DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII

AN APPROACH TOWARDS RURBANISATION

DAVAD Village

SABARKANTHA District

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
Khilan Mistry	Civil Engineering	180887106002
Shubh Patel	Electrical Engineering	180883109008
Akeel Mansuri	Civil Engineering	180883106003

Samarth College of Engineering And Technology

NODAL OFFICER:-

MR. BRIJESH PATEL

YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY

Chandkheda, Ahmedabad – 382424 Gujarat

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ON

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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 : DAVAD

DISTRICT: SABARKANTHA

Under

Vishwakarma Yojana: Phase-VIII

in partial fulfillment 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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Khilan Mistry	Civil Engineering	180887106002
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Date of Report Submission:	
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Internal(Evaluator) Guide Name and Signature:	**PROF. Brijesh Patel**
College Name:	**Samarth College of Engineering And Technology**
College Stamp:	

ABSTRACT

Vishwakarma Yojana is one in every of the approaches to cut back urban town Pressure and lower the migration by developing village with a “rural soul however” but with all urban amenities that a city may have. The most objective of this yojana is “Creation of infrastructure property, civic and social infrastructure beside provision of different Economy generation is that the key pillars that idea hinged on” Through the Vishwakarma Yojana, the Student of GTU are envolved in on groung work experience and are able to apply their technical knowledge to a real problem.

Vishwakarma Yojana would provide solution for development of villages in Rurban areas. The developmental work in villages that could undertaken as per the need of the village in particular includes Physical infrastructure facilities (Water, Drainage, Road, Electricity, Solid waste Management, Storm Water Network, Telecommunication & Other), Social infrastructure facilities (Education, Health, Community Hall, Library, Recreation Facilities & other) and renewable energy (Rain water harvesting, Biogas plant, Solar Street lights & Other) for Sustainable development.

We are allotted with the village name Davad which is located in Sabarkantha District, Gujarat. It is located 70 KM From State Capital Gandhinagar. It has a total population of 3559 with 1703 female population against 1856 males according census 2011 data.

In this village the condition of roads is Poor except few roads. All the village roads are made up of bitumen. There are also roads which are made of soil . There is no transportation facility in the village. In the village lack of basic facilities like public toilet, poor condition of panchayat building, public garden, etc. The facility of clinic is available in village.

For development of the village infrastructure facilities like roads , public garden etc. and public facilities like bus station are required. For sustainable development of the village rain water harvesting system, solar street light may be provided. For cleaning purpose Bio-Gas plantprovided.

Key Words: Good Facility Of Post Office , Public Toilet, Community Hall , Public Garden, Agriculture

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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Mr. Brijesh Patel from college Samarth College of Engineering And Technology
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We are also thankful to all the experts who provided us their valuable guidance during the work. We express our sincere thanks to, **Dr. Jayesh Deshkar, Hon'ble Director of Vishwakarma Yojana project and Principal, V.V.P Engineering College and Core Committee member of Vishwakarma Yojana project Prof(Dr.)Jigar Sevalia**, Professor, SCET, Surat, **Prof.K.L.Timani,** Associate Professor,VGEC, **Prof.Rena Shukla**, Associate Professor, LD Engineering College, **Prof.Y.B.Bhavsar,** Associate Professor,VGEC, **Prof.Jagruti Shah**, Assistant Professor, BVM Engineering College for providing us technical knowledge of this project work.

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ABBREVIATIONS

SHORT NAME	FULL NAME
PHC	Public health Centre
TDO	Taluka Developer Officer
DDO	District Developer Officer
PPP	Public Private Partnership
NGO	Non-government organization
PURA	Provision of Urban Amenities in Rural
DRDA	District Rural Development Agency
MGNREGA	Mahatma Gandhi National RuralEmployment Guarantee Act
PMGSY	PradhanMantri Gram Sadak Yojana
NRUM	National Rurban Mission
WBM	Water bound macadam
CDHO	Chief District Health Officer
MoRTH	Ministry of Road Transport and Highways
RTO	Road Transport Offices

Chapter:1

Ideal village visit from District of Gujarat State (Civil & Electrical Concept)

1.1 Background & Study Area Location

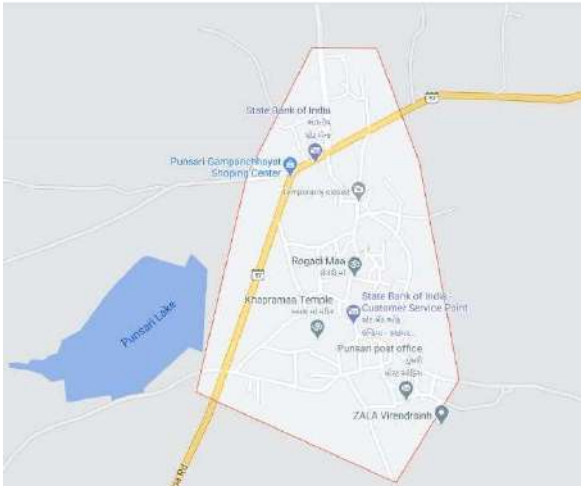
- Punsri is a Village in Talod Taluka in Sabar Kantha District of Gujarat State, India. It is located 32KM towards South from District head quarters Himmatnagar. 14 KM from . 58 KM from State capital Gandhinagar. Punsri Pin code is 383307 and postal head office is Vadagam . Modhuka (3 KM) , Nana Chekhla (4 KM) , Lalino Math (5 KM) , Amodara (5 KM) , Mota Chekhla (6 KM) are the nearby Villages to Punsri. Punsri is surrounded by Talod Taluka towardswest , Modasa Taluka towards East , Bayad Taluka towards South , Prantij Taluka towards west.Modasa , Prantij , Himatnagar , Dehgam are the near by Cities to Punsri..
- In past few years , there is 0% migration in the village. And around 10 families have been immigrated to punsari. The gram panchayat had spent around 12-13 crores for the development of the village and that to with using government schemes and from the NRI/NGO/CSR.
- The income of villages is approx Rs5.50 to Rs6 lakhs and its expenditure is approx is Rs12 lakhs. The gram panchayat introduce every year to motivate the villagers to pay advance tax by providing a gift/kit i.e. last year they have been given a dustbin. The kit also bears a particular number/identity to a particular family, so that the panchayat have a record as to which kit it is allocated to which family. Around 30-35 families resides in hut rest all are having their house with all modern amenities.
- It is also seen that those families who are engaged in a agricultural activities are having a good standard of living as compared to that those who are engaged in their own business.
- Many advanced technologies are used in this village. Efforts have been made for empowerment of women and increasing the security in the village. Many facilities provided by the panchayat include local mineral water supply, gutter project, health care centre, banking facility and tollfree complaint reception service
- The village has received several awards from the state as well as national government for its outstanding achievements and has become extremely popular across the country.
- A team of 22 full-time and 47 part-time employees along with the elected officials of the gram Panchayat under the leadership of village headperson run this local unit. The village has developed an effective mechanism to redress grievances through a toll-free number.

❖ **Study Area Location :**

- Punsari village is located in sabarkantha district, from Ahmedabad, it is 85 km.
- The Coordinates of punsari village is 23020‘59.46‘‘N and 7308‘12.48‘‘E.
- In t the punsari village there is Gram Panchayat Government.
- Its Total Population in 2011 is 5500 peoples.
- Punsari Village Pin Code is 383307.
- Official Website for punsari village is www.punsarigrampanchayat.in
- Its Time Zone is IST(UTC+5.30).

Punsari Village	
Coordinates: 23.34985°N, 73.1368 °E	
Country	**India**
State	**Gujarat**
District	**Sabarkantha**
Government Body	**Punsari Gram Panchayat**
Elevation	**106 m**
Population (Total):	
(2001)	**4,681**
(2011)	**5,500**
Languages	
Official	**Gujarati, Hindi**
Time zone	**UTC+5:30 (IST)**
PIN	**383307**
Telephone code	**02779**
Lok Sabha constituency	**Sabarkantha**
Vidhan Sabha constituency	-
Civic agency	**Punsari Gram Panchayat**
Website	**gujaratindia.com**

(T-1.1A – Punsari data)



(F-1.1A– Punsari map)

(F-1.1B – Punsari satellite map)

1.2 Concept: Ideal Village, Normal Village

- An ideal Indian village will be constructed in such a manner that it will be able to lend itself perfect sanitation. It shall have cottages with sufficient light and ventilation built of material that can be obtained within a radius of five miles of it. The cottages shall have courtyards enabling householders to plant vegetables for domestic use and to house their cattle. The village lanes and streets will be free of all kind of avoidable dust. It shall have wells as per the need and demand. It will have houses of worship for all, also a common meeting place, a village common for grazing its cattle, a co-operative dairy, primary and secondary schools in which industrial education will be the central fact, and it will have Panchayats for settling disputes. It will produce its own grains, vegetables and fruit. It shall also have a gram panchayat as the governing body which may help in solving necessary disputes. The water storage is such that it fulfills the requirements of the village.The lanes are well illuminated at night. It also has proper drainage facilities and ideal ways to dispose-off waste properly. The ideal village has transportation facilities that enable efficient connectivity with nearby towns and villages.

1.2.1 Objectives :

- To prevent migration from rural to urban areas, which is a common phenomenon in India's villages due to lack of opportunities and facilities that guarantee a decent standard of living.
- To make the model village a "hub" that could attract resources for the development of other villages in its vicinity.
- To provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such villages.
- To contribute towards social empowerment by engaging all sections of the community in the task of village development.
- To create and sustain a culture of cooperative living for inclusive and rapid development.
- To creating models of local development which can be replicated in other villages.

1.2.2 Example / Live Case studies of ideal village of India/Gujarat :

Ideal Village: Punsari

- "Swarajya (self-governance) to Surajya (good governance)" has been hailed as the mantra for rural development in the state of Gujarat. The good governance model of this prosperous state from western part of India has been a matter of study for quite some time now. A number of schemes have been launched in the past decade, such as Adarsh Gram, Smaras Gram, Tirth Gram, Sardar Awas, and Paawan Gram, to develop rural areas in Gujarat. The present adopts a constructive approach and aims to explore and understand the successful experiment of Punsari Village. The official document of the state government of Gujarat on smart and model village defines a model village as "a village which has foresight for the development and proper planning to keep the village clean, healthy, green, pollution free, crime free, and disease free with co-ordination of various community development and welfare schemes of Government. Smart villagemeans a village which wishes to increase facilities for the citizen by taking decisions democratically. Smart village means a village in which the youth, women, farmers, village artisans, backward, and deprived people may get equal opportunity for development." (Sengupta,

2014). These guidelines aim to offer a design of rural development that focuses not only on improving economic indicators of development but also on bettering the social indicators of development such as health, sanitation, education, women's empowerment, inclusiveness, etc. In this process, the Gram Panchayat has to play a pivotal role. The present programme was inspired by the success of a small village from the District of Sabarkantha in Gujarat called Punsari.

- Punsari is located approximately 80 kilometres away from the state capital of Gandhinagar in Gujarat. It has had phenomenal success in the past decade.The village has received several awardsfrom the state as well as national government for its outstanding achievements and has become extremely popular across the country. This was the most important reason that motivated the author to visit and study this model village personally, to understand and explore how this transformation was made possible. The village has 23 communities with a population of 6000, including only 350 people living below the poverty line. Most of the people in the village are dependent on agriculture and milk production for livelihood. The major crops cultivated in the village are cotton, wheat, and potato. The trajectory of development can be broadly divided into five headings. Infrastructure Development. The most important concern in rural development is to provide basic amenities to each person living in the rural area. Punsari stands out in this regard as it has constructed a reverse osmosis plant and since then provided house-to-house piped connections to supply chlorinated water. It also has its own 66 KVA substation for electricity generation and 100 per cent coverage of all streets with LED streetlights. A public address system with 120 waterproof speakers for announcing information and spreading messages has been another striking feature of this village. The village headperson uses this public announcement system to share what s/he thinks, plans, and is doing at the gram Panchayat. The entire village has been put under CC TV surveillance, which has helped to bring down crime rate to almost zero per cent. Each household has a personalised lavatory and the whole village has a well-designed drainage and storm water disposal system. Atal Express is a free bus service available for commutation to all the villagers. Education. Education for all and free for all is the mantra this village has aspired to adopt. Punsari has five primary schools and four secondary schools. The class rooms in these schools are fully equipped with CCTV cameras, LED screens used for teaching, mineral water plants, separate toilets for girls and boys. MidMeals programme of the central government has been successfully implemented. Availability of these basic amenities within the premises of schools has also helped to reduce the dropout rate to zero. Health, Sanitation & Women Empowerment. Punsari has a 24/7 primary health centre equipped with a pharmacy and a library. It also has a 24/7 maternity ward to encourage institutional deliveries in the village. In fact, the village has been successful in achieving the goal of 100% institutional deliveries. It has also been able to materialise the objective of 100% immunisation and zero per cent infant and maternal mortality rate. The waste collection system offers door-to-door collectionservice. The street polluters are heavily fined. There are 109 women self-help groups in the village, which has helped and changed the lives of more than 1200 women involved in them. They provide vocational training in order to make women self-reliant. Democratic Governance. A team of 22 full-time and 47 part-time employees along with the elected officials of the gram Panchayat under the leadership of village headperson run this local unit. The village has developed an effective mechanism to redress grievances through a toll-free number. A complaint register is maintained in order to ensure timely grievance redress. A co-ordination committee involving elected representatives and government officials works tirelessly to achieve the goals of good governance.

- The has attempted to explore the development journey of a smart and model village called Punsari. The author argues that grass-roots leadership, community participation, decentralization of powers to local bodies in rural areas, and financial support in the form of various government schemes can bring far-reaching changes in the rural landscape of India. Punsari represents aclassic example as well as an exemplar of concerted efforts of elected leaders, community people, and government support to bring transformation and make villages smart and sustainable. The has highlighted the role played by a local leader whose vision and mission can achieve the impossible. However there still exists a gap between a model village and an ideal village. The gap can only be filled with the persistent efforts for rural revitalization not only by the government butalso with effective involvement of the local leaders and village folks. Economic progress has to coincide with social progress which is inclusive, sustainable, and sensitive not only to its environment but to its people as well.

1.2.3 The Idea of a model/Smart Village :

- The idea of Internet of Things (IoT) is the future prospect of technology. The rationale behind its working is the amalgamation of web, mobile and Information and Communications technology. It enables various devices in a system to communicate and interact with each other to perform their job in a harmonious way. The rising population of the world makes it necessary to facilitate the cities and villages to function in a smart way. Hence, the idea of Smart cities came into being. These cities use the data from sensors, other remote devices and analyze the data to take appropriate actions. It extends the idea of Smart cities to Smart villages. It focuses on the key areas of interest in the village perspective and evaluates the applications of IoT in those areas. It provides a comprehensive view with respect to improvement in the quality of life in villages.
- Government Of India has been Targeted it Goal Towards the development of village in the sense to reduce migration, better living standard, Eco-friendly Environment . Some of the states in India have started pilot projects for the rurbanisation of village in the sense to provide urban amenities in the rural soul. Right now Government of Gujarat have undertaken a pilot project which came to be known as vishwakarma yojna for the rurbanisation of village or to create a model/ideal village.
- In India, 68.9% of our population lives in rural areas (Census 2011). Though number is expected to fall in the coming years, it is still estimated that more than half of our population would be rural even in 2050. So day by day people will move to the urban area in the search of better occupational options, high living standard, better transportation facilities, Good educational Facilities, Employment opportunities.
- A few years ago, the idea of Internet of Things and Smart cities used to be considered as a future possibility. But it has become a reality today, thanks to the technological advancements. Many countries have deployed the job of turning their cities into Smart cities to many organizations. The optimal use of available resources is the need of the hour. Ever-increasing population has restrained the resources and their usage. IoT combines the benefits of multiple technologies to realize the idea of intelligent devices in a city. This idea can be extended to the villages as well, improving the quality of life of the residents. As the villages have slightly different requirements than the cities, It focuses on those differences and aims to provide solutions for the same.

1.2.4 Ancient History Civil concept about Indian Village / other Countries Perspective about village and its new Development :

- A village is a clustered human settlement or community, larger than a hamlet but smaller thana town (although the word is often used to describe both hamlets and smaller towns), with a population typically ranging from a few hundred to a few thousand. Though villages are often located in rural areas, the term urban village is also applied to certain urban neighborhoods. Villages are normally permanent, with fixed dwellings; however, transient villages can occur. Further, the dwellings of a village are fairly close to one another, not scattered broadly over the landscape, as a dispersed settlement. In the past, villages were a usual form of community for societies that practice subsistence agriculture, and also for some non-agricultural societies. In Great Britain, a hamlet earned the right to be called a village when it built a church. In many cultures, towns and cities were few, with only a small proportion of the population living in them. The Industrial Revolution attracted people in larger numbers to work in mills and factories; the concentration of people caused many villages to grow into towns and cities. This also enabled specialization of labor and crafts, and development of many trades. The trend of urbanization continues, though not always in connection with industrialization. Historically homes were situated together for sociability and defense and land surrounding the living quarters was farmed.
- The history of Indian villages, in fact, goes back to the Vedic era when the kingdoms comprised a major city and several villages. The villages were a cluster of houses and the surrounding land was cultivated by the villagers. The concept of villages in India flourished during the late Vedic era or during the reign of the Mauryas. The Maurya Dynasty was founded by Chandragupta Maurya during 323 BC and the villages were a predominant part of the Indian social system at that time. The villages were administered in a structured way, through a Gram Sabha during the Maurya Dynasty. The religious and cultural scenario of the villages was primarily dominated by the Hindus, especially the Brahmans. The caste system of Hinduism was strictly maintained during that period.

❖ **India:**

- "The soul of India lives in its villages," declared M. K. Gandhi at the beginning of 20th century. According to the 2011 census of India, 68.84% of Indians (around 833.1 million people) live in 640,867 different villages. The size of these villages varies considerably. 236,004 Indian villages have a population of fewer than 500, while 3,976 villages have a population of 10,000+. Most of the villages have their own temple, mosque, or church, depending on the local religious following.
- India is a vast country with a majority of its total population living in the villages. The Indian society is predominantly divided into two divisions like the rural society and the urban society. Villages have always been an integral part of society in India. No specific timeframe can be mentioned about the conception of villages in India. However, the concept of village was not present there in the ancient period. The Indus Valley civilisation is so far known to be the ancient civilisation in India and it mainly comprised two cities of Harappa and Mohenjodaro.
- The administrator of ten villages was called dashi; of 20 villages, vinshati; of 100 villages, shati, and of over 1,000 villages, sahasra gramadhipati. This is a clear indication of the interlink-ages between the villages. Kautilya's Arthashastra suggests that river, hill, forests, ditches, tanks, bunds or trees demarcated village boundaries.

❖ **Rural Development**:

- 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. Rural development has traditionally centered on the exploitation of land-intensive natural resources such as agriculture and forestry.
- However, changes in global production networks and increased urbanization have changed the character of rural areas. Increasingly tourism, niche manufacturers, and recreation have replaced resource extraction and agriculture as dominant economic drivers. The need for rural communities to approach development from a wider perspective has created more focus on a broad range of development goals rather than merely creating incentive for agricultural or resource based businesses.
- Education, entrepreneurship, physical infrastructure, and social infrastructure all play an important role in developing rural regions. Rural development is also characterized by its emphasis on locally produced economic development strategies. In contrast to urban regions, which have many similarities, rural areas are highly distinctive from one another. For this reason there are a large variety of rural development approaches used globally. Rural development is a comprehensive term.
- It essentially focuses on action for the development of areas outside the mainstream urban economic system. We should think of what type of rural development is needed because modernization of village leads to urbanization and village environment disappears.
- Rural Development is a process of changes carried out deliberately for the uplift of the Rural People. It is generally refers to the process of improving the quality of life and economic well-being of people living in relatively isolated and sparsely populated areas. Changes in global production networks and increased urbanization have changed the character of rural areas.
- Increasingly tourism, niche manufacturers, and recreation have replaced resource extraction and agriculture as dominant economic drivers. Agriculture, with its allied sectors, is unquestionably the largest livelihood provider in India, more so in the vast rural areas. Indian agriculture and allied activities have witnessed a green revolution, a white revolution, a yellow revolution and a blue revolution.
- The sector accounts for 18 per cent of India's gross domestic product (GDP) and employs just a little less than 50 per cent of the country's workforce. This sector has made considerable progress in the last few decades with its large resources of land, water and sunshine. Sustainable agriculture, in terms of food security, rural employment, and environmentally sustainable technologies such as soil conservation, sustainable natural resource management and biodiversity protection, are essential for holistic rural development.
- This mainly focuses on the need for rural communities to approach development from a wider perspective which has created more focus on a broad range of agricultural developmental goals. Education, entrepreneurship, physical infrastructure, and social infrastructure all play an important role in developing agricultural regions. Rural development is also characterized by its emphasis on locally produced economic development strategies. What is needed in this hour is not to go on introducing new and ongoing schemas for rural agricultural development and creating awareness.
- It will provide minimum facilities into rural mess in term of drinking water, education, transport, electricity and communication.
- It will increasingly tourism, niche manufacturers, and recreation, have replaced resource extraction and agriculture as dominant economic drivers.

1.3 Detail study (Socio economic, physical, demographic and infrastructuredetails) of Ideal village PUNSARI with photograph :

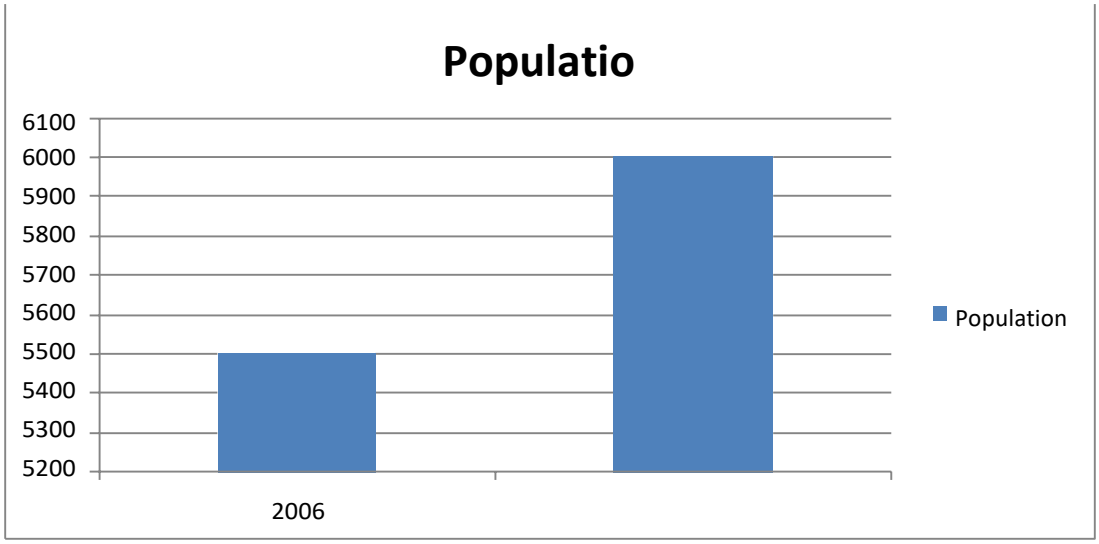
❖ **Physical, Socio economic and Demographical Details:**

- **Demographic Growth :**

➢ The population of punsari in 2006 was about 55oo peoples and in 2011 which is increased to 606000 peoples , so from the available data it can be seen that there is o% migration from village . but , there is 10% immigration in village from other urban areas.

- **Physical growth :**

➢ It can be see that from 2006 to the 2011 there is lot of change in physical amenities in punsari, Availability of roads, water supply, drainage, street lights, waste collection system .The Demographical growth of punsari village is shown by following chart:



F-1.3-A –Population Growth

- **Economic Profile:**

Name Of Major Occupational groups in Punsari Village	90 % People do Agricultural Activities
	10 % people got engaged in small business

T-1.3-A –Occupation

➢ In this village there are three major occupational are available.
1. Agriculture
2. Business
3. Animal bleeding

➢ Most of people income source is farming. More than 90% people are involved in agriculture and dairy farming & 10% people are going to Himmatnagar for work .

- **Social Scenario :**

- The village contains five primary schools, Higher Secondary school, Eight Aanganwadis ,So that there is 100% admission in the village.Till now there is 0% Drop out student from the school.
- Till now not a single case were registered for crime, till now crime rate is 0%.
- Women in the village are self employed by running self help groups.
- As a part of development there is women skill development centre where women with good skill guides other women.
- There are 47 peoples including 22 members, and remaining workers(sweeper,cleaners) were got employed indirectly.
- There is a community hall in which peoples of punsari are invited to give their opinion freely at the end of every month.

- **Infrastructures facilities:**

Infrastructure facilities can be defined as the building material facilities which are availableto fulfill the basic and primary facilities like education, government purpose, sanitation or irrigation purpose, business purpose like a factories or shop etc. it also includes various infrastructure likes overhead or underground tanks.

- police station, post office, telephone exchange and primary health centre.
- Atal express minibus for villages with free of charge commute for students.
- Internet Wi-Fi covering the whole village; future development of the village proposed through GIS mapping.
- A public address system with 120 waterproof speakers for announcing communal informations, bhajans, slokas and Mahatma Gandhi‘s messages.
- Every street nook of the village under CCTV surveillance, which has helped drop the crime rate to 0%.
- Every family has a solid constructed home with personal lavatory.
- Whole village covered with underground drainage system for disposal of waste and storm water.
- Pay and use public toilet near the bus station.
- A well managed crematorium for last rites; mortal remains of the deceased kept in pots/urns and dispersed collectively at haridwar or suitable religious sites.
- Development of village level step-well recharge mechanism at historical well of Dera falia.
- Solar street lights are available in some places in the village but are not in working condition and in obsolete use. So street lights can be made repaired for good use of renewable energy.
- Rain water harvesting at Dera falia is suggested as people of Dera falia does not get required amount of water during summer ending periods.
- Well-developed and planned water supply system and Development of appropriate health facilities is suggested.
- As not only basic amenities are satisfactory in this fast growing world for achieving high standard life of people, provision of advance facilities like appropriate wireless communication network, Internet and WiFi facility .
- Panchayat has encouraged rural women to adopt dairy as an entrepreneurial activity. Atal Express is the local transport facility. It is maintained by charging 3/trip for using Atal express. The revenue generated is used for fuel expense, salary of the driver and maintenance of the bus.

F-1.3-B-library

F- 1.3-C- Bank

F- 1.3-D- Primary School

F-1.3-E-Aanganwadi

F-1.3-F-Overhead Tank

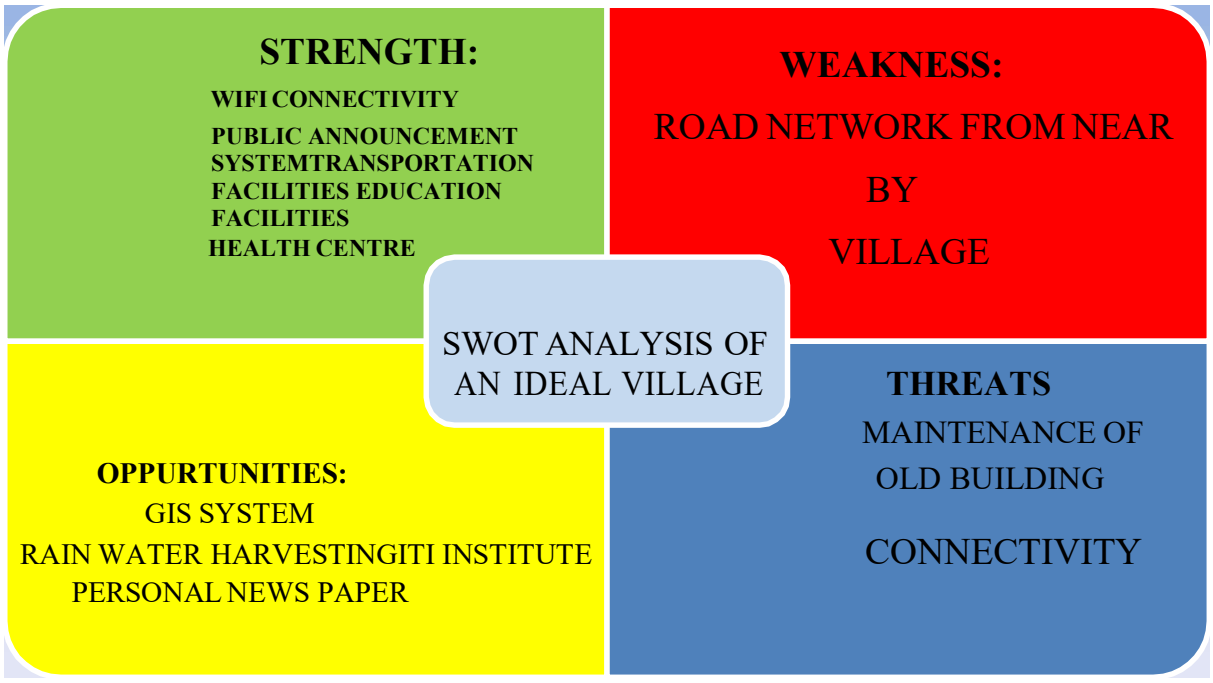
F-1.3-G-Public Toilet

F-1.3-H- Other Facilities

1.4 SWOT analysis of Ideal village / Smart Village

- SWOT analysis (or SWOT matrix) is a strategic planning technique used to help a person or organization identify strengths, weaknesses, opportunities, and threats related to business competition or project planning. This technique, which operates by 'peeling back layers of thecompany' is designed for use in the preliminary stages of decision-making processes and can beused as a tool for evaluation of the strategic position of organizations of many kinds (for-profitenterprises, local and national governments, NGOs, etc.). It is intended to specify the objectives ofthe business venture or project and identify the internal and external factors that are favorable andunfavorable to achieving those objectives. Users of a SWOT analysis often ask and answerquestions to generate meaningful information for each category to make the tool useful andidentify their competitive advantage. SWOT has been described as the tried-and-true tool ofstrategic analysis, but has also been criticized for its limitation.
- SWOT (strengths, weaknesses, opportunities, and threats) analysis is a framework used to evaluate a company's competitive position and to develop strategic planning. SWOT analysis assesses internal and external factors, as well as current and future potential.
- A SWOT analysis is designed to facilitate a realistic, fact-based, data-driven look at the strengths and weaknesses of an organization, initiatives, or within its industry. The organization needs to keep the analysis accurate by avoiding pre-conceived beliefs or gray areas and instead focusing on real-life contexts. Companies should use it as a guide and not necessarily as a prescription.
- The primary objective of a SWOT analysis is to help organizations develop a full awareness of all the factors involved in making a business decision. This method was created in the 1960s by Albert Humphrey of the Stanford Research Institute, during a study conducted to identify why corporate planning consistently failed. Since its creation, SWOT has become one of the most useful tools for business owners to start and grow their companies.

F- 1.4-A- SWOT Analysis



1.5 Future prospects of Development of the Ideal village / Smart Village

- Punsari Gram Sarpanch is Planning to develop GIS in a whole village in order to know correct position of people.
- Also planning to construct an I.T.I institute.
- Planning to develop Rain Water Harvesting Plant.
- Planning for Garden/Amusement Park.
- Punsari Gram Sarpanch planning to publish one newspaper ―Kalam Sandesh in which Only positive information are shared only for village to accomplished and fulfilled the dreams of Dr. A.P.J Abdul Kalam sir.
- There is a proposal for establishment of a driving school for women in near future.
- Many More…

1.6 Benefits of the visits of Ideal village :

- We have seen the ideal village with our own eyes is one of our benefit.
- We got a meeting with the sarpanch of punsari village.
- We discuss about many types of resources to be developed in the village, for increasing strength of village.
- We got an idea of how they identify beneficiaries for different programmes and schemes. However, if the Gram Sabha fails to identify such beneficiaries within a reasonable time, the Gram Panchayat shall identify the beneficiaries.
- We learned how Sarpanch take all measures to ensure participation of people from all sections of society mainly, Scheduled Caste, Scheduled Tribes, Women, and he encourage them to express their grievances and give suggestions in the Gram Sabha, which are discussed in detail in the next meeting.
- Sarpanch have shared his view with us on village development, Rurbanization with positive response.
- We got an idea of developing a village.
- We got a road map of creating an Ideal village.
- Members of punsari have shared enough information to us regarding development.
- How sarpanch deals with the up and down in village.
- By this visit of punsari, it improved our communication skill and we knew how to interact with the different people. Comparison between ideal village and normal village through the visit of ideal village.

1.7 Electrical / Civil aspects required in Ideal village / Smart Village :

- We have observed the balance of commercial, residential and recreational land use in the village but as per the feedback which were given by villagers some facilities are lacking in the village from civil aspects and these are, Gas Pipelines, Biogas Plant, Cold Storage Area, Rain Water Harvesting, Solar Street Lights, Public WiFi Connection, Fire Station , etc.
- Moreover, by providing skill development centers for the youth, panchayat should also focus on enabling the youth to setup the self-employment units. Water harvesting, Ground water recharge and improvement of village tanks/lakes are also projects to be pursue.

