No Impact**	**Positive Impact**	**High Impact**	**Medium Impact**	**Low/No Impact**	**Positive Impact**
Air Quality								
SPM		✓					✓	
SO_2			✓				✓	
NO_x			✓				✓	
CO			✓				✓	
Water Environment								
Water availability			✓				✓	
Ground water quality			✓				✓	
Surface water quality			✓				✓	
Noise								
On site		✓					✓	
Off site			✓				✓	
Ecology								
Flora			✓				✓	
Fauna			✓				✓	
Socio-economic Environment								
Social fabric							✓	
Health								✓
Education				✓				✓
Infrastructure				✓				✓
Occupation Pattern				✓				✓
Economy				✓				✓
Aesthetic								
Scenery		✓					✓	
Structures			✓			✓		

Environmental Management Plan: An Environmental Management Plan (EMP) has been proposed by the project proponent. The (EMP) provides a conceptual framework to reduce or mitigate predicted environmental impacts of the project. Following are the proposed measures for improving the overall environmental management of the site:

- Mitigation of the adverse environmental and socio-economic impacts
- Recommendations of approaches that can integrate environmental concerns in design, operation and development of necessary physical infrastructures.
- Monitoring plan for significant environmental attributes.

Environmental Monitoring: A regular environmental monitoring program has been proposed to monitor environmental parameters. This monitoring includes meteorological data collection, monitoring of air quality; noise-level monitoring, water-quality monitoring and soil testing to monitor land environment. The EIA reports provide a detail of the monitoring of:

- Noise Levels
- Meteorological state and Air Quality

- Water Quality
- Land Quality
- Monitoring Schedule and Parameters

Organization Setup: An environmental management cell has been proposed to implement environmental monitoring and management plan. An environmental engineer will head all this under the guidance of the plant manager. He will have support staff in carrying out his functions.

Lessons Learned:

1. Number of issues require higher degree of competence at functional and organizational level, for example, the project is close to marine biosphere reserve requiring specialized studies to assess nature of impact. Therefore, the environmental monitoring becomes highly specialized and stringent.
2. Need for institutionalization of environmental issues into organization structure for effective implementation. The specific environmental monitoring requires specialized skill of monitoring team.
3. Need for better infrastructures to address environmental monitoring.
4. Need for post-project, monitoring and reporting of environmental attributes.

Conclusion: State government has provided the environmental clearance to the project proposal and the project will be implemented shortly.

14.1.5 WATER SUPPLY - SEWERAGE SYSTEM - WASTE WATER - SUSTAINABLE DEVELOPMENT TECHNIQUES:

A Hybrid Wetland for Small Community Wastewater Treatment in Morocco: Morocco, as with other countries in North African and the Middle East, is situated predominantly in arid and semi-arid climatic zones and is confronted with a growing water crisis. Agriculture remains the primary consumer of water at 88 percent of mobilized water resources, and it is projected that available water resources will decline from 1000 m^3/cap/yr. in 2000 to 570 m^3/cap/yr in 2025 (Government of Morocco, 2001).

As well, wastewater treatment in rural areas of Morocco is significantly lacking, with uncontrolled discharge. Due to a lack of irrigation options, farmers often use untreated wastewater and subject themselves and consumers to significant health risks.
In the case of Morocco, approximately 70 million m^3 of untreated wastewater are used each year without any sanitary precautions to irrigate an area of more than 7000 hectares (El Kettani et al., 2008).

A pilot hybrid constructed wetland system was established in 2007 at the Institute Agronomies et Veterinaries Hassan II in Rabat, Morocco in order to adapt constructed wetland technology for small community wastewater treatment and agricultural reuse under Moroccan climatic conditions.

Technical Data: The pilot wetland system consists of three stages: a primary vertical flow wetland, a secondary horizontal flow wetland and a tertiary vertical flow sand filter.

Design details include:

- Design flow = 12 m^3/d
- Total system occupies 4.5 m^2 per person equivalent (PE)
- Three primary vertical flow wetlands operated in sequence with 4 d operation and 8 d rest period. Hydraulic loading rate = 0.5 m/d
- Horizontal flow wetland residence time = 3.1 d
- Vertical flow sand filter hydraulic loading rate = 0.25 m/d
- Optimums recycle rate for denitrification = 100%

Overview of the Wastewater Technology (Hybrid Constructed Wetland Technology):

The hybrid wetland technology is depicted in Figure 14.4 and consists of three stages: a primary vertical flow (VF) wetland to remove solids, a secondary horizontal flow (HF) wetland to remove organic matter and nitrogen and a tertiary VF sand filter to remove pathogens and to nitrify effluent. Wastewater is recycled from Stage 3 to Stage 2 to promote denitrification.

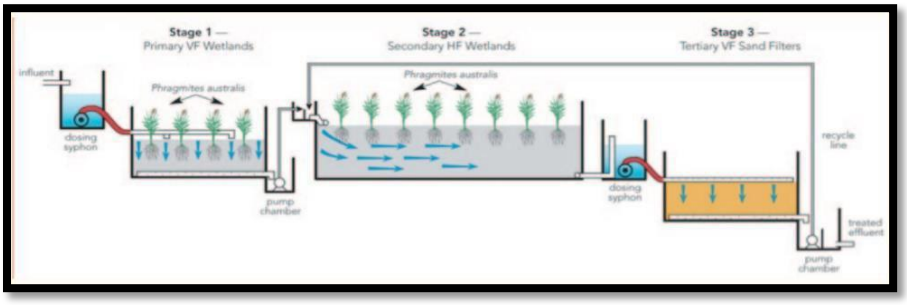


FIG 14.4: HYBRID PILOT WETLAND CROSS-SECTIONAL VIEW

The first stage is a primary VF wetland following the CEMAGREF design (Molle et al., 2005). The filter consists of: a 15 cm drainage layer of 20-40 mm gravel, a 10 cm intermediate layer of 10-20 mm gravel and a 30 cm layer of 8-10 mm gravel (Figure 14.5 and Figure 14.6). Three filters (5 x 5 m) are planted in native Phragmites australis. Each filter is dosed for 4 days at 12 m^3/day followed by an 8-day rest period. The primary filter receives raw wastewater and removes solids and organic matter through filtration and biological treatment. Organic matter accumulates in the filter and mineralizes over time. Root penetration and wind induced swaying of the Phragmite stems act to maintain drainage pathways and alleviate clogging of the filter surface.

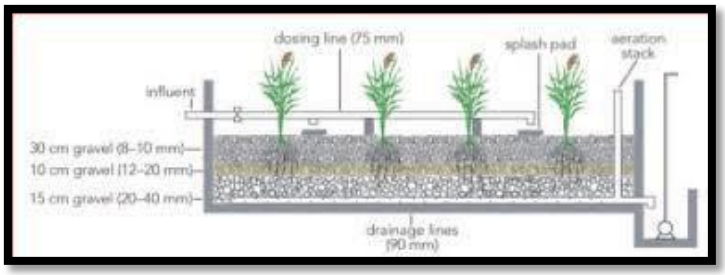


FIG 14.5: PRIMARY VF WETLAND CROSS-SECTIONAL VIEW

PRIMARY VF WETLAND – (PHOTO 2007)

PRIMARY VF WETLAND (PHOTO - 2011)

FIG 14.6: PRIMARY VF WETLAND PHOTOS

The second stage is a HF wetland planted in native Phragmites australis (Figure 14.7 and Figure 14.8). The wetland sizing is based on first order kinetics for removal of organic matter (Young et al., 1998; El Hamouri, 2007). The HF wetland consists of three parallel cells of 20 m × 2.45 m each with a depth of 0.65 m of 12-20 mm gravel (middle cell unplanted). The HF wetland has a hydraulic retention time of 3.1 days.

The third stage is comprised of a series of three VF sand filters in parallel for nitrification and pathogen attenuation (Figure 14.9 and Figure 14.10). The design is based on a single pass sand filter designed for nitrification (Crites and Tchobanoglous, 1998; Cooper, 2005). Each filter (4 x 4 m) consists of: a 20 cm drainage layer of 12-20 mm gravel, a 40 cm layer of 1-5 mm washed sand and a 20 cm layer of 12-20 mm gravel.