Chapter:2

Davad Village Literature review

2.1 Introduction: Urban & Rural Village Concept

❖ **Urban Area/Village:**

- Urban means built up and populated area that include a municipality and generally, has a population of 5000 or more.
- For the Census of India 2011, the definition of urban area is as follows:
- All places with a municipality, corporation, cantonment board or notified town area committee, etc.
- All other places which satisfied the following criteria:
- A minimum population of 5,000.
- At least 75% of the male main working population engaged in non-agricultural pursuits.
- A density of population of at least 400 persons per sq. km.
- An urban areas characterizes by higher population density and vast human feature in comparison to areas surrounding it, towns or conurbation , but the term is not commonlyextended to rural settlements such villages and hamlets

F- 2.1-A- Urban Village

❖ **Urbanization**

- Urbanization is the physical growth of urban areas as a result of rural migration and even suburban concentration into cities, particularly the very largest ones.
- Private cities are now expanding due to the support of private companies. Private developers are building private housing projects that will exponentially grow in the years to come.
- The Delhi-Mumbai Corridor is an infrastructure program set to develop 'Smart Cities' and combine next-generation technology with infrastructural development.
- The transport and logistics sector of India underlines the importance of interconnecting the different modes of transportation: road, rail, sea and air. An efficient multi-modal system is relevant in the development and successful growth of the infrastructural systems.
- Special Economic Zones dot the landscape of India. Each of these zones is focused on a particular sector such as IT, apparel and fashion, or petroleum and petrochemical industries.
- Industrial townships are built to house employees close to the factories and manufacturing plants at which they work. After the success of the pioneering industrial township – Tata's Steel Town – the government is planning on developing more like it.
- India's expected economic growth opens up expansion prospects for Indian airports. Domestic and international passengers inevitably predicted to double in number in the years to come.

- Urbanization is taking place at a faster rate in India. Population residing in urban areas in India, according to 1901 census, was 11.4%.
- According to a survey by UN State of the World Population report in 2007, by 2030, 40.76% of country's population is expected to reside in urban areas. As per World Bank, India, along with China, Indonesia, Nigeria and the United States, will lead the world's urban population surge by 2050.

❖ Rurbanaisation

- Rurbanisation is a well thought initiative. It is quest given by chief minister narendrabhai modi that "Aatma Gaav Ki, Suvidha Sheher Ki." It means that all the facilities which available in urban area or city/town area are provided to rural area somigration from villages to town can be reduce and culture of Indian villages can be save. By rurbanaisation peoples get all the facilities like education, health, and employment opportunities etc. which are available in urban area in their villages.
- Talking about the Rurbanisation initiative, Shri Modi pointed, "Rurbanisation is a well thought initiative. Our quest is Aatma Gaav Ki, Suvidha Sheher Ki. To preserve the spirit of the village is essential but why can't we invigorate them with the facilities associated with the cities?" He stressed on the need of providing basic facilities to the villages and added that the Government is working on long-distance education.
- He pointed out that due to Jyotigram Yojana migration to cities reduced by 33% and now the state Government is concentrating on providing broadband to the villages. He recalled that there was a time when for diamond cutting and polishing one had to leave home but that too has become history due to Jyotigram Yojana.

❖ Rural Area/Village:

- A village or area is a clustered human settlement or community , larger than a hamlet but smaller than a town , with a population ranging from a few hundred to few thousand
- In rural areas ,agriculture is the chief source of livelihood along with fishing , cottage industries etc.

F- 2.1-B- Rural Village

- **According to the Planning Commission**

- A town with a maximum population of 15,000 is considered rural in nature. In these areasthe Panchayat takes all the decisions. There are five people in the Panchayat.

- **According to the National Sample Survey Organization (NSSO)**

- Rural is An area with a population density of up to 400 per square kilometer, Villages with clear surveyed boundaries but no municipal board, A minimum of 75% of male working population involved in agriculture and allied activities.

2.2 Importance of the Rural development

- Rural development is important not only for the majority of the population residing in a rural area but the growth of rural activities is necessary to stimulate the speed of overall economic expansion of the nation
- Rural development is pretended to be noticeable importance in the country today than in the olden days in the process of the evolution of the nation. It is a strategy trying to obtain improved rural creation and productivity, higher socio-economic equality, and ambition, stability in social and economic development.
- The primitive task is to decrease the famine roughly about 70 percent of the rural population, implement sufficient and healthy food. Later, serve fair equipment of clothing and footwear, a clean environment and house, medical attention, recreational provision, education, transport, and communication.
- In India, majority of the population, resides in rural communities. The development of all aspects within rural communities is vital for the effective development of the country. These
- include, education, employment opportunities, infrastructure, housing, civic amenities and the environmental conditions. Furthermore, rural individuals need to be aware of all modern and innovative methods and techniques that are vital to augment productivity. Within the country, the rural communities are still in an underdeveloped state. The individuals are residing in the conditions of poverty, they are illiterate and unemployed. Due to these factors, they are unable to sustain their living conditions in an appropriate manner. It is essential to formulate programs, schemes and measures that have the main objective of bringing about improvements in rural communities.
- To improve productivity and the wages of rural people.
- To guarantee increased and quick employment possibilities.
- To demolish unemployment and a notable decline in underemployment.
- To guarantee to increase the standard of living of the underprivileged population.
- To provide the basic needs – e.g. elementary education, health care, clean drinking water, and, rural roads, etc.

2.3 Ancient Villages / Different Definition of Rural Urban Villages:

❖ Ancient Villages :

- There is sufficient evidence to suggest that the village was one of the important settlements in ancient India. The Rig Veda talks about the gram to which various families owed their allegiance. Valmiki's Ramayana talks of two types of villages – the ghosh and the gram. The ghosh was smaller than the gram and was also known as vraja, or brij (signifying a cattle farm). Both types of villages had their officials, called the mahattar. There is also a reference to a senior official called gramani or gramik.
- The Mahabharata talks of different types of settlements, for example, ghosh or brij (cattle farm), palli (small hutments), gram (villages around the forts or durgs), kharvata or pattan (towns), and pur, puri, nagar (cities of different types). The villages were linked with one another, culturally, socially and administratively.
- The administrator of ten villages was called dashi; of 20 villages, vinshati; of 100 villages, shati, and of over 1,000 villages, sahasra gramadhipati. This is a clear indication of the interlink-ages between the villages. Kautilya's Arthashastra suggests that river, hill, forests, ditches, tanks,

bunds or trees demarcated village boundaries. He prescribed that villages should be situated at distances of one or two krosha (in

- Rajasthan, it is spelt as koss, which is the equivalent of two miles or 3.219 km) from each other so that in times of need, one village could go to the help of the other
- Rural area have low population density and large amount of undeveloped land. Agriculture activates are more in rural area.
- A rural area is an open swath of land that has few home or other building and not many people
- Village: as per census 2011 the population of village is between 2000 to 20000 and basic.
- Facilities like primary school, PHC is available and living standard of people is low as compare to urban area.
- Village is a settlement having low population density and more area
- In ancient time villages were a usual form of community for societies that practice subsistence agriculture, and also for some non-agricultural societies. A village is a clustered human settlement or community, larger than a hamlet but smaller than a town, with a population ranging from a few hundred to a few thousand. Although many patterns of village life have existed, the typical village is often small, consisting of perhaps 5 to 30 families. rural area settlements are based more on natural resources.

❖ **Characteristics of a village**

- Village have population between 500 and 10000.
- The villagers managed their own affairs through the traditional institution of Panchayat. The central government had neither inclination nor the means for interfering with the self-government of villages.
- Village has the atmosphere of simplicity, calmness and peace. There is no noise and little sophistication.
- Generally the women in villages are less educated and their social status is lower than that of their counterparts in the towns.
- Factors like prevalence of child marriage, joint family system, traditional ideals, old values and lack of education among females are responsible for the low status of women.
- The poverty and illiteracy of the village people.

❖ **Characteristics of rural area are**

- Lower literacy rate.
- Lack of educational facilities.
- Lack of good health infrastructure.
- Less population density.
- Agriculture as prime employment (more than 75% male).
- Lower standard of living and less amenities.
- Migration in search of opportunities.

2.4 Scenario: Rural / Urban village of India Population Growth :

- The urban population of India has seen a rise from 17.1 per cent to 29.2 per cent between 1950 and 2015. Meanwhile, the rural population declined from 82.9 per cent (in 1915) to 2015's 67.2 per cent. The speculation for the year 2050 suggests that the urban-rural segregation will be 52.8 and 47.2 with a difference of 5.6 per cent. The population growth rates in both urban and rural

areas suggest a similar story. The urban rate has consistently overpowered the total population growth rate over the last seventy years. This trend is set to continue for the next 30 years. There was a clear increase in the population growth rate from 1950 to 1975. But, the growth rate took a hit as a result of the forced sterilization program under the Indira Gandhi government. Though the effect was not as evident in rural parts, the overall rate of population growth declined in those years. It came down to 1.23 from the all-time high figure of 2.31 during 1975-80. The urban population saw a steep decline following the implementation of the sterilization program with the growth rate decreasing to 3.35 from 3.84 in the year 1975. The report suggests that the rural population growth rate will turn negative in the next fifteen years. Thus, in 2050, it is expected to be 1.06, in contrast to the urban growth rate of 1.54.The report suggests that the rate of urbanization, which has been increasing since 1950, is expected rise further till 2035. It is supposed to start decreasing slightly in the next few years.

- Within a decade of globalization, the rate of urbanization increased by one-third of its previous growth. This has resulted in stress on the country's urban conglomerations; Delhi, Chennai, Kolkata, and Mumbai being four among them. The swelling of the population in the cities has been a result of labor migrations that have taken place in the past decade because of industrial growth. This created millions of employment opportunities for the rural poor. The national capital, Delhi, especially has seen an explosion of population. It saw a 26-time increase since 1950 when the population was just a million people. The current population of the national capital is 28 million, which equals to half of the population of all the ten ASEAN country capitals combined. Kolkata has seen a three-time increase in the urban population while Mumbai's population has increased by over six-fold since 1950. Bengaluru, the new entrant on the list, in 2015 crossed the 10 million-mark, ten times the number of people in 1950s. All these cities will see a further rise in the population in the next fifteen years. The number of urban agglomerations consisting more than a million people is also expected to be doubled by 2035.
- Census 2021 preparations are underway for more than a year now. One of the first tasks the Office of the Registrar General and Census Commissioner, India was to identify the country’s urban and rural areas. For this, officials created a base map by applying the census criteria.Officials involved in this process say it is surprising how quickly urbanisation is spreading, and that rural India will be history sooner than we think. Many of the urban areas identified in Census 2011 have expanded while thousands of villages have turned into towns, as per the census definition, the officials say. This exercise usually captures the changing demography, geography and economy of the country. As we wait for another three years before the preliminary results of Census 2021 emerge, what’s certain is that India is changing from rural to urban. What are the implications of this change? It’s perilous, because with India’s transition from a predominantly rural economy to an urban one, people’s occupations and preferences will also change.The immediate concern is whether India’s farming population will remain the same or will it migrate to non-farm occupations. The other big questions are who would be left in the farming sector and whether agriculture would survive by being lucrative enough to provide for the survival of its practitioners? Much would depend on the resolution of the Catch-22 rural-urban situation. Going by the census definition, a habitation is declared urban (excluding a municipality, corporation, cantonment board and a notified town area committee) if it has a minimum population of 5,000; at least 75 per cent of the male working population is engaged in non-agricultural pursuits; and the population density is at least 400 people per sq km. Such habitations are also called the Census Towns.

- For the first time in history, the Census 2011 reported a decline in the population growth rate of rural India. However, at that time India was still predominantly rural, with the urban population being just 30 per cent. Between Census 2001 and Census 2011, the number of Census Towns increased from 1,362 to 3,894. This indicates that people in rural areas are quitting farming or joining non-farm livelihoods. Millions of farmers have quit agriculture and, worryingly, very few from the current generation are entering the sector. In absolute terms, India is losing farmers. In fact, there are indicators that many rural residents are not taking up farming despite being unemployed and having small lands. This shows that India on the cusp of a major change. In 1970, three-fourths of a rural household's income came from farm sources. After 45 years, in 2015, it is below one-third. Basically, most of the households now earn more out of non-farm sources. Another concern is that these non-farm jobs are mostly in urban areas. In recent years, these urban employment sources have not been able to meet the surging job demands due to the exodus from agriculture. As the latest economic data points out, manufacturing, construction and other related sectors have not been able to generate employment as they used to earlier. All these sectors are experiencing slowdown. This leaves us with that big conundrum: We urbanise and celebrate it as a sure shot path to prosperity, but urbanisation doesn't provide basic livelihood to people who have migrated from rural areas. This explains the current slump in demand that is keeping the overall economy down.

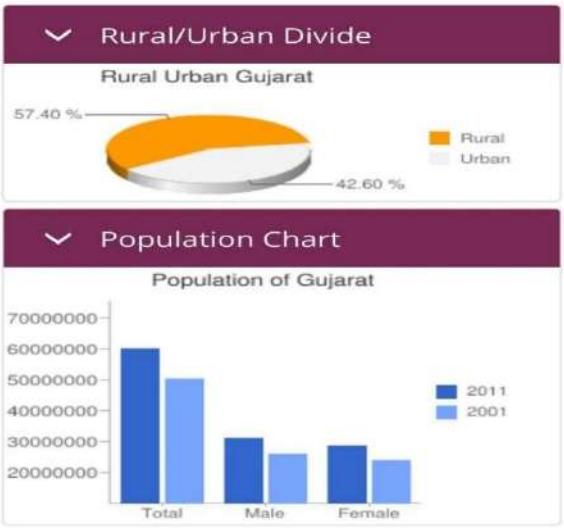
Scenario of India as per Census 2001 to 2011

- Number of Rural villages in India: As per cencus 2001: 6,38,588
- As per cencus 2011: 6,40,867
- Population by Rural/Urban residence in India 2011:

Census 2011: Figures at a Glance

POPULATION	Persons	1,21,01,93,422		POPULATION IN THE AGE GROUP 0-6		Absolute	%age to total population
	Males	62,37,24,248			Persons	15,87,89,287	13.12
	Females	58,64,69,174			Males	8,29,52,135	13.3
DECADAL POPULATION GROWTH 2001-2011		Absolute	%age		Females	7,58,37,152	12.93
	Persons	18,14,55,986	17.64	LITERATE		Absolute	Literacy rate
	Males	9,15,01,158	17.19		Persons	77,84,54,120	74.04
	Females	8,99,54,828	18.12		Males	44,42,03,762	82.14
DENSITY OF POPULATION (per sq. km.)		382					
SEX RATIO (females per 1000 males)		940			Females	33,42,50,358	65.46

F- 2.4-A- Scenario of Rural and Urban in Gujarat



F- 2.4-B- Population Growth

- The report suggests that the rural population growth rate will turn negative in the next fifteen years. Thus, in 2050, it is expected to be 1.06, in contrast to the urban growth rate of 1.54.The report suggests that the rate of urbanization, which has been increasing since 1950, is expected rise further till 2035. It is supposed to start decreasing slightly in the next few years. Within a

decade of globalization, the rate of urbanization increased by one-third of its previous growth. This has resulted in stress on the country's urban conglomerations; Delhi, Chennai, Kolkata, and Mumbai being four among them. The swelling of the population in the cities has been a result of labor migrations that have taken place in the past decade because of industrial growth. This created millions of employment opportunities for the rural poor. The national capital, Delhi, especially has seen an explosion of population. It saw a 26-time increase since 1950 when the population was just a million people. The current population of the national capital is 28 million, which equals to half of the population of all the ten ASEAN country capitals combined. Kolkata has seen a three-time increase in the urban population while Mumbai's population has increased by over six-fold since 1950. Bengaluru, the new entrant on the list, in 2015 crossed the 10 million-mark, ten times the number of people in 1950s. All these cities will see a further rise in the population in the next fifteen years. The number of urban agglomerations consisting more than a million people is also expected to be doubled by 2035.

Population	Total	1,210,854,977
	Males	623,724,568
	Females	586,469,294
Literacy	Total	74%
	Males	82.10%
	Females	65.46%
Density of population	per km^2	382
Sex ratio	per 1000 males	940 females
Child sex ratio (0–6 age group)	per 1000 males	914 females

T-2.4-A-India Census 2011 Data

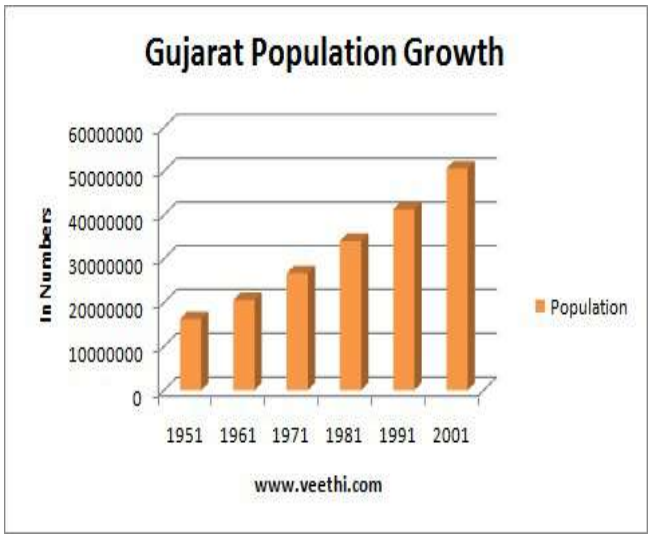
2.5 Scenario: Rural / Urban village of Gujarat as per Census 2011

- As per details from Census 2011, Gujarat has population of 6.04 Crores, an increase from figure of 5.07 Crore in 2001 census. Total population of Gujarat as per 2011 census is 60,439,692 of which male and female are 31,491,260 and 28,948,432 respectively.
- In 2001, total population was 50,671,017 in which males were 26,385,577 while females were 24,285,440. The total population growth in this decade was 19.28 percent while in previous decade it was 22.48 percent.
- The population of Gujarat forms 4.99 percent of India in 2011. In 2001, the figure was 4.93 percent.Recently as per Gujarat census data, 83.92% houses are owned while 13.54% were rented. In all, 65.95% couples in Gujarat lived in single family. In 2011, 57.87% of Uttar Pradesh population had access to Banking and Non-Banking Finance Corporation.
- Only 3.13% of Uttar Pradesh population had internet facility which is likely to improve in 2021 due to Jio. 6.10% of family in Uttar Pradesh owned car while 34.14% owned two wheller. In few months we will also get details of election data for Gujarat.
- The decadal growth rate is a vital part of Census operations. This gives an overview of the percentage of total population growth in a particular decade. Hence, it is termed as "Decadal Growth Rate". As per the provisional report published during 31st March, 2011, India showed a decadal growth rate of 17.64 % for the entire population as compared to 21.15 % in Census 2001.

- The report says, during the last decade of 2001 to 2011, population in India grew by 181 million. According to the Census of India, Ministry of Home Affairs, the decade of 2001 to 2011 is the 1st decade post Indian Independence, which added least number of people to the country's population. Among the total decadal growth rate, the rural areas of India grew at 12.18 % whereas; the urban areas of the country grew at the rate of 31.80 % in the last Census decade.

Description	2011	2001
Approximate Population	6.04 Crores	5.07 Crore
Actual Population	60,439,692	50,671,017
Male	31,491,260	26,385,577
Female	28,948,432	24,285,440
Population Growth	19.28%	22.48%
Percentage of total Population	4.99%	4.93%
Sex Ratio	919	920
Child Sex Ratio	890	883

F- 2.5-A- Gujarat population as per census



F- 2.5-B- Rural and Urban Population Growth in Gujarat

Year		Rural			Urban	
	Female	Male	Total	Female	Male	Total
1951	4.87	19.02	12.1	22.33	45.6	34.59
1961	10.1	34.3	22.5	22.5	66	54.4
1971	15.5	48.6	27.9	48.8	69.8	60.2
1981	21.7	48.6	36	56.3	76.7	67.2
1991	30.17	56.96	36	64.05	81.09	67.2
2001	46.7	71.4	59.4	73.2	86.7	80.3
2011	59.73	77.15	66.77	79.11	88.76	84.11
% increase in	**24%**	**8%**	**12%**	**8%**	**2%**	**5%**

T-2.5-A-Percentage increase in literacy rate

2.6 Rural Development Issues – Concerns – Measures:

❖ **Issue of rural area:**

- This is particularly shown in the disparity of economic and cultural development between urban and rural areas. It is mainly done because of the dual segmentation based on the household registration system.

❖ **Issue of farmer**

- It include increasing income level of farmer, reducing burden of farmer, protect rights of farmer with out confused migration of rural workers to cities.

❖ **Crime Free / Dispute Free**

- The types of crime that commonly occur in Indian villages include dacoity, robbery, agricultural feuds , disputes over : land , irrigation , cattle, election rivalries. Further crimes such as un-touch ability offences, insurgency, domestic violence etc. also prevail in the villages.
- Therefore it may be suggested that to tackle the problem of village crimes and disputes, a separate rural wing of police can be established. The rural police should be provided training which is needed for welfare activities.
- As of now all the small disputes occurring in Kamrol are solved internally and no FIR is reported.

❖ **Resources**

- Various natural resources like wind, water from lakes, ponds and rivers are available in kamrol village.
- Generally all the villages have easy access to crops and food items used in daily life. But some resources are not available easily in kamrol village. For this village needs to dependent on other villages or cities which are sometimes not easily accessible . monetary factor plays an important role in this.
- Previous studies have found that resource dependence strongly decreases with income. Efforts to improve the village natural resource base would help the poorest of the poor.

❖ **Literacy**

- Literacy is traditionally understood as the ability to write, read and use arithmetic. Literacy is the key to human progress in development.
- The Literacy rate of Kamrol village is 71.80% which is lower than Gujarat which has a literacy rate of 78.03%.

❖ **Health/ Hygiene**

- Poor sanitation and hygiene are a major health concern in all villages. Poor personal and household hygiene can lead to increased rate of infections and other diseases.
- Various reasons for poor hygienic conditions are open drainage, breading of mosquitoes in water logged areas, improper waste disposal, lack of sanitation facilities and cleanliness.
- We should educate our village communities about the importance of household and personal hygiene, sanitation.
- Clean drinking water should be easily accessible to the village communities

2.7 Various infrastructure guidelines with the norms for villages for the provision of Different infrastructure facilities :

- The importance of infrastructure for economic growth and development in rural area can hardly be overemphasized in a developing economy like India. With poor rural infrastructure, even a marginal improvement in its quantity and quality could significantly improve economic development and human well-being. Improving basic infrastructure, such as roads, transport, electricity, telecommunications, housing, health, water and sanitation, is essential for development and well-being of the rural population. The development of rural infrastructure could promote economic growth, improve the standard of living of the population and reduce the incidence of poverty by generating both farm and non-farm employment and earning opportunities, increasing productivity, providing access to basic goods and services and improving the health and physical condition of people. Empirical studies also report a strong relationship between infrastructure, economic growth, rural development and poverty reduction. In spite of the crucial importance of infrastructure, significant deficiencies have persisted in rural infrastructure across Indian states. The quantity and quality of infrastructure facilities are substantially lower in rural areas than in urban areas.

❖ Rural Infrastructure in India: Scope and Importance:

- Infrastructure is the backbone of any country. It plays a very important role in supporting nation's economic growth and the same is the case with India. If we talk about rural infrastructure in the country, then it is crucial for agriculture, agro-industries and poverty alleviation in the rural areas. Typically, rural infrastructure in the country encompasses rural roads, major dams and canal works for irrigation and drainage, rural housing, rural water supply, rural electrification and rural telecommunication connectivity.

❖ Importance of rural infrastructure in India:

- Basically, rural infrastructure has the potential to provide basic amenities to people that can improve their quality of life. To give an example, development of rural infrastructure can lead to improved access to market centers for the rural producers, better availability of inputs and raw materials at reduced prices and improved mobility. Here is a look at how different sections of rural infrastructure play their role in improving the rural economy as well as life of the people...
- Rural road infrastructure: It provides mobility and connectivity to people living in rural areas. It also provides the much needed boost to agricultural activities by making available water, seeds and other raw materials to the farmers. By improving connectivity, rural roads also enhance employment opportunities for the rural people in non-agriculture sector, thereby, increasing livelihood opportunities.
- Rural electrification infrastructure: It basically caters well to the requirements of agriculture and other activities including irrigation pump sets, small and medium industries, khadi and village industries, cold storage chains, healthcare and education
- Rural water supply system: It can lead to sustainability of systems and sources and tackle the problem of water quality, thereby, increasing good health of people.
- Rural housing infrastructure: It has the potential to improve living standard of the people. Overall and as per various studies, development of rural power, irrigation, water, sanitation and road infrastructure can increase productivity, savings, income and tourism and result in better jobs and health of rural people.

❖ **Scope for development of rural infrastructure in India:**

- As per the road statistics published by central government for the year 2012-13, rural roads span 60.39 km of every 100 km. The sad part is that most of these rural roads in the country are in bad shape i.e., they are of poor quality, potholed and unable to withstand the loads of heavy farm equipment, thereby, affecting the rural population's quality of life and ability of the farmers to transport their produce to the market. Further, the rural surfaced road is just 33 per cent of the total rural road network in India and remaining are kutcha roads which are highly vulnerable and inaccessible particularly during the rainy season.
- Living conditions of people in rural areas has still not improved much and there are majority who live in kutcha houses which are highly vulnerable to rainfall, wind blow, fire and other environmental hazards. Hence, good rural housing infrastructure is needed in the country.
- As per the Census 2011, still 45 per cent of the rural households are not connected with electricity and depend on kerosene and other means for lighting. Hence, rural electrification infrastructure is needed to make the lives of rural people better.
- Although there are schools in the rural areas but they lack in terms of the number of classrooms, availability of safe drinking water facilities, toilet facilities etc. Hence, the education infrastructure in rural India also needs a lot more improvement.
- It goes without saying that the health infrastructure is poorly developed in rural India. Even if it is there, there are no good doctors because the rural areas have very low connectivity and doctors or skilled health workers are unable to access these areas.
- As per the reports from Census 2011, merely 30 per cent of rural areas are covered with tap water supply. In addition, the sanitation facilities in the rural areas are also not adequate. Thus, there is huge scope for developing drinking water infrastructure and sanitation facilities in the rural areas. With these points, it is clear that there is huge scope for development of all kinds of infrastructure in rural areas. In fact, the gaps in the rural infrastructure need to be addressed properly and as fast as possible so as to achieve redistributive growth and alleviate poverty .

❖ **Guidelines for various infrastructure Facilities**

- There have been instances where the roads have been made, not through the popular or the preferred route, but through routes, which as per the villagers, are not very comfortable, or in frequent use by the villagers. So it is of utmost importance that the roads be made with due participation of the villagers during the survey of the roads.
- There have been instances that the full roads have not been made and the roads are left short of the main road by 2-3 kms as in the case of Beth upreli. If this link would have been provided then the villagers would have been tremendously benefited and the results would have accrued in a very short period. Infact if this link is made they will be close to Baijnath town, which can change the complexion of the whole village and it turning out to be a major supplier of essentials in Baijnath.
- There have also been instances where the contractors have not taken full care of protecting the roads from landslides by providing retaining walls on either side. This could be very dangerous and swipe the road during heavy rains.
- Some instances of misutilization of funds, by the contractors, have been brought up by the villagers, which has resulted in not meeting and fulfilling the quality standards, but getting cleared the full sanctions and payments.

- If we see from the indicators perspective that the roads can play a very important role in propelling the development in the villages, so it is of utmost importance to keep the roads intact for a sustainable period so that much more benefits accrue to the villagers. So proper maintenance of the roads should be done. Though the contractors have given the guarantee for next 5 years but then also a strict monitoring should be done so that the roads get the necessary maintenance in time.
- Further the roads should be made keeping in view of providing a link to the nearby town or market or important center which can have multifarious impacts on the lives of the people. The roads not only propel the development of the people but of the village as a whole.
- The roads have given a better understanding to the villagers of the benefits that can accrue to them and the roads have also played an important role in creating an awareness in them about how to better utilize their resources and take the benefit form it. In some of the villages it has become a lifeline by providing connection to the outer world. So it is of utmost importance that full care of the roads be taken and the villagers donot deteriorate the newly constructed roads by digging holes or tying the animals on these roads.
- A road protection committee should be made and given training so that they take proper care and inform the officials to take precautionary measures if they see any damage being done to the road.
- In Himachal Pradesh most of the villages which have been connected are having a wealth of forests and now the activity of tractors has increased which ply to carry the wood logs. Also the traffic is increasing as more and more people are buying vehicles, so it is of utmost importance that PWD officials ensure proper quality of construction and maintenance of roads.
- While doing the survey for making the roads one of the aspects that should also be kept in mind is the potential of the area which is being connected like heavy production of horticulture, floriculture or agriculture, because this will have a very high degree of impact on the villagers, village and the region as a whole as the link or connection opens up a gamut of opportunities for them, thus accelerating the growth, development and prosperity of area.
- Other district roads are the roads serving rural area of production and providing them with outlet to market centres, taluka/tehsil headquarters, block development headquarters or major district roads, and would serve to connect villages with population 1000 and above or cluster of villages. Village roads are roads connecting villages or cluster/group of villages with each other and to the nearest road of a higher category. These two categories of roads are proposed to be called together as 'rural roads' with uniform standards.
- Dwelling with individual conveniences shall have at least the following fitments:
  - One bathroom provided with a tap,
  - One water closet
  - One nahani or sink raised from the floor with a tap.
- Gram panchayat in consultation with Zilla Parishad/ Block Panchayat (as the case may be) should select the landfill site which should be:
  - Located at the outskirts of the village
  - Accesible
  - On vacant/uncultivated land
  - Located in the natural depressions with slight slopes
  - Site should be such as to avoid surface water and ground water pollution.

2.8 Ancient / Existing Electrical concept study as a Literature Review for village development:

- Energy is one of the key drivers of development and access to clean, safe and affordable sources of energy are considered as instrumental to stimulate economic, social and physical development. Availability of energy/power facilitates effective and efficient delivery of most basic services such as safe drinking water, public lighting, health care, education, etc. Besides, it also enables better standards of household living and fuelling economic and income generation activities. It has usually been observed that a high correlation exists between consumption of electricity (energy) and improvements in the Human Development Index (HDI), especially at low levels of HDI. Lack of access to clean and efficient energy sources has thus been proved as one of the significant barriers to alleviation of poverty. India, despite the unprecedented pace of addition in the generation capacity over the Plan period, continues to have very low levels of energy consumption.
- The per capita energy consumption in India remains well below the world averages. This low level of energy availability and consumption tends to affect the poorest the most. While 16 % of the global population are residing in India, its share of global energy consumption is a paltry 4.2 %. Similarly, India's per capita electricity consumption of around 734 kWh is way below the global average of 2,782 kWh and China's 2,471 kWh. In India, rural per capita consumption of electricity is only 8kWh per month compared to 24 kWh in urban areas. Indian economy has traditionally been characterised as an agrarian economy with majority of its population living in the rural areas and are dependent on their farm land to earn their livelihood. These areas often do not have access to energy resources for livelihood expansion like power for irrigation, cold storage or processing and for normal day-to-day activities and are instead dependent on traditional and unclean sources of energy like woody biomass, dung cakes, kerosene, etc. As a result, the opportunities for productivity enhancements and value addition get limited by the lack of modern and efficient energy services. India has approximately 400 million people with no access to electricity, a majority of whom live in the rural areas. One of the key reasons for this is that such rural population resides in areas where geographical distribution combined with terrain and low purchasing power of consumers creates hurdles in providing uninterrupted electricity supply. As a result, limited investments have gone into maintaining and sustaining infrastructure for energy delivery, even if it gets built under government programmes. Rural areas usually suffer on account of the poor and under developed state of transmission and distribution infrastructure and sometimes even lack adequate distribution capacity to supply electricity.

❖ Rural Electrification in India

- The need for extension of the electricity system to rural areas was felt quite early, just after the independence of the country. Rural Electrification programme in India was launched with two distinct dimensions i.e. (1) Village Electrification. (2) Irrigation Pump set Energization. The former enhances consumer satisfaction and the latter optimises crop yield. The area of focus was certainly maximising farm output, which did result in the Green Revolution in the mid-1960s. Accordingly, the indicator of electrification was not based on the percentage of households or population with access to electricity but merely extension of electricity lines to a particular area. By this definition, almost 86% of the villages have access to electricity. In 2004, the programme has been refocused to provide electricity access to rural households

The main objects currently are:

- To subscribe to special rural electrification bonds that may be issued by the SEB on conditions to be stipulated from time to time.
- To promote and finance rural electricity co-operatives in the country.
- To administer the money received from the govt. and other sources such as grants.
- To promote, organize or carry on the business of consultancy services and/or project implementation in any field of activity in which it is engaged in India and abroad.
- To finance and/or execute works on small/mini/micro-generation projects, to promote and develop other energy sources and to provide financial assistance for leasing out the above sources of energy.

2.9 Other Projects / Schemes of Gujarat / Indian Government :.

- The main objective of rural development has been to remove shortage of the people and fill the widened gap between the rich and the poor. This has been also vocalized in the policy of the government which says: said, 'Rural poverty alleviation has been the primary concern in the economic planning and development process of the country … rural development which encompasses the entire gamut of upgrading in the overall quality of life in the rural areas can be achieved through eradication of poverty in rural areas.
- Rural development is a process of improving quality of life and economic status of people living in villages. Education, entrepreneurship, physical infrastructure and social infrastructure also play a role in developing the rural regions. Rural development is characterized by its emphasis on locally produced economic development strategies. The main objective of the rural development is to remove poverty of the people and fill the widening gaps between rich and poor.
- Propagation of technology/schemes for rural development is slow and there is a lacking in wider participation of different stakeholders. An ideal approach may therefore, include the government, panchayats, village personals, researchers, industries, NGOs and private companies to not only help in reducing this imbalance, but also to have a multiplier effect on the overall economy.

❖ Sansad Adarsh Gram Yojna:

- This programme was launched by the Prime Minister Narendra Modi on the birth anniversary of Lok Nayak Jai Prakash Narayan on 11 October 2014.
- Ministry of Rural Development will be the supervising authority for this programme.
- Under this programme each Member of Parliament will take the responsibility for developing physical and institutional infrastructure in three villages by 2019.

❖ Deen Dayal Upadhyay Grameen Kaushal Yojana:

- This is a placement linked skill development scheme for rural poor youth.
- It was launched by on 25 September 2014 by Union Ministers NitinGadkari 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.

❖ **Swarnjayanti Gram SwarozgarYojana (SGSY)**

- Swarnjayanti Gram SwarozgarYojana (SGSY) has been restructured as National Rural Livelihoods Mission (NRLM), now renamed as "Ajeevika" to implement it in a mission mode in a phased manner for targeted and time bound delivery of results.
- Aajeevika recognizes that thepoor people have the potential to come out of poverty with proper handholding, training and capacity building and credit linkage.
- Aajeevika also believes that a strong institutional architecture owned by the poor, enables them to access institutional credit for various purposes, pursue livelihoods based on their resources, skills and preferences and also to access other services and entitlements, both from the public and private sector.
- Therefore, Aajeevika will focus on building strong institutions of the poor into Self Help Groups (SHGs), their federations and livelihoods collectives.

❖ **Bharat Nirman Programme**

- Rural Housing is one of the six components of Bharat Nirman Programme. Under Bharat Nirman Programme Phase-I, 60 lakh houses were envisaged to be constructed through Indira Awaas Yojana all over the country during the four years i.e. from 2005-06 to 2008-2009.
- Against this target, 71.76 lakh houses were constructed with an expenditure of Rs.21720.39 crore. The target for the next five years period starting from the year 2009-10, was doubled to 120 lakh 525 houses.
- Since 2009-10, 33.86 lakh, 27.15 lakh, 24.65 lakh and 16.6 lakh houses were constructed each year. Including 15.6 lakh houses completed during 2013-14, the targets seem to have been achieved.

❖ **National Social Assistance Programme (NSAP):**

- This was introduced in the budget of 95-96 and it included National Old Age Pension Scheme (NOAPS), National Family Benefit Scheme (NFBS) and National Maternity Benefit Scheme (NMBS).
- In 2000 a new scheme known as Annapurna Scheme was launched with an aim to provide food security to those senior citizens who, though eligible had remained uncovered under the NOAPS.
- With effect from 01.04.2011, the eligibility age for old age pension under IGNOAPS has been reduced from 65 years to 60 years and the amount of pension has been raised from Rs200 to Rs 500 per month for those who are 80 years or above.
- In view of the modification in age limit, more than 200 lakh beneficiaries were covered under IGNOAPS during 2011-12 & 2012-13 against 171 lakh beneficiaries covered during the year 2010- 11.

❖ **PradhanMantri Gram Sadak Yojana (PMGSY):**

- 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

❖ **Indira AwasYojana:**

- The government in 1985 under the leadership on Rajiv Gandhi introduced a public housing scheme that is popularly known as the Indira AwasYojana.
- This programme happened to fall under a larger scheme called RLEGP which was the official acronym Rural Landless Employment Guarantee Programme.
- This scheme was run under the Ministry of Rural Development where the primary objective was to provide housing for the roofless. This programme particularly targeted the free bonded labourers under the below poverty line
- (BPL) and the population falling in the Scheduled Castes and Scheduled tribes categories where it intended to address the housing issues and eventually construct residences.
- The year 1996 saw the Indira AwasYojana, become and independent scheme that fell under the Ministry of Rural Development.
- Through the central idea of the scheme was to provide housing for all, it also aimed at eradication of rural poverty along with the alleviation of the general living standards of the rural population by providing them with various development programs.

The benefits of the Indira AwasYojana are as follows:

- The Indira AwasYojana aims to provide assistance and support in the construction of the houses in rural locations.
- It seeks to support the construction of the houses with the required supplies including workplaces within the house.
- The houses under the scheme are to be designed based on the requirement of the reside.

❖ **PradhanMantri Adarsh Gram Yojana:**

- PradhanMantri Adarsh Gram Yojana (PMAGY) is a rural development programme launched by the central government in India in the financial year 2009-10 for the development of villages having a higher ratio (over 50%) of people belonging to the scheduled castes through convergence of central and state scheme and allocating financial on a per village basis.
- The plan aims to build an "Adarsh Gram" (model village) which has adequate physical and institutional infrastructure, in which minimum needs of all sections of the society are fully met. The village which is progressive and dynamic and its residents live in harmony.
- All the facilities necessary for dignified living should be available and the residents are enabled to utilise their potential to the fullest.
- The plan is considered ambitious as it aimed to bring a number of development programs to the village. Some of these programs are Bharat Nirman, PradhanMantri Gram Sadak Yojana (PMGSY) for rural, water supply, housing, electrification and other big-ticket schemes .

❖ **National Rural Livelihood Mission:**

- This scheme was restructured from the SwarnJayanti Gram SwarojgarYojna in 2011.
- National Rural Livelihoods Mission (Aajeevika) is aimed to empower the women's self-help group model across the country.
- Under this scheme govt. provides loan up to 3 lakh rupee at the rate of 7% which could be lowered to 4% on the timely repayment.

Chapter:3

Smart (Cities / Village) Concept Idea and its Visit

3.1 Introduction: Concepts, Definitions and Practices :

❖ **Concept**

- Smart Village was one of concepts for the developed villages in India. This concept was developed by Viswanadham and Vedula in their book entitled "Design of Smart Village". A smart village model followed a model from smart city as an effect of integrated technology changes to be implemented in the remote areas. The aim of smart village was to help it solve all problems through the implementation of ICT (Information and Communications Technology) and GIS (Geographic Information System) . Nowadays, Indonesia has implemented the concept of "nawacita" for regional development, this program prioritized the development in rural area . Smart village concept focused on the role of technology in building governance and public services. The use of technology utilized by villagers was ableto make them become more responsive . Smart village model based on the concept of"Access to Information for Everybody" in which ICT (Information and Communications Technology) service was reached easily by villagers through IIIC program. Smart village model developed by N. Viswanadham and S. Vedula was called as smart village ecosystem covering 4 aspects; 1) Institution, 2) Resources, 2) Service Chain and 4) Service delivery technologies & mechanism. Besides, there were 7 focus areas in smart village including economy, ICT, people, governance, environment, living and energy. Smart village existed because of ICT awareness that was able to be utilized as the instrument as the efforts of local economic development . The use of technology became a main factor in creating 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). Prime Minister Narendra Modi launched Sansad Adarsh Gram Yojana (SAGY) or SAANJHI) on 2 October 2014, Gandhi's birthday, in addition to Smart Cities and Digital India, as a development program for India. The Parliamentarian's Model Village Scheme main goal is for each Member of Parliament and Minister to adopt a rural village and develop it into a model by 2019 under the SAGY guidelines. The vision of SAGY is an integrated village development plan, encompassing Personal, Human, Social, and Economic dimensions.
- Smart Village India gets its foundation from Mahatma Gandhi's vision of Adarsh Gram (model village) and Gram Swaraj (Village self-rule/independence). Gandhi in two texts, Hind Swaraj and Gram (Village) Swaraj, promotes the concept of integrated rural development to impact majority of the population, as the primary initiative after India Independence in 1947. The Eco Needs Foundation has initiated the concept of "Smart Village". Under this project the Foundation is adopting villages and putting efforts for sustainable development by providing basic amenities like sanitation, safe drinking water, internal road, tree plantation.

❖ **Definition :**

- A Smart Village enables its inhabitants to make use of the contemporary technological and social achievements, while its infrastructures are still being developed in line with Sustainable Development Goals, offers an opportunity to efficiently deal with future of energy security and issues of local and circular economies.

❖ **Practices :**

- It has already been noted that the implementation of smart concepts into regional,both rural and urban contexts has to be adapted to socio-cultural and environmental circumstances. Thus, in the cities, different issues need to be tackled than in rural areas, where the main challenge is to bridge the distances among relatively small number of people. In the context of digital transformation that is at the forefront of our interest, this means that also digitalization requires adapted concepts, business models and solutions that have to strive to generally improve the well-being of the rural population.

1. Procurement

- The procurement practice involves:
- Selecting Appropriate Method for Construction Management
- Selection of Best team for the design
- Selection of best team to deliver
- Select best team to Operate the facility
- Contracting by focusing on lowest price tendering and lump sum contracts is a better practice.

2. Partnering

- When compared to the traditional approach of working, the partnering is an different working style. This takes a collaborative approach in working.
- It has been proved through great projects that working through partnering helps in achieving
- Greater value of money.
- Higher Profits for the company
- Quality Improvement
- Prediction of project completion

3. Risk Management

- Risk in projected are always expected and it is necessary to maintain a “risk register”. This will help to enter all the risk faced from the starting of the project to its end. Along the risk encountered, the method used to manage is also recorded. This helps to be applied in other projects. Risk assessing and analyzing will help to assign appropriate actions to different project team. The risk assessment is an activity that have to be performed in a regular basis and in no case be ignored.

4. Value Management

- This key practice takes into account time, cost and risk constraints, in order to meet the client’s business needs. The method of value management will involve complete collaboration with the team. The team is in charge of design and delivery of the project. This team will also include the end-users and the stake holders.

5. Benchmarking

- This method is practiced by comparing with other completed projects. The performance of different projects are compared each other. The lessons from each project is used to make best performances for new projects. Benchmarking is a method that improves the performance of the project in a logical and systematic way.

6. Whole Life Costing

- Here, the cost of ownership is measured of a building. This will take into consideration the sum of:
- Initial Capital Cost for making the building
- Cost of maintenance of the building
- Cost of servicing the building
- The cost of maintenance of the building is practically more when compared to the initial capital cost. This make the whole life costing an essential practice in construction. As per studies, for a building of capital cost £100 , the operational procedure will account for £500 over the life period of the building.

3.2 Vision-Goals, Standards and Performance Measurement Indicators :

- India is a rural dominated country and villages are said to be the heart of this nation. According to 2011 Census, the population of rural areas comprised of 68.84 per cent. Migration of the people from rural areas to urban areas causes some burden on the urban areas. If the vision of the founders of this nation is to be respected and implemented, then we all need to have the responsibility to make our villages smart, which means self-sufficient, efficient, healthy and educated villagers. To make the villages smart means to make the country self-reliant, stronger and secured. India lives in its villages. Villages are the food basket of the nation. Village Panchayats are the centers of grass root democracy. However, the holistic development of rural India is still under tremendous pressure owing to the declining farm output, increasing trend of distressed migration, absence of basic amenities and emerging problems of environmental pollution and conflicts. The smart village concept is needed for a sustainable and a secured future of the villages. It is about understanding the villages towards the growth model which is inclusive. It's about achieving a higher goal without compromising the roots and the sense of belongingness of the masses.

❖ **Vision:**

- With increasing urban population and rapid expansion of areas, operators are looking at smarter ways to manage complexities, increase efficiencies and improve quality of life. This has created need for cities that monitor and integrate infrastructure to better optimize resources while maximizing services to its citizens.

❖ **Goals**

- 24x7 availability of high quality utility services like water and power.
- A robust transport system that emphasizes on public transport.
- Provide opportunities for jobs and livelihoods for its inhabitants.
- Proper facilities for entertainment and the safety and security of the people. State-of-the- art health and education facilities are also a must.

❖ **Standards**

- Adequate Water Supply.
- Assured Electricity Supply.
- Sanitation, including Solid Waste Management.
- Efficient Urban Mobility and Public Transport.
- Affordable Housing, especially for the poor.
- Widespread and transformative use of Data and Technology.
- Good Governance and Citizen participation.
- Sustainable Environment.
- Safety and Security of Citizens, particularly women, children, and the elderly.
- Affordable Healthcare for everyone.
- Modern Education for children and adults.
- Attractive for Business.

3.3 Technological Options:

- Human society is developing with rapid momentum and achieved various successes for making its livelihood better. The civilization is witness for various changes related to its development through different catalysts like industrial development, green revaluation, science and technology, etc. India has more than 72% of its population living in villages.Near about seven decade had been passed since India got freedom, but the scenario in villages in our country is still unchanged. On one side India has recently selected 100 cities for Smart City project and ready to adapt all the advanced technologies for these smart cities and on other hand villages in our country are still struggling for getting basic amenities like24 x 7 electricity. On one hand 4G internet technology is being utilized all over the urban areas but on other hand villages in our country are still searching for genuine mobile networks. Our Governments are joining hands with developed countries like America, China, Japan to run bullet trains to connect big cities in India whereas villages in our country are stilldisconnected and are lacking with basic facilities like drinking water, healthy food, sanitization, toilets, transportation, education, etc. The technology that we use here can be availed to the people living in rural areas to help in improving their lifestyle. This summarizes such efforts which can definitely help us to introduce various technologies in these neglected parts of our country fulfilling our responsively to build up our nation. Thus new concept of smart villages can be introduced to make heaven in the heart of our India, because real Bharat is recognized by the villages in our country.
  - Smart energy
  - Smart mobility
  - Smart infrastructure
  - Smart public services
  - Smart care
- Indian villages need to be more focused on basic things such as sanitization, health care, drinking water and education. As villages and the villagers have farming - agriculture as their primary source of income. So having villages reap the benefits of irrigation is really very important. The biggest barrier to achieve our goal of developing smart villages will be to deal with the mentality of the villagers and make them understand the real need of modernization.

3.4 Road Map and Safe Guards:

- Smart Maps capture abroad range of detailed data, such as roads (with details including lanes, speed limits, and turn restrictions),shops,(types, user ratings),and other information(bike and transit routes, building shapes, etc.)Smart Maps are designed so that users can quickly and intuitively interact with them despite having virtually no training, ensuring that information reaches the widest possible audience. Smart Maps are built to update quickly and correctly as cities change and evolve.
- For example, Lusail City in Qatar,Masdar City in the UAE,and Songdo in SouthKorea are all making digital technology,networks, and appsa central part of how they operate and interact with citizens. By contrast, existing or brownfield metropolitan areas face clear challenges in moving up the ICT Maturity ladder, as they need to modernize their existing infrastructure with embedded sensors and control systems and retrofit old buildings a complicated and expensive process.
- Mahatma Gandhi said, “the future of India lies in its villages”. Despite government’s focus on villages for many decades, villages remain poorly serviced and governed. India has been an agricultural economy yet the sector is still not a well-paying livelihood option. Generating new avenues of employment in villages, reviving agriculture and improving services in rural areas are some of the components that need to be included right away in rural development policies. The visual perception of Indian villages has not changed much though certain corrective policy measures and infrastructural reforms have taken place. Governments need to transform our villages into smart habitats by generating lucrative economic opportunities and addressing the basic challenges rural areas are facing for decades. Delhi and Mumbai add almost 200 migrants every day.
- India is a country of villages. Any product or solution that has to succeed and be popular in the country has to be of direct relevance to village life of this country. As per Census of India 2011, the country has a 69% rural population spread across more than 600,000 villages. Now, that being the case, no marketer worth his salt can ever dream of ignoring rural India.

❖ Government initiatives

- Pradhan Mantri Gram Sadak Yojana (PMGSY) has proved to be a transformative scheme. Thousands of villages which were cut-off from the outside world were connected. The national rural road construction program has built paved roads to over 100,000 villages since its launch in 2000. A research report ‘Market Access and Structural Transformation: Evidence from Rural Roads in India’ by Sam Asher and Paul Novosad examines the labor market consequences of high rural transport costs by estimating the causal effects of a USD 37 billion rural road construction program, which has provided over 100,000 Indian villages with paved connections to the wider road network. It states, “These effects are driven by villages close to large cities, where a new rural road represents a larger proportional decrease in total transportation costs to external demand for rural labor and production.” Similarly the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) has brought significant improvement in employment generation in rural India. The scheme that is termed the biggest poverty reduction scheme provides jobs to over 50 million households. However, the government needs to find out some innovative ways through which rural workforce can be provided skills and improve their employability in the evolving markets in rural India.

3.5 Issues & Challenges :

❖ **Availability of master plan or city development plan:**

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

❖ **Three-tier governance:**

- Successful implementation of smart city solutions needs effective horizontal and vertical coordination between various institutions providing various municipal amenities as well as effective coordination between central government (MoUD).

❖ **government and local government**

- agencies on various issues related to financing and sharing of best practices and service delivery processes.

❖ **Financing smart cities:**

- The High Power Expert Committee (HPEC) on Investment Estimates in Urban Infrastructure has assessed a per-capita investment cost (PCIC) of Rs 43,386 for a
- 20-year period. Using an average figure of 1 million people in each of the 100 smart cities, the total estimate of investment requirements for the smart city comes to Rs 7 lakh crore over 20 years (with an annual escalation of 10 per cent from 2009-20 to 2014-15). This translates into an annual requirement of Rs 35,000 crore.

❖ **Technical constraints of ULBs:**

- Most ULBs have limited technical capacity to ensure timely and cost-effective implementation and subsequent operations and maintenance owing to limited recruitment over a number of years along with inability of the ULBs to attract best of talent at market competitive compensation rates.

❖ **Urban water and sanitation challenges:**

- For urban India, the situation is critical. In 2015, about 377 million Indians lived in urban areas and by 2030, the urban population is expected to rise to 590 million. Already, according to the National Sample Survey, only 47% of urban households have individual water connections and about 40% to 50% of water is reportedly lost in distribution system due to various reasons. Further, as per the 2011 census, only 32.7% of urban Indian households are connected to a piped sewerage system. When distribution becomes challenging, the workaround is to tap ground water.

3.6 Smart Infrastructure - Intelligent Traffic Management :

❖ **Smart Infrastructure:**

- Smart infrastructure can be defined as an infrastructure that integrates digital technology and(a) delivers the values of self-monitoring and accuracy in decision making; efficiency and cost

savings; reliability; security, safety and resilience; user interaction and empowerment; sustainability; redundancy minimisation; fast response time; low carbon footprint; and service quality; (b) functions based on the principles of data acquisition, data analysis, maintenance of feedback loop and design for adaptability; and (c) operates at higher levels from semi- intelligent infrastructures and intelligent/semismart infrastructure.

Advantages:

- Reduced environmental impact through more efficient infrastructure
- Simplification of infrastructure planning and maintenance (Digital Twin)
- Optimization of investment and operating costs
- Sustainability of public services

❖ **Intelligent Traffic Management:**

- Ever-increasing traffic flow leads to traffic congestions and jams, giving rise to increase in the cost of transportation as well as affecting the routine lives of people. An intelligent traffic management system enables users to be better informed and to make safer, more coordinated, efficient and smarter use of transport networks.
- An intelligent traffic management system (ITMS) is defined as an advanced application that—without embodying intelligence as such—aims to provide innovative services related to different modes of transport and traffic management. It enables users to be better informed and to make safer, more coordinated, efficient and smarter use of transport networks.

❖ **Social Health Indices:**

- The number of businesses per ten lakh population can form a city's level of economic activity and economic performance. It provides a single indication of the business climate in a jurisdiction, and attitudes towards entrepreneurship. The unemployment rate is measured by taking the unutilized labor supply and then tracks business cycles. It is measured in terms of working-age city residents who during the survey period were not considered in paid employment or self-employment and were searching for work divided by the number of total labor force.

❖ **Sanitation :**

- The sanitation front will see figuring out of sanitary toilet facilities used by the people and community toilet facilities provided at public places. The rate is 10 people per seat. Share of primary, secondary or tertiary treatment of wastewater shall give ranking in matters of handling of waste water. For solid waste management, disposal by bio digestion, landfills, burning or recycling will end the Smart Cities their place in the ranking.

❖ **Electricity:**

- All the electrical lines will be present underground by not disturbing aesthetics of a place or making any kind of nuisance. The power generated will be available from renewable sources like wind energy farm, hydroelectric plant or natural gases will also be used for not exhausting natural resources.

3.7 Cyber Security :

- Cyber security is the practice of defending computers, servers, mobile devices, electronic systems, networks, and data from malicious attacks. It's also known as information technology security or electronic information security. The term applies in a variety of contexts, from business to mobile computing,
- Over the past few years, Technology has begun to play an important role in our daily lives. Internet enabled gadgets have changed the way in which we work or do our daily chores. Digitization has an impact on personal lives, education, health, government and national security. Due to increase in complexity of smart city systems and globally connected social, economic, political systems, etc. has increased vulnerability of security of a city. The cyber threats have amplified due to infinite supply of data. Smart surveillance technology or analytics to manage the crowd, traffic, cyber security, data privacy, building codes to manage natural/man-made disasters, etc. are some parameters that would make a city safe. Different challenges to our security and expectations of privacy have arrived due to innovations in IT. Humans are already interconnected via gadgets. Standards are evolved for all these potentially connected systems. This will lead to improve in quality in life.

❖ **Types of cyber threat:**

- The threats countered by cyber-security are three-fold:
- Cybercrime includes single actors or groups targeting systems for financial gain or cause disruption.
- Cyber-attack often involves politically motivated information gathering.
- Cyberterrorism is intended to undermine electronic systems to cause panic or fear.

3.8 Retrofitting- Redevelopment- Greenfield Development District Cooling:

- 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 effect 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.
- 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.

❖ **Redevelopment:**

- Redevelopment causes the tremendous development in infrastructure by using the mixed land use patterns and also increasing the density at the same time. When the area is more than 50 acres then for the sake of concerns of citizens redevelopment is adopted. For example, By implementing high ground coverage, mixed land use is done by preparing new layout for the

area. Vacant land represents both a significant problem and an attractive opportunity for many central cities. Vacant land and abandoned structures impose both economic and social costs on cities and the neighborhoods or districts in which they are located. On the economic side, such properties lower neighboring property values and tax revenues even as they create pressure to raise taxes .

- Addressing the issue of vacant and abandoned land and structures, state governments play an important role as well. In many cases, the ability to overcome the problems associated with vacant properties and convert them to productive use requires legislative powers that are found only at the state level. Even when demand for new or restored land uses is sufficient for redevelopment to occur, the path to success is troubled by the displacement of previous residents and the elimination of their neighborhoods. Displacement can occur directly through property clearance and conversion to new uses, or indirectly through gentrification when land prices and rents are bid-up to a level unaffordable to the neighborhood's long-term residents. The redevelopment process can create winners and losers, with the losers too often racial and ethnic minorities and the economically disadvantaged.

❖ **Green field development:**

- 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. from a legal perspective, the challenges in obtaining timely, effective, and affordable approvals for Greenfield residential development. In particular, we focus on the constraints on Greenfield developments (not all green fields are equal); the need to integrate land use planning with the provision of infrastructure; and the opportunities provided by the Special Housing Area legislation. Greenfield areas are seen as the low hanging fruit in terms of providing land for urban expansion, however the reality is quite different.

3.9 Strategic Options for Fast Development :

- Governments should take the lead
- Adapt to evolving technologies and risks
- Put data at the centre of policy
- Use a broad range of policy levers
- Attract private capital
- 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. cyber tour of worksites.

3.10 India's Urban Water and Sanitation Challenges and Role of IndigenousTechnologies

- For urban India, the situation is critical. In 2015, about 377 million Indians lived in urban areas and by 2030, the urban population is expected to rise to 590 million. Already, according to the National Sample Survey, only 47% of urban households have individual water connections and about 40% to 50% of water is reportedly lost in distribution system due to various reasons. Further, as per the 2011 census, only 32.7% of urban Indian households are connected to a piped sewerage system. When distribution becomes challenging, the workaround is to tap ground water. According to a study by the Centre for Science and Environment, 48% of urban water supply in India comes from ground water. Ground water exploitation for commercial and domestic use in most cities is leading to reduction in ground water level.
- Distribution and water loss issues: - Distribution challenges, such as water loss due to theft, pilferage, leaky pipes and faulty meter readings, result in unequal and unregulated distribution of water. In New Delhi, for example, water distribution loss was reported to be about 40% as per a study.

❖ Sanitation :

- Most Indians depend on on-site sanitation facilities which means mainly pit latrines in rural areas. In rural areas, the government has been promoting community-led sanitation approaches such as the Total Sanitation Campaign, with some success. In urban areas, a good practice example is the Slum Sanitation Program in Mumbai that has provided access to sanitation for a quarter million slum dwellers. Sewage, where available, is often in a bad state. In Delhi the sewage network has lacked maintenance over the years and overflow of raw sewage in open drains is common, due to blockage, settlements and inadequate pumping capacities. The capacity of the 17 existing wastewater treatment plants in Delhi is adequate to cater a daily production of waste water of less than 50% of the drinking water produced. Of the 892 million people in the world that defecate openly, some 15 million live in India, making it the country with the highest number of people who defecate in the open. unsafe and undignified.

❖ Responsibility for water supply and sanitation

- Water supply and sanitation is a State responsibility under the Indian Constitution. States may give the responsibility to the Panchayati Raj Institutions (PRI) in rural areas or municipalities in urban areas, called Urban Local Bodies (ULB). At present, states are generally plan, design and execute water supply schemes (and often operate them) through their State Departments (of Public Health Engineering or Rural Development Engineering) or State Water Boards. Highly centralized decision- making and approvals at the state level, which are characteristic of the Indian civil service, affect the management of water supply and sanitation services.

❖ Rural areas

- There are about a 100,000 rural water supply systems in India. At least in some states, responsibility for service provision is in the process of being partially transferred from State Water Boards and district governments to Panchayati Raj Institutions (PRI) at the block or village level (there were about 604 districts and 256,000 villages in India in 2002, according to Subdivisions of India. Blocks are an intermediate level between districts and villages).

- Where this transfer has been initiated, it seems to be more advanced for single-village water schemes than for more complex multi-village water schemes. Despite their professed role Panchayati Raj Institutions, play only a limited role in provision of rural water supply and sanitation as of 2006. There has been limited success in implementing decentralization, partly due to low priority by some state governments. Rural sanitation is typically provided by households themselves in the form of latrines.

3.11 Initiatives in village development by local self-government :

- The Gram Panchayats are constitutionally mandated for preparation of Gram Panchayat Development Plans (GPDP) for economic development and social justice utilizing resources available with them. The Gram Panchayat Development Plan (GPDP) should be comprehensive and based on participatory process involving the community particularly Gram Sabha, and will be in convergence with schemes of all related Central Ministries / Line Departments related to 29 subjects listed in the Eleventh Schedule of the Constitution. The convergence assumes greater significance in view of the fact that Panchayats can play an important role for effective implementation of flagship schemes on subjects of National Importance for transformation of rural India.

❖ **Gangaram village - a source of inspiration for other villages**

- The village has ensured that all its 612 houses have Individual Sanitary Latrine (ISL). Drinking water pipeline was laid for each house in the village under the Mission Bhagiratha scheme, and the villagers are now getting potable water every day. The village has got CC roads in all the 10 wards laid at a cost of Rs 50 lakh. The village also got the street lights in all the lanes and bylanes. Rainwater harvesting pits have been constructed in the village.
- Other acco mplishments include:
- 100 per cent tax collection at the village amounting to about Rs 1.1 lakh.
- Construction of Gram Panchayat office building with Rs 13 lakh under the MGNREGS. The land for the office has been donated by the Village Sarpanch.
- The health sub-centre in the village has been converted into a wellness centre where the villagers can also do physical exercises, physiotherapy and mediation.
- A tractor has been procured for the Gram Panchayat to shift the garbage in the village. A total of 10 sanitary workers are working with the GP.
- The institutions of Local Government have flourished in India since time immemorial. The Panchayats or Village Governments, as they were called, were ancient institutions and were themselves small republics. They exercised power in various spheres such as industrial, commercial, administrative, and social including civic education and religious functions. The development of Urban Local Self-Government, as compared to that of Rural Local Self Government, has been very slow after independence. The first two Plans did not carry much for the improvement of Urban Local Bodies. It was only at the end of the Second Plan that the planners focused their attention on the Urban Local Bodies. In the Third Plan, it was suggested strengthening the Municipal Administration by the way of better Personnel and Finances and by enlarging their jurisdiction and functions

3.12 Smart Initiatives by District Municipal Corporation :

- Here are some of the initiative by Municipal Corporation :

❖ **Water ATM**

- Installing the water vending machines across the city. The basic need of life -water - available to the citizens at most of the public spaces with assurance of the quality and the budgeted price.

❖ **Place Making for Garden**

- Rejuvenation of the selected public places through improving the visual aesthetics and providing modern amenities. It contributes to increasing the green cover and enhancing the engagement of the public with public spaces.

❖ **Slum Rehabilitation**

- Creating approx. 8000 new houses for the existing slum dwellers on PPP mode in the selected area. It would impact not only the social livelihood standards but it would also minimize the problems created through unhygienic and poor outreach of basic infrastructure facilities in the slums.

- **Integrated command and control center.**
- **Installation of CCTV Cameras**
- **Installation of smart toilets**
- **Installation of public wi-fi**

3.13 Any Projects contributed working by Government / NGO / Other DigitalCountry Concept

❖ **AADHAAR ENABLED PAYMENT SYSTEM (AEPS)**

- AEPS is a bank led model which allows online interoperable financial inclusion transaction at PoS (MicroATM) through the Business correspondent of any bank using the Aadhaar authentication. It is a payment service empowering a bank customer to use Aadhaar as his/her identity to access his/ her respective Aadhaar enabled bank account and perform basic banking transactions like balance enquiry, cash deposit, cash withdrawal, remittances through a Business Correspondent.

❖ **BPO SCHEME**

- The India BPO Promotion Scheme (IBPS) seeks to incentivize establishment of 48,300 seats in respect of BPO/ITES operations across the country. It is distributed among each State in proportion of State's population with an outlay of Rs. 493 Crore. This would help in capacity building in smaller cities in terms of infra & manpower and would become basis for next wave of IT/ITES led growth. This scheme has potential to create employment opportunities of around 1.5 lakh direct jobs considering three shift operations. It may also create jobs.

❖ **DIGIDHAN ABHIYAAN**

- The initiative plans to enable citizens and merchants to undertake real time digital transactions through the DIGIDHAN Bazaar.Through organising DigiDhan Mela's across the country, it aims to handhold users in downloading, installing and using various digital payment systems for carrying out digital transactions.

❖ **MYGOV**

- MyGov platform is a unique path breaking initiative which was launched by the Hon'ble Prime Minister of India, Shri Narendra Modi. It is a unique first-of-its-kind participatory governance initiative involving the common citizen at large. The idea of MyGov brings the government closer to the common man by the use of online platform creating an interface for healthy exchange of ideas and views involving the common citizen and experts with the ultimate goal to contribute to the social and economic transformation of India.

❖ **PAHAL (DBTL)**

- The PAHAL (DBTL) aims to reduce diversion and eliminate duplicate or bogus LPG connections. The scheme was earlier launched in 2013 and was modified in 2015. Under the PaHaL scheme, LPG cylinders are sold at market rates and entitled consumers get the subsidy directly into their bank accounts. This is done either through an Aadhaar linkage or a bank account linkage.

3.14 How to implement other Countries smart villages projects in Indian villagecontex

❖ **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**

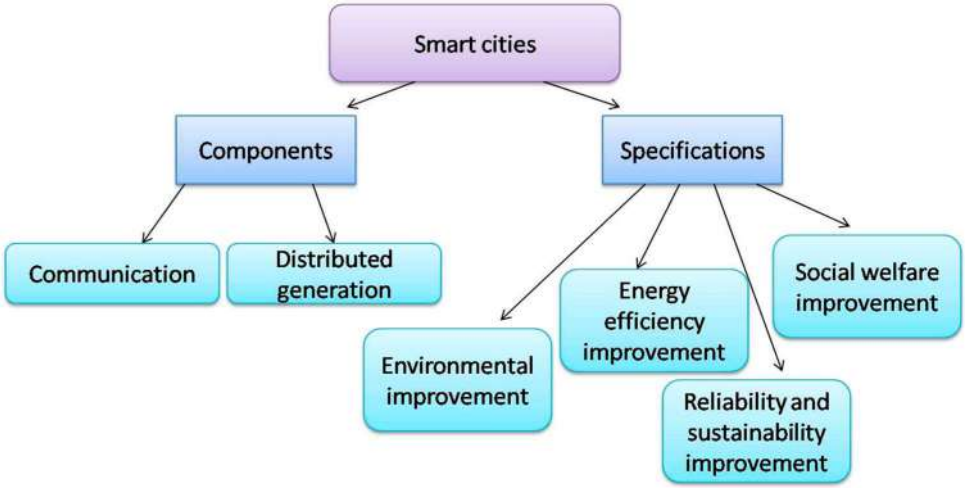
- Friendly and cost effective-increasingly rely on online services to bring about accountability and transparency, especially using mobiles to reduce cost of services and providing serviceswithout having to go to municipal offices. For minge-groups to listen to people and obtain feedback and use online monitoring of programs and activities with the aid of cyber tour of worksites.

❖ **Smart cities revolution to boost employment in India**

- Government of India's 'smart cities mission', a flagship initiative, is aimed at developing 100 sustainable and citizen friendly cities across the country. Each of these smart cities will be a key driver of economic growth boosting the GDP of the country and creating multiple new-age employment opportunities. With increased urbanization, urban areas are expected to house 40 per cent of India's population and contribute to over 75 per cent of India's GDP by 2030. This calls for large scale infrastructural development which is not just physical and institutional but also social and economic infrastructure. Only then would these cities will attract investments leading to continuous growth and development. A key way of developing smart cities is by enabling using smart evolved technology for local area development in the cities. Such development will generate employment for a large segment of local population. Application of smart solutions will enable cities to use technology, information and data to improve their services. Integration of technology is a major challenge and implementation of technology across smart cities needs a lot of hand holding at the moment. To understand the dynamics of smart cities and to create a strong eco-system it is important that the workforce has advanced skill sets. Smart cities have emerged as a potential job creator in the past few months. Many new-age profiles are likely to witness potential growth especially in the areas of ICT (Information Communication Technology), Data Management & Analytics and e- Governance. As there is a large pool of data being used in the building and management of smart cities, data monitoring and surveillance will become a crucial aspect. Whether the data is used for intelligence gathering, prevention of crime, public health, investigation or surveys; surveillance will hold a lot of importance for citizens. It is important for us to understand that the existing workforce and the new workforce entering the labor market need to align their skill sets basis the requirements of smart cities. Each and every sector and job roles will need enhancement of knowledge, specialized skills training and continuous upskilling. People with varied skill sets will be needed to manage and monitor data across smart cities. Data Skills, Communication skills, Business Intelligence and Analytics, Visualization, Data Modelling, Numerical skills, Quantitative Analysis, Product Development are few key skills that will be required for continuous surveillance at smart cities.