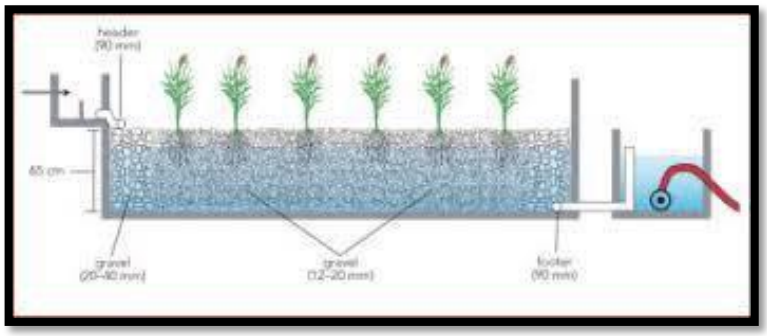


FIG 14.7: SECONDARY HF WETLAND CROSS SECTIONAL VIEW

FIG 14.8: SECONDARY HF WETLAND PHOTOS (2007 & 2008)

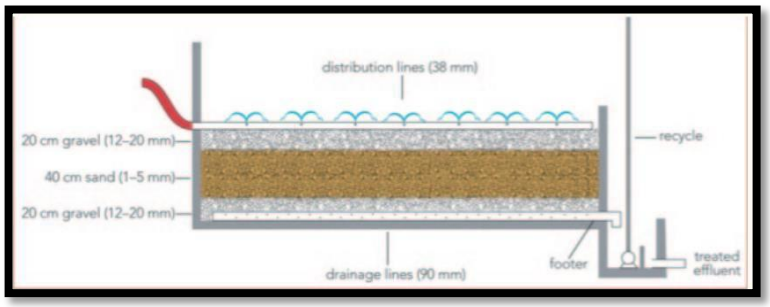


FIG 14.9: TERTIARY VF SAND FILTER CROSS SECTIONAL VIEW

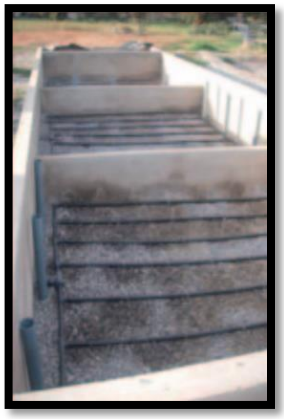


FIG 14.10: TERTIARY VF SAND FILTER CROSS PHOTO (2011)

Conclusions:

The hybrid constructed wetland technology is a promising wastewater treatment alternative for small communities in Morocco and for communities with comparable socio-economic and climatic conditions. The system has been shown to function well over four years of continuous operation.

The passive wetland technology provides several advantages including low capital and operating costs, low energy requirements and high levels of treatment. The system produces tertiary quality effluent suitable for direct discharge or for irrigation of forage crops, cereals and fruit trees while reducing pathogen risk and protecting groundwater from excess nitrogen leaching.

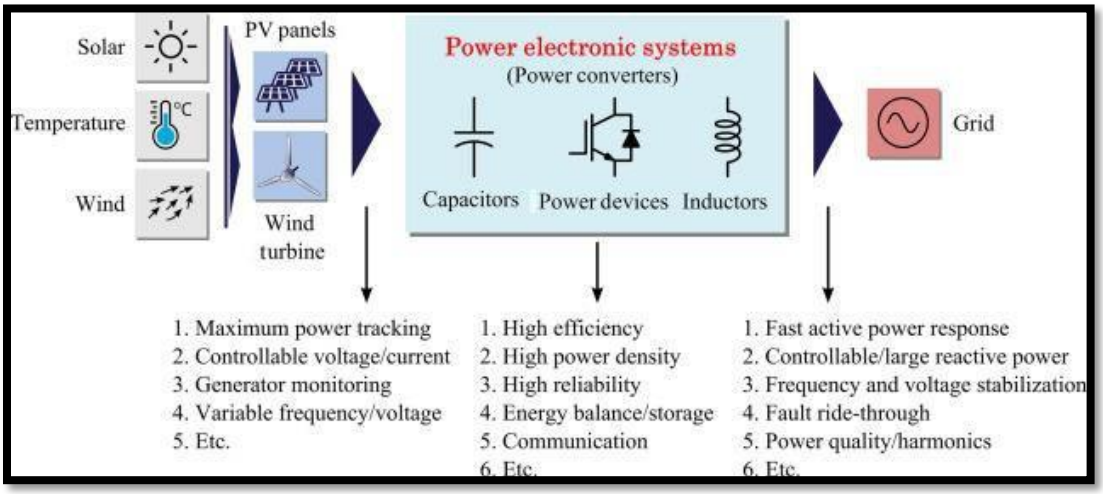
14.2 ELECTRICAL ENGINEERING:

14.2.1 DESIGN OF POWER ELECTRONICS CONVERTER:

The task of a power converter is to process and control the flow of electric energy by supplying voltages and currents in a form that is optimally suited for the user loads. Energy was initially converted in electromechanical converters (mostly rotating machines). Today, with the

development and the mass production of power semiconductors, static power converters find applications in numerous domains and especially in particle accelerators. They are smaller and lighter and their static and dynamic performances are better. A static converter is a meshed network of electrical components that acts as a linking, adapting, or transforming stage between two sources, generally between a generator and a load.

An ideal static converter controls the flow of power between the two sources with 100% efficiency. Power converter design aims at improving the efficiency. But in a first approach and to define basic topologies, it is interesting to assume that no loss occurs in the converter process of a power converter. With this hypothesis, the basic elements are of two types: – non-linear elements, mainly electronic switches: semiconductors used in commutation mode; – linear reactive elements: capacitors, inductances and mutual inductances or transformers.



These reactive components are used for intermediate energy storage but also for voltage and current filtering. They generally represent an important part of the size, weight, and cost of the equipment. There are two types of sources: voltage and current sources. As mentioned earlier, any of these sources could be a generator or a receptor (load).

A source is called a voltage source if it is able to impose a voltage regardless of the current flowing through it. This implies that the series impedance of the source is zero (or negligible in comparison with the load impedance). A source is called a current source if it can impose a current regardless of the voltage at its terminals. This implies that the series impedance of the source is infinite (or very large in comparison with the load impedance).

These definitions correspond to permanent properties. The principle of operation of a converter is based on the switch mode action of its switches. Commutations of the switches generate very fast current and/or voltage transients so that the transient behavior of the sources is fundamental for converter design. The transient behavior of a source is characterized by its ability or inability to withstand steps generated by the external circuit in the voltage across its terminals or in the current flowing through it. Then new definitions could be stated:

– a source is a voltage source if the voltage across its terminals cannot undergo a discontinuity due to the external circuit variation. The most representative example is the capacitor since

an instantaneous change of voltage across its terminals would mean an instantaneous change of its charge which would require an infinite current.

– a source is a current source if the current flowing through it cannot undergo a discontinuity due to the external circuit variation. The most representative example is the inductance since an instantaneous change in current would correspond to an instantaneous change in its flux which would require an infinite voltage.

14.2.2 ELECTRONIC SOFT STARTER FOR 1/3 PHASE INDUCTION MOTOR FOR AGRICULTURE:

An Induction motor can self-start owing to the interaction between the rotating magnetic field flux and the rotor winding flux, causing a high rotor current as torque is increased. As a result, the stator draws high current and by the time the motor reaches to full speed, a large amount of current (greater than the rated current) is drawn and this can cause heating up of the motor, eventually damaging it. To prevent this, motor starters are needed.

A soft starter is any device that reduces the torque applied to the electric motor. It generally consists of solid-state devices like thyristors to control the application of supply voltage to the motor. The starter works on the fact that the torque is proportional to the square of the starting current, which in turn is proportional to the applied voltage. Thus, the torque and the current can be adjusted by reducing the voltage at the time of starting the motor. There can be two types of control using soft starter:

Open Control: A start voltage is applied with time, irrespective of the current drawn or the speed of the motor. For each phase, two SCRs are connected back-to-back and the SCRs are conducted initially at a delay of 180 degrees during the respective half-wave cycles (for which each SCR conducts). This delay is reduced gradually with time until the applied voltage ramps up to the full supply voltage. This is also known as Time Voltage Ramp System. This method is not relevant as it doesn't control the motor acceleration.

Closed-Loop Control: Any of the motor output characteristics like the current drawn or the speed is monitored, and the starting voltage is modified accordingly to get the required response. The current in each phase is monitored and if it exceeds a certain set point, the time voltage ramp is halted.

Thus, the basic principle of the soft starter is by controlling the conduction angle of the SCRs the application of supply voltage can be controlled.