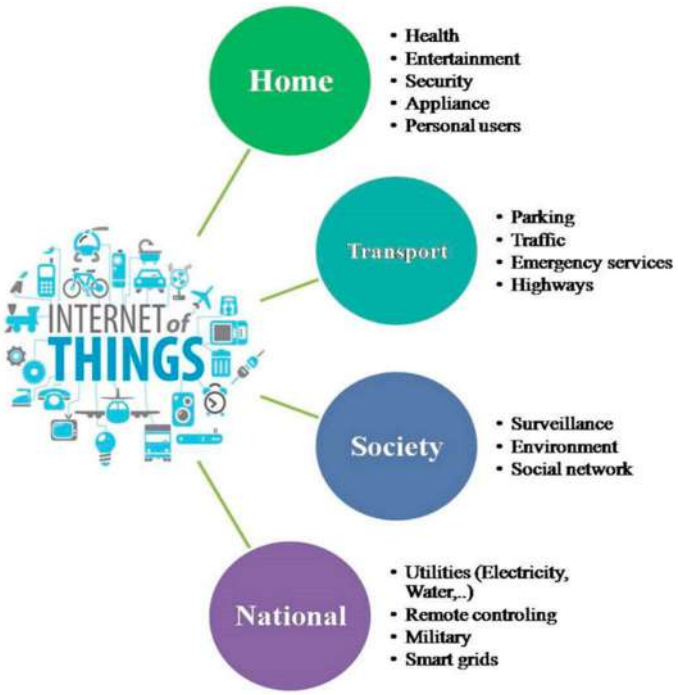
3.15 Electrical concept (Design Ideal and Prototype model)

- The smart city is becoming smarter than in the past as a result of the current expansion of digital technologies. Smart cities consist of various kinds of electronic equipment applied by some applications, such as cameras in a monitoring system, sensors in a transportation system, and so on. Furthermore, utilization of individual mobile equipment can be spread. Hence, with taking the heterogeneous environment into account, various terms, like characteristic of objects, participants, motivations and security policies would be studied . Reference presented some of the key features of potential smart cities in 2020. Smart citizens, smart energy, smart buildings, smart mobility, smart technology, smart healthcare, smart infrastructure, smart governance and education and finally smart security are the aspects of smart cities. The features of a smart city are shown in Figure.



F-3.15-A- The key aspects of smart cities.

- In an IoT environment, devices can be aggregated according to their geographical position and also assessed by applying analyzing systems. Sensor services for gathering specific data are utilized with some ongoing projects regarding the monitoring of each cyclist, vehicle, parking lot and so forth. There have been a lot of service domain applications which utilize an IoT substructure to simplify operations in air and noise pollution control, the movement of cars, as well as surveillance and supervision systems.
- The developments on the Internet provide a substructure that enables a lot of persons to interlink with each other. The following development on the Internet may make it more applicable to arrange proper interlinks between objects. In 2011, the number of interconnected things was far higher than the amount of population. Figure shows the interconnection among the various objects based on the IoT. Consequently, providing IoT improves cities and affects the different features of humans' life by creating cost-effective municipal services, enhancing public transformation, reducing traffic congestion, keeping citizens safe and healthier. Moreover, it plays a vital role in the national level associated with policy making (e.g., energy conservation and pollution reduction), monitoring systems, and needed infrastructures.



F-3.15-B-IoT based linkages

❖ IoT Technologies for Smart Cities

- The IoT is a broadband network which employs standard communication protocols, whereas the Internet would be its convergence point. The major notion of the IoT is the widespread existence of objects which are able to be measured and inferred, as well as it is able to modify the situation. Accordingly, IoT is empowered by the expansion of several things and communication equipment. Things in the IoT involve smart equipment such as mobile phones and other facilities including foodstuff, appliances and landmarks that can collaborate to achieve a joint objective. The main characteristic of the IoT is its effect on consumers´ life.

❖ Radio-Frequency Identification (RFID)

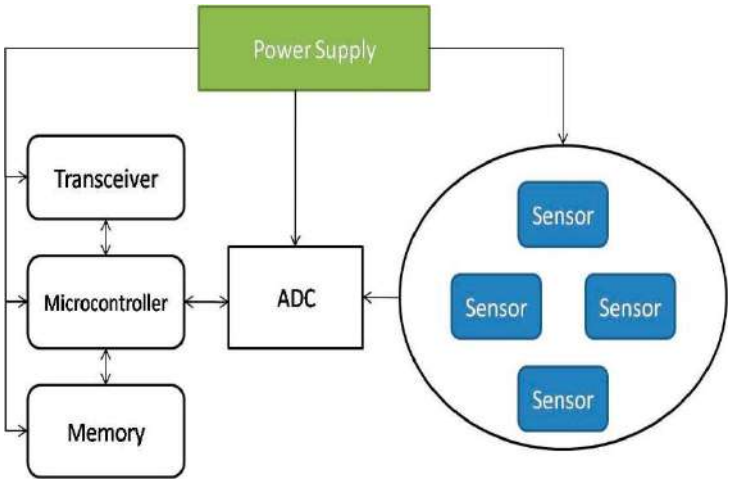
- RFID including readers and tags has a vital task in the framework of the IoT. Employing the technologies on each related thing, accomplishing their automatic identification and dedicating the single digital identity to any of the things will be possible, to include the network associated with the digital information and services. RFID provides some applications in smart grids, including tracking and localization of objects, healthcare applications, parking lots and asset management.

❖ Near Field Communication (NFC)

- Near Field Communication (NFC) is used for bidirectional short distance communication, especially in smart-phones. This range usually involves a centimeter range. The application of NFC in smartphones enables us to use it in smart cities, as well. One of its applications includes using smartphones with NFC as a wallet which enables us to use smartphones as our personal cards such as bank card, identification card, public transportation card, access control cards.

❖ Wireless Sensor Networks (WSNs)

- WSNs make diverse proper data available and might be applied in lots of uses like healthcare, as well as government and environmental services. Moreover, WSNs can be aggregated with RFIDs to obtain several targets such as gaining data related to the position of people and objects, movement, temperatures, etc. A WSN consists of wireless sensor nodes which include a radio interface, an analog-to-digital converter (ADC), multiple sensors, memory and a power supply,



F-3.15-C- The architecture of a wireless sensor node.

❖ Actual IoT Applications for Smart Cities

- The IoT uses the Internet to merge various heterogeneous things. Accordingly and for providing the ease of access, all existing things have to be linked to the Internet. The reason behind this is that smart cities include sensor networks and connection of intelligent appliances to the internet is essential to remotely monitor their treatment such as power usage monitoring to improve the electricity usage, light management, air conditioner management. To get this aim, sensors are able to be extended at various locations to gather and analyze data for utilization improvement. Figure illustrates the major utilizations of the IoT for a smart city. The key aims in this field of knowledge are expressed in the following subsections.

1. Smart Homes

- By utilizing the data which are produced by various sensors, smart homes can be observed. For example, novel demand response (DR) methods can be applied, or customers can be cautioned in the case where pollution is above its acceptable limit through monitoring the pollution. In fact, IoT technology leads to having smart houses and appliances including smart TVs, home security system, lighting control, fire detection, and temperature monitoring. The sensors of this appliances monitor the conditions and environment and send surveillance data to a central controller at home which enables the householder to continuously monitor and control the home even from outside and make the best decision under every circumstance.

2. Smart Parking Lots

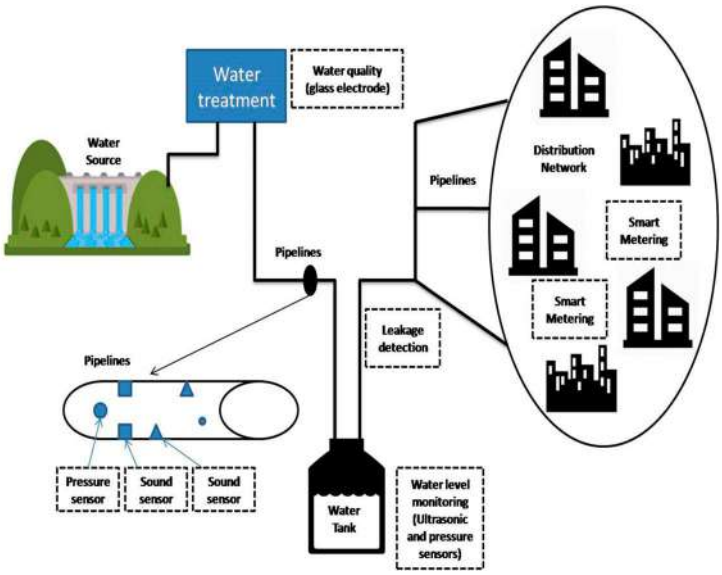
- By enabling smart parking, arriving and departing times of different cars are traced all over the city. Thus, these parking lots have to be planned in such a way to take a number of vehicles in every region into account. Furthermore, new parking lots have to be set up where there are more cars. Accordingly, the data of smart parking lots are able to provide profits for both customers and merchants' daily lives in the smart cities.

3. Healthcare

- In the healthcare domain, IoT technologies have many advantages in smart cities. Some of those applications are tracking of people and objects including patients, staff and ambulance, identification of people, and automatic data gathering and sensing. In terms of people and objective tracking, the status of patients in a clinic or hospital is monitored in order to provide better and faster work-flow in the hospital. The location of the ambulance, blood products and different organs for transplantation are monitored to check the availability on-line. In terms of people identification, in a database, patients are recognized to decrease the risk of mistake for prevention of getting wrong drugs, doses and procedures. The staff authentication aims to improve the employee's behavior toward patients. Regarding the data collection and sensing, it helps to save time for data processing and preventing human errors. Through sensor devices, diagnosing patient conditions, providing real-time information on patient health indicators such as prescription compliance by the patient is implemented.

4. Water and Weather Systems

- Weather systems use diverse sensors to supply proper data such as temperature, rain, solar irradiation and wind speed, as well as to help enhance the efficiency of a smart city . Besides the electricity one, water distribution systems are essential parts of every smart city. Conventional methods of water distribution from the water source to the customer premises are not suitable and efficient, especially for diagnosing any leakage in the pipeline or other parts of the system. Therefore, by deploying sensors at appropriate locations of the distribution system, it becomes an intelligent one for detection of any kind of faults or other applications. Water distribution systems have some parts including a water source like a lake or a river, storage facilities like reservoirs, and distribution networks like under- or aboveground pipelines which can be seen in Figure.



F-3.15-D- Smart water distribution

5. Transportation & Vehicular Traffic

- The vehicular traffic information is a substantial source of data in smart cities whereby utilizing the data and employing a proper analysis, residents and the government will profit significantly. Residents can utilize the vehicular traffic information to define the arrival times at their destinations. Monitoring the traffic congestion in the smart city by urban IoT should be implemented. However camera-based traffic monitoring systems are already available in many cities, they require more powerful communication infrastructure to provide more information. Traffic monitoring is conducted by sensing capabilities, GPS installed on modern vehicles and a mixture of air quality sensor and acoustic sensors along the given road.

6. Surveillance Systems

- Security is the most significant element of the smart cities from the citizens' point of view. To this end, the entire smart city has to be constantly monitored and observed, but evaluating the information and discovering criminal acts are highly challenging. new scenarios to boost smart cities´ security. Conventional closed-circuit television (CCTV) systems provide an infrastructure for smart surveillance systems. However they connected to a video recorder; do not have the capability of intelligent processing. Moreover, human operators may miss some scene and cause a fault. With smart surveillance, it is possible to monitor people's actions to find any violent act and even detect the people involved. Smart surveillance systems can alarm in case of any event of interest occurs. It can be used as guidance for the future design of pedestrian facilities or its modification through monitoring people's attitude and finding pedestrian traffic patterns.

Chapter:4
About Davad Village

4.1 Introduction:

4.1.1 Introduction About Davad Village details

- DAVAD is a village in Sabarkantha district in Gujarat state.
- Davad is located 22 km distance from its district main city Himmatnagar.
- Davad is located 70 km distance from its state main city Gandhinagar.

4.1.2 Justification/ need of the study :

- About 70% of India's population live in villages. More than 85% of these villages are in the plains or on the Deccan plateau. The average village has 200-250 households, and occupies an area of 5 sq. km. Villages are thus spaced 2-3 km apart, and spread out in all directions from the market towns. The market centers are typically spaced 30-40 km apart. Each such center serves a catchment of around 250-300 villages in a radius of about 15 km. As the population and the economy grow, several large villages are continually morphing into towns and market centers. The Next Two Billion People will live in cities and town; So We Need To Plan Now. Almost all future population growth in the next 40 years will be absorbed by cities of the developing world, which are unprepared for such rapid expansion. Planning needs to begin now to take advantage of the many benefits cities can offer.
- Around 65% of the State's population is living in rural areas. People in rural areas should have the same quality of life as is enjoyed by people living in sub urban and urban areas. Further there are cascading effects of poverty, unemployment, poor and inadequate infrastructure in rural areas on urban centers causing slums and consequential social and economic tensions manifesting in economic deprivation and urban poverty. Hence Rural Development which is concerned with economic growth and social justice, improvement in the living standard of the rural people by providing adequate and quality social services and minimum basic needs becomes essential. The present Project deals with the same.
- Vishwakarma is project of state of Gujarat. Vishwakarma project is for development of geographical area. Davad is developing village of Gujarat. It is placed nearer taluka Idar. Davad is village place so it is ideal for villages which is situated in this taluka. So in brief need of study is development of town and supply all facilities available at big city. It's project of urban planning and infrastructure development. During this project we collect data of davad city and during phase of project we design the structures as need of town. So need of study is how we will provide major facilities available at big towns and stop peoples to migrate from villages to the towns. By providing facilities of excellent education facilities, health facilities, and recruitment to the people of town we will prevent migration of peoples from small towns to big cities. So for shielding our indian culture and villages we've got to develop this small villages and towns instead of urban areas.

4.1.3 Study Area :

- Study area mainly includes the study of the village Davad which is located in Bayad taluka in Sabarkantha district of Gujarat state. It is about 22 km from Himmatnagar.
- The Vishwakarma Yojana is aimed to Rurban development of the village. For that purpose study area is decided for taking detail information of the village. The study area includes education, health and safety, drainage, transportation facilities, social life etc.

4.1.4 Objectives of the study :

- Creation of infrastructure – connectivity, civic and social infrastructure along with Provision of alternative livelihood generation are the key pillars.
- Basic Socio-cultural Infrastructure – Community hall, Public library, recreation facilities should be the priority focus and be provided.
- Basic Sustainable Infrastructure – Rainwater harvesting system, Bio gas plant, solar street light facilities, eco friendly toilet should be provided and ensure proper delivery of facilities to village dwellers.

F-4.1A-Satellite view of village

- Promote integrated development of rural areas with provision of quality housing, better connectivity,employment opportunities and supporting physical and social infrastructure.
- Basic physical infrastructure- water supply, transport, sewage and solid waste management should be the main concern focus and be provided.
- Basic social infrastructure- health and infrastructure facilities should be provided and ensure proper delivery of facilities to village dwellers.
- Promote integrated development of rural areas with provision of quality housing, better connectivity, employment opportunities ansd supporting physical and social infrastructures.
- Reduce migration from rural to urban areas due to lack of basic services and sufficient economic activities in rural areas.
- Internal road within village settlement, efficient mass transportation systems to improve connectivity between urban and rural areas, public transportation facilities that need to be developed like bus stops transport depot etc.
- Identification of sanitation facilities that need improvement-sewage and drainage line for household connection, door to door solid waste collection and dumping facilities.
- Electricity connections like street lighting that is energy efficient and eco-friendly.
- Promote integrated development of rural areas with provision of quality housing, better connectivity, employment opportunities ansd supporting physical and social infrastructures.
- To analyze all feasibility parameters and relevant factors for sustainable development of villages.
- To evolve strategic planning proposal in the form of Physical, Social And Renewable infrastructure facilities for the development of villages, channelizing urban growth and to sustain future.

4.1.5 Scope of the study :

- To ensure integrated development of village, people and environment by creating sustainable designs for all to optimum extent as possible.

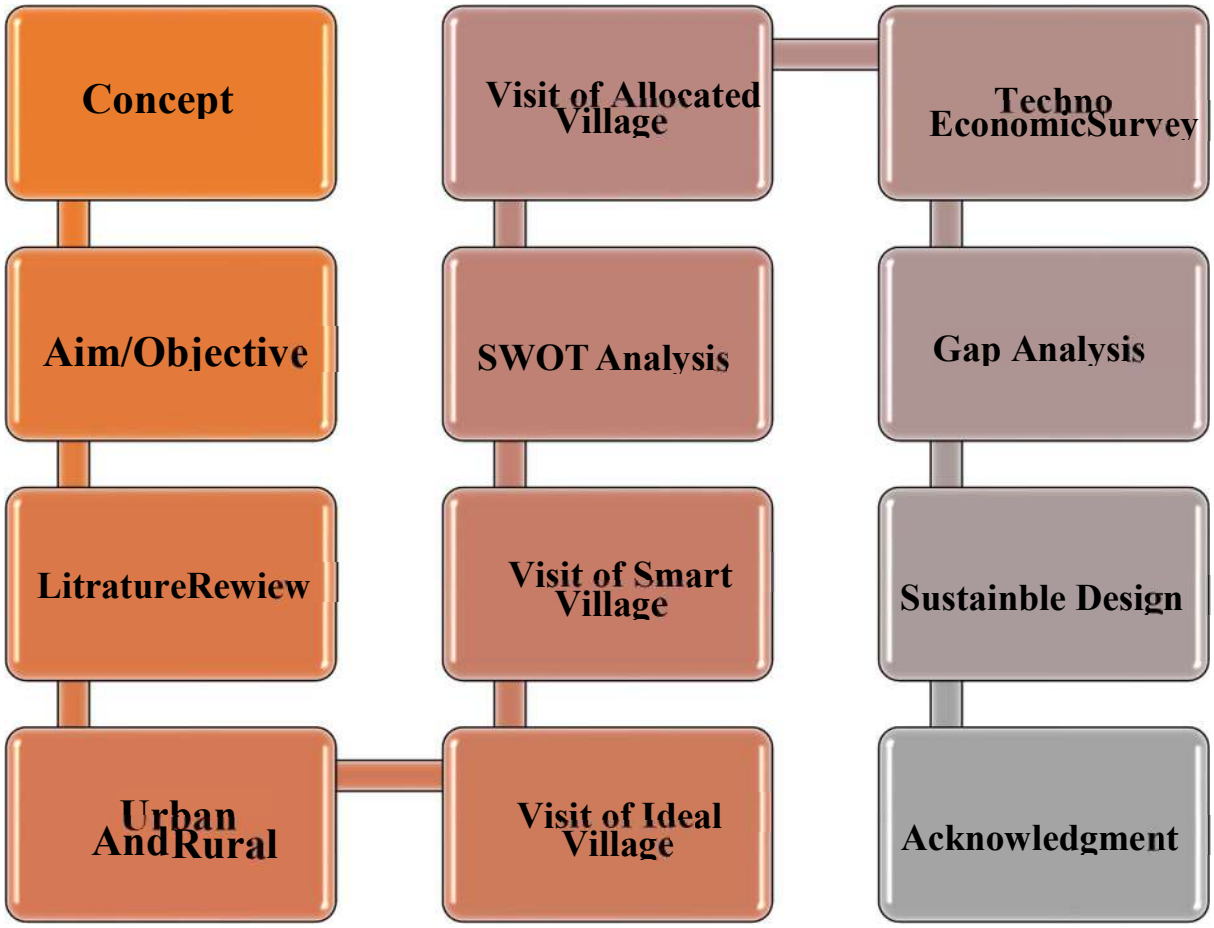
- The study will focus the development trend, intensity of growth of the village, and find out the problems related to the physical development of the area and infrastructure services of the village.
- Project proposal and sustainability aspect not consider in micro level; it is only guide way. The study focused to only following Village: Davad.
- The study will focus the development trend, intensity of growth of the village,find out the problems related to the Physical development area, infrastructure services,the administrative systems of the village. Project proposal & sustainability aspect not consider in micro level, it is only guide way. The study focused on the Davad village.
- The main scopes of the present study are:
  - Requirement of solid as well as liquid waste disposal facility & management.
  - Need to redesign & reconstruction of Primary school building and aaganwadi.
  - Need of Public Garden
  - Neeed Of public library

4.1.6 Methodology Frame Work for development of your village :

- The techno-economic survey of villages will be conducted in different districts of theGujarat state in terms of basic and public amenities, other infrastructural facilities.
- The project has been divided into three parts:
  - **Techno-economic survey of villages:** Collected all essential information from village such as: Household data, Occupational detail, Water facilities, Drainage facilities, Sanitation availability, Storm water network, Solid waste Management facilities, Electricity Networks, Recreation facilities, Education facilities, Health Facilities, Transportation facilities, Road network, Irrigation system, Use of non-conventional energy sources, Migration rate, Literacy rate and other necessary data.
  - **Development document preparation:** Plan and estimate of proposed development by assessing gap analysis
  - **Detailed Project report (DPR):** Preparation of development strategies and action plan.
  - **Data Analysis:** GAP analysis for all the selected villages were performed by comparing existing with the required facilities. Rural Planning guidelines were taken as a reference for providing infrastructure facilities.

4.1.7 Available Methodology for development of related to Civil/Electrical :

- SWACH BHARAT ABHIYAN Guidelines bygov.
- GAP Analysis of village
- Data of ideal village (Techo form of Punsari Village)
- SWOT Analysis of ideal village
- Data of smart village
- GOV. guideline regarding village developmen
- Outline MAP of Davad village
- Providing the quality utility services like power, water, sanitation, medical facilities and essential services such as education, healthcare, transportation, infrastructure (roads, railways, buildings, equipment) etc must be the primary strategy for the development of every village. Some of the utility services & facilities can be managed at a district level and others such as health care, schooling etc. need to be managed at village level for reasons of proximity and accessibility.



F-4.1-B-Available Methodology for development

- Investment of a climate region is defined as policy, institutional, and behavioral Environment, both present and expected, that influences the returns, and risks, associated with an investment. We perceive these as location specific factors like infrastructure, primary occupation of majority of people, nature of industries/business (SMEs) and finance inflow/outflow that impacts the investment and growth of the region. The village can be a tourist location, pilgrimage centre, or a place of historical importance i.e. forts, museum etc. Mines ,vallys, gardens, Forests, Ocean shores or River banks can be part of the natural environs of the village. So growth strategy of a village depends primarily on its investment climate. Hence the assessment of the investment climate of the village is the first step in design of a Smart Village.

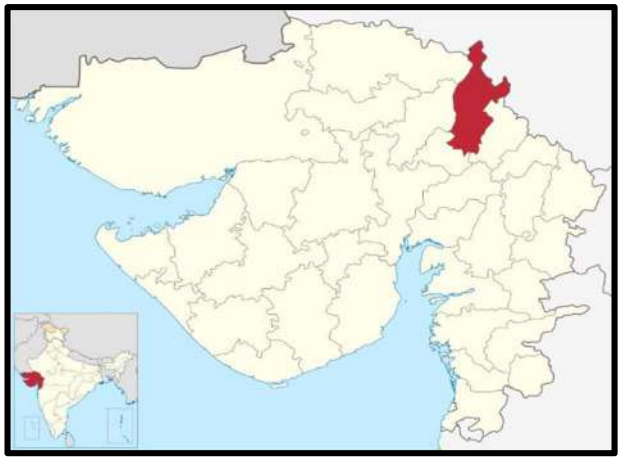
4.2 DAVAD Study Area Profile :

4.2.1 Study Area Location with brief History land use details :

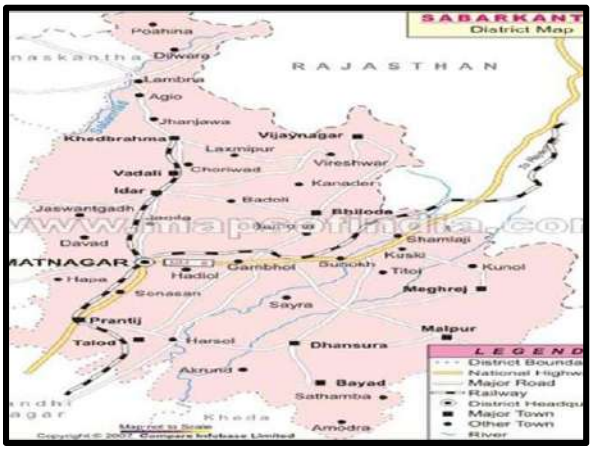
- Davad is a village in Idar Taluka in Sabarkantha district of Gujarat state India.
- It is located 22 KM toward North from District head quarters Himmatnagar .70 KM from state capital Gandhinagar.
- Davad Pin code is 383255.
- Davad is surrounded by vadali taluka towards North , idar Taluka towards East, Ilol Taluka towards South.
- Idar, Kheralu, Himmatnagar are nearby cities to Davad.
- The most of peoples of the village depend on agriculture.
- Himmatnagar rail way station are the very nearby

F- 4.2-C- Satellite Image Of Davad

4.2.2 Base Location map, Land Map, Gram Tal M



F- 4.2-A-Location Of Sabarkantha



F-4.2-B-Location of Davad Village

4.2.3 Physical & Demographical Growth :

4.2.3.1 Demographic Growth

Sr. No.	Census	Population	Male	Female	Growth rate(district)
i)	2011	3559	1856	1703	18.25%
ii)	2021	4150	2164	1986	16.62%
iii)	Projection in 2041	4839	2523	2316	16.62%

T-4.2-A-Demographic Growth

F- 4.2.3-A -Male and Female Population

4.2.3.2 Geographical Details of Davad Village

Sr.No.	Description	Information/Detail
i)	Area Of Village	1146.60.8(Hect.Ra.Sqm)
II)	Agriculture Land	506.91.18(Hect.Ra.Sqm)
III)	Residential Area	1146.60.8(Hect.Ra.Sqm)
Iv)	Nearest Town & Distance	Himatnagar -22KM

T- 4.2-B -Geographical Details of Davad Village

4.2.4 Economic generation profile / Banks

- Economic profile of Davad is good. Most of peoples income source are farming etc. Most of peoples live in Davad are depend of farming and some peoples have dairy farming also in side of farming.

4.2.5 Actual Problem faced by Villagers and smart solution

- During an interaction with people of Davad village we understood their problems and issues like:
- There is a waterlogging problem during rainy season,
- There is no Public Library available in the village,
- There is no RCC road in the village,
- Other than these the villagers have no any issues and they are satisfied with the work of Sarpanch and Talati of Davad village.

❖ **Smart solutions:**

- Pharmacy Store
- Cybercafe
- Supermarket
- Rain water harvesting
- Public garden
- Solid waste management
- Skill development center

4.2.6 Social scenario -Preservation of traditions, Festivals, Cuisine

- Davad village, people are not knowing about that basic facility provide by gov. also in the village basic crop are grown are of wheat and Pulses. village people are not that much connected with technology and digitalization. people basic income is connected with their agriculture product value and industrial area. people are also connected with another village and stay connected with culture. people are belonging to Hindu religion and celebrate all Hindu festival with good spirit like Diwali,Navratri, Ram Navmi etc

4.2.7 Migration Reasons / Trends

❖ Following reason of people are migrant in urban area

- Job opportunities
- Easy access to informal sector
- Higher Income
- Better Livelihood
- When a person is enumerated in census at a different place than his / her place of birth, she / he is considered a migrant. This may be due to marriage, which is the most common reason for migration among females-or for work, what is the case as generally among males, etc. It also happens that many return to their place of birth after staying out. To capture such movements of population census collect information on migration by last helps to understand the current migration scenario better. In India, as per census 2001, about 307 million person have been reported as migration by place of birth. Out of them about 259 million (84.2%), migrated from

one part of the state to another, i.e., from one village or town to another village or town. 42 million (2%) from outside the country. The data on migration by last residence in India as per Census 2001 shows that the total number of migrants has been 314 million. Out of these migrants by last residence, 268 million (85%) has been intra-state migrants, those who migrated from one are of the stateto another. 41 million (13%) were interstate migrants and 5.1 million (1.6%) migrated from outside of the country.

4.3 Data Collection Davad village(Photograph/Graphs/Charts/Table)

4.3.1 Describe Methods for data collection

- Base line survey is a benchmark for any intervention during and post implementation of any development programme. A detailed baseline survey was undertaken which involved household census survey, Bio-physical survey and Village level data collection from Sarpanch. This gave in the details of the demographic profile of the village, the literacy percentage, SC/ST population, cattle population and net consumption rate in the village, average milk production of the cattle and various schemes running and their benefits Bio- physical survey was undertaken to identify various natural resources available in the village. It included the soil typology, well in the area, crop taken in the field, Cropping pattern, fertilizer used and various sources of irrigation in the field.
- Individual interviews.
- Interviews can be conducted in person or over telephone.
- Interviews can be done formally or informally.
- Questions should be focused , clear , and encourage open ended responses.
- They should be qualitative in nature.

❖ **Focus groups**

- A facilitated group interview with individual that has something in common.
- Gathers information about combined opinions.
- Responses are often coded in categories and analyzed .

❖ **Observations - Field trips**

- Allows for the study of the dynamics of a situation , frequency counts of target behavior.
- Good source for providing extra information about a certain group , can use videography.

❖ **Questionary Survey**

- Responses can be analyzed with quantitative methods by assigning numerical values to like type scales
- Results are generally easier to analyze.
- Other than this survey forms are prepared which are distributed to responders to record their opinions , data so that it can be analyzed.

4.3.2 Primary details of survey

- Davad is a village in Idar Taluka in Sabarkantha district of Gujarat state India. It is located 22 KM toward North from District head quarters Himmatnagar .70 KM from state capital Gandhinagar. Davad Pin code is 383255. Davad is surrounded by vadali taluka towards North , idar Taluka towards East, Ilol Taluka towards South. Idar, Kheralu, Himmatnagar are nearby

cities to Davad. The most of peoples of the village depend on agriculture. Himmatnagar rail way station are the very nearby railway station to Davad. Primary Details of Survey Include the raw data required like

- Land Map
- Census Details
- Infrastructure Details
- Geographical Details
- Need of villagers

4.3.3 Average size of the House - Geo-Tagging of House

- Average size of the house in the village is 5 X 10m. Geo Tagging is not implemented in Davad village.

4.3.4 No of Human being in One House

- On an Average Survey of Village No of Human being in One House is Approximately 5 to 7 people.

4.3.5 Material available locally in the village and Material Out Sourced by the villagers

- The materials like milk, grocery materials, wheat, Vegetables and other agricultural products are. used locally

4.3.6 Geographical Detail

- Davad Village with Census of India Village-code is located in Sabarkantha district in Gujarat, India.
- State code : 24
- District code : 472
- Taluka code : 383430
- Davad village managing by gram panchayat which is located in Davad.

Sr.No.	Description	Information/Detail
i)	Area Of Village	1483.2.4(Hect.Ra.Sqm)
II)	Agriculture Land	1210.0.0(Hect.Ra.Sqm)

T- 4.3.6A- Area Of Land

4.3.7 Demographical Detail:

Sr.No.	Census	Population	Male	Female	Growth rate(district)
i)	2011	3559	1856	1703	18.25%
ii)	2021	4150	2164	1986	16.62%
iii)	Projection in 2041	4839	2523	2316	16.62%

T- 4.3.7-A-Male And Female Growth

4.3.8 Occupational Detail - Occupation wise Details / Majority business

Name of the Major Occupation Groupsin Villages	**Agriculture**
	Laborers
Name of the Major Crop Grown in theVillage	**Wheat**
	Pulses

T-4.3.8-A- Occupation

4.3.9 Agricultural Details / Organic Farming / Fishery

- Majority of the population of Kamrol village are occupied in farming. The main crops grown in the village are: wheat, cotton, rice, etc. There are no any farmer or villager using organic farming or fishery.

4.3.10 Physical Infrastructure Facilities - Manufacturing HUB / Ware Houses

- Transportation facilities are Government bus service is available from main highway road. Local transportations are autorickshaw, chagdaa, private vehicles are available. . One overhead tank is available. Also primary school , healthcare facilities are available in village . There are no any ware houses or manufacturing hub activities active in village.

4.3.11 Tourism development available in the village for attracting the tourist

- No tourism in this village.

4.4 Infrastructure Details (With Exiting Photograph)

4.4.1. Drinking Facilities / Water Management Facilities in the Village

- For drinking Purpose one Over Head water tank and Sump is available. Some people also use hand pump for water purpose. But condition is, only 60000 lit elevated water tank available.

4.4.2. Drainage Network& Sanitation

- Village is having closed Drainage Lines and The condition of Drainage is overall good. The village is not having any Facilities for Solid Waste management.

F- 4.4-A -Dustbin

F- 4.4-B-Dumped Garbage

4.4.3. Transportation& Road Network

- Peoples commute by using GSRTC, jeep and Auto rickshaw.
- Some people do use private vehicle for their transport.
- Road network in village is very poor.

Main Road	The Village Main Road is Available.
Internal Streets	There is no bitumen road available .

F- 4.4-C -Internal Road

F- 4.4-D-Approach Road

F- 4.4-E -Main Road

4.4.4. House Condition

- The Houses in Davad Village are made of Brick, Sand, Cement, Concrete .The number of Pucca houses are more than the Kutchcha houses. Most of houses are in good conditions. ome houses are even Double storey and well-constructed.

F- 4.4-F- House

4.4.5 Social Infrastructure Facilities, Health, Education, Community Hall, Library

❖ Health Facilities:

- There is one PHC Centre available in Davad village.
- In the village no PHC, CHC, dispensary or any kind of private clinics are available in the village.
- The villagers go to jarod village for any kind of health facility.

F- 4.4-H-Public Health Care Centre

❖ Education system:

- There is Aanganwadi in the and primary school.
- Davad village has 1 Anganwadi and 1 primary school. Primary School is managed by Local body.
- The school consists of Grades from 1 to 8. The school is Co-educational and the school have an attached playground section. Gujarati medium of instructions in this school.
- This school is approachable by all-weather roads. school is Government building.
- It has got 8-10 classrooms for instructional purposes. As per the observation classrooms are in good condition. The school has a separate room for Head master/Teacher.

F- 4.4-I-Primary School

4.4.6 Existing Condition of Public Buildings & Maintenance of existing Public Infrastructures.

- In village existing public building like panchayat building, school, PHC are in good conditionand they don't required maintenance. Anganwadi required maintenance as well as Post Primary school branch required maintenance.

F-4.4-J –Anganwadi

F- 4.4-K-Gram Panchayat

4.4.7 Technology Mobile / Wi-Fi / Internet Usage Details in %:

- In village 60 to 65 % use smart phone, among which 20 to 25% use a normal phone and rest of people are still having less knowledge of phone. Youth of Village have knowledge of internet and its usages.

4.4.8 Sport Activity as Gram Panchayat

- No activity of sports is conducted by gram panchayat but School Conduct Sport Activities.

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

- Public Library: There is no Public Library in the village.
- Public Garden: There is no Public Garden in the village.
- Village Pond: There is one pond or lake in the village.
- Community Hall: There is one community Hall in the village.
- Temples: In village at Present 1 temple in village.

4.4.10 Other Facilities /4.4.11 Any other Details

- There is one Panchayat Building in the village.
- There is one Post Office Building in the village.
- There is one Bank and one atm in the village.
- There is one Milk Co-operative Society in the village.

F- 4.4-L- Temple

F- 4.4-M-Lake

F- 4.4-N-Post Office

F-4.4-O-Dairy

F- 4.4.P-Bank

F- 4.4.Q-Bank ATM

4.5 Electrical Concept

4.5.1 Renewable energy source planning particularly for villages

- India is one of the largest countries in the world, where the people's occupation is predominantly agriculture and most of the population lives in villages. Many of these villages are remotely located and their connectivity with the grid is very difficult resulting in their being not electrified at all or lack of continuous supply. For the development of the region, there is every need to utilize energy efficient techniques and potential of available renewable energy resources. An economic solution can be achieved by proper energy management making the village self sustained in its energy requirement. By employing existing but well proven energy conversion techniques, these resources can be used for various energy requirements for basic needs like electricity, cooking, water heating etc.
- The aim is to generate electric power, produce cooking gas and other forms of energy locally and distribute them within the village effectively. Based on a survey conducted in an Indian village named "Bacharam" situated near Hyderabad in India, this attempts to identify the available resources like agro-waste, animal dung, and solar energy. The regular resource usage pattern has been studied and an effective solution has been proposed for proper usage to meet the daily energy requirements. Community biomass plant, biogas plant, solar cooker and heater are proposed as feasible solutions for the needs of the village.

1) Solar Water Heater:

- The solar water heating system can be installed on rooftop, building terrace as well as ground as suitable to the region. The heater is effective when the sun rays penetrate through a toughened glass and fall on the absorber. The heat of the sunrays is absorbed by the cold water inside the absorber thereby increasing its temperature. The water temperature can be raised up to 85 degrees Celsius. Some of the evident advantages of the system are:
- No environmental pollution at all.
- Large amount of firewood and other conventional fuels saved.
- Plenty of time saved as there is no need to regularly collect the wood.

F-4.5.1-A-Solar Water Heater

2) **Biogas Plant:**

- There are numerous models of biogas plants but the most important and familiar types used in India are fixed-dome and floating-drum plants. The fixed dome plant has been dealt with in the section due to some advantages over the floating drum type. A fixed-dome plant is a dome-shaped digester with an immovable, rigid gas-holder The gas is stored in the upper part of the digester. When gas production commences, gas pressure increases with the volume of gas stored. For the construction of fixed dome plants, local materials can be used.
- Simple in design and is compact.
- Long life of the plant of about 20 years or more.

F-4.5.1-B- Biogas Plant

4.5.2 Irrigation Facilities

- Since India is a country with an important agricultural sector, and over 55% of population is dependent on agriculture, many state governments are offering incentives to ensure availability of water for irrigation purposes, such as: State government of Punjab (Northern India) are offering free electricity for ground water pumping. Moreover, states of Gujarat and Maharashtra (Western India) offer high subsidy for solar pumps. Variations in irrigation intensity are due to among others varied geographical conditions in different parts of the country.

- **Well water irrigation system:**

- Wells are abunduntly found in the states of U. P., Bihar, Tamil Nadu, etc. There are various types of wells like shallow wells, deep wells, tube wells, artesian wells, etc. Shallow wells water are not always available as the level of water goes down during the arid season. Deep well is more suitable as such type of well always has water irrespective of time. A deep tube well worked by electricity, can irrigate a much larger area (about 400 hectares) than a surface well (1/2 hectares).

F-4.5.2-A-Well water irrigation system

- **Reservoir water irrigation system**:

- In near Hyderabad areas, water-reservoirs a
water bodies. Such structures are referred as d
of Tamil Nadu, Andhra Pradesh, and Karnat
water are constructed for storing water. From
through canals.

4.5.3 Electricity Facilities with Area

- Electricity in the village is provided by UGVCL (Uttar Gujarat Vij Company Limited.) .
- Electricity is available 24*7 in the village.
- Street Light is also provided by Government .

4.6. Existing Institution like - Village Administration – Detail Profile:

4.6.1 Bachat Mandali

- Village has no bachat mandali. So required a small scale bachat mandli in village.

4.6.2 Dudh Mandali

- Village have small dudh mandali but Condition of Dudh Madali is not great physically.

4.6.3 Mahila forum

- Village has no Mahila Forum .

4.6.4 Plantation for the Air Pollution

- In a village every year plantation program is arranged by industrial group and panchayat.

4.6.5 Rain Water Harvesting

- No facility of rain water harvesting in a village.

4.6.6 Agricultural Development

- The agriculture activities are supported by Canal irrigation.

Chapter 5

Technical Options with Case Studies
(FOR ANY ONE TOPIC, Take a new concept design , prototype model with actual costing)

5.1 Concept (Civil)

5.1.1 Advance Sustainable construction techniques / Practices and Quantity Surveying

- Sustainable construction is the practice of creating a healthy environment that's based on ecological principles. According to Professor Charles J. Kibert, sustainable construction focuses on six principles: "conserve, reuse, recycle/renew, protect nature, create non-toxic and high quality."
- The goal is to reduce the industry's impact on the environment by utilizing sustainable development practices, employing energy efficiency, and taking advantage of green technology.
- Although many different business sectors are doing what they can to be more sustainable, the construction sector is unique because it has the chance to significantly affect the way these practices are applied. This is because of the large amounts of materials and energy that the industry uses.

❖ **Methods:**

- Sustainable construction isn't just about using the newest materials; it's also about using building methods that enhance renewable and sustainable efforts. Some of these methods include:
- Cutting materials precisely in order to reduce waste
- Controlling waste management, such as separating and recycling waste
- Constructing green buildings
- Adaptive reuse projects that transform old buildings
- Managing construction sites to improve the environment

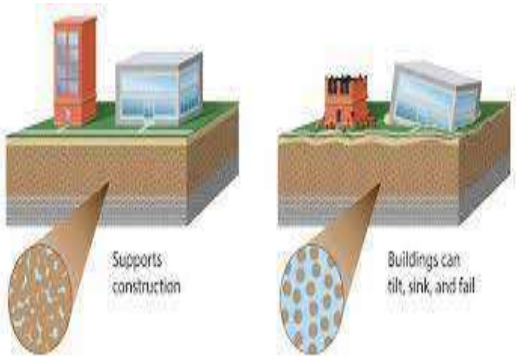
F-5.1.1-A-Advance Sustainable construction techniques

❖ **Challenges of Sustainable Construction:**

- Although the benefits to sustainable construction an overnight process. It takes time and preparation to be implemented in order to start practicing sus money.
- Another obstacle that many companies may come across is the actual principal cost of sustainable construction. The general consensus is that sustainable construction comes at a premium and the cost is higher than what the demand actually is, despite the evidence to the contrary.
- Nevertheless, as more interest in sustainability efforts continue to rise, more construction firms are making the switch to sustainable construction, with green building activity on the rise.

5.1.2 Soil Liquefaction

- Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. Liquefaction and related phenomena have been responsible for tremendous amounts of damage in historical earthquakes around the world.
- Liquefaction occurs in saturated soils, that is, soils in which the space between individual particles is completely filled with water. This water exerts a pressure on the soil particles that influences how tightly the particles themselves are pressed together. Prior to an earthquake, the water pressure is relatively low. However, earthquake shaking can cause the water pressure to increase to the point where the soil particles can readily move with respect to each other.
- Liquefied soil also exerts higher pressure on retaining walls,which can cause them to tilt or slide. This movement can cause settlement of the retained soil and destruction of structures on the ground surface (left, GH)
- Increased water pressure can also trigger landslides and cause the collapse of dams. Lower San Fernando dam (left, SC) suffered an underwater slide during the San Fernando earthquake, 1971.



F-5.1.2- Soil Liquefaction

❖ Effects of Liquefaction

- Liquefaction phenomenon can result in many e ey are:

- **Sand Boiling**

- When liquefaction occurs below the surface that below the surface makes the water to break out like a b . This is called as sand boiling.

- **Failure of Structures under Earthquake**

- Liquefaction followed by earthquake forces make the structures to lose its stability. They can either split or lean bringing complete collapse of the structure. Past earthquake records have shown a huge failure of building structures due to liquefaction. These hazards do not provide enough time for evacuation that it results in a huge loss of life and property. Read More: Effect of Soil Liquefaction on Pile Foundation

❖ Methods of Reducing Soil Liquefaction Hazards

- There are basically three methods of reducing liquefaction hazards:

- **By Avoiding Liquefaction Susceptible Soils**

- Construction on liquefaction susceptible soils is to be avoided. It is required to characterize the soil at a particular building site according to the various criteria available to determine the liquefaction potential of the soil in a site

- **Build Liquefaction Resistant Structures**

- In certain situations, the construction over a land which shows the chances of liquefaction are not avoidable. Hence, foundation structures constructed must be designed such a way to resist the effects of liquefaction. The major reasons for constructing structures over liquefiable soil are space restrictions, favorable conditions, and other reasons.

5.1.3 Sustainable Sanitation

- Sanitation has been always neglected area at local, regional, national and international level. The recent statistics declared that India is the most populated open defecated country i.e. 660 million people in rural and urban do not have access to safe sanitation, besides most town, cities, mega cities in India face serious problem in providing adequate sanitation, sewer and waste water management systems, collectively producing more than 27,000 million liters of waste water per day. The continuous declining of fresh water quantity and quality (from 3400 cu m/cap to 1967 cu m/cap over last 50 years) is a major cause of concern.
- It is also estimated that by 2025, India will be water stress country which may lead to conflict between three major users of water i.e. Agriculture, Industrial and Domestic. Thus innovative, decentralized, cost effective, environment friendly and energy efficient solution treating the waste as close to the source and reusing the same after proper treatment, there by taking care of environment is the need of an hour! Hence ESF in cooperation with gtz, Germany and seecon International Switzerland started to work along with pilot demo model to disseminate the kno roach focusing to school to the future generations, th open defecation free and livable cities in India. ESF i rural, peri-urban and urban areas focusing to agricult illage project, sanitation plan for pilgrimage town and u odies with participatory approach and cost effective sustainable sanitation solution.

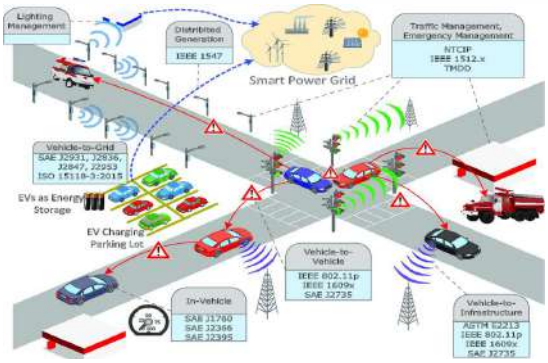
F-5.1.3-A- Sustainable Sanitation

❖ **The challenge:**

- While India has made remarkable economic progress over the last decades and invested heavily in sanitation, the country ranks number 148 out of 176 nations for rural sanitation coverage with improved latrines according (WHO/UNICEF, 2010), with an estimated 23% of the rural population covered. Using the Indian census data of 2011, for improved latrines (sewer, septic tank, improved pit latrines) which estimates rural coverage of 27.6%, India would still have ranked an astonishing 144 out of 176 countries.
- Coverage figures alone do not give the whole picture, as actual use of the facilities and sustained behaviour change are crucial elements for reaching desired NBA results. A key element of the TSC policy was the acknowledgement that the construction of a toilet does not automatically lead to its actual use and that people need to be motivated to abandon practicing open defecation. There is also evidence that sustainability is a challenge: In 2008 UNICEF reviewed 162 NGPs that had been declared ODF between 2005 and 2007. This study found that in most GPs there was a sharp decrease in efforts for social mobilization and monitoring of ODF status after the NGP award has been received. Data suggest that sanitation services have not benefited the poor, rural population to the extent intended. Another challenge for the sector is related to human capacity development. In 2002, a national study commissioned by the Planning Commission (Planning Commission, 2002) identified the need to
- build capacities of states;
- improve promotion of sanitation and hygiene awareness;
- increase participation of communities in decision-making processes;
- provide external support for communities to deal with “internal” threats such as conflicts, poor leadership, equity issues, and theft.

5.1.4 Transport Infrastructure / system

- As per the 2011 census, rural areas account for 69 percent of India's total populationTherefore, improved connectivity and accessibility to rural areas will provide a vital impetus to the country's economic growth. Development of rural infrastructure in general and rural transport infrastructure in particular is very crucial in India. Rural road connectivity ensures access to critical services and opportunities, and fosters sustainable poverty reduction programs as well as employment generation through industrialization in rural areas. It is estimated that 20-30 percent of the agricultural, horticultural and forest produce gets wasted because of either inadequate rural road network or poor condition of roads, which creates an impedance for transporting such commodities for the user needs. Rural road accounts for 60 percent of the total road length in India. While the total rural road length was only 3,54,530 kilometres in 1970-71, it has increased to about 24,50,559 kilometres in recent times. These statistics corroborate the importance given to the development of rural roads as part of the overall development of the country. Furthermore, research suggests that public investment in infrastructure, specifically in the rehabilitation of rural roads, improves local community and market development. Studies on rural road development in several countries reported rise in male agricultural wages and aggregate crop indices (Bangladesh), increase in the availability of food, the completion rates of primary school and the wages of agricultural workers (Vietnam), etc. However, studies on Indian rural roads are almost non-existent.
- The necessity of a proper road network for the socioeconomic development of rural India and consequently the whole country was understood quite early in India. The first road development plan of 1943-61, popularly known as Nagpur Plan, looked at the road needs of the country on a long-term basis, and for the first time classified the road system into a functional hierarchy comprising National Highways (NH), State Highways (SH), Major district roads (MDR), Other District roads (ODR) and Village roads (VR). The last two classes of roads form the rural road system in the country. The third road development plan known as Lucknow Plan (1981-2001), estimated rural road requirement for the country and had spelt out various measures to develop rural roads.



F-5.1.4-Transport Infrastructure / system

- Challenges of Developing Rural Road infrastructure India has a rural road length of about 2.7 million km which is about 80 per cent of the total road network. The serviceable condition of this is crucial to the rural / agricultural growth and affording means of access to millions of rural people to social facilities viz. medical, education as also to market. Lack of maintenance affects the poor people badly as the time for access to markets and other social infrastructure is increased. Hence, the challenge lies in both expansion of the network to provide road links to unconnected habitations and at the same time maintenance of the existing vast rural road network built at huge cost to the economy over the past over fifty years. The Thirteenth Finance Commission (FC) has specifically made provision for maintenance funds for the core rural roads network including for PMGSY roads that have completed their initial five-year maintenance contracts. Among several issues to be addressed for ensuring maintenance of rural roads on sustainable basis, the most critical one are need for Government Policy, dedicated funds, maintenance backlog, linkage to initial construction, Maintenance Management System, institutional reforms, contract maintenance, Panchayati Raj Institutions, modernization, experience sharing etc.

5.1.5 Vertical Farming

- Indoor farming is an open secret and the concept is no newer now, per se, greenhouse-based farming has been in practice for years and various herbs, food plants, such as strawberries, tomatoes, cucumbers etc., can be seen in supermarkets to consume year round. The operation of producing vegetables, fruits and herbs are exercised in predominantly single-storied structure in a monitored and regulated atmosphere but it is unable to meet ever increasing food requirements. Therefore, this conventional farming has been replaced by the concept of vertical farming propounded by Prof. Dickson Despommier to produce more yields to feed the burgeoning population .

❖ **Used Technology**

- Vertical farming (VF) can be judged as an extended form of in- door farming, which is exercised in multi-storeyed buildings of urban or periurban areas. The concept facilitates the cultivation of fruits, vegetables, medicinal, fuel producing plants and other plants in vertical stacks in cities, where the shortage of arable land strips is the major cause of concern. VF also assists to reduce transportation cost, cuts the emission of greenhouse gases and utilizes small tracts of land efficiently and further, it promotes the reduction in food prices and the consumers may get fresh fruits and vegetables at their door step in mega cities.

❖ **Case Study :**

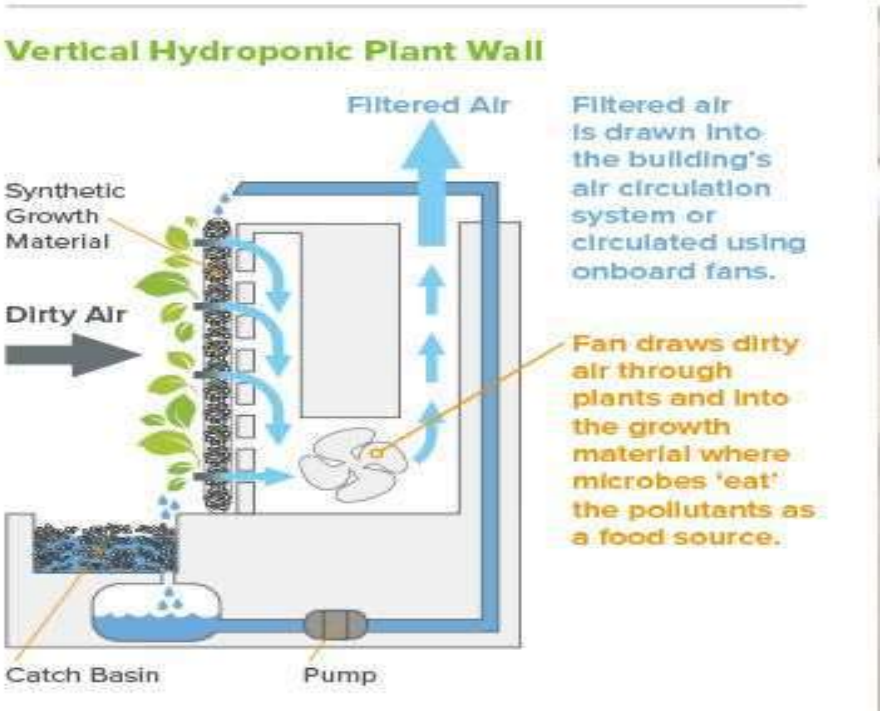
- **Hydroponics**

- Picture of Vertical Farming is shown. It is situated at on large land Located in Revas village.
- We visited for analysis of vertical farming and had discussion with owner about cost-benefit ratio of vertical farming , life span etc.
- Hydroponics or hydro-culture is a soilless indoor farming in a controlled atmosphere. Plants are supplemented the nutrients, which are dissolved in sterile water and the solution of nutrients passes through the routes of the plants and inundate them regularly. According to the experts, the growth rate of the plants are higher in hydroponic cultivation system because the nutrients are engrossed by the plants immediately. Accessibility of fresh vegetable, off season production, high nutrition value, least use of water are the few attributes, which make hydroponics indispensable to vertical farming

F-5.1-A-Vertical Farming

- In this soilless cultivation, plants are grown using liquid nutrients and the nurturing cum developing process of the saplings and grown up plants pass through various steps. At the very first, an artificial atmosphere in a greenhouse is needed to be built to nurture the plants and for that, steel frames and Ethylene tetra flouro ethylene (ETFE) membrane can be assembled to construct the conservatory. ETFE is a translucent plastic polymer membrane and it has much better qualities than glass.

- Now, these new plants are all set to be planted into mesh net pot cups, which is full of pea gravel and finally the net pot may be transferred into tote tub, which is full of liquid nutrients. Pea gravels act as an anchor to provide support to the roots and provide an excellent porous medium for the roots to heave and grow. The solution of the nutrients is prepared depending on the requirements of the plants. Usually, seventeen elements are needed for the proper growth of the plants, nine of these elements are macro nutrients (i.e. carbons, hydrogen, oxygen, sulfur, phosphorus, calcium, magnesium, potassium, and nitrogen) and are required in comparatively large amount, whereas the staying eight elements are trash elements and known as micro nutrients and needed in minute amounts, these are as follows: iron, zinc, copper, manganese, boron, chlorine, cobalt, and molybdenum.
- Hydroponics offer a big advantage as they are usually installed in close or semi-close loops that return the excessive water with the enriched nutrient solution back to a collective tank in order to re-distribute it back to the cultivation area. In contrast to the hydroponic solutions, traditional farming experiences huge amounts of resource and water waste as farmlands face the negative effects of soil degradation and the harmful effect of eutrophication (when nutrients from agricultural land create massive increase of phytoplankton populations leading to reduction of oxygen and nutrient reduction of from water and suffocation of multicellular water organisms). Unfortunately, in traditional agriculture, excess supply of phosphates and nitrates in the soil can cause nutrient run/off and leaches. Furthermore, the close or semi-closed loop of hydroponics categorizes them as more efficient in terms of sustainability process for water efficiency in comparison with traditional farming where most of the water is drained to lower levels of soil that plants cannot access.



F-5.1-B-Model Of Vertical Farming

❖ **Benefits or advantages of Vertical Farming**

- Due to proper management of environmental parameters, herbicides or pesticides or fertilizers are not required. Hence the crop production is organic and healthy.

- They have potential to yield more in small places compare to traditional farming.
- They reduce CO2 emissions/pollution by decreasing reliance on coal-burning power plants and eliminating use of vehicles to transport food over long distances. Moreover vertical farms use renewable sources of energy which has many benefits.
- Water can be used more effectively in a vertical farm.
- It reduces deforestation and land use to a minimum. This reduces erosion and hence leads to less flooding.
- No weather issues and hence no crop failures due to droughts, floods etc. Hence it helps in getting year round crops.
- It is possible to have such farms in traditionally difficult environments such as tropics, arctic, space, moon etc.
- Another important upside of vertical farming is that crops can be harvested all year long. In contrast to outdoor farming where harvest time is only a few weeks or months, crop yields from vertical gardening are much more stable.
- In general, through vertical farming, far fewer crops are lost to pests and other adverse circumstances compared to conventional outdoor farming. This implies that crop yield through vertical farming will be higher and fewer crops are lost during the growth process.
- Since the conditions inside vertical gardening systems regarding humidity and lighting can be altered as desired, there is also the possibility to grow quite exotic plant species that could not be grown through conventional outdoor farming.
- This gives farmers greater flexibility to meet the demand of people regarding certain crops and may also increase their profits due to this high level of flexibility to adjust to the market.

❖ **Disadvantages of Vertical Farming**

- Following are the drawbacks or disadvantages of Vertical Farming:
- They rely on data collected from sensors in order to maintain ideal growing conditions.
- Initial cost of installation is not attractive to the developers.
- It leads to potential loss of traditional farming jobs.
- It displaces entire agricultural societies.
- Only limited variety of plants or vegetables can be grown.
- This is due to the fact that all plants are not suitable to be grown in the controlled and limited environment.
- There are also significant maintenance efforts related to vertical farming. Since the conditions inside the farming system are controlled in an artificial manner through lighting and altering the humidity level, some of the devices that are used to control these parameters may break down over time.
- Thus, these devices have to be replaced and over time, this may imply serious maintenance efforts and costs.

❖ **Cost Analysis**

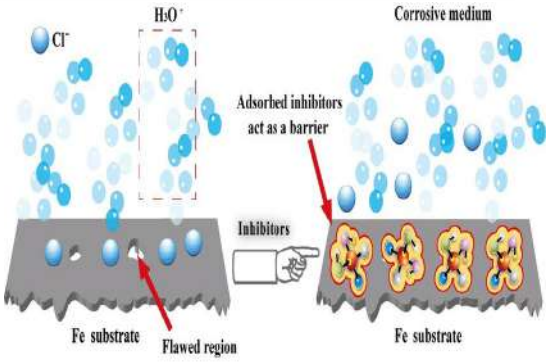
- **Investment** required in one acre land for hydroponic farm will be around Rs **110 lakhs** to Rs **125 lakhs**
- **Temperature controlling system** - **9.5 lakhs** to **13 lakhs** it may increase while installing full automated system (to manage temperature according to the crop).
- **NFT System** - Rs **30 lakhs** to **35 lakhs**
- **Poly House Cost** - Rs **57 lakhs** to **60 lakhs**
- **NVPH Cost** - Rs **36 lakhs** to **39 lakhs**

5.1.6 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure

- Though concrete is quite strong mechanically, it is highly susceptible to chemical attack and thus structure gets damaged and even fail unless some preventive measures are adopted to counteract this and thereby increasing the durability of structure. In the case of Reinforced concrete structure the ingress of moisture or air may lead to corrosion of steel, cracking and spalling of concrete cover thereby reducing durability of concrete structure . Repair has been suggested as the protective solution for damaged structure due to corrosion. The successful repair of concrete in the long term depends on a number of factors including correct diagnosis, carefiil selection of appropriate repair material and accurate methodology of material application .

❖ PROTECTIVE SOLUTION AND ITS MECHANISM:

- The damage to concrete due to corrosion of reinforcement has been recognized as one of the most serious causes for durability problem over the last several years. Research has given rise to a variety of concrete corrosion protection measures in both new concrete and in repair of damaged concrete. Epoxy based thin coating has been found to be extremely effective except few drawbacks. The innovative method of corrosion protection is the development of a two component anti-corrosive coating ofrebars which has all the positive features ofepoxy coating excluding all the short comings of the same. For corrosion not to occur it is necessary that the alkalinity around the rebar is high.
- The various component have been so designed in this cementitious product that the alkalinity around the rebar is increased to the tune of 13. Specific reactive fillers reduces the permeability of protective coating over rebar. Selective polymer in the formulation increases the bond between coating and rebar and also makes the coating more impenetrable to polluting gas. Thus the increased corrosion inhibiting property of the coating helps in achieving a durable and successful repair of corrosion affected concrete structures.



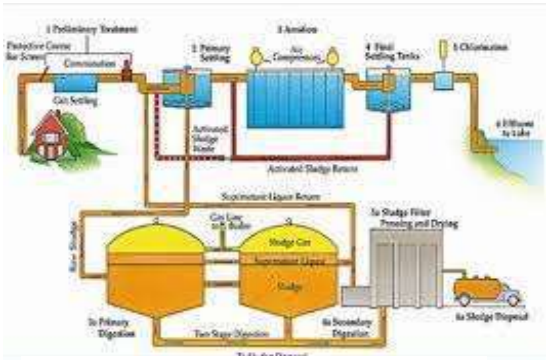
F-5.1.6-Corrosion Mechanism

❖ PROTECTIVE MATERIAL

- Concrete protection is a complex system. Repair i on affected concrete structure. In carrying out repair v ld structure and new repair materials which will restric od repair mortar should have following properties.
- Lowest shrinkage
- High tensile creep
- Low modulus of elasticity
- Low coefficient of thermal expansion
- Impermeability.
- High tensile and flexural strength
- High chemical resistance
- High bond strength
- High flexibility By adding accurate granulometry of aggregate, keeping water - cement ratio to the lowest possible, suitable quality of cement for the job and appropriate polymers in right proportion we may incorporate the above properties to repair mortar to achieve that.

5.1.7 Sewage treatment plant

- In a sewage treatment plant, waste or contaminated substances are treated with various means and produce purified substances that are safe and reusable in the process or discharge to the environment.
- Without the correct treatment plant, an industry can suffer from scale formation, corrosion, fouling in the cooling system, and it may be a source for harmful bacteria. The proper conditioning of water can increase efficiency, span plant life and plant safety.
- The treatment plant involves three stages:
- Primary treatment – Solids are screened and settled out of the wastewater. They flow through a screen and then typically flow to a grit chamber and sedimentation tank.
- Secondary treatment – Bacteria and other small organisms consume the waste and help clean the water. This is done through an activated sludge process and then to another sedimentation tank to settle impurities.
- Tertiary treatment – This is needed to remove additional pollutants like nitrogen and phosphorus.



F-5.1.7-Sewage treatment plant

- Disinfection – This is usually done with chlorine to kill more than 99% of harmful bacteria.

❖ Benefits of Sewage treatment plant

- **Low-Cost**

- Wastewater systems can last for up to 15 years if they are maintained correctly. They provide a very cost-effective means of treating water and keeping unwanted bacteria at bay. There are many grants and other forms of financial aids available now to help you with the cost of purchasing a wastewater system.

- **Minimal Odour Emissions**

- In comparison to earlier systems, modern waste water systems eject minimal odours. Something which often put people off investing in a septic tank or similar system is because they could not stand the odours it could often protrude. With modern systems, once they are cared for correctly, odours are not an issue.

- **No Water Bills**

- Water charges are an unfortunate reality in many countries in today's world. If you have your own wastewater system on your property, you do not have to worry about water bills. Pumping water into the system costs very little too, so you certainly save on costs in this regard.

- **Break Down Solids Faster**

- Most modern wastewater systems are aerobic systems which have the ability to break down solids much faster than older systems. Therefore blockages become less of an issue, de-sludging is required less frequently and less solids contaminate the groundwater and drainage field.

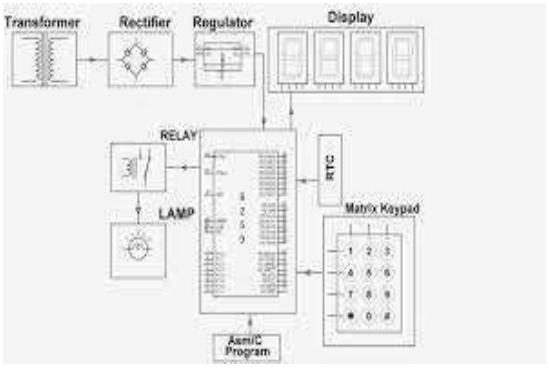
❖ Disadvantages of a sewage treatment plant

- The plant needs a constant supply of electricity to run
- Will require professional maintenance annually, and in the unlikely event of problems
- Design and installation of the system needs to be undertaken professionally

5.2 Concept (Electrical)

5.2.1 Programmable Load Shedding

- For proper functioning of the complete distribution system, the power generation system must be operated in the stable condition. The stable condition is defined as the power generated by the system must be completely utilized in running and remaining in losses so that equation may become valid. Reserved power + power generated = System Running power + losses. But the problem may arise if there is an extra demand in the Load, which will make the system unstable during demand time. This will affect the system stability and the demand will also not get fulfilled because of a specific range of pre-installed generation system which cannot generate more than its capacity.
- Hence we say there serve power for critical/extra loading is not possible. Thus it becomes very important to shed the Load of some zones to meet the demand of other zones and providing next time to those which were shed before. Since, till now, Load Shedding was done manually but if done using "Programmed devices" to control, it may prove more efficient. The reason is that the entire substation can be controlled by a single controlled substation and command can be transferred from single centered substation to ease the work of different person.



F-5.2.1-Programmable Load Shedding

- Thus after completely cutting the power from a particular zone, no one can access power from any other nearby locations under the restricted zone, but with manual handling at substation people try to steal the connection from other active connections of nearby zone but when this new technology is employed, it completely cuts off the total power available in that zone.
- The biggest problem is to deal with the assembly of various components including feeders, distribution points, etc all at a time, therefore to meet the problem a single centered station designed with Programmable Load Shedding system to operate them all from a single location. Therefore a system has to be designed which can control the supply over specific period of time for every zones. Thus "Load shedding time management system using microcontroller" is a reliable system to monitor the on/off of electrical devices as per the time. Real time clock system interfaced with 8051 microcontroller. When the set time matches the real time, the microcontroller gives command to the respected relay to turn on/off the load.

❖ ADVANCEMNENT & FUTURE SCOPE

- This project could be further extended in which the distribution point can be monitored by one central location. The supply of concerned geographical region is cut off using relays through circuit breaker. In this system to read the remote electrical parameters, user can send commands to concerned DP.
- In this type of power system sensors are used to communicate with the microcontroller. Internal memory in the microcontroller helps to hold the assembly code. . Some set of assembly instructions are dumped into the controller using internal memory.
- Assembly instructions are very important as the operation of the micro-controller is completely dependent on these instructions. This proposed system might takeover manual efforts for controlling the load shedding time break by sending SMS. Power supply cut off of specific zone can be done by just sending an SMS to the concerned Distribution Point from a central point .