Components of a basic soft starter

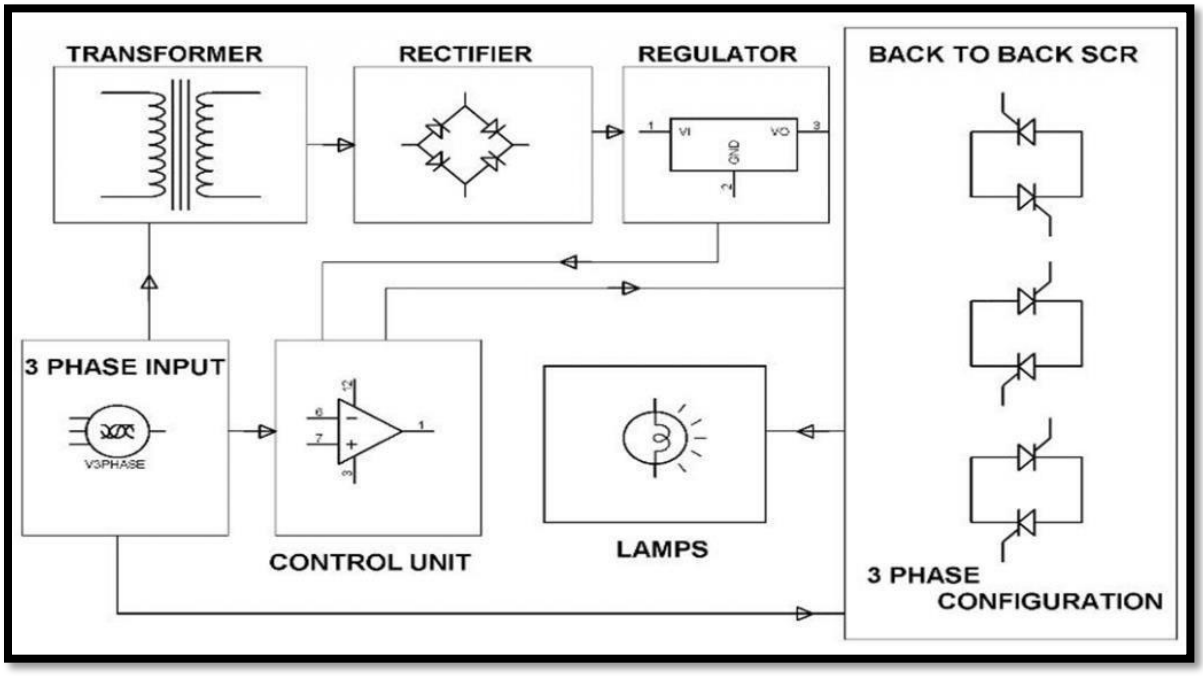
1. **Power switches** like SCRs which need to be phase controlled such that they are applied for each part of the cycle. For a 3-phase motor, two SCRs are connected back-to-back for each phase. The switching devices need to be rated at least three times more than the line voltage.

2. **Control Logic** using PID controllers or Microcontrollers or any other logic to control the application of gate voltage to the SCR, i.e., to control the firing angle of SCRs to make the SCR conduct at the required part of the supply voltage cycle.

Working Example of Electronic Soft Start System for 3 phase induction motor. The system consists of the following components:

- Two back-to-back SCRs for each phase, i.e., 6 SCRs in total.
- Control Logic circuitry in the form of two comparators- LM324 and LM339 to produce the level and the ramp voltage and an opt isolator to control the application of gate voltage to each SCR in each phase.

A power supply circuitry to provide the required dc supply voltage. The level voltage is generated using the comparator LM324 whose inverting terminal is fed using a fixed voltage source and the noninverting terminal is fed through a capacitor connected to the collector of an NPN transistor. The charging and discharging of the capacitor cause the output of the comparator to change accordingly and the voltage level to change from high to low. This output level voltage is applied to the noninverting terminal of another comparator LM339 whose inverting terminal is fed using a ramp voltage. This ramp voltage is produced using another comparator LM339 which compares the pulsating DC voltage applied at its inverting terminal to the pure DC voltage at its noninverting terminal and generates a zero-voltage reference signal which is converted to a ramp signal by the charging and discharging of an electrolyte capacitor.



The 3rd comparator LM339 produces a high pulse width signal for every high-level voltage, which decreases gradually as the level voltage reduces. This signal is inverted and applied to the Optoisolator, which provides gate pulses to the SCRs. As voltage level falls, the pulse width of

the Optoisolator increases and more the pulse width, lesser is the delay and gradually the SCR is triggered without any delay. Thus, by controlling the duration between the pulses or delay between applications of pulses, the firing angle of SCR is controlled and the application of supply current is controlled, thus controlling the motor output torque.

The whole process is an open-loop control system where the time of application of gate triggering pulses to each SCR is controlled based on how earlier the ramp voltage decreases from the level voltage.

ADVANTAGES OF SOFT START:

Now that we have learned about how an electronic soft start system works, let us recollect a few reasons why it is preferred over other methods.

- **Improved Efficiency:** The efficiency of the soft starter system using solid-state switches is more owing to the low on-state voltage.
- **Controlled startup:** The starting current can be controlled smoothly by easily altering the starting voltage and this ensures smooth starting of the motor without any jerks.
- **Controlled acceleration:** Motor acceleration is controlled smoothly.
- Low Cost and size: This is ensured with the use of solid-state switches.

Cost: The cost of electronic soft starter for 1/3 phase induction motor for agriculture is approximated is around 2000.

14.2.3 ADVANCED WIRELESS POWER TRANSFER SYSTEM:

The Transfer of electrical power in reliable and efficient way is always challenging for the designers and engineers. Presently all electrical power from the generating stations to the distribution station is transferred by the uses of wires and underground cables. One of the major issues in these types of systems is the losses due to resistance of the material. Generally, the percentage of loss of power during the transmission and distribution is 26%.

In modern technology the use of portable device has increased such as mobile robots and electric vehicle. Mobility is the main concern of these equipment i.e.; they are not connected to the main source of power. All these problems are the main motivation for researchers. Nikola Tesla was the first who introduce the concept of wireless power transfer.

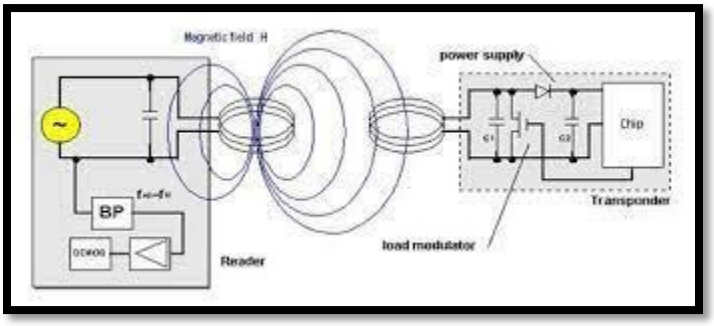
But this technology from the time of Tesla is underdeveloped due to lack of funding and technology. But research from past few years has always going on and recent development has been observed in the field. Wireless power transfer can be achieved by several methods (discussed later). Here we discussed few methods such as induction coupling, resonating coupling, LASER technology for electrical power transfer.

This type of WPT is simply based on inductive coupling between two coils. This is a type of near field technique measuring with appliance near the source. It is generally based on the principle of

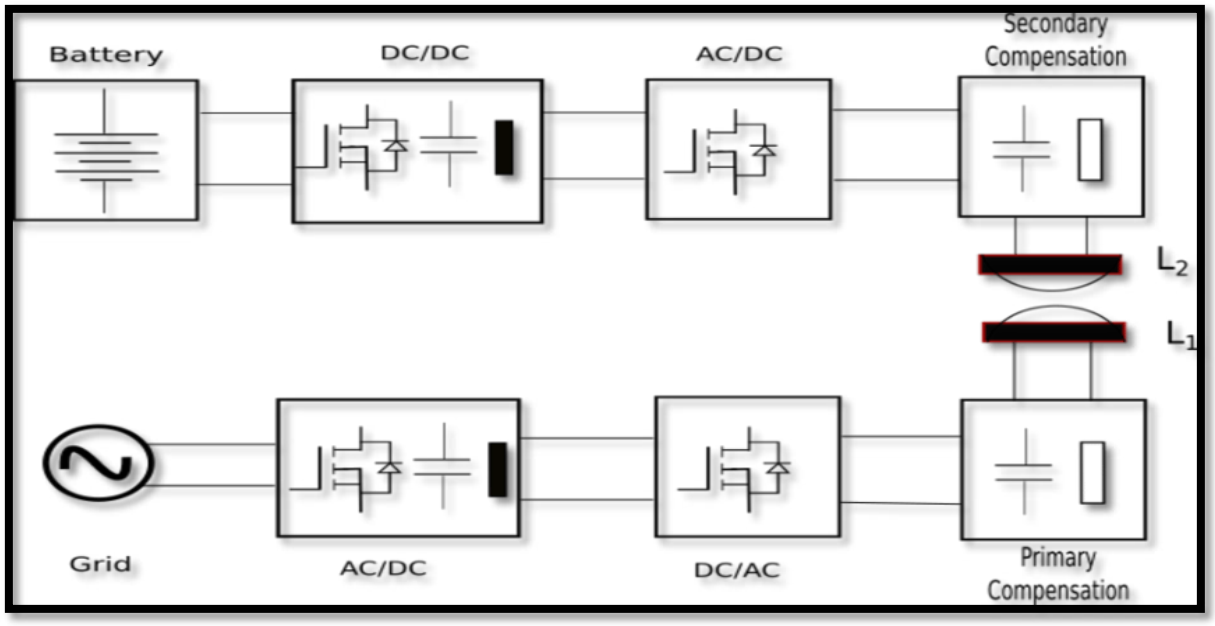
mutual induction, where two coils are placed vicinity to each other and there is no physical connection between these two coils.

The simplest example is transformer where the transfer of energy takes place due to electromagnetic coupling. Each of these coils connected without wires and it has been an important and popular technology to transfer power without wires because of its simplicity and reliability. Based on this technology there are various application device has been already made including electric brush and charging pad for cell phones or laptop. But this kind of method also have some limitation i.e., the range can be very less up to few cm and separation distance is very less than the coil diameter.

This is one of the types of far-field technique of WPT which have range upto KM, with power transfer upto MW. This method uses microwave frequency ranging from 1GHZ to 1000GHZ generated from the microwave generator. First the microwave is generated by microwave generator which pass through the coax-waveguide adapter to the waveguide circulator. Then a tuner and directional coupler are used to separate wave according to their propagation direction. Then they are transmitted through antenna. At the receiver terminal, a receiver antenna receives which pass through a low pass filter to finally produce DC power. Based on microwave WPT system the present application is solar power satellite [8]. Advantages of microwave WPT are that it is used for several KM range with transferring high amount of power. Disadvantages are generally that the radiation effect to human beings from the microwave electromagnetic radiation.



This is also one of the types of far- field technique, where the power is transmitted through LASER beams. For power transmission firstly the electrical energy is converted to high LASER beams and at receiving side, these LASER beams are converted to electricity by using photo voltaic cells. This type of WPT has several disadvantages i.e., why it is not used for electrical power transmission because LASER beams can easily harm human being if they cut LASER beam path. Therefore, these are generally used for military weapon development and space research.



❖ **ADVANTAGE OF WPT:**

- It gives the human comfort as there is no chording or wiring problem, so mobility is easier.
- There is no problem of power failure and extensive heating.
- Cost of overall system decreases due to no uses of wires.
- Overall efficiency increases due to decrease in the power loss.
- It offers no corrosion as there is no exposure to the atmosphere which is Ecofriendly.
- It offers ranges of power levels and separation distance between coils.
- It offers convenient, reliability, high efficiency, low cost at the same time.

❖ **DISADVANTAGE OF WPT:**

- WPT methods uses the electromagnetic radiation for power transfer and the main effect of electromagnetic wave is its biological impact which harms human beings and animal.
- Biological impact of inductive coupling and resonance coupling is far less than compared to microwave power transmission technique.
- There is also a limitation of separation distance and power capacity.
- Interference of microwave with other communication system.
- Initial cost is very high for implementing WPT system.

APPLICATION OF WPT:

- **MEDICAL DEVICES** The most important application of WPT is in medical science. As we know medical device uses very small amount of power. Some medical devices are LAVAD heart assist pumps, pacemaker and infusion pumps. These devices one implemented in human body. Now for replacement of battery there is a need of surgery

after a particular period. With using the WPT technology, the power can sufficiency supplied to medical device without harming human body.

- **ELECTRICAL VEHICLES** Electrical vehicles are the new technology which uses electrical energy for their operation. The main concern about the electrical vehicles is that their mobility i.e., they are not directly connected to the source of power by wires. With using this technology, it enables the reliable and efficient power transmission to electrical vehicles without using of wires. WPT also marketed the electrical vehicles which attract the consumers to buy it and decrease the load on diesel and petrol vehicles.
- **SOLAR POWER SATELLITE (SPS)** The most important application of WPT system is solar power satellite that uses the microwave for energy transferring. Satellites are generally equipped with solar power transmitter and receiver antenna. Solar panel converted the generated electricity into high power microwave beams and directed towards the ground station receiver antenna. The major problem with this system is it biological effect of microwave radiation on human and animals, if they are distracted from their path. The receiving zone of SPS is much larger for getting a small amount of power. For achieving 750MW power with power intensity of 1mw/cm2, we have to take a area with 10KM diameter so that radiation level is in safe zone.

CONCLUSIONS:

So far, we have discussed all aspects of wireless power transmission system and we can conclude that it is an important research area for electrical engineers that has large scope in future in domain of power generation and transmission. Based on the study, we also conclude that from all method magnetic resonance coupling is the most efficient compared to other in all aspects. Microwave WPT gives us to increase the range up to KM and power transferring capacity up to MW, but it cannot be safe for humans and animals due to its biological impact. Researchers must find a safe solution for microwave WPT so that it cannot harm humans. WPT gives the comfort, convenience, safety, reliability, low cost, high efficiency simultaneously which make it one of the best research areas in electrical engineering.

14.2.4 INDUSTRIAL TEMPERATURE CONTROLLER:

A thermocouple is a temperature sensor that uses a phenomenon (i.e., the See beck effect) that generates a thermoelectromotive force according to the temperature difference between the joint end and the open end of different types of metal that have been joined together at one end. The combination of metals with high and stable thermoelectromotive force is called a thermocouple. Thermocouples are widely used in industry.

The Law of Intermediate Temperatures and the Law of Intermediate Metals:

The size of the potential difference is determined by the two different materials of the metal wires and by the difference in temperature between the thermocouple junction (i.e., hot junction) and reference junction (i.e., cold junction).

Any difference in temperature in between has no effect (Law of Intermediate Temperatures). There is also no effect if there are different types of metals in between as long as there is no difference in temperature (Law of Intermediate Metals).

Compensating Lead Wire If the thermocouple temperature sensor lead wire does not reach the temperature controller and the cable between the sensor and the temperature controller is extended with copper wire, a large temperature error will occur. The thermocouple temperature sensor lead wires must be extended with compensating conductors.

A compensating conductor is a cable that produces nearly the same thermoelectromotive force as the thermocouple. There are general purpose cables (-20 to 90°C) and heat-resistant cables (0 to 150°C), depending on the ambient operating temperature. The characteristics of these cables are determined by JIS. Compensating conductors are available for each type of thermocouple. A compensating conductor that is suitable for the thermocouple must be used.

14.2.5 ACCIDENT ALERTS IN MODERN TRAFFIC SIGNAL CONTROL SYSTEM -CAMERA SURVEILLANCE SYSTEM:

It is mainly benefit for the companies which are based on transport system. Since it can show the position of all vehicles in real time, so that they can create the expected data accordingly. These tracking systems can store the whole data where the vehicle had gone, where did it stop, how much time it take at every stop and can create whole data analysis. It is also used in buses and trains, to estimate how far are they, how much time it takes for them to come to a particular stop. These systems are used to data capture, data storage, data analysis and finally data transfer.

Accident Alert System Features:

This system is based on new technology, its main purpose is to detect an accident and alert to the control room, so the victim can find some help. It can detect accidents the intensity of the accident without any visual contact from control room. If this system is inserted in every vehicle, then it is easy to understand how many vehicles are involved in a particular accident and how intense is it. So that the help from control room will be according to the control room. The present board designed has both vehicle tracking and accident alert systems, which make it more valuable and useful. This board alerts us from theft and on accident detection also. This device detects fire accidents also by placing fire detector in one of the interrupt pins.

Usage of tracking in India:

Tracking in India is mainly used by transport systems, taxi companies, traffic operators. Taxi operators use this to estimate how far the vehicle is from a particular area and send this information to call centers and they can inform public about the distance of the taxi location and time it takes tom come to them. Another use is for traffic police if this system is located in every vehicle, they can estimate the traffic by looking on the map and if any accident is detected then

they can route the traffic into another way. This is how tracking is useful because India is one of busy traffic countries and this system can control many of the traffic problems.

BLOCK DIAGRAM: This is the block diagram of vehicle tracking and accident alert system. This shows the overall view of the vehicle tracking and accident alert system circuit. The blocks connected here are LCD display, GPS, GSM, Shock Sensor, Power supply, fire detector.