5.2.2 Railway Security System using IoT

- Due to the continuous development of the highspeed railway lines and the growth of automatic systems, it is becoming more and more necessary to install safety elements to prevent accidents. For that purpose, this project proposes the design of a multisensory system, which consist of infrared (IR) and ultrasonic (US) sensors, which are placed at opposing sides of the railway tracks, respectively, in order to establish optical and acoustic links between them. When the train arrives at the particular location then the details about that train will be given from the database. Now, check the train details, if match then and only then, the parameters will be measured and the speed of train regarding to that parameters will be sent to the loco pilots display.
- Also, the time required that present train to pass that location will be measured. On the basis of these all parameters, the allowable speed of the train at that particular location will be sent to the loco pilot. In addition, all these information will be sent to the database. Now, information about train will be sent to another train which will be next arrived at that location. If there is any change in parameters, then according to that parameters allowable speed of train will send to that trains loco pilot.

F-5.2.2-Railway Security System using IoT

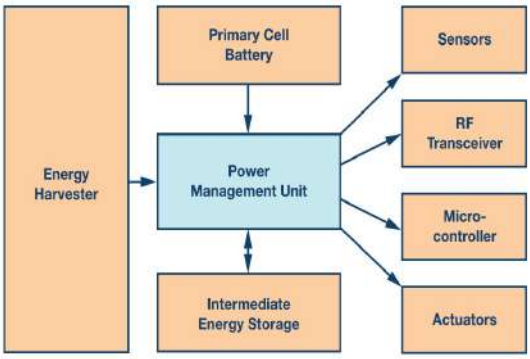
- Manufacturers are connecting things to before we referred to as it the web. By the mid-1990s, Web servers were being added to embedded products. Current M2M makers are desegregation Internet-connected systems into high-value plus trailing, alarm systems, fleet management and the like for more than 15 years. These M2M systems area unit difficult to create despite the fact that some area unit supported trade commonplace protocols. However, it's obtaining easier to integrate M2M systems as additional powerful processors area unit incorporated into the tip nodes. And since these processors support high-level in operation systems (OSes) and languages, the platform can leverage intelligent frameworks.
- The edifice wherever I even have a reservation is aware of I am returning and also the approximate time of my arrival as a result of I even have allowed Apple and Google to trace my location. It also knows that I am hot and sweaty from my trip because of the temperature and moisture sensors that are part of my smart watch. The bedroom i'll keep in is presently dormant (no lights, drapes closed, the temperature is at optimized dormant levels). Upon my arrival, the valet is aware of it's Pine Tree State.

❖ **Some of the technology initiatives that were announced by government:**

- Open Wi-Fi would be made available at 400 railway stations across the country
- Digitised mapping of Rail land will be initiated to counter encroachment.
- An integrated customer portal is being put in place for customers to access various railway services at one place
- An ‘Operation five minutes’ will be introduced for issuing unreserved tickets. Under this facility, ticketless passengers can get regular tickets within five minutes of entering station. Unreserved ticket purchase is also expected to be made simpler through smart phones and debit cards
- SMS alert service would be introduced to inform passengers about train arrival and departure
- Mobile charging facility would be made available in all trains and stations. The facility will be extended to general coaches as well.

5.2.3 Management through Energy Harvesting Concept

- Energy harvesting is commonly defined as the conversion of ambient energy into electrical energy1 . This definition is too narrow. We define energy harvesting as "the collection and storage of ambient energy for on-demand, off-grid use". The first definition considers only the transducer technology for energy conversion, and assumes that the energy must be converted to electricity. Our definition takes a broader, application centric view, where the transducer is one component of a complete system that provides power for those niche applications where other sources of energy are unavailable or unsuitable. Ambient energy Energy is all around us, in many different forms – thermal, chemical, electrical, mechanical and more.
- To make use of energy harvesting one or more of these energy fields must be present in the environment of interest, and there must be a suitable transducer to convert the energy. Off-grid energy Energy harvesting is used where another supply of energy is not available. Harvesters cost money, so it only makes sense to use them when it is too expensive or physically impossible to use other energy sources such as grid electricity or batteries. On-demand energy An energy harvester has to supply power when it is needed, not simply when it is available, and some form of energy storage is generally required to match the demand with the supply.



F-5.2.3-A-Management through Energy Harvesting Concept

- Energy harvesting – a great solution Energy harves
- There is a match between the available energy and
- Energy harvesting provides a benefit that is not acl

Industrial condition monitoring At a large oil pumping station, there are thousands of pieces of vibrating machinery. Knowing the operating conditions prevents failures and downtime, increases performance, and reduces costs.

- Wired sensor networks with miles of cabling can be expensive to install, and regular battery replacement for thousands of sensors is possibly even more expensive. A network of autonomous vibration powered, wireless sensors provides a "fit and forget" solution to the problem of data collection. Powering remote infrastructure A bus stop becomes more useful with an electronic bus information display. In remote areas, the information is even more useful, but grid electricity is expensive to install because of the distance, and single use batteries wouldn't last very long. A generator would be noisy and need to be maintained. The most economical way to power the display and associated electronics is a solar panel and / or small wind turbine, together with a rechargeable battery and power management electronics.
- Wireless sensor networks Sensors rarely need much energy, so that readings of flow rate, temperature, humidity and pressure can be taken with small amounts of harvested energy. Transmitting those readings with newly developed efficient wireless communication protocols then allows that information to be used to save money by early diagnosis of problems and planned maintenance. Wireless tyre pressure sensors Monitoring tyre pressure allows for reduced fuel consumption and safer driving, but there's no route for power cables from the battery to the tyres. Battery powered sensors with wireless data transmission don't last long enough, so introduce a maintenance overhead for battery changing.
- Vibration energy harvesting from the regular impacts as the wheel rotates provides the best solution for powering the sensors. Pipeline actuators In an industrial gas pipeline, or a steam

pipe distribution system, plenty of energy is available. Thermal energy can be harvested using maintenance free solid state thermoelectric transducers.

- The energy can be used to open and close valves without the need to run cabling to the actuators. Other suitable applications
- Road / rail side traffic signs and monitoring using solar panels and wind turbines.
- Remote environmental sensing
- Wind scoop on a lorry to provide autonomous container tracking

- Self powered wireless light switch for retrofit dimming without rewiring or battery replacement
- Solar powered mobile phone base station in Africa
- Keeping batteries topped up on small boats

❖ **Challenge of Application**

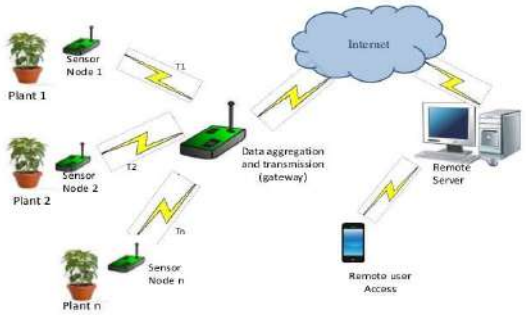
- The application of EHES mainly faces the problem of safety. There are two main limiting factors, and they may cause several potential security risks. These problems are mainly caused by environmental factors. Firstly, the energy obtained from the environment is difficult to predict, that is, the amount of electricity generated is random, and when the harvested energy is converted into electric energy, there is a low conversion rate.
- If the EHES is transmitting data, data loss may occur. Secondly, due to differences in physical environment or harvested energy, for example, there are corrosive substances in the environment and energy, which can damage the hardware, the EHES will be damaged and will stop operating .
- These limiting factors are potential sources of threats to EHES. When devices are powered by energy harvesting sources, they face other threats from attackers who can change the environment. For example, the RF source may be blocked and the device cannot send their data . There have been researches on attacks and privacy .

❖ **Challenge of Energy Management**

- The most persistent and critical challenges in EHES are related to energy management, such as system scheduling, energy consumption, energy harvesting, and energy distribution. Compared with battery-powered embedded systems, the energy supply of EHES is unpredictable and unreliable. In this case, how to ensure the normal scheduling of system tasks is a signification problem.
- In this regard, many researchers have proposed various approaches, for example, global controller track the optimal operating point of the photovoltaic panel, state of charge management for the supercapacitor, and energy harvesting real-time task scheduling with DVFS in the embedded device the time constraints of battery-powered embedded devices are extended to energy constraints a new strategy was designed in conjunction with traditional battery-powered embedded system scheduling algorithm after considering energy attributes. Energy consumption has always been a long-term problem for embedded systems.
- Due to the power supply problem of the EHES system, the traditional battery-powered embedded system method cannot be used for EHES. Usually, researchers combine energy harvesting with traditional methods to form new methods . Moreover, energy harvesting needs to consider how to stably and efficiently convert the collected energy. Lastly, how to reasonably supply power to embedded devices distributed in different geographical locations is a challenge currently facing energy distribution. At present, the main method is to use reinforcement learning for configuration.

5.2.4 Moisture Monitoring System

- India is known as land of farmers. It gives more importance to farming as agriculture contributes a lot in the economic growth of the country. Weather is very important for growing crops and should be monitored for proper growth and good quality of crops. The farmers have to adopt the modern technology to have better yield and quality crops. In order to help the farmers we decided to make this automatic water supply using microcontroller. The main aim of this project was to provide water to the plants or gardening automatically using microcontroller (Arduino Uno). We can automatically watering the plants when we are going on vacation or don't we have to bother my neighbors, Sometimes the Neighbors do too much of watering and the plants end up dying anyway. There are timer based devices available in India which waters the soil on set interval. They do not sense the soil moisture and the ambient temperature to know if the soil actually needs watering or not. Assimilation is that the artificial application of water to the land or soil it is used to assist in the growing of agricultural crops, maintenance of landscapes, and revegetation of disturbed soils in dry areas and during periods of inadequate rainfall.
- Wireless Sensor Network (WSN) is the technology, in which the data collected from the field of interest is transmitted through wireless link. WSN can be used in various fields such as monitoring, wireless measurements, controlling, etc. In the field of precision agriculture and organic farming, it is important to continuously monitor the fields as they are site specific.



F-5.2.4-Moisture Monitoring System

- Monitoring plant health is essential which enriches the productivity of food grains. Soil moisture is one of the primitive factor for plant health. The water that remains in soil as a thin film aid in supplying nutrients to the plant growth[1]. The main objective of this, is to establish a plant soil moisture monitoring system which enables the user to monitor the plant health remotely. For wireless communication, Zigbee technology is used to collect data which is then transferred to the server. In order to increase the lifetime of WSN, Event Detection Algorithm (EDA) is adopted.
- Moisture content of the soil is a major factor determining plant growth1, especially in irrigated systems. Currently there are many and varied methods for determining soil water content on a volume basis or a tension as described by Gardener. The basic objective of irrigation scheduling is to minimise water stress of the plant, that of over irrigation, and under irrigation.

- **Types of Soil Moisture Measurement**
  - **The Neutron Probe (NP):** The technique is based on the measurement of fast moving neutrons that are slowed in the soil by an elastic collision with existing Hydrogen particles in the soil. Hydrogen (H+) is present in the soil as a constituent of 1. Soil organic matter 2. Soil clay minerals 3. Moisture content
  - **Tensiometers:** Portable and stationary tensiometers measure the soil moisture content as a tension or pressure ranging from 0 to -100 kPa). Tensiometers fundamentally act in a similar fashion to a plant root measuring the force that plants have to exert to obtain moisture from the soil. As the soil dries the water is lost from the tensiometer via a ceramic cup. The loss of water creates a vacuum in the tensiometer and is reported as a pressure reading, the drier the soil the higher the pressure reading.
  - **Oven drying method:** The soil sample is dried in hot air oven at 1050 C until constant weight is obtained and dry weight of the sample is recorded. Moisture content (on weight

basis) = Wet weight-Dry weight X 100/ Dry weight.

- Thus the "Automated Irrigation system based on soil moisture using Arduino" has been designed and tested successfully. It has been developed by integrated features of all the hardware components used. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit.
- Thus, the Arduino Based Automatic Plant Watering System has been designed and tested successfully. The system has been tested to function automatically. The moisture sensors measure the moisture level (water content) of the different plants. If the moisture level is goes to be below the desired and limited level, the moisture sensor sends the signal to the Arduino board which triggers the Water Pump to turn ON and supply the water to respective plant using the Rotating Platform/Sprinkler.
- When the desired moisture level is reached, the system halts on its own and the water Pump is turned OFF. Thus, the functionality of the entire system has been tested thoroughly and it is said to function successfully.

❖ **Advantages**:

- Irrigation and watering play a substantial role in determining the quality and yields of farming. More appropriate is the process of watering of the fields, more favorable are the end results.
- Time saving.
- No need Extra work Hard.
- Save Water, Accordingly our Requirement of water, depends upon water level quantity soil and crops.
- Money Saving (Electricity bile + Water).

❖ **Disadvantages**

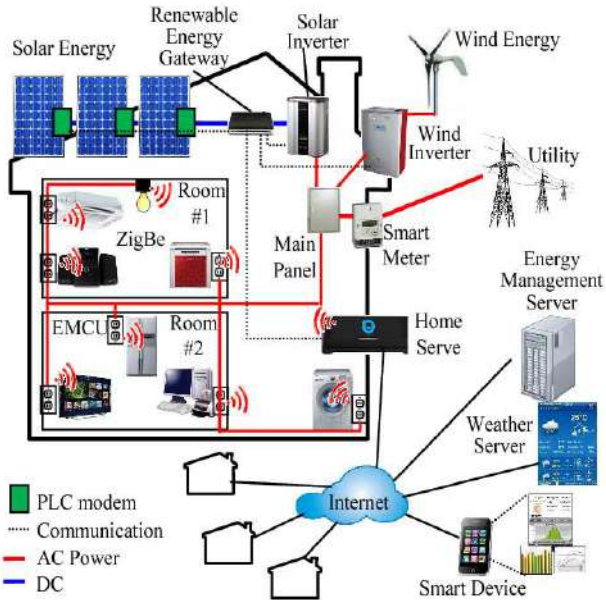
- It requires initial evaluation of site specific conditions before selection of appropriate moisture sensor.
- It requires probe to be inserted in the soil. It requires labor to collect the data and maintain the measurement processes.
- The measured values depend on properties of various materials. The correct interpretation and use of moisture data is needed.
- Watermark sensors provide less accuracy in sandy soils due to large particles.
- Watermark sensors are required to be calibrated for each soil types. Tensiometers also require periodic service.

5.2.5 Home Automation using IoT / Any other methodology

- home automation has three major parts:
- hardware
- software/apps
- communication protocols
- each of these parts is equally important in building a truly smart home experience for your customers. having the right hardware enables the ability to develop your iot prototype iteratively and respond to technology pivots with ease.a protocol selected with the right testing and careful consideration helps you avoid performance bottlenecks that otherwise would restrict the technology and device integration capabilities with sensors and iot gateways.
- another important consideration is the firmware that resides in your hardware managing your data, managing data transfer, firmware ota updates, and performing other critical operations to make things talk.

❖ **Application:**

- lighting control
- hvac
- lawn/gardening management
- smart home appliances
- improved home safety and security
- home air quality and water quality monitoring
- natural language-based voice assistants
- better infotainment delivery
- ai-driven digital experiences
- smart switches
- smart locks
- smart energy meters
- let's have a look at what you should expect from a typical iot platform:
- device security and authentication
- message brokers and message queuing
- device administration
- data collection, visualization, and simple analysis capabilities
- integrability with other web services
- horizontal and vertical scalability
- websocket apis for real-time for real-time informatic



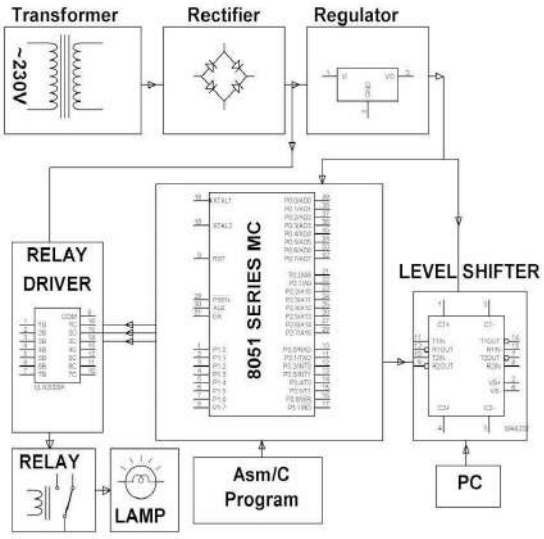
F-5.2.5-Home Automation using IoT

❖ **home automation sensors**

- there are probably thousands of such sensors out the
  this is an introduction towards smart home technolo
  down iot sensors for home automation by their sensing capabilities:
- temperature sensors
- lux sensors
- water level sensors
- air composition sensors
- video cameras for surveillance
- voice/sound sensors
- pressure sensors

5.2.6 PC Based Electrical Load Control

- A Personal computer (PC) based home control appliance is the use of control systems at homes, in the offices and in industries to reduce human efforts. Home control appliances have greatly decreased the need for human sensory and mental equipments and plays an important role in the world economy and in daily experience. It is more efficient and stress-free (Coyle et al 2007). Home and office appliances, including television, VCRs, stereo equipment, refrigerators,, washing machines, thermostat, light switches, telephones, copiers and factory equipment, have embedded computers and often come with remote controls.
- However, the trend has been that as appliances get more computerized with more features, their user interfaces get harder to use (Dickey et al 2012). PCs are commonly used with better input-output capability than the average home appliance, such as high-resolution screens, text-entry technologies and speech capability. PC.s are likely to maintain this advantage over appliances, because improved hardware is a key differentiator between PC and is often marketed as an incentive to upgrade to a new PC.
- All PC has the ability to communicate over the Local Area Network (LAN) and most have built-in short range communication capabilities, such as Bluetooth, that could allow them to communicate with and control appliance in their surrounding environment. PC laptops are also personal devices, which allow th (Koyuncu 1995, Nunes and Delgado 2000, Srisk



F-5.2.6-PC Based Electrical Load Control

❖ **Advantages**

- Not tied to any one hardware platform
- Fast communication between controls programming and equipment
- Supports more programming languages

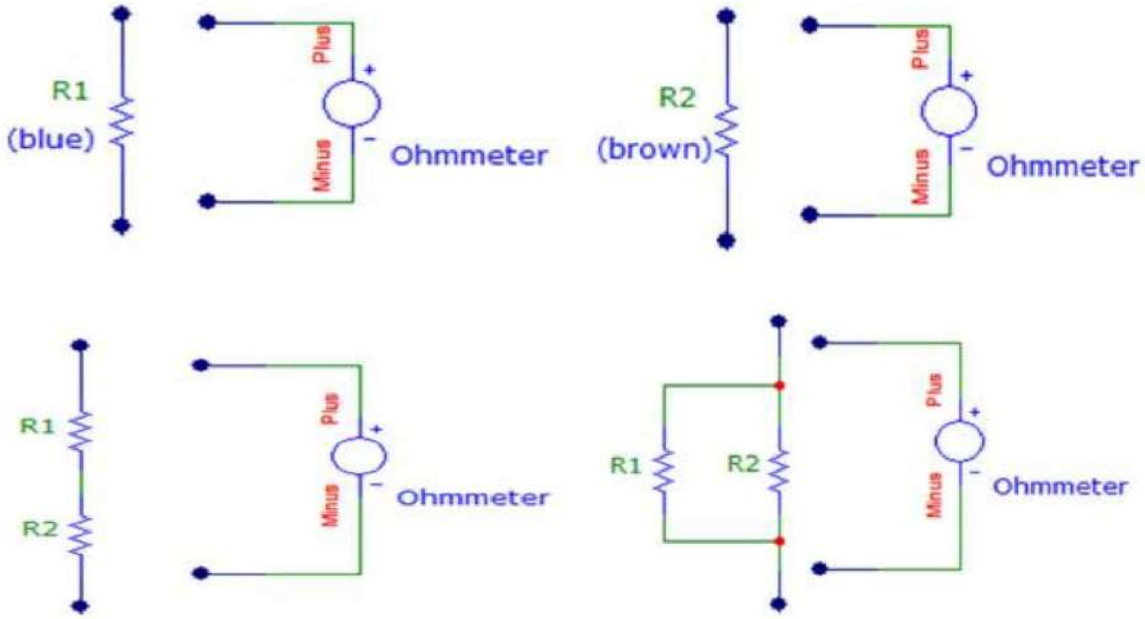
❖ **Disadvantages**

- Difficult to upgrade as new versions of Windows are released
- Difficult to implement system changes down the road because it is hard to find controls engineers familiar with the platform (You tend to be locked into using the OEM as they have the "specialists" necessary for implementation.)
- Long-term product support, which ties back to the various version of Windows that the PC-based controls must support
- For which power monitoring and controlling system like this will be very efficient. In this project the range is limited up to 100m but we can increase it as per requirement. Also the number of loads can be increase in future.
- This project can further be developed by using Internet of Things which is going to be the next major breakthrough in technology. In few years every home will have a smart meter installed in them.
- Along with the other features of the smart meters, this feature can be added to benefit both the consumer as well as the energy supplier.

5.2.7 Electrical Parameters Measurement

- Measurements of electric arc parameters are normally made with canventional electromechanical instruments with the tacit assumption that the measurements are mean values. This may be a close approximation in the case of dc arcs supplied from a battery or from a rectified and smoothed dc source. It is, however, not true for dc arcs in plasma torches, arcs supplied with unsmoothed dc, ac arcs used for welding, or in arc furnaces where effects due to nonlinear variation of arc voltage with arc current, sudden random fluctuations in arc voltage, and high frequency components of the arc voltage occur. Electricity supply authorities use electrodynamic instruments to measure power and kVA in arc loads which, as arc fumaces, are among the largest single loads in the country, again assuming that mean values are obtained in this way.
- Possible sources of error in these assumptions which may have important effects on process control and operating costs, are examined. Some methods of measurement are shown to be subject to errors not normally appreciated, and are of little value, except for comparative purposes. Methods of minimizing errors are also considered.
- Optical parameters bring detailed information about structural features of a photovoltaic (PV) cell. Precise measurement and calculations allow estimating band gap energy, free carriers generation and photo-generation charge transfer kinematics to the respective electrode and from the electrode outflow.
- Thus, final electrical parameters like resistivity (thermal-dependent), open-circuit voltage V0 and short-circuit current Is can be estimated numerically, too. However, there exist uncertainties at quantum particles level. Thus, the only real measurements of electrical parameters bring a proofs about newly designed materials efficiency . Current-voltage I − V characteristics measurement and power-voltage P − V conversion verify PV cell electrical efficiency. On that account, a real PV cell is measured at standard conditions, ie in the lab using solar simulator equipment, at known both irradiance intensity and standard spectral distribution specified by air mass AM1.5 Global filter usually at 1000 W/m2 light power. Based on theoretical approach with respect to experiments, this analyses I − V electrical parameters acquisition needs when measuring a PV silicon cell, as well as P − V and efficiency estimation, to reveal troubleshooting and accuracy of these procedures. In a PV cell, solar photons bring their energy greater then band-gap energy into thin film semiconductors junction and create proportional quantity of electron-hole pairs to conduct the electrical current .
- Besides of incident irradiation intensity, the material wafer band-gap energy determines electrical current value a lot. While higher photons energy causes particles recombination and extinction of some pairs, lower photons energy causes energy transmission and temperature changes into material. Due to nonlinear I − V characteristics of any PV cell, it is necessary to design it for maximum power or electrical efficiency. Due to wafer structure and surface finish thinning, different phenomena are observed with novel silicon materials. Computer modelling might be used to fill in discontinuities over I − V characteristics, gaining in real PV cell sparse data matrix approximation and optimization. Consequently, PV cell parameters can be obtained from accurate computer model for any supposed realistic conditions.
- Generally, a PV cell as an elementary PV electrical energy source, is described by equivalent electrical circuit - a five-parameter model. Maximum electrical power Pm at the output of a PV cell and electrical efficiency η , with respect of its fill factor f are given as follows Pm = VmIm = V0Isf, η = Pm Pin (1,2) Electrical parameters estimation of any real silicon PV cell is based on measurement of I − V characteristics, by ASTM E948-09 standard test method using a reference PV cell under simulated sunlight.measured and the true value including the statistical systematic error A (it outgoes from series of repeated determinations) and a random error B (associated with the instruments and calibration).

- No doubt that accurate five-parameter model of a PV cell is sufficient enough for most Si cells yet. Nevertheless, novel Si cells dispose of considerable phenomena that invoke electrical field intensity growth, charge transfer kinetics quantizing, tunnelling charge improving within dielectric layers and, electrical parameters modification.
- When measuring a real PV cell in the lab using solar simulator equipment, both irradiance intensity and irradiance spectra must be set well to achieve near-realistic measurement outputs. During I−V electrical parameters measurement process, maximum preciseness is required. If I − V , P − V characteristics, F F and efficiency calculation methods are applied to predict the behaviour of any unknown either experimental PV cell, panel or array under wide range of operating conditions and physical parameters changes, statistical analysis should be applied to validate reliability of obtained electrical parameters.



: **F-5.2A-Circuit Diagram**

Chapter:6

Swatchh Bharat Abhiyan (Clean India)

6.1 Swatchhta needed in allocated village -Existing Situation with photograph

- In a village a need of swatchhta is more because unavailability of solid waste management like collection of waste collection dustbin and management of that waste. Due to this village people throw all waste around the village border. This is real issue of villagers the disposal of waste.

F-6.1A- Existing Sanitation Condition In Davad

6.2 Guidelines - Implementation in allocated village with Photograph

- "A clean India would be the best tribute India could pay to Mahatma Gandhi on his 150 birth anniversary in 2019," said Shri Narendra Modi as he launched the Swachh Bharat Mission at Rajpath in New Delhi. On 2nd October 2014, Swachh Bharat Mission was launched throughout length and breadth of the country as a national movement. While leading the mass movement for cleanliness, the Prime Minister exhorted people to fulfill Mahatma Gandhi's dream of a clean and hygienic India. Shri Narendra Modi himself initiated the cleanliness drive at Mandir Marg Police Station. Picking up the broom to clean the dirt, making Swachh Bharat Abhiyan a mass movement across the nation, the Prime Minister said people should neither litter, nor let others litter. He gave the mantra of 'Na gandagi karenge, Na karne denge.' Shri Narendra Modi also invited nine people to join the cleanliness drive and requested each of them to draw nine more into the initiative. By inviting people to participate in the drive, the Swachhta Abhiyan has turned into a National Movement. A sense of responsibility has been evoked among the people through the Clean India Movement. With citizens now becoming active participants in cleanliness activities across the nation, the dream of a 'Clean India' once seen by Mahatma Gandhi has begun to get a shape.

❖ **Village have following thing implemented:-**

- Use of toilets and Maintenance of it.
- Inclusion of water and sanitation issues in Gram Panchayat Development Plan (GPDP).
- Hygiene education.
- Toilets for all households and institutions.

❖ **Village have Certain Draw Backs:**

- Solid waste management
- Public toilet
- Surveillance of water bodies
- Water supply scheme.
- Environment management framework

6.3 Activities Done by Students for allocated village with Photograph

- We avoided throwing waste in open and always used dustbin.
- We interacted with village people and tried to spread awareness regarding Swatch bharat abhiyan.
- We proposed Solid waste management design for the allocated village.
- We also planned to carry out awareness campaign but due to Covid-19 we didn't get permission still we will conduct campaign in future.

Chapter:7

Village condition due to Covid-19

7.1 Taken steps in allocated village related to existing situation with photograph

- They Maintain social distance with people.
- Use of mask and sanitizer.
- Maintaining hygienic condition.
- Avoided travelling.
- Drinking immunity booster.
- Avoided Public gathering.

7.2 Activities Done by Students for allocated village Clean with Photograph

- We have taken a permission from Talati and Sarpanch for doing one awareness regarding covid 19 in the Kamrol village and then we did awareness camp regarding covid 19. In that awareness camp we have distributed some face masks to the villagers for the protection against covid 19 and aware them about covid 19 situation in India and told them to take precautionary measures like wear a mask perfectly, wash hands regularly, maintain social distancing in public and avoid crowdy area & firstly make yourself home quarantined if you fill any COVID-19 symptom in your body.

F-7.2-A-Covid 19 Awareness Activity Photos

7.3 Any other steps taken by the students / villagers

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

Chapter:8

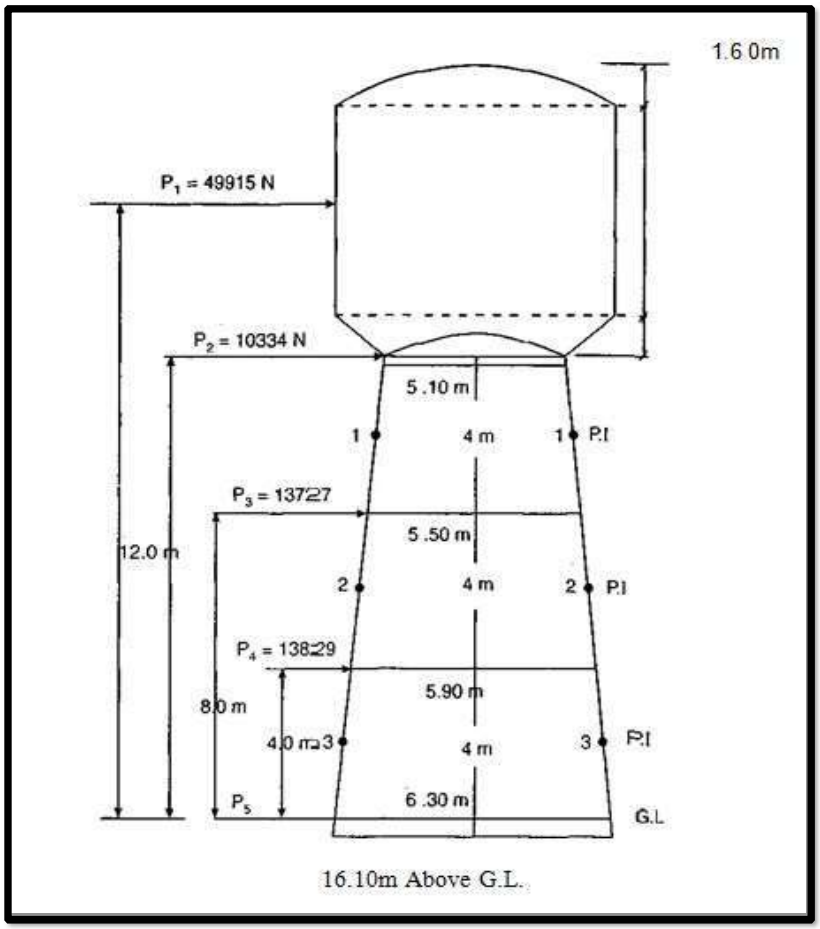
Sustainable Design Planning Proposal (Prototype Design)- Part- I (Scenario / Existing Situation / Proposed Design in Auto cad / Recapitulation Sheet / Measurement Sheet / Abstract Sheet / Sustainability of Proposal / Any other software)

8.1 Design Proposals

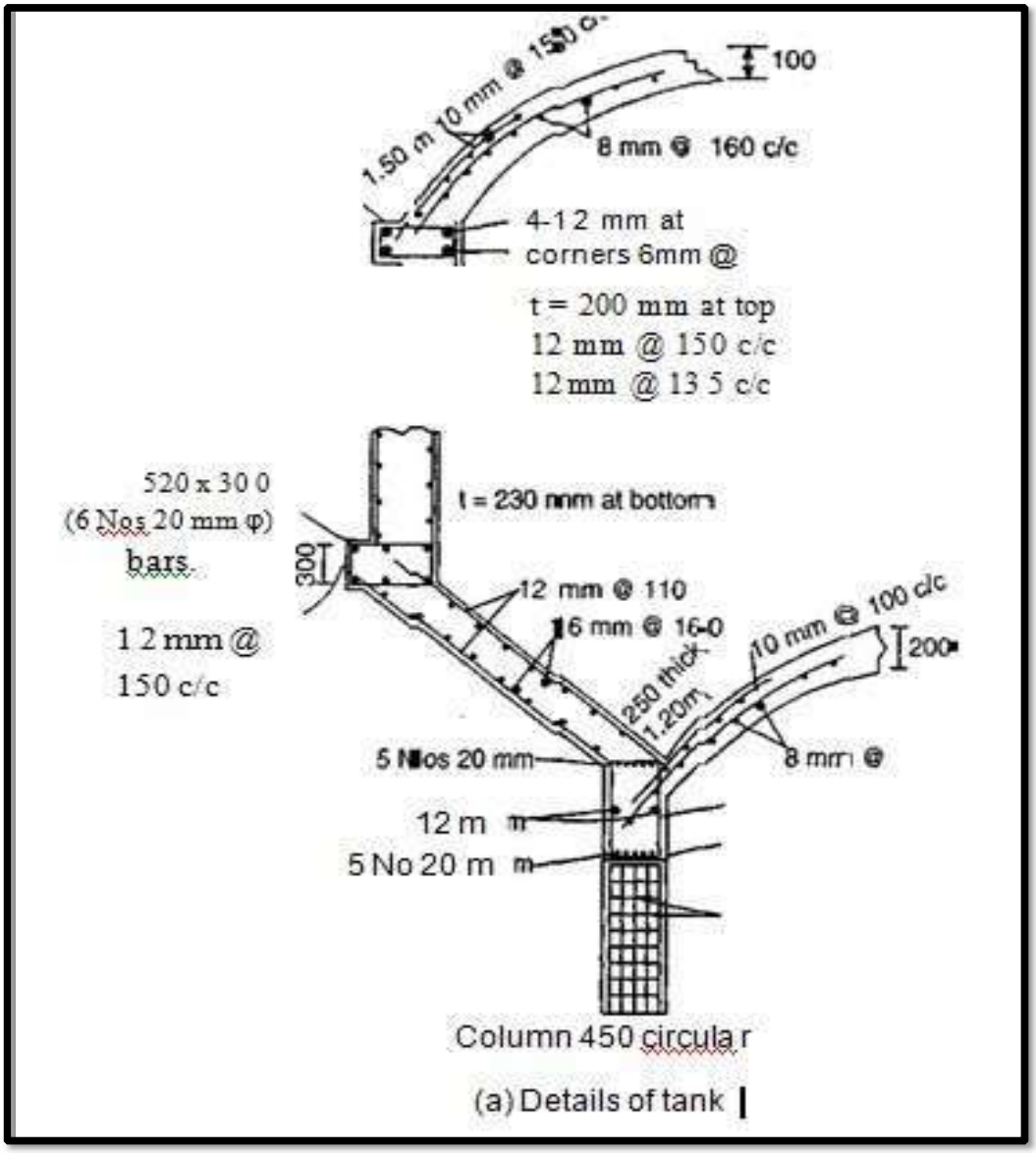
8.1.1 Sustainable Design (Civil) : Elevated storage reservoir

- Water tanks are used to store water to tide over daily requirements of water by localities, industries, towns etc.
- Davad village already have one water tank but capacity of that water tank is not sufficient to meet the requirement of villagers. The existing water tank is of 60000 liters. We are proposing another water tank of 2.5lakh liters Capacity to meet the requirement of villagers.

❖ **Drawing Of Over Head Tank:-**



F-8.1-A- Overhead Water Tank



F-8.1-B- Water Tank Detail

- **Measurement sheet of overhead tank:**

DECRIPTION OF WORK	NOS.	Length(m)	Breadth(m)	Area(m2)	Depth(m)	QTY.
EARTH WORK IN EXCUVATION	1			64.32	2	128.64m^3
EARTH WORK IN FILLING	1					100.198m^3
R.CC WORK IN FOUNDATION (1:1.5:3)	1			64.32	0.4	25.728m^3
RCC WORK IN COLOUMNS BELOW G.L (1:1.5:3)	6			0.282	1.6	2.714 m^3
RCC WORK IN COLOUMNS ABOVE G.L UPTO 4M HT (1:1.5:3)	6			0.282	4	6.785 m^3
RCC WORK IN COLOUMNS FROM 4M TO 8M HT(1:1.5:3)	6			0.282	4	6.785 m^3
RCC WORK IN COLOUMNS FROM 8M TO 12M HT (1:1.5:3)	6			0.282	4	6.785 m^3
TOTAL RCC WORK IN COLOUMNS (1:1.5:3)						23.069 m^3
RCC WORK IN BRACING AT 4m HT (1:1.5:3)	1	18.535	0.3		0.3	1.668 m^3
RCC WORK IN BRACING AT 8m HT(1:1.5:3)	1	17.278	0.3		0.3	1.555 m^3
RCC WORK IN RING BEAM AT BOTTOM OF THE CL WALL (1:1.5:3)	1	23.56	0.3		0.52	2.675 m^3
RCC WORK IN RING BEAM AT TOP OF THE CL WALL	1	23.56	0.16	99.95	0.225	0.848 m^3

(1:1.5:3)						
RCC WORK IN	**1**				0.1	9.995 m^3
DOMED ROOF(1 :1.5:3) RCC WORK IN CONICAL SLAB (1:1.5:3)	**1**			47.06	0.25	11.751 m^3
RCC WORK IN CONICAL DOME (1:1.5:3)	**1**			38.76	0.2	7.752 m^3
RCC WORK IN CYLINDRICAL WALL (1:1.5:3)	**1**		0.215	117.8	5	126.35 m^3
DEDUCTIONS IN RCC WORK IN BRACINGS IN COLOUMNS	**2X6**	0.3	0.3		0.6	
TOTAL RCC WORK IN COLOUMNS AFTER DEDUCTIONS						22.901 m^3
TOTAL RCC WORK						138.174 m^3
PLASTERING IN C M (1:2) FOR INNER SURFACE OF CONIVAL SLAB (12MM)	**1**			47.06		47.006 m^2
PLASTERING IN C M (1:6) FOR OUTER SURFACE OF CONICAL SLAB (12MM)				60.2		60.2 m^2
PLASTERING IN C M (1:2) FOR INNER SURFACE OF CONICAL DOME (12MM)	**1**			38.76		38.76 m^2
PLASTERING IN C M (1:6) FOR OUTER SURFACE OF CONICALDOME (12MM)				43.135		43.135 m^2

PLASTERING IN C M (1:2) FOR INNER SURFACE OF CYLINDRICAL WALL (l2MM)				117.8		117.8 m2
PLASTERING IN C M (1:6) FOR OUTER SURFACE OF CYLINDRICAL WALL 12mm				125.03		125.03 m2
PLASTERING IN C M (1:2) FOR INNER SURFACE OF DOMED 12mm				96.5		96.556 m2
PLASTERING IN C M (1:6) FOR OUTER SURFACE OF DOMED ROOF				99.95		99.95 m2
PLASTERING IN C M (1:6) FOR COLUMNS12mm	6			45.23		271.433 m2
PLASTERING IN C M (1:6) FOR CIRCULAR GIRDER (12MM)	1	16.022			0.6	91.732 m2
PLASTERING IN C M (1:2) FOR RING BEAM AT TOP (12MM)		23.56	0.16			18.213 m2
PLASTERING IN C M (1:2) FOR RING BEAM AT BOTTOM (12MM)		23.56	0.3		0.225	38.95 m2
PLASTERING IN C M (1:6) FOR BRACING AT 4M HT 12mm		18.535	0.3		0.52	22.422 m2
PLASTERING IN C M (1:6) FOR BRACING AT 8M HT12mm		17.278	0.3		0.3	20.936 m2

TOTAL PLASTERING IN CM (1:2) 12MM THICK					0.3	357.289 m2
TOTAL PLASTERING IN CM(1 :6) 12MM						652.838 m2
THICK WATER PROOF CEMENT PAINTING FOR TANK PORTION						647.174 m2
WHITE WASHING FOR COLUMNS	6			45.23		27 1.433 m2
TOTAL WHITE WASHING						918.607 m2

T-8.1-A-Measurement Sheet

❖ **Abstract sheet of overhead tank :**

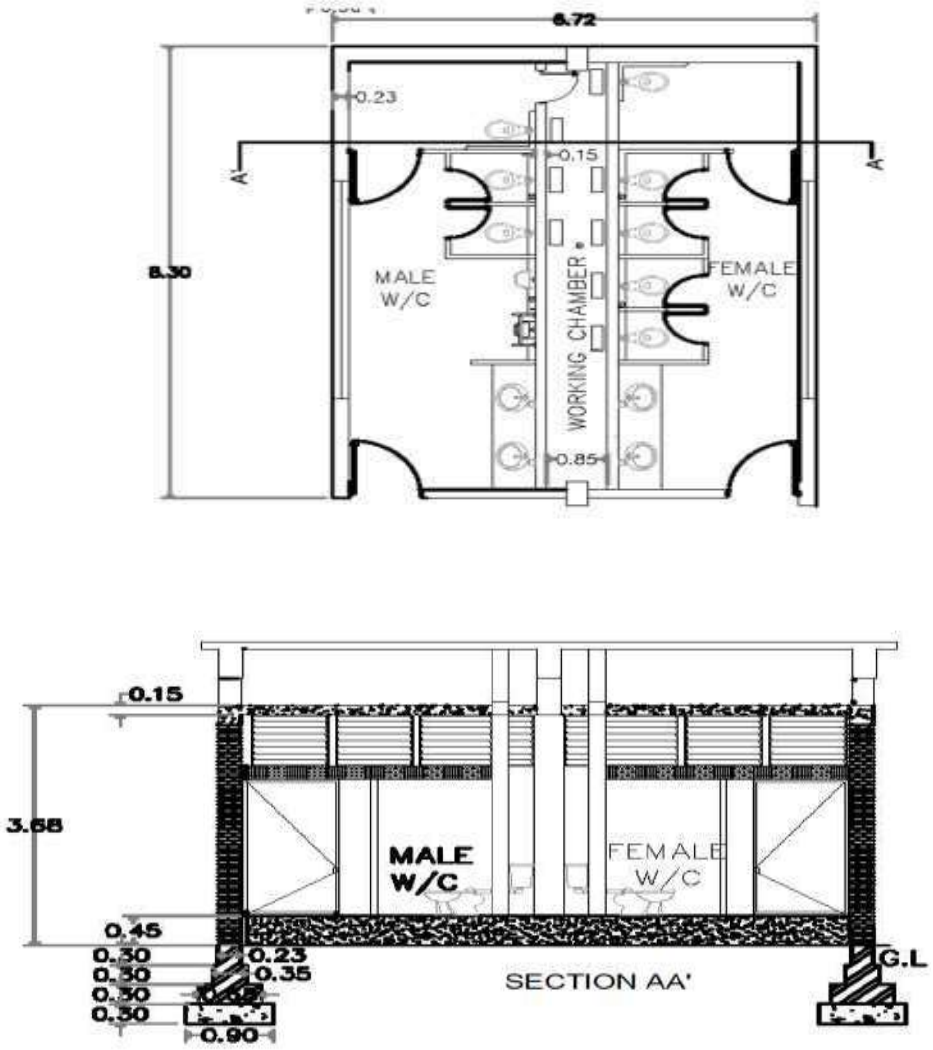
DESCRIPTION	QUANTITY	RATE	PER	AMOUNT
R.C.C work in foundation(1:1.5:3)	25.728	5538/-	CUM	1,42,482/-
Total R.C.C work in column (1:1.5:3)	23.069	7383/-	CUM	1,70,322/-
R.C.C work in ring beam at top of the CL wall(1:1.5:3)	0.848	7450/-	CUM	6,318/-
R.C.C work in	9.995	61141/-	CUM	6,11,105/-
R.C.C. work in conical dome (1:1.5:3)	7.752	25035/-	CUM	1,94,072/-
R.C.C. work in cylindrical wall	126.635	7249/-	CUM	9,17,978/-
V.R.C.C (1:1 ½ :3)20 mm size HBG, machine crushed chips including cost, seignorage and conveyance of all materials and labour charges such as Machine mixing, vibrating, curing etc., -ring beam at bottom of cylindrical wall – SF	3.675	7854/-	CUM	28,866/-
V.R.C.C (1:1 ½ :3)20 mm size HBG, machine crushed chips including cost, seignorage and conveyance of all materials and labour charges such as Machine mixing, vibrating, curing etc., -circular girder – SF	3.845	6914/-	CUM	26,585/-
V.R.C.C (1:1 ½ :3)20 mm size HBG, machine crushed chips including cost, seignorage and conveyance of all materials and labour charges such as Machine mixing, vibrating, curing etc., -inclind cone shaped slab – SF	11.751	25035/-	CUM	2,94,187

T-8.1B-Abstract Sheet

V.R.C.C (1:1 1h :3)20 mm size HBG, machine crushed chips including cost, seignorage and conveyance of all materials and labour charges such as Machine mixing, vibrating, curing etc., - Bracing at 4m heigh- SFt	1.668	7498/-	CUM	12,507/-
V.R.C.C (1:1 1h :3)20 mm size HBG, machine crushed chips including cost, seignorage and conveyance of all materials and labour charges such as Machine mixing, vibrating, curing etc., - Bracing ay 8mheigh – SFt	1.555	7617/-	CUM	11,845/-
Supplying, placing and fitting of HYSD bars reinforcement, complete as per drawings and technical specifications for bars below 36mm dia including over laps wastage, wherethey are not welded- SF	41.45	55419/-	MT	22,97,240/-
Total plastering in cm (1:6) for	357.29	969/-	SQM	34,622/-
Total plastering in	652.84	766/-	SQM	50,000/-
Thick water proof water cement painting for tank portion	647.174	1660/-	SQM	10,431/-
White washing for columns	271.433	1035/-	SQM	28,152/-
			TOTAL	47,33,576/-
			ADD 3% CONTIGENCIES	1,42,007/-
			ADD 2% FOR WORK.CHARGE ESTABLISHMENT	94,671.52/-
			Add 10% contractor profit	4,73,357.6/-
			GRAND TOTAL	54,43,612. 12/-
			SAY	**54,50,000/-**

8.1.2 Physical design (Civil): Public Toilet

- A public toilet is a room or small building with toilets available for use by the general public. Public toilets are commonly separated into male and female facilities. Increase in the public toilets are now been made for disabled people also.
- Some public toilets are free of charge and some charge fees. Public toilets are typically found in government schools, government offices, roadsides, etc. Concept of portable and Bio-toilets is increasing.



F-8.1.2-A-Plan And Section

- **Measurement sheet**

	Item description	No .	Length L (m)	Width B (m)	Height H (m)	Quantity	Total
1	Excavation for foundation	1	46.48	0.9	1.2	50.112m3	50.112m3
2	Foundation concrete used in P.C.C [1:3:6]	1	46.48	0.9	0.3	12.52m3	12.52m3
3	Brick masonary used in cement mort ar [1;4] for Foundation upto plinth						
	For 0.65m offset	1	47.44	0.65	0.3	9.25m3	
		1	48.6	0.35	0.3	5. 103m3	22.8 19m3
	For 0.23m offset	1	49.08	0.23	0.75	8.466m3	
4	Earth filling						
	Male W/C	1	20.38	-	0.45	9. 17 l m3	
	Female W/C	1	20.38	-	0.45	9.17 lm3	2 1.34m3
	W/C Working Chamber	1	6.664	-	0.45	2.99m3	
5	Brick work up to slab level	1	49.08	0.23	3.08	34.76m3	
	Deduction D Vl V2	4 6 2	1.01 0.74 4	0.23 0.23 0.23	2. 1 0.78 0.78	l.95l m3 0.79m3 1 .43m3	30.59m3
	Total deduction	-	-	-	-	4.1m3	
6	R.C.C slab	1	8.07	6.53	0.15	7.90m3	7.9m3
7	Providing fixing shutter doors, ventilator including fraame						
	l) Door 2) Ventilator Vl V2	4 6 2	1.01 0.74 4	- - -	2.1 0.78 0.78	8.48m2 3.46m2 6.24m2	18.18m2

T-8.1.2-A- Measurement

Item Number	Item description	No.	Length L (m)	Width B (m)	Height H (m)	Quantity	Total
8	C.C .work						7.9m3
	l)R.C.C slab	1	8.07	6.53	0.15	7.90m3	
9	R.C.C steel quantity						
10	Providing glazed tiles Dado upto lintel level						
	Male W/C	1	2.6	7.84	-	20.38m2	40.7 m2
	Female W/C	I	2.6	7.84	-	20.98m2	
11	Smooth plaster 12 mm thick CM(1:6)						
	A) Ceiling						
	1) Male W/C 2)Female W/C 3)Working Chamber	1 1 1	2.6 2.6 0.85	7.84 7 84 7.84	- - -	20.384m2 20.384m2 6.664m2	47.42m2
	B) Walls						
	1) Male W/C 2)Female W/C 3)Working Chamber	1 1 1	20.86 20.86 17.38	• - -	3.08 3.08 3.08	64.31m2 64.31m2 53.53m2	182.15m2
12	20 mm thick sand face plaster on outer wall	1	30.04	-	4.62	138.78m2	124.88m2
	Deduction D V1 V2	4 6 2	1.01 0.74 4		2.1 0.78 0.78	1.951m3 0.79m3 1.43m3	1142.64m3

- **Abstract Sheet**

Item Number	Item description	Quantity	Rate in Rs	Per	Amount in Rs.
1	Excavation work	50.1 12	120	M3	6013.4
2	Foundation concrete	12.52	827	M3	10354
3	RCC Work total	7.9	300	M3	2370
4	Steel	596.76	45	kg	26854.2
5	200 class brick work upto slab	30.59	800	M3	24472
6	Earth filling	21.34	45	M3	958.5
7	Brick masonry up to plinth	23.21	800	M3	18568
8	Glazed tiles	40.768	120	Sq.feet	60000
9	Plaster	124.88	40	M2	50000

Total cost = 199590 rs
Lump sum =200000 rs
10% contractor charges = +20000 rs
5 % extra charges like painters,mixer, transpo1t & labor charges= + 10000 rs
Overall cost = 230000 rs

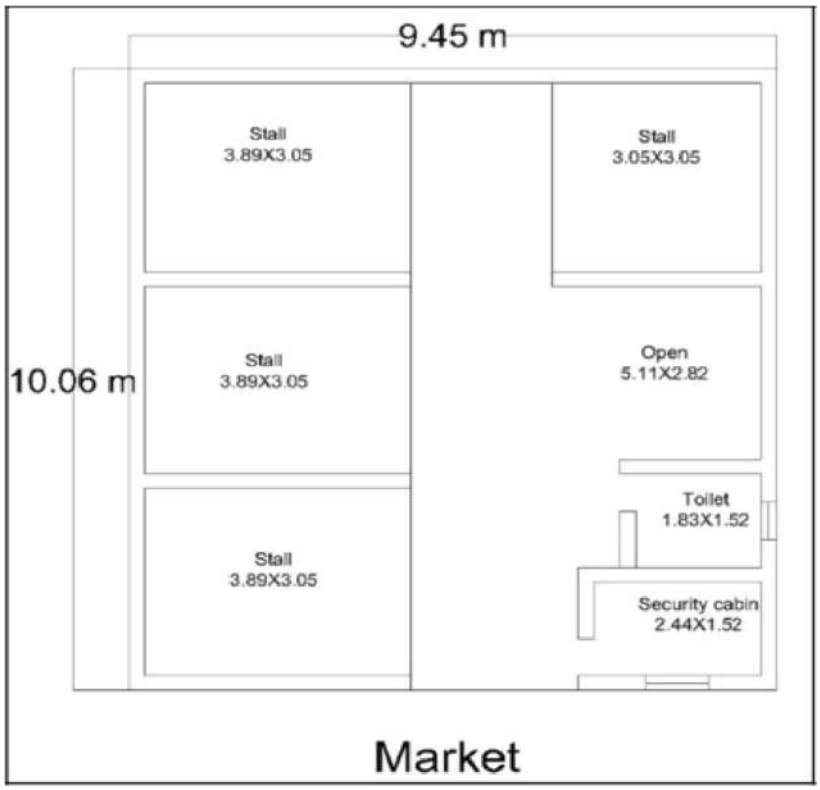
T-8.1.2-B- Abstract sheet

8.1.3 Social design (Civil):General market

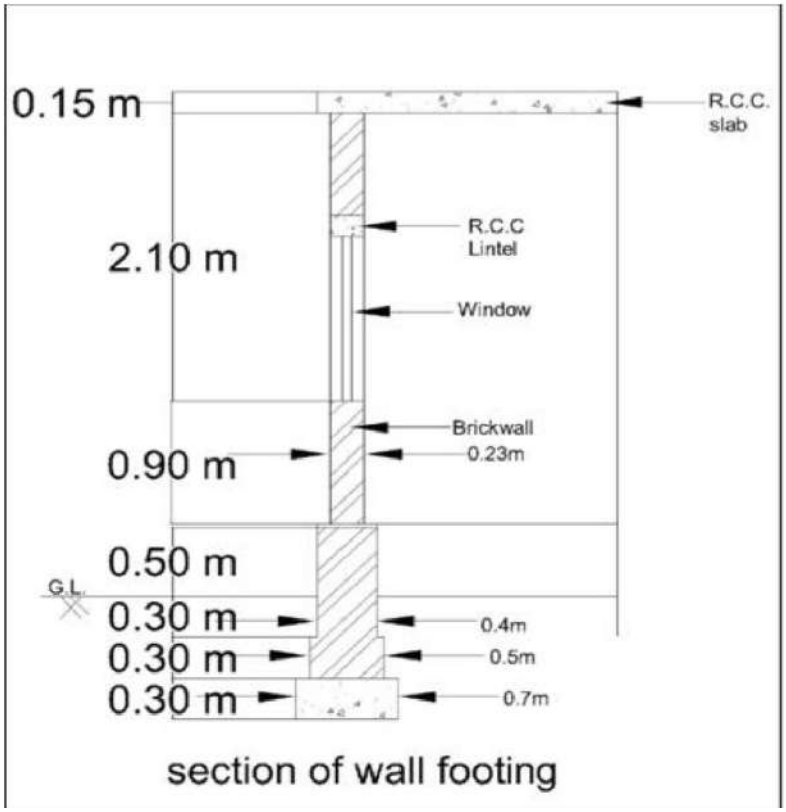
- Marketing is important to all farm enterprises, regardless of size. It is strongly recommend that you identify and research your market before you become a fruit and vegetable grower.
- Some farmers, such as cash grain farmers or dairy farmers, have large, well-established markets. They can use existing organizations to perform the marketing function for them, or they can band together, form a cooperative, and market their products jointly.
- Fruits and vegetables are produced seasonally, but the market requires products throughout the year. For many decades, this problem of matching product availability with consumer demand was solved in two ways:
  - Selling fresh products during harvest and shortly thereafter
  - Processing the rest to meet demand during the rest of the year
- As technology improved and consumer incomes increased, it became possible to provide fresh produce yearround. American consumers now expect fresh tomatoes, strawberries, and sweet corn every month of the year. In addition, a strong demand remains for processed fruits and vegetables.

❖ **Existing situation:-**

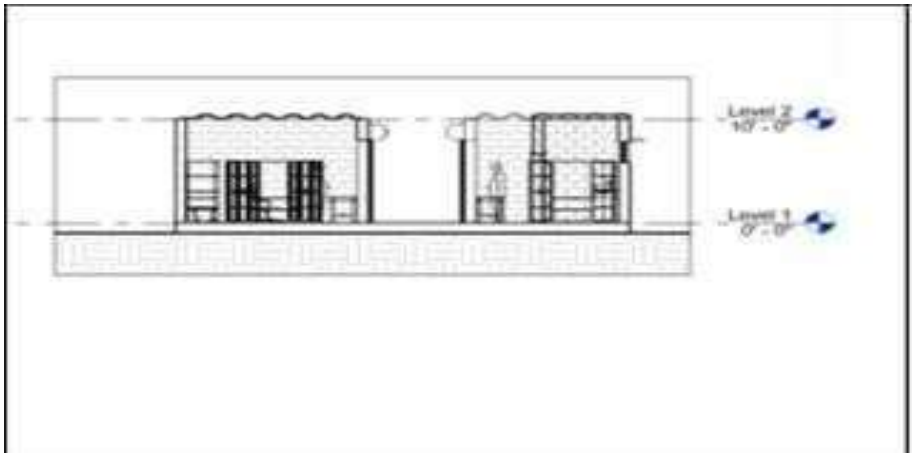
- In this village, there are no grocery shop or small scale market yard. People of this village have to go 21 km far in jetpur to buy the vegetables and other things.so we decided to give this small scale of market yard.so the people of this village can get vegetables, Stationary etc.in their village area.
- There is one open market. Market is opened only two days of the week and very difficult in rainy season.
- So we decided to provide small scale market in the village and provided the shops in market thus there is no difficulty in rainy season and the market will be open six days in the week.



F-8.1.3A-Plan of market



F-8.1.3B-Section of wall footing



F-8.1.3C-Section of Market

- **Measurement sheet**

T-8.1.3A-Measurement Sheet

Measurement Sheet						
Item NO.	Item description	Nos.	Length (m)	Width (m)	Height (m)	Quantity
1.	Excavation in foundation	1	52.53	0.7	0.9	33.10 m3
2.	P.C.C. (1:4:8)	1	52.53	0.7	0.3	11.03 m3
3.	Brick masonry in foundation and plinth in C.M. (1:6)					
	Step-1	1	53.23	0.5	0.3	7.98 m3
	Step-2	1	53.58	0.4	0.3	6.43 m3
	Step-3 (up to plinth)	1	54.93	0.3	0.875	14.42 m3
				Total quantity = 28.83 m3		
4.	Sand filling in foundation 33.10-28.83-11.03=2.716 m3	1	Total Quantity= 2.716 m3			
5.	Brickwork in superstructure	1	54.175	0.23	3	37.38 m3
6.	Deduction for Door and Window					
	D	2	0.6	0.23	2.1	0.58 m3
	W	1	1	0.23	1.2	0.276 m3
	V	1	0.4	0.23	0.4	0.037 m3
					Deduction = 0.893 m3	
	Deduction for lintels above door & windows with 15 cm bearing at each Side					
	D1	1	0.9	0.23	0.15	0.0621 m3
	W	1	1.3	0.23	0.15	0.045 m3
	V	1	0.7	0.23	0.15	0.024 m3
					Deduction = 0.131 m3	
	Net Quantity =37.38-0.893-0.131= 36.35 m3					
7.	Inside Plaster (1:4) 12mm thick					
	Stall-1	2	3.89		3	23.34 m2
		1	3.05		3	9.15 m2
	Stall-2	2	3.89		3	23.34 m2
		1	3.05		3	9.15 m2
	Stall-3	2	3.89		3	23.54 m2
		1	3.05		3	9.15 m2
	Stall-4	2	3.05		3	18.3 m2
		1	3.05		3	9.15 m2
	Open space	1	3.05		3	9.15 m2
		1	2.82		3	8.46 m2
		1	2.06		3	6.18 m2
	Toilet	2	1.83		3	10.98 m2

		2	1.52		3	9.12 m2
	Security cabin	2	2.44		3	14.64 m2
		2	1.52		3	9. 12 m2
	Ceiling plaster					
	Toilet	1	1.83	1.52		2.78 m2
	Storeroom	1	2.44	1.52		3.71 m2
				Total quantity =		199.06 m2
	Deduction					
	D	1	0.6		2.1	1.26 m2
	w	0.5	1		1.2	0.6 m2
	v	0.5	0.4		0.4	0.08 m2
					Deduction =	1.94 m2
	Net Quantity= 199.06-1.94= 197.06 m2					
8.	Outside plaster (1:6) 20mm thick					
	Long wall					
	Long side	2	10.06		3.5	70.42 m2
	Short side	1	9.45		3.5	33.075 m2
	Short wall- I	1	4.12		3.5	14.42 m2
	Short wall-2	1	2.9		3.5	10.15 m2
				Total quantity =		128.06 m2
	Deduction					
	w	0.5	1		1.2	0.6
	v	0.5	0.4		0.4	0.08

Deduction = 0.68 m2
Net Quantity=128.06-0.68= 127.38 m2

- **Abstract Sheet**

T-8.1.3-B-Abstract Sheet

1. Earthwork in excavation up to 1.5m depth					
Nos.	Particular	Quantity/Number	Rate Rs.	Per	Amount Rs.
1.	Labour				
	Male Coolie	4	200	Day	800
	Female Coolie	2	180	Day	360
	Sundries				20
			Total cost		Rs.1180
2. Sand filling in foundation and plinth					
Nos.	Particular	Quantity/Number	Rate Rs.	Per	Amount Rs.
1.	Materials				

	Sand	16.76 m3	800	m3	13408
	Sundries				20
				Material cost Rs.13428	
2.	Labour				
	Male coolie	2	200	Day	400
	Female coolie	1	180	Day	180
	Bhistie	0.5	200	Day	100
	Sundries				20
				Labour cost Rs.700 Total cost	
3. P.C.C. (1:4:8) in Foundation					
Nos	Particular	Quantity/Number	Rate	Per	Amount Rs.
1.	Materials				
	Cement	37	280	Bag	10360
	Sand	5.157	800	m3	4125.6
	Aggregate	10.314	1000	m3	10314
	Sundries				50
				Material cost Rs.24850	
2.	Labour				
	Mistry	0.5	400	Day	200
	Mason	1	300	Day	300
	Male coolie	7	200	Day	1400
	Female coolie	11	180	Day	1980
	Bhistie	2.5	200	Day	500
	Sundries				50
				Labour cost Rs. 4430 Total cost	
4. Brick masonry in foundation (1:6)					
Nos	Particular	Quantity/Number	Rate	Per	Amount Rs.
1.	Materials				
	Brick (19cmx9cmx9cm	14415 Nos.	4000	1000 Nos.	57660
	Cement	39	280	Bag	10920
	Sand	8.115	800	m3	6524
	Sundries				50
				Material cost Rs.75172	
2.	Labour				
	Mason	2	300	Dav	600
	Male coolie	3	200	Dav	600
	Female coolie	2	180	Day	360
	Bhistie	1	200	Day	200
	Sundries				50
				Labour cost Rs.1810	

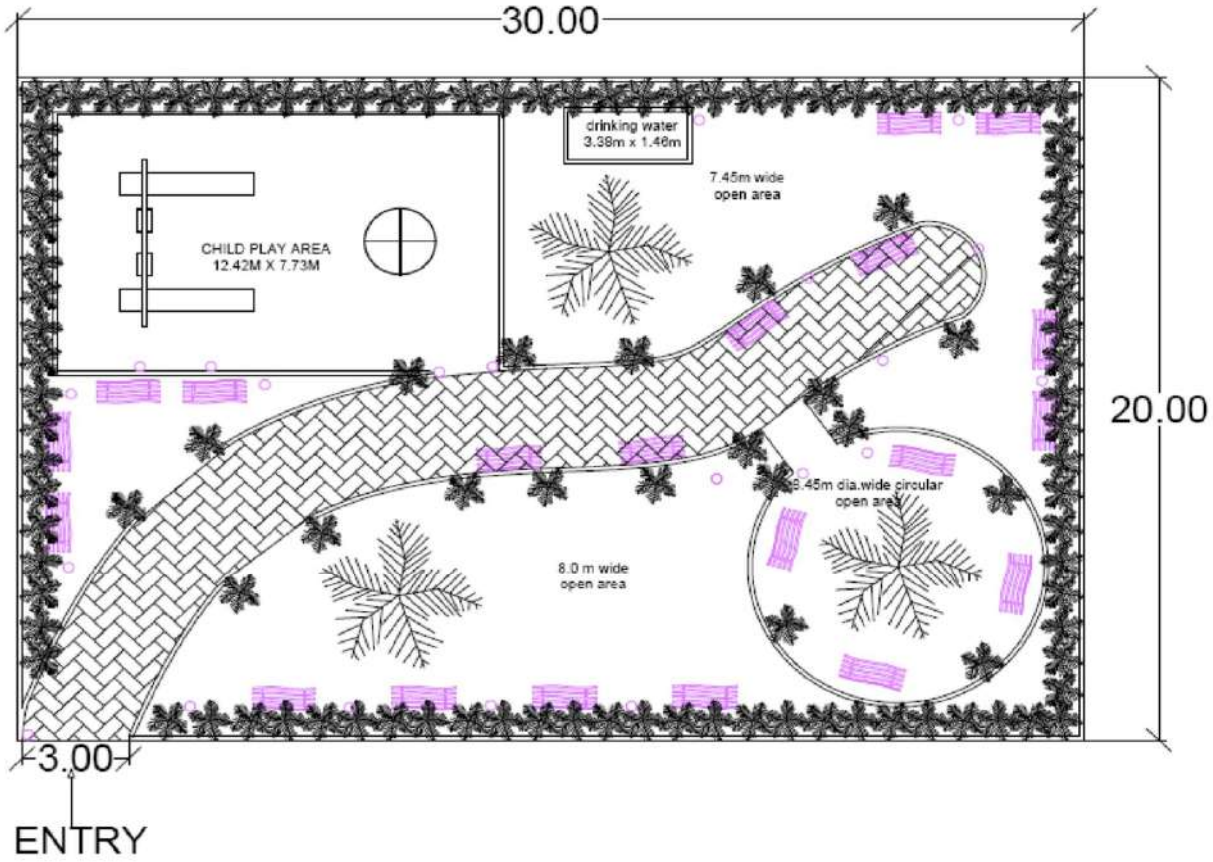
				Total cost Rs.76782	
5. Brickwork in superstructure (I:6)					
Nos	Particular	Quantity/Number	Rate Rs.	Per	Amount Rs.
1.	Materials				
	Brick (l9cmx9cmx9cm	18175 Nos.	4000	1000 Nos.	72700
	Cement	49	280	Bag	13720
	Sand	10.286	800	m3	82288
	Sundries				50
				Material cost Rs.168758	
2.	Labour				
	Mistry	0.5	400	Day	200
	Mason	7	300	Day	2100
	Male coolie	7	200	Day	1460
	Female coolie	7	180	Day	1260
	Bhistie	2	200	Day	400
	Sundries				50
				Labour cost Rs.5410 Total cost Rs.174168	
6.12 mm thick cement plaster in C.M. 1:4					
Nos	Particu lar	Quantity/Number	Rate Rs.	Per	Amount Rs.
1.	Materials				
	Cement	23	280	Bag	6440
	Sand	3.152	800	m3	2522
	Sundries				50
				Material cost Rs.9012	
2.	Labour				
	Mistry	0.25	400	Day	100
	Mason	10	300	Day	3000
	Male coolie	10	200	Day	2000
	Female coolie	10	180	Day	1800
	Bhistie	2	200	Dav	400
	Sundries				50
				Labour cost Rs.7350 Total cost Rs 17532	

8. R.C.C. work for slab and l in tel (1:1 .5:3)					
Nos	Particular	Quan tity/N umbe	Rate Rs.	Per	Amount Rs.
I.	Materials				
	Cement	12 bags	280	Bag	3360
	Sand	0.64 m3	800	m3	512
	Aggregate	3.93 m3	1000	m3	3930
	Steel (1%)	117 kg	45	Kg	5265
	Binding wire	2 kg	50	Kg	100
	Sundries				50
				Material cost Rs.13217	
2.	Labour				
	Labour for mixing, transporting and placing concrete including curing	1.53 m3	300	m3	459
	Cost of hiring mixture and vibrator			L.S.	1000
	Labour for bending, cutting and placing reinforcement steel	118 kg	5	Kg	590
	Labour for centering and shuttering			L.S.	2000
	Sundries				50
				Labour cost Rs.4099 Total cost Rs.17316	

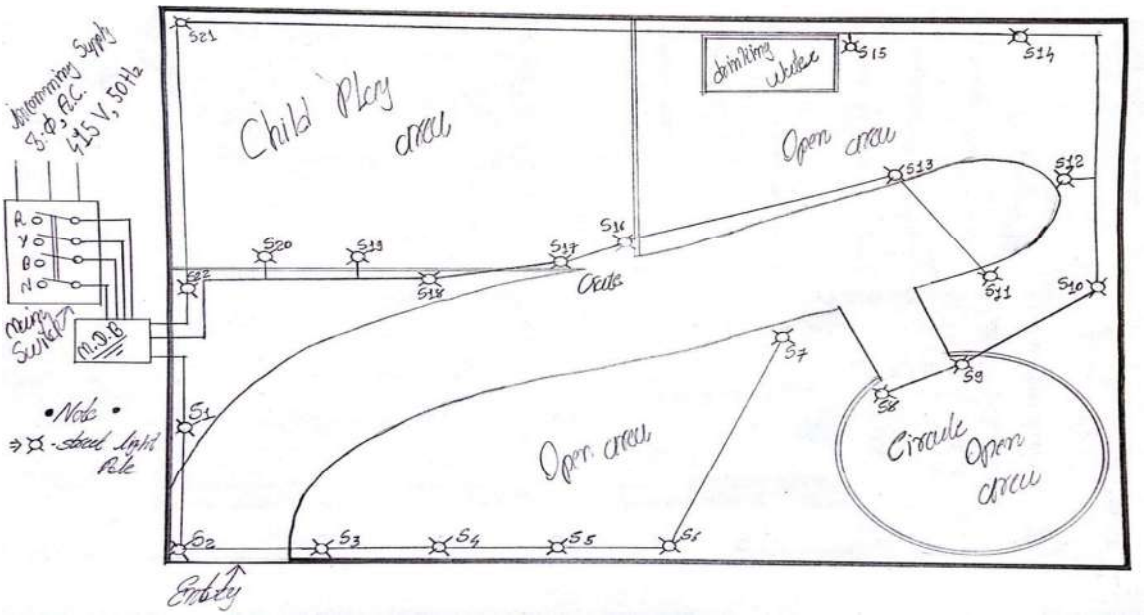
Total cost Rs.3,46,748
1.5% water charge 5201 RS.
10% contractor's profit 34674 RS.
Total cost of Shop= 3,86,623 RS.