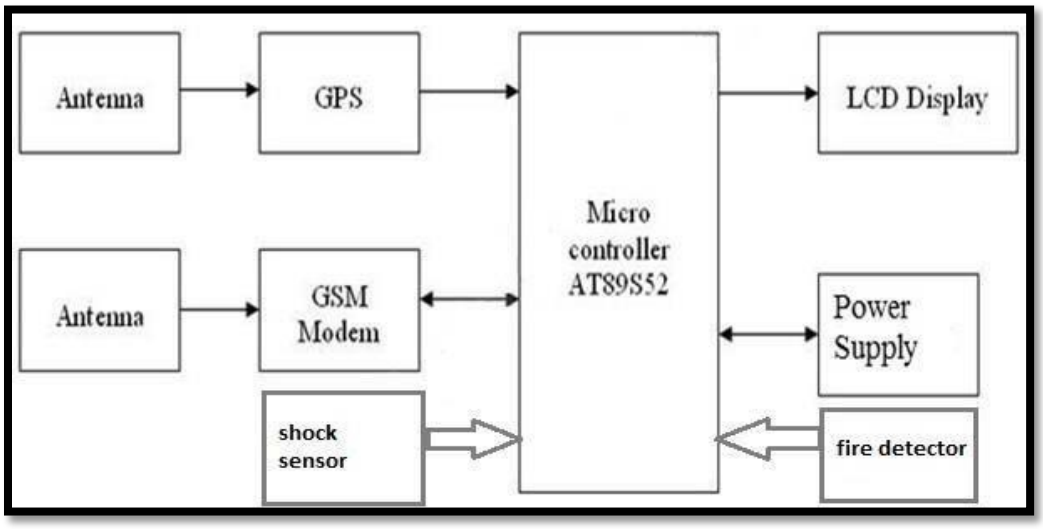


FIG 14.11: BLOCK DIAGRAM

CHAPTER 15: SMART AND / OR SUSTAINABLE FEATURES OF CHAPTER 8 AND 13 DESIGNS, IMPACT ON SOCIETY.

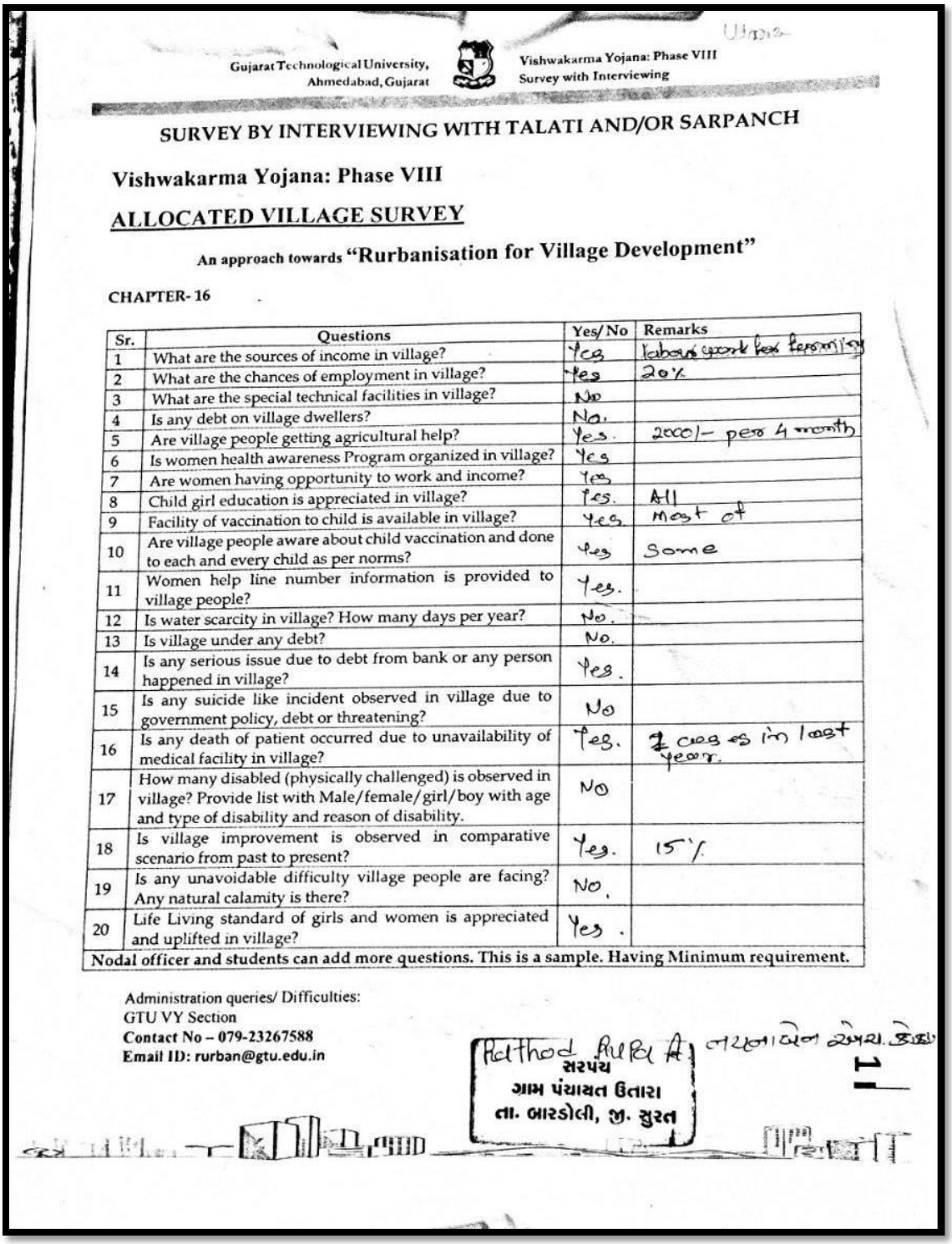
"Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs."

The concept of sustainable development can be interpreted in many ways, but at its core is an approach to development that looks to balance different, and often competing, needs against an awareness of the environmental, social and economic limitations we face as a society.

SR. NO.	NAME OF DESIGN	PERIOD	AMOUNT EXPENDI-TURE (RS.)	BENEFIT
PART – I				
1.	Drainage System	12 – 14 months	5,77,124	Drainage and sewerage system in rural areas is an important priority in Indian setting because of rapid rurbanization, industrialization, and population growth, along with increase in population and migration.
2.	Bus Stand	5 – 7 weeks	69,455	Transportation plays a critical role in the livability of a community the factors that influence a community's quality of life
3.	Party Plot	3 – 4 months	7,62,933	Rural Development is the process of improving the quality of life and economic well-being of people living in rural areas, often relatively isolated and sparsely populated areas.
4.	Cemetery	4 – 6 weeks	7,68,253	Reflecting geography, religious beliefs, social attitudes, and aesthetic and sanitary considerations, cemeteries may be simple or elaborate built with a grandeur that overshines the community of the living.
5.	Public Health Center	3 – 4 months	8,45,146	Residents should be able to access services such as primary care conveniently and confidently, dental care, behavioral health, emergency care,

				and public health services.
6.	Cattle House	4 – 6 weeks	1,13,845	Proper housing which is conducive to good health, comfort, and protection from inclement weather, and which would enable the animals to utilize their genetic ability and feed for optimal production.
PART – II				
7.	Bank with ATM	3 – 5 months	3,76,656	One of the most significant benefits of ATMs is their ability to provide cardholders access to their money 24×7.
8.	Temple	14 – 16 months	20,00,000	Visiting temple is one of the most popular culture in our religion. Unlike our previous generations, who are aware of the benefits of visiting temple regularly.
9.	Organic Waste Composting	12 – 14 months	6,13,97,170	Organic wastes can represent a large proportion of the solid waste stream in any rural community.
10.	Banquet Hall	3 – 6 months	33,55,625	Partying and participating, in any event, is enjoyable. But organizing a successful event is no small feat to achieve.
11.	Cheese Factory	3 – 4 months	2,07,946	Any consideration of farming system's potential to contribute to a local development process in rural areas must be approached from a multifunctional point of view, in which, in addition to the agrarian activity's productive functions, its territorial and environmental functions must also be considered.
12.	Park	8 – 12 months	41,98,252	By providing a safe place for kids to play and parents to bring their little ones, cities can enjoy more beautiful areas surrounding the parks. Residents get a safe place for physical activity in addition to elevated property values in the immediate vicinity.

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?	Yes	labour work for farming
2	What are the chances of employment in village?	Yes	20%
3	What are the special technical facilities in village?	No	
4	Is any debt on village dwellers?	No.	
5	Are village people getting agricultural help?	Yes.	2000/- per 4 month
6	Is women health awareness Program organized in village?	Yes	
7	Are women having opportunity to work and income?	Yes	
8	Child girl education is appreciated in village?	Yes.	All
9	Facility of vaccination to child is available in village?	Yes	Most of
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes	Some
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?	Yes.	
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.	2 cases in last year.
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.	No	
18	Is village improvement is observed in comparative scenario from past to present?	Yes.	15%
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

Rathod Rupal A
સરપંચ
ગ્રામ પંચાયત ઉતારા
તા. બારડોલી, જી. સુરત

CHAPTER 17: IRRIGATION / AGRICULTURE ACTIVITIES AND AGRO-INDUSTRY, ALTERNATE TECHNICS AND SOLUTION

Farming methods have evolved massively over the years, from basic, hand-held tools to the modern, sophisticated machinery we use today. Farmers are now embracing modernity, which has enabled them to achieve the highest potential in whichever farming activity they choose to undertake.

Technological advancements have permeated every industry across the world and agriculture is no exception. Nowadays, technology is significantly helping growers and farmers in several ways, including precise forecasting, data-driven decision making, and more. The changes have also resulted in a positive impact on the bottom line of most farmers and ultimately led to improved accesses to food products, at reasonable prices. Let's delve into the specific ways in which technology has revolutionized agriculture.

1. Online resources:

The proliferation of internet technology has dramatically offered farmers unprecedented access to a wealth of valuable resources and tools to make farming easier. Notably, the internet has innumerable production and planning tools to help them forecast future crops.

Additionally, the World Wide Web provides several farming forums that let them exchange ideas seek advice and participate in insightful discussions.

These forums offer robust support groups that can help farmers without ever setting foot on the farm.

2. GPS:

A few decades ago, the idea of tractors driving themselves on the farm was implausible. However, the entry of GPS technology has completely changed everything. GPS provides precise location information at any point near or on the earth's surface. So, farming machines integrated with GPS receivers can recognize their position within the farm and adapt their operation to maximize their efficiency at that location.

Now, tractors equipped with GPS technology coupled with automatic steering systems are used to improve the placement of seeds on the farm, thereby reducing wastes and costs. Additionally,

GPS guided drones are increasingly being used to perform tasks such as crop spraying, livestock monitoring and 3D mapping.

The applications of GPS are many and transcend their usage in tractors. For example, farmers can use a GPS receiver to detect preselected positions in a farm field for soil sample collection. The selected soil samples are then analyzed to generate a fertility map in a geographic information system (GIS). Using the map, farmers can accurately prescribe the quantity of fertilizer required for each sampled section of the farm field. After that, the farmer can use Variable-rate technology (VRT) fertilizer applicators to distribute the precise number of fertilizers in the area.

3. Sensors:

Sensors, like GPS technology, are increasingly being used by farmers to comprehend their crops at a micro level, reduce environmental impacts, and conserve resources. Most of the sensing technologies used in precision agriculture provide critical data that helps farmers to adapt their approaches to the changing environmental factors. Location sensors use GPS satellites signals to ascertain longitude, latitude and altitude.

To effectively triangulate a position, a farmer should have a minimum of three satellites. Optical sensors are also used in precision agriculture to aggregate and process plant color and soil reflectance data. More precisely, they are used to determine the organic matter, moisture content and clay content in the soil.

Generally, sensors can monitor everything from soil temperature to humidity levels in grain silos. Also, they can offer very critical knowledge of soil health. And importantly, sensor technology helps farmers to use their irrigation waters more efficiently, minimizing on wastage, and lowering costs.

4. Mobile devices:

As technology improves every day, mobile technology also has advanced, as evidenced by the number of apps popping up. This development has significantly impacted every sphere of life with agriculture too benefiting from the progress.

The actual game changes have been mobile applications. They have altered the lives of farmers and agricultural field holders, for the better. Famers have access to several mobile apps that can help them to collect information on their field farms, check the weather, and receive relevant updates.

With farmers getting insightful details from mobile apps, they are smoothly transitioning from handling fields to creating farm maps and facilitating the use of drones. The software behind the apps put them in the drivers' seat when managing everything from strategy formulation to tracking progress.

5. Smart farming:

When all the above technologies are merged, the resulting product will be a smart farming system, often referred to as precision agriculture. Smart farming involves the implementation of contemporary Information and Communication Technologies (ICT) into agriculture, resulting in what is referred to as the Third Green Revolution.

The revolution is slowly taking over the agricultural sector through the joint application of ICT solutions such as the Internet of Things (IoT), GPS, robotics, sensors and actuators, Big Data, Unmanned Aerial Vehicles (UAVs, drones), precision equipment, plus much more.

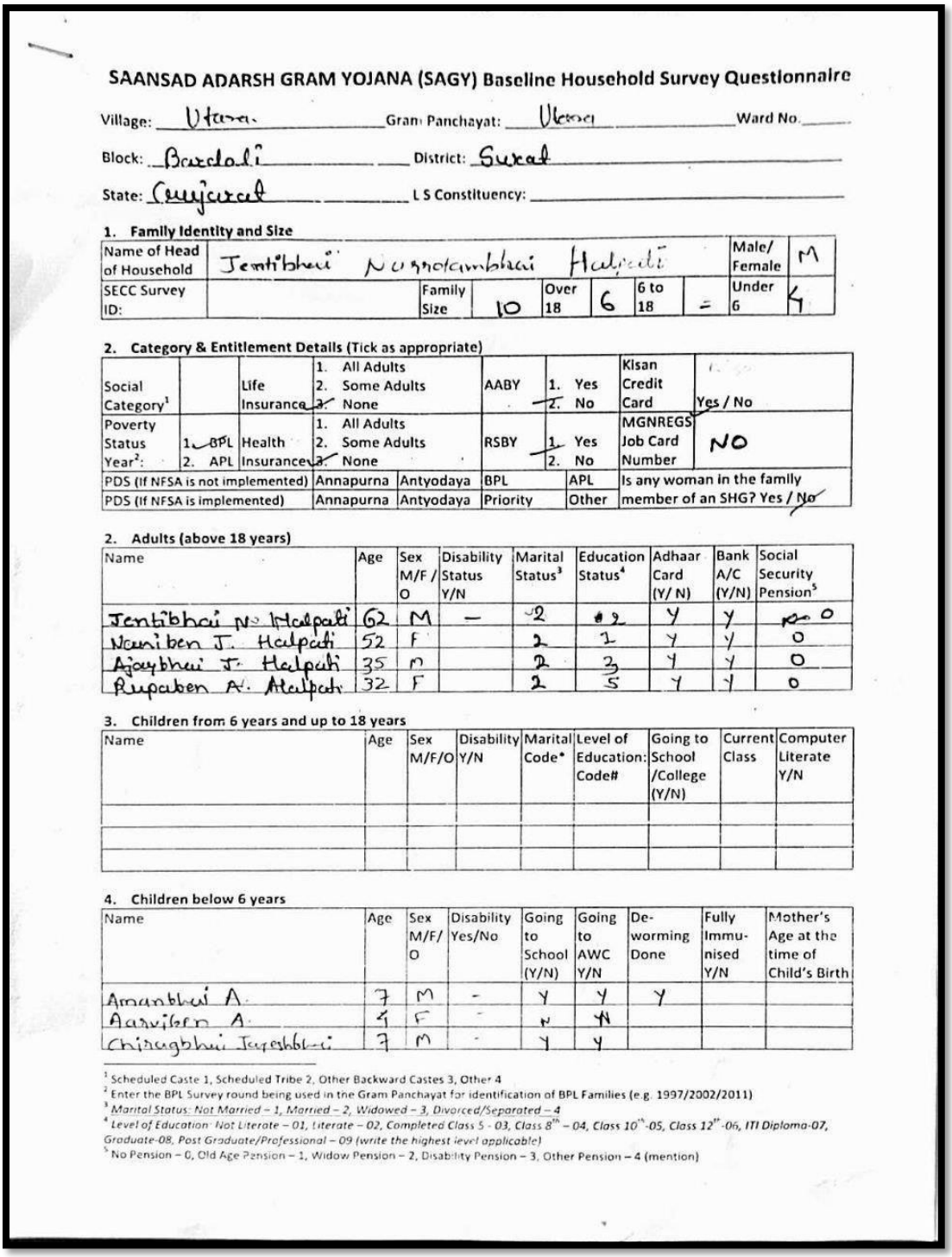
Using irrigation as an example, we can demonstrate how different technologies are combined to offer smart farming. Before watering the farm field, a farmer can mount a sensor on an irrigator to assess the moisture level of the soil. The information obtained is then used to vary the quantity of water required.

Farmers can use drones to assess plant health and enable them to take any corrective measures, where applicable. Similarly, smart farming techniques allow farmers to monitor the individual needs of their animals better and regulate their nutrition correspondingly, thereby averting disease and improving their health.

Smart farming provides farmers with limitless potential to deliver a more sustainable and productive output based on field-generated data. Also, it gives farmers an added value through better and timely decision-making.

Undoubtedly, technology is significantly altering the way we live and work. The adoption of various technologies in agriculture has brought several disruptions in the industry, with specific emphasis on agricultural jobs. Increasingly, agricultural technician jobs are now on demand to cater to the needs of the changing times.

CHAPTER 19: SAGY QUESTIONNAIRE SURVEY FORM WITH THE SARPANCH SIGNATURE



SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Utara Gram Panchayat: Utara Ward No.

Block: Bardoli District: Surat

State: Gujarat LS Constituency:

1. Family Identity and Size

Name of Head of Household	Jentibhai Nagnatambhai Halpati							Male/ Female	M
SECC Survey ID:		Family Size	10	Over 18	6	6 to 18	=	Under 6	4

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	NO
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]
Jentibhai N. Halpati	62	M	–	2	12	Y	Y	0
Naniben J. Halpati	52	F		2	1	Y	Y	0
Ajaybhai J. Halpati	35	M		2	3	Y	Y	0
Rupaben A. Halpati	32	F		2	5	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

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
Amanbhai A.	7	M	-	Y	Y	Y		
Aaviben A.	4	F	-	N	N			
Chiragbhai Jayeshbhai	7	M	-	Y	Y			

[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 Yes	Kitchen Garden : Yes / No Yes
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	
Community Water Tap	Yes / No	
Hand Pump (Public / Private)	Yes / No	
Open Well(Public / Private)	Yes / No	
Other (mention):		

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		2. Cultivable Area	
3. Irrigated Area		4. Uncultivable Area	

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)**

Name	Unit	Quantity

17. **Livestock Numbers**

Cows:_____	Bullocks:_____	Calves:_____
Female Buffalo:_____	Male Buffalo:_____	Buffalo Calves:_____
Goats/ Sheep: 4	Poultry/ Ducks:_____	Pigs:_____
Any other: Type _____		No._____
Shelter for Livestock: Pucca / Kutcha / None		
Average Daily Production of Milk(Litres): 1		

18. **What games do Children Play**

19. **Do children play musical instrument** (mention)
NO

Schedule Filled By:
Principal Respondent:
Date of Survey:

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

I. Basic Information

a. Gram Panchayat: Utara.

b. Block: Bardoli

c. District: Surat

d. State: Gujarat.

e. Lok Sabha Constituency: Bardoli

f. Number of Wards in the Gram Panchayat: _____

g. Number of Villages in the Gram Panchayat: Utara (2)

h. Names of Villages:

Demographic Information

Number of Households 360 Total Population 546 Male 268 Female 278

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	N	
b.	Nearest Primary Health Centre (PHC)	N	Vaaad
c.	Nearest Community Health Centre (CHC)	N	
d.	Nearest Post Office	N	Dhamdod
e.	Nearest Bank Branch (Any)	N	Bardoli
f.	Nearest Bank with CBS Facility		
g.	Nearest ATM	N	Bardoli
h.	Nearest Primary School	Y	
i.	Nearest Middle School	N	Bardoli
j.	Nearest Secondary School	N	Bardoli
k.	Nearest Higher Secondary School / +2 College	N	Bardoli
l.	Nearest Graduate College	N	Bardoli
m	Nearest ITI / Polytechnic Centre	N	TEN
n	Kisan Seva Kendra	N.	TEN

1

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	N	
p	Nearest Agro Service Centre	N	
p	MSP based Government Procurement Centre	N	
q	Milk Cooperative /Collection Centre	N	
r	Veterinary Care Centre	N	Bardoli
s	Ayurveda Centre	N	
t	E – Seva Kendra	N	
u	Bus Stop	N	
v	Railway Station	N	
w	Library	N	
x	Common Service Centre	N	

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 1 Public 1 Private X

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 1

b. Number of villages without Angan Wadi Centres 1

Names of such villages: _____

c. Schools (Number)

Primary Private: — Primary Govt.: 1

Middle Private: — Middle Govt.: —

Secondary Private: — Secondary Govt.: —

Higher Secondary Private: — Higher Secondary Govt: —

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)	—	—	Yes	—	—	Bardoli	
b.	Kerosene	—	—	No	—	—		
c.	Other (mention)	—	—	Sugar Cane Seed	—	—	—	—

2

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

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 Yes Not Covered –	Utara Utara	Null Null
b.	Hand Pump Coverage in Villages:	Covered Yes (4) Not Covered —		
c.	Coverage under Covered Drains:	Covered Yes Not Covered –		Utara (Ahirwad) office - Faliyu Vankar faliyu
d.	Coverage under Open Drains:	Covered – Not Covered –		
e.	Villages with Household Electricity Connection (Numbers)	Connected 300 Not Connected –		

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	1049	d.	Pasture / Grazing Land	–	g.	Check Dam	
b.	Irrigated Land		e.	Forests/ Plantations	–	h.	Wells/Bore Wells	
c.	Un-irrigated Land	313.35	f.	Other Common Land	203.66	i	Tanks /Ponds	

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

3

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)	0
b)	Number of Households receiving pension (old age, widow, disability)	0
c)	Number of eligible Households who are not receiving pension	0
d)	Number of Households eligible for Ration Card	0
e)	Number of eligible HHs having ration cards	360
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	0
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	0
h)	Number of active Job Card holders under MGNREGA	0
i)	Number of Job Card holders who completed 100 days of work during 2013-14	0
j)	Number of shops selling alcohol	0
k)	Number of BPL families	302
l)	Number of landless households	0
m)	Number of IAY beneficiaries	0
n)	Number of FRA[2] beneficiaries	0
o)	Number of Community Sanitary Complexes	00
p)	Number of Households headed by single women	10
q)	Number of Households headed by physically handicapped persons	0
r)	Total number of Persons with Disability in the village	0
s)	Number of SHGs	0
t)	Number of active SHGs	0
u)	Number of SHG Federations	0
v)	Number of Youth Clubs	0
w)	Number of Bharat Nirman Volunteers	0

Name and Signature of Surveyor and Respondent'

Surveyor	PRI Respondent (Preferably Gram Panchayat Chairperson)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey
		Rathod Rupi A.	22/02/2021

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

4

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]

I. Basic Information

a. Village: Utara
b. Ward Number: _____
c. Gram Panchayat: Utara
d. Block: Bardoli
e. District: Surat
f. State: Gujarat
g. Lok Sabha Constituency: Bardoli
h. Number of Habitations / Hamlets in the Gram Panchayat: 546
i. Names of Habitations / Hamlets:

Demographic Information

Number of Households 360 Total Population 546 Male 268 Female 278

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	N	3
c.	Nearest Secondary School	N	3
d.	Kisan Seva Kendra	N	3
e.	Milk Cooperative /Collection Centre	N	3
g.	Health Sub Centre	N	3
h.	Bank	N	3
i.	ATM	N	3
j.	Bus Stop	Y	
k.	Railway Station	N	3

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

1

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	Bardoli
m	Common Service Centre	N	Bardoli
n	Veterinary Care Centre	N	Bardoli

ii. Road Connectivity

a. Habitations connected by All-weather Roads *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations where not available: All

iii. Drinking Water Facilities

a.Piped Water Supply Coverage to Habitations: All *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: _____

b.Hand Pump Coverage in Habitations: Some *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: 2- Non-functioning

iv. Coverage of Habitations under Waste Management System

a. Coverage under Covered Drains: Some *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: _____

b. Coverage under Open Drains: None *(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: None

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: All

b.Coverage under Street Lighting: All *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: All

vi. Sports Facilities in the Village

a.Number of Play Grounds in the Village (minimum size 200 square meters): None

b.Mini Stadium : N Yes(Y) /No (N)

vii. Education, ICDS

a. Number of Anganwadi Centres: 1

c. Schools (Number)

Primary Private: — Primary Govt.: 1

Middle Private: — Middle Govt.: —

Secondary Private: — Secondary Govt.: —

Higher Secondary Private: — Higher Secondary Govt: —

2

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

viii. Land Category		Area in Acres		Land Category	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	1049	d.	Pasture / Grazing Land	-	g.	Check Dam	-
b.	Irrigated Land		e.	Forests/ Plnatations	—	h.	Wells/Bore Wells	—
c.	Un-irrigated Land	313.35	f.	Other Common Land	205.66	I	Tanks /Ponds	-

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	-
2	Number of active Job Card holders who have completed 100 days of work	—
3	Number of shops selling alcohol	—
4	Number of BPL families	302
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	—
10	Number of active SHGs	-
11	Existence of SHG Federation in the Village (Yes / No)	NO
12	Number of Youth Clubs	—
13	Number of Bharat Nirman Volunteers	—

Name and Signature of Surveyor and Respondent'

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
			22/02/2021

3

CHAPTER 20: TDO – DDO - COLLECTOR EMAIL SENDING SOFT COPY ATTACHMENT IN THE REPORT

9/9/21, 1:32 PM SNPIT & RC College Mail - Development scenario of Utara village,Bardoli,Surat.

SNPIT&RC

sandip mistry <sandip.mistry@snpitrc.ac.in>

Development scenario of Utara village,Bardoli,Surat.

1 message

sandip mistry <sandip.mistry@snpitrc.ac.in> Thu, Sep 9, 2021 at 1:32 PM
To: tdo-bardoli@gujarat.gov.in, ddo-sur@gujarat.gov.in
Cc: Vishwakarma Yojana <rurban@gtu.edu.in>

Respected Sir/Madam

I am professor Sandip K. Mistry from S.N. Patel Institute of technology & R.C. Our B.E. final year students of Shree Sitaram Naranjibhai Patel Institute of Technology and Resreach Center,Umrakh,Baradoli,Surat affiliated to Gujarat Technological University-GTU. GTU has been assigned to Vishwakarma Yojanaa-VY in which students survey various villages and Designs various amenities To Deliver it to them making them ideal for living 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 **Utara Village** profile of issues for development and our design work for them which is as below.

Village : Utara		**Population: 546(As of Census 2011)**
Key Issue	**Remark**	**Design Given**
Water Scarcity	Water storage capacity of ESR-UG is enough but supply at the household is not enough to commence daily needs, here water is supplied every other day for nearly half an hour. Canal is there for irrigation water. Water can't be bored due to salinity of ground water.	· Organic Waste Composting
Solid Waste Management	Open waste disposal can be seen everywhere in the village.	· Drainage System
Recreational Area	Currently only Village does not have any recreational place except for one temple near gamtal.	· Bus Stand · Cemetery · Cattle House · Public Health Center · Bank with ATM · Cheese Factory
Community Place	Grampanchayat faces difficulties in conducting gramsabha, village does not have any place for gatherings or for celebration.	· Party Plot · Public Health Center · Temple · Banquet Hall · Park

SR. No.	Design Name	Period (Months)	Amount Expenditure	Benefits
1	Drainage System	12-14	5,77,124	Drainage and sewerage system
2	Bus Stand	5-7	69,455	Transportation Facility
			7,62,933	

3	Party Plot	3-4		Refreshment purpose
4	Cemetery	4-6	7,68,253	function purpose
5	Public Health Center	3-4	8,45,146	Residents
6	CattleHouse	4-6	1,13,845	function purpose
7	Bank withATM	3-5	3,76,656	financial purpose
8	Temple	14-16	20,00,000	Recreational Area
9	Organic Waste Composting	12-14	6,13,97,170	Sanitation
10	BanquetHall	3-6	33,55,625	Entertainment purpose
11	CheeseFactory	3-4	2,07,946	Business purpose
12	Park	8-4	41,98,252	Entertainment purpose

Please find herewith attached,
1. Detailed Project Report Of UTARA Village.

--
Mr. Sandip K. Mistry
Assistant Professor,
Civil Engineering Department,
S.N.P.IT& R.C,Umrakh,
Bardoli.
9428380875

UTARA_SNPITRC_VY-8_PART-2.pdf
15658K

CHAPTER 21: COMPREHENSIVE REPORT FOR THE ENTIRE VILLAGE

A village represents a community where a group of different classes with different problems live in the same place having common interests who frequently interact socially, economically, and politically. The class-based and the problem-based approach have not identified the village community.

Sustainable rural development is vital to the economic, social, and environmental viability of nations. It is essential for poverty eradication since global poverty is overwhelmingly rural. The manifestation of poverty goes beyond the urban-rural divide, it has subregional and regional contexts.

A village is a place, or a destination where there are old houses which are made up of mud are there are hurts, but nowadays the communities have developed, and there is the sturdy house is made up of bricks. But how about modern would be the village, but there are a cattle present in the town where everyone owns some cows and various other animals for their daily needs, and sometimes they also use them for farming like cows are used for milk and where bulls are used in the farm for doing heavy work.

It is also saying that people living in the village help each other and understand everyone's problem and provide a solution to each other. The life of the people living in the village is very hard as they must work a lot for earning daily needs not also the money, they must farm their food and must do their household works and have to look after the cattle.

The concept of smartness is popular in respect and honor of human development regardless of a rural or urban area, literate or illiterate in all the countries and India is not omission to it. Like many developing countries, India too is a rural-dominated country.

The ideas of "Smart Village" will also attend to multiple challenges such as unplanned urbanization, under-development of villages, migration for economic pursuance, improved standard of living, etc. Smart Village enabling the provision of good education, healthcare, access to clean water, sanitation, and nutrition, the growth of productive enterprises to boost incomes and enhanced security, gender equality, and democratic engagement.

The need for reducing poverty and to develop the general standard of living in rural areas around the world is enormous. Ideas for new approaches have to be created, developed, and implemented in a big way.

Design thinking and methods combined with innovation in practice and management as a design-inspired innovation - could mostly be such a concept to particularly provide for rural people to empower themselves and kind of improve their living conditions in a very big way.

On the actual other hands, it is important to learn from the sustainable lifestyle practices being followed in rural villages and extrapolate them to the urban setting. Rural development is important not only for the majority of the population residing in rural areas but also for the overall economic expansion of the nation.

Rural development is considered to be of noticeable importance in the country today than in the olden days in the process of the evolution of the nation. It is a strategy that tries to obtain improved and productivity, higher socio-economic equality and ambition, and stability in social and economic development.

The primary task is to decrease the famine that exists in roughly about 70 percent of the rural population and to make sufficient and healthy food available. The secondary task is to ensure the availability of clothing and footwear, a clean environment and house, medical attention, recreational provision, education, transport, and communication

- To improve productivity and wages of rural people
- To guarantee increased and quick employment possibilities
- To demolish unemployment and bring a notable decline in underemployment
- To guarantee an increase in the standard of living of the underprivileged population
- To provide the basic needs: elementary education, healthcare, clean drinking water, rural roads, etc.

An understanding of how to prevent illness through good hygiene and sanitation practices. Local schools with sufficient learning equipment. Children who have benefited from education programs (project dependent). Increased their take-home income because of participation in our livelihoods programs Another important objective for us is that our volunteers complete their programs and develop a life-long passion for community development work.

Gandhi often expressed that most of India lives in villages and unless village life can be revitalized the nation as a whole can hardly come alive. About 70 percent of the Indian population resides in more than 627,000 villages.

The innovation and entrepreneurial imperatives – with close links to each other – are obvious and probably the most important ingredients in any society today – rich and poor – to find new opportunities and new solutions for a better life for all. Entrepreneurs exploit new ideas, solutions, innovations, and businesses in society or other ways to create value for themselves and their families. And no-where is the ‘entrepreneurial revolution’ so present than in Eastern Asia. Here the unemployment rate is already high and the young generation is growing rapidly, especially in India.

Rural development is the process of improving the quality of life and economic well-being of people living in rural areas. According to the 2011 Census, 68.84% of the population lives in villages. The backwardness of the rural sector would be a major impediment to the overall progress of the economy. India is predominately an agricultural country and farming is their main occupation. According to the 2011 Agricultural Census of India, an estimated 61.5% dependent on agriculture. Technical developments in the field of agriculture have increased the

gap between the rich and poor, as the better-off farmers adopted modern farm technology to a greater extent than the small farmers.

The All-India Rural Credit Review Committee in its report warned "If the fruits of development continue to be denied to the large sections of the rural community, while prosperity accrues to some, the tensions social and economic may not only upset the process of orderly and peaceful change in the rural economy but even frustrate the national afford to set up agricultural production.'' Report of the All-India Rural Credit Committee, New Delhi, 2003 has rightly pointed out that a purely agricultural country remains backward even in respect of agriculture.

Most of the labor force in India depends on agriculture, not because it is remunerative but because there are no alternative employment opportunities. This is a major cause of the backwardness of Indian agriculture. A part of the labor force now engaged in agriculture needs to be shifted to non-agricultural occupations. Until the 1970s, rural development was synonymous with agricultural development and hence focused on increasing agricultural production.

Today, Inclusive rural development is a more specific concept than the concept of rural development of earlier, in broader terms, inclusive rural development is about improving the quality of life of all rural people. More specifically, inclusive rural development covers three different but interrelated dimensions: Economic dimension, social dimension, and Political dimension. The economic dimension encompasses providing both capacity and opportunities for the poor and low-income households, in particular, to benefit from economic growth.

The social dimension supports the social development of poor and low-income households, promotes gender equality and women's empowerment, and provides social safety nets for vulnerable groups. The political dimension improves the opportunities for the poor and low-income people in rural areas to effectively and equally participate in the political processes at the village level.

The village plays an important role in maintaining the ecological balance as it is a place which is covered by greenery which overcomes the green cover which is less in the cities, and it is a shelter for various animals. Everyone loves their village as they enjoy living in that village and they also like the environment which is present in the town. The village is a very peaceful place where there is very little noise which makes a suitable environment for old people.

The overall goal of our Village Development work is that people in poor rural villages have access to their most basic needs, improved education and health, and a means of sustaining their livelihoods and increasing their standard of living. More specifically, they have access to clean, safe drinking water within or near their homes. Sufficient lighting in their homes. A safe and adequate shelter that withstands the elements.