8.1.4 Socio-Cultural design (Civil) :Public Garden

- In Davad village have no public garden. Villagers and children are need of public garden. Secondary school campus is very wide So we give planning proposal for public garden in Secondary school.



F-8.1.4A-Public Garden



- **Measurement sheet**

ITEM NO	DISCRIPTION	NO	LENGTH	BREADTH	HEIGHT	QUANTITY	TOTAL QUANTITY
1	Fencing	1	100			100m	
							100m
	Deduction						
	Main gate	1	3			3m	
							97m
2	Sand filling in children play area (0.2m thick)	1	12.42	7.73	0.2	19.20m^3	
							19.20m^3
3	Flooring in walking path	1	25	3		75m^2	
							75m^2
4	Grass in all garden	1	30	20		600m^2	
							600m^2
	Deduction						
	Child play area		12.42	7.72		96m2	
	Walking path		25	3		75m2	
	Drinking water area		3.38	1.46		4.93m^2	
							424.7m^2

T-8.1.4A-Measurement Sheet

- We provide twenty nos. seating bench in all garden. Location of all seating bench are shown in garden plan.
- We provide children playing instrument like marry go round , sliding etc.
- We provide lighting pole in all garden because many people come in garden at night so they need light.

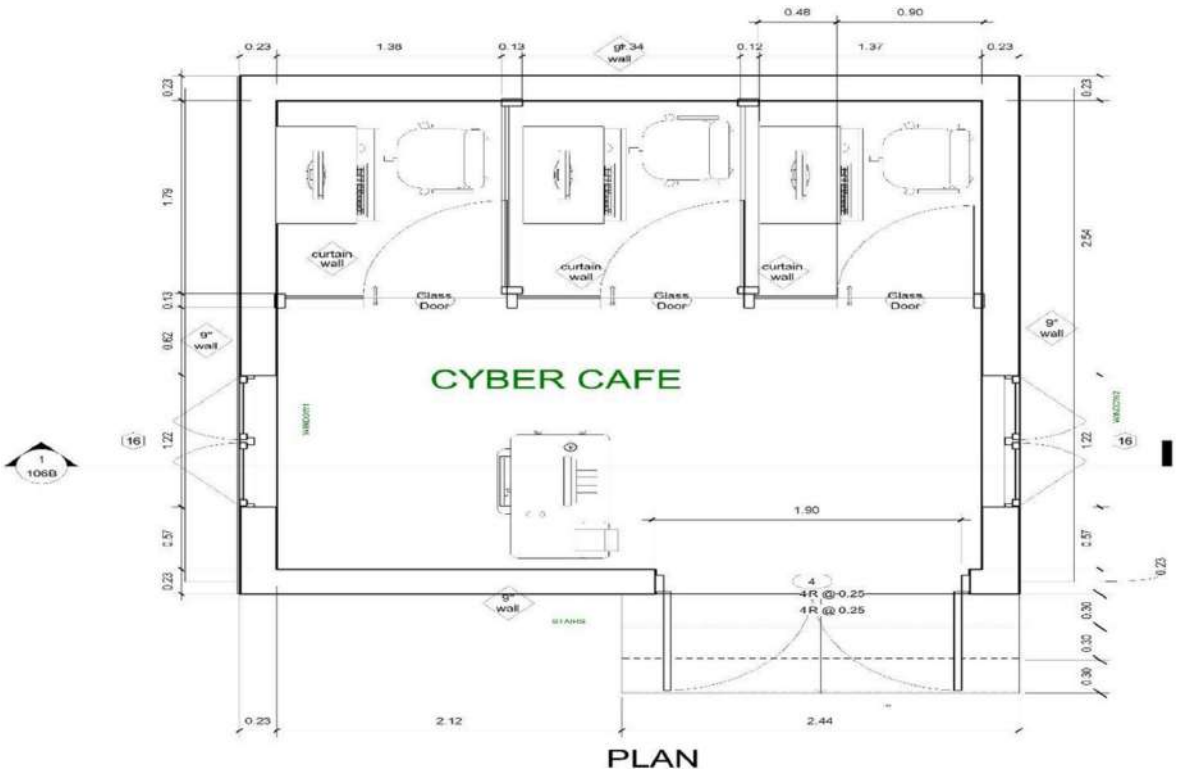
- **Abstract sheet**

ITEM NO.	DESCRIPTION	QUANTITY	RATE (RS.)	PER	AMOUNT(RS.)
1	Fencing	97	35	M	3395
2	Sand filling	19.20	50	M3	1560
3	Grass	424.7	20	M	8494
				Total =	13449
				Add 3% contingency charge	403.47
				2% work charge establishment	268.98
				Grand total	14121.45
					14125

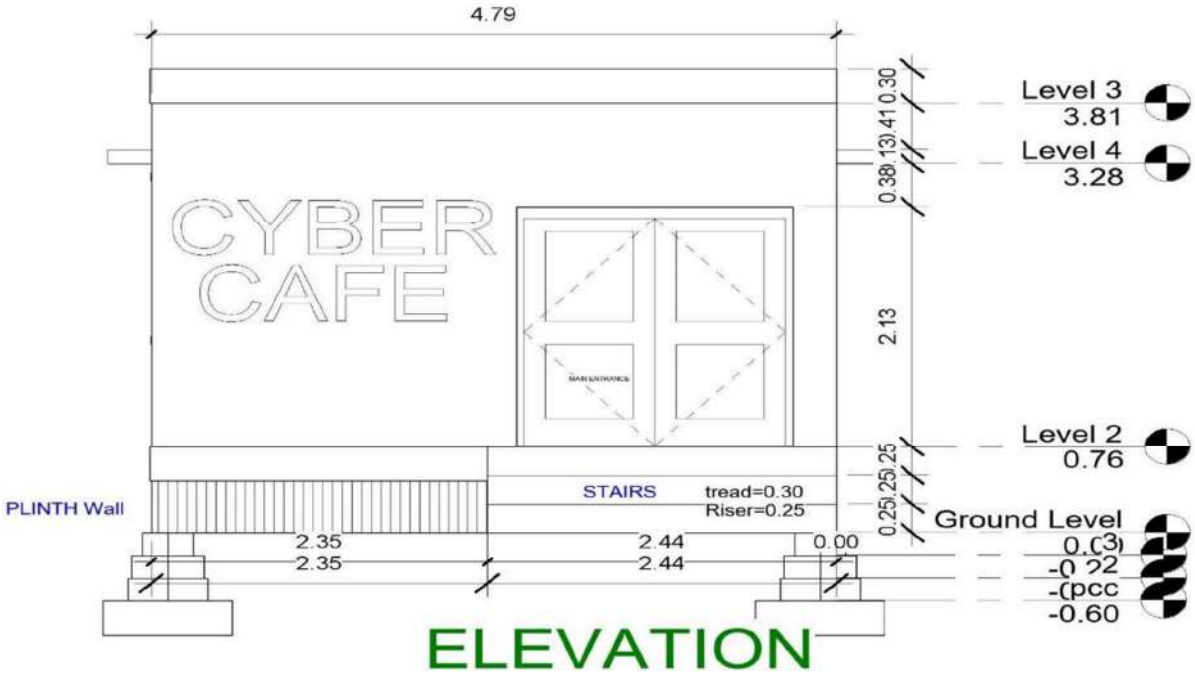
T-8.1.4B-Abstract Sheet

8.1.5 Smart Village Design (Civil) : Cybercafe

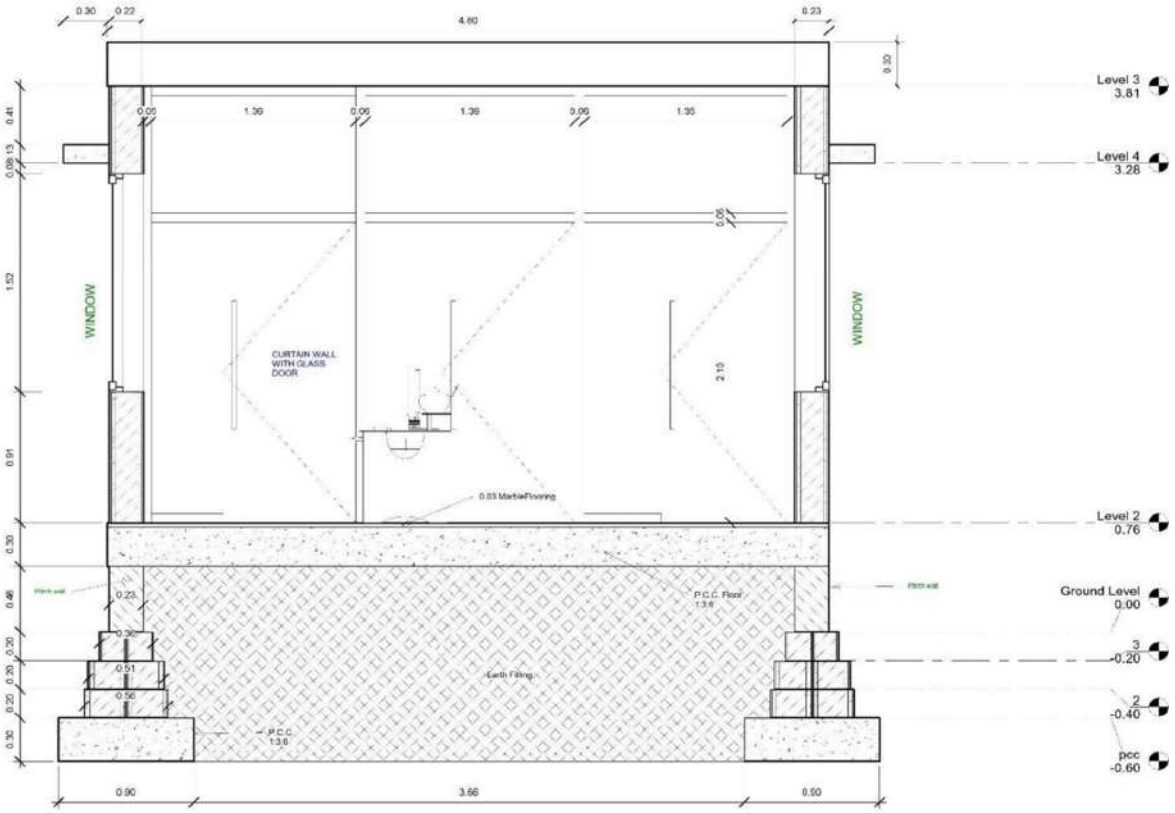
- A cybercafe is a type of business where computers are provided for accessing the internet, playing games, chatting with friends or doing other computer-related tasks. In most cases, access to the computer and internet is charged based on time.
- In the Davad village there is no any cybercafe existing in the village. From the feedbacks which were given by the villagers we have decided to design a cybercafe as a smart village design for the main purpose of internet availability at any time for any person in the village.
- People living in the village of even outsiders from nearby villages and relatives of the villagers can use or utilize a cybercafe for their different uses.
- A cybercafe alternatively referred to as an Internet cafe, PC bangs, or Net cafe. Cybercafe is a place to use computers to access the Internet, play games, create documents, chat with friends using voice and video, and other computer-related tasks. At most Internet cafes the computer and Internet access is provided for an hourly or daily fee.
- The cybercafe first came into existence in July 1991 in San Francisco, when Wayne Gregori started up the SFnet Coffeehouse Network. He built and set up 25 coin operated computer stations in multiple coffeehouses in San Francisco. The Binary Cafe was the first cybercafe in Canada, started up in June 1994. Today, there are thousands of cybercafes all over the world, providing the computer and Internet access that people need to go about their daily lives.



F-8.1.5A- Cybercafe plan



F-8.1.5-B- Cybercafe section



- **Measurement Sheet**

SR. NO	Description	Length (m)	Width (m)	Height (m)	Count (Nos.)	Total Quantity (m^3)
1	BASIC WALL: GENERIC - 9" 2	4.572	0.2286	3.0	1	**12.82**
2	BASIC WALL: GENERIC - 9" 2	4.572	0.2286	0.762	1	**12.82**
3	CURTAIN WALL: CURTAIN WALL 1	1.905	0.0254	3.048	1	**-**
4	DOOR-EXTERIOR-DOUBLE-TWO LITE: 72" X 80"	1.8288	0.0508	2.0574	1	**-**
5	1452181752750CURTAIN WALL DOOR: AUS SGL GLASS FRAMED W D-PULL	0.8382	0.0127	2.1082	3	**-**
6	WINDOWCASEMENT-DOUBLE: 49" X 60"	1.2192	0.101	1.524	3	**-**
7	BASIC ROOF: GENERIC - 1	4.572	0.2286	0.1524	1	**7.45**
8	FLOOR: GENERIC - 1	4.572	0.2286	0.1524	1	**6.99**
9	PCC	4.1148	0.90	0.4	1	**5.02**
10	BASIC WALL: 00.30	18.3	1.2	0.4	1	**2.2**
11	BASIC WALL: 0.40	18.3	1.6	0.4	1	**2.94**
12	BASIC WALL: GENERIC - 0.50	18.3	2	0.4	1	**3.66**
13	EXCAVATION	22	1.2	1.5	4	**3.6**

T- 8.1.5-A- Cybercafe measurement sheet

- **Abstract Sheet**

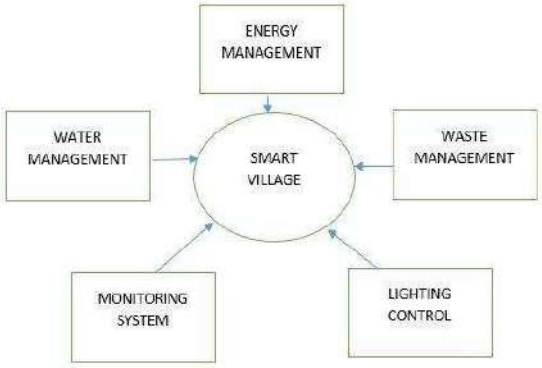
SR NO.	Description	Quantity (m^3)	rate	per	Amount
1	BASIC WALL: GENERIC - 9" 2	10.92	130	Ft2	**66818.7**
2	BASIC WALL: GENERIC - 9" 2	1.91	90	Ft2	**8077.5**
3	DOOR-EXTERIORDOUBLE-TWO LITE: 72" X 80"	-	-	-	**4000**
4	1452181752750CURTAIN WALL DOOR: AUS GLASS FRAMED W D-PULL	-	-	-	**5400**
5	WINDOW-CASEMENT-DOUBLE: 49" X 60"	-	-	-	**4800**
6	CAST-IN-PLACE STAIR: MONOLITHIC STAIR	-	-	-	**6000**
7	BASIC ROOF: GENERIC - 12" 2	3.73	3500	m^3	**13055**
8	FLOOR: GENERIC - 12"	3.5	3500	m^3	**12250**
9	EXCAVATION	1.215*4	350	m^3	**1701**
10	PCC	9.32	3500	m^3	**32620**
11	BASIC WALL: 00.30	4.08	90	Ft2	**13140**
12	BASIC WALL: 0.40	5.44	90	Ft2	**13140**
13	BASIC WALL: GENERIC - 0.50	6.78	90	Ft2	**13140**
				GRAND TOTAL	**194142**

T-8.1.5-B- Cybercafe Abstract sheet

8.1.7 Electrical Design 1 : IOT Based Smart Village

- There are huge challenges in realization of a rural development that monitors and integrates all of the village infrastructure and services to leverage the collective intelligence. The development of a IoT based smart village includes Cloud based network which can provide a virtual infrastructure to process and integrate the analysis tools monitoring equipment, storage, and visualization platform within the system.IT- OT convergence which intend to smart billing and data analytics in energy management. Waste collection system enhanced with cloud based IoT services which enable dynamic scheduling and routing in a waste collection system seems to be an efficient system.
- The access to sustainable energy services acts as a basic catalyst for smart village development extending the provision of efficient management of energy, water, waste and various other attributes. Major parts of rural areas are not stand-alone system it remains a part of a cluster, which are related to each other. These clusters explains the potential for development and it possess economic drivers, derive
- Locational and competitive advantages. Rurban is named after the development of these clusters which aims to strengthen the rural areas by provisioning of physical infrastructure, economic and social facilities.
- The envisaged components in each cluster are listed below:

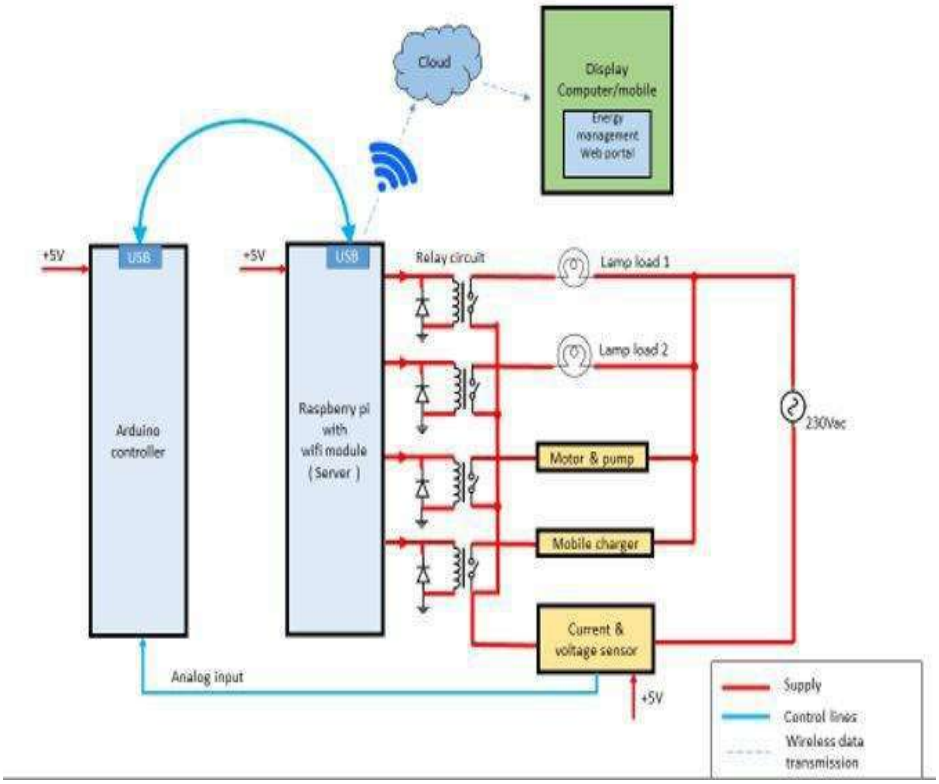
  - Mobile medical services.
  - Education system.
  - Sanitation
  - Water management system
  - Waste management.
  - Road system Inter village connectivity.
  - Lighting control
  - Fleet management
  - Digital Literacy and People Service Centres.
  - Economic activity based Skill development programme



  - Fig.1 represents the overall block diagram of the smart village system. The enormous IT infrastructure is required by rural development along with the huge financial support which is to be incorporated. Sensors, thousands of networking equipment and computing devices are built in this complex network. Operational and maintenance cost of such a complex real time system will be much higher which is evident to meet stringent reliability and efficiency improvement. In case of smart irrigation management system each field has to be fitted with a sensors and data control unit which are highly efficient and reliable.

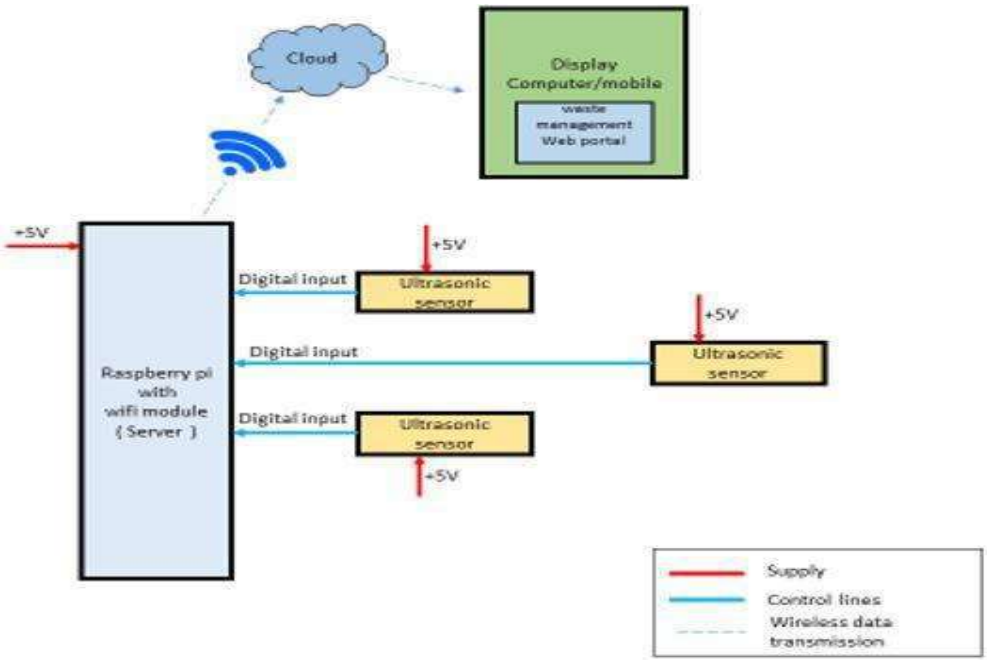
❖ **Energy Management**

- The challenges in load control for the power grid is now more severe than ever, due to advancement in communication layer and the creation of a two-way infrastructure for real-time communication between people and the utility. The operator of the smart grid access the information and communication technologies to enhance grid security and reliability. They enforce controllable use of energy, and incorporate various components such as green resources, distributed generator and power storage premises. Fig. 3 explains the energy management circuit diagram



F-8.1.7A-Circuit diagram of energy management module

❖ **Smart Irrigation System**

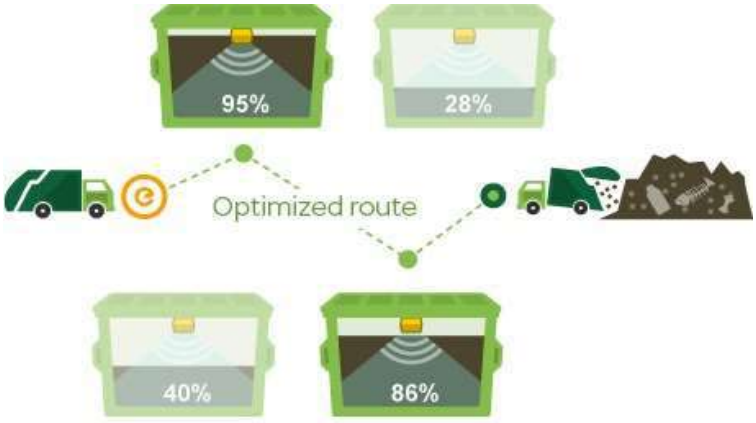


F-8.1.7B- Smart Irrigation System

- The agricultural productivity is dependent on efficient irrigation system. When water is spread over a wide area covering all the places and temporally distributed it matches with field water demand hence efficiency is achieved.85% of the fresh water is consumed by the
- agriculture and it remains dominant due to increase in population and the increasing of demand for food .Field of agriculture has seen the rapid advancement.
- Irrigation system is improved by latest technologies. As precision advanced irrigation
- scheduling plays an important role in reduction in water wastage. The usage of various monitoring and controlled system is increased by people in order to increase the yield. Soil moisture plays a key role in the life of the plant. Nutrients in the soil solution provide the plant with the food it needs to grow. Water is also essential for regulating plant temperature through the process of transpiration. Plant root systems are better developed when growing in moist soil. Excessive levels of soil moisture, however, can lead to anaerobic conditions that can promote the growth of plant and soil pathogens..

❖ **Waste Management System**

- As the population in the rural areas increases, the accumulation of waste and trash level also gets increased. The conventional bins with no automation is the existing status. The time rate for dumping the waste differs for each bins bin and it doesn't provide any details about the status.



F-8.1.7-C- Waste Management System

- The proper collection and disposal of these waste becomes a must. In current scenario the garbage collector physically go to each bin and check trash levels which involves more human power and wastes both time and fuel of the containers. Fig. 8 explains the waste management circuit diagram
- The sensors interfaced waste bins , are capable of intimating waste level status, is not a novel method, the aim is use cloud interfaced network to automate the waste bins and efficiently manages the waste collection. It is not limited to the notification alone. The waste management technique which are not managed efficiently may cause serious environmental problems and increase in cost occurs. Therefore, in this , by developing an optimising route for the waste collection is extended to reduce the fuel cost, source through an IoT-based smart waste management (SWS). Fig.9 explains the optimised route for the smart waste collection system. It is achieved with the help of smart bins. The conventional bins specifically designed and allotted with the sensors behaves as a smart bins. These sensors are powered with the batteries or green energy sources can be used. These wireless sensors monitors, provide data at every instant and sends signal to the control center through the cloud. A specific portal is developed for the monitoring and control of the waste with the help of a centralized hub.

  The technology advancement in various fields of life has created a sophisticated service delivery. The aim of all these techniques in energy management is optimal balancing of supply with demand in which undesired blackouts and outages are eradicated. For successful implementation of demand response technique, modern equipment has to be implemented the rural areas.

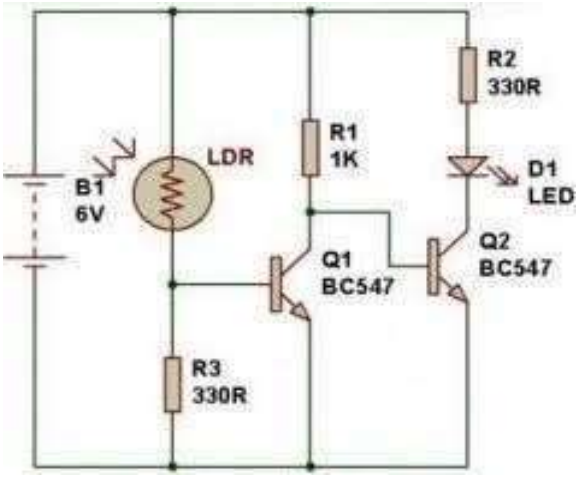
8.1.8 Electrical Design 2: AUTOMATIC STREET LIGHT CONTROL SYSTEM

- Street light controllers are smarter versions of the mechanical or electronic timers previously used for street light ON-OFF operation. They come with energy conservation options like twilight saving, staggering or dimming. Also many street light controllers come with an astronomical clock for a particular location or a Global Positioning System (GPS) connection to give the best ON-OFF time and energy saving. Automatic Street Light Control System is a simple and powerful concept, which uses transistor as a switch to switch ON and OFF the street light automatically.
- By using this system manual works are removed. It automatically switches ON lights when the sunlight goes below the visible region of our eyes. It automatically switches OFF lights under illumination by sunlight.
- This is done by a sensor called Light Dependant Resistor (LDR) which senses the light actually like our eyes By using this system energy consumption is also reduced because now-a-days the manually operated street lights are not switched off properly even the sunlight comes and also not switched on earlier before sunset.
- In sunny and rainy days, ON time and OFF time differ significantly which is one of the major disadvantage of using timer circuits or manual. This project exploits the working of a transistor in saturation region and cut-off region to switch ON and switch OFF the lights at appropriate time with the help of an electromagnetically operated switch.

❖ **BASIC PRINCIPLE**

- The automatic streetlight control system operates on 12 V DC supply. The automatic streetlight controller has a photoconductive device whose resistance changes proportional to the extent of illumination, which switches ON or OFF the LED with the use of transistor as a switch. Light dependent resistor, a photoconductive device has been used as the transducer to convert light energy into electrical energy. The central dogma of the circuit is that the change in voltage drop across the light dependent resistor on illumination or darkness switches the transistor between cut-off region or saturation region and switches OFF or ON the LEDAs we know property of LDR that during the time of day resistance is low therefore voltage at the inverting input (IE pin 2) is higher than the voltage at the non-inverting input (pin3) hence the output at the pin6 is low so the transistor goes into the cut off state which means LED or bulb will not glow. and

.



F-8.1.8-A – Circuit diagram of automatic street light controller.

❖ LIST OF COMPONENTS-

S.NO.	PARTS	RANGE	QUANTITY
1.	LDR		1
2.	TRANSISTOR	BC -547 NPN	2
3.	RESISTOR	1K, 330 ohm	3
4.	LED		1
5.	PCB		1
6.	POWER SUPPLY	6V OR 9V	1

T-8.1.8-A – LIST OF COMPONENTS

❖ SPECIFICATION OF COMPONENTS- 5.1. LDR (LIGHT DEPENDENT RESISTER)

- LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically.
- When the light level is low the resistance of the LDR is high. This prevents current from flowing to the base of the transistors. Consequently the LED does not light.

❖ TRANSISTORS

- BC547 is an NPN bi-pola junction transistor. A transistor, stands for transfer or resistance commonly used to amplify current. A small current at its base controls a larger current at collector & emitter terminals. BC547 is mainly used for amplification and switching purposes. It has a maximum current gain of 800. Its equivalent transist.
- The transistor terminals require a fixed DC voltage to operate in the desired region of its characteristic curves. This is known as the biasing. For amplification applications, the transistor is biased such that it is partly on for all input conditions. The input signal at base is amplified and taken at the emitter.

.

❖ RESISTORS

- Resistor is an electrical component that reduces the electric current. The resistor's ability to reduce the current is called resistance and is measured in units of ohms (symbol: Ω).If we make an analogy to water flow through pipes, the resistor is a thin pipe that reduces the water flow.

❖ LED (LIGHT EMITTING DIODE)

- A light-emitting diode (LED) is a two-lead semiconductor light source that resembles a basic pnjunction diode, except that an LED also emits light. When an LED's anode lead has a voltage that is more positive than its cathode lead by at least the LED's forward voltage drop, current flows.

- Electrons are able to recombine with holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the colour of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor.

❖ PCB (PRINTED CIRCUIT BOARD)

- A printed circuit board (PCB) mechanically supports and electrically connects electronic components using conductive tracks, pads and other features etched from copper sheets laminated onto a non-conductive substrate. PCBs can be single sided (one copper layer), double sided (two copper layers) or multi-layer. Conductors on different layers are connected with plated-through holes called bias. Advanced PCBs may contain components - capacitors, resistors or active devices - embedded in the substrate.

❖ WORKING

- Circuit of a compact and true solid-state automatic lawn light is described here.
- The circuit can be used to switch on incandescent garden light bulbs at desk and switch off them at dawn. A 10 mm encapsulated light dependent resistor (LDR) here works as the twilight detector.
- The whole circuit can be housed in a very small plastic cabinet.
- For powering the circuit AC household supply is needed. With a little skill and patience, you can easily modify this circuit to drive a number of white LED strings, instead of the incandescent bulb load at the output.
- When ambient light is normal, transistor T1 is reverse biased by the low resistance of LDR. Multiturn plastic trimpotP1 sets the detection sensitivity. If ambient light dims, transistor T1 turns on to drive the triac T2. Now the lamp load at the output of T2 energises.
- When the ambient light level restores, circuit returns to its idle state and light(s) switched off by the circuit.
- Working voltage for the circuit is derived directly from the AC supply input through components R1, R2 and R3. This obviates the requirement of a bulky.
- If you wish to operate the, light bulb(s) on a little reduced power, just replace the triac T2 with a suitable silicon controlled rectifier (SCR). This may give a long life to the incandescent load. Finally, the LDR should not be mounted to receive direct sunlight. It may be mounted at the top of the enclosure, pointing to the sky say southwards.

❖ ADVANTAGES & DISADVANTAGES-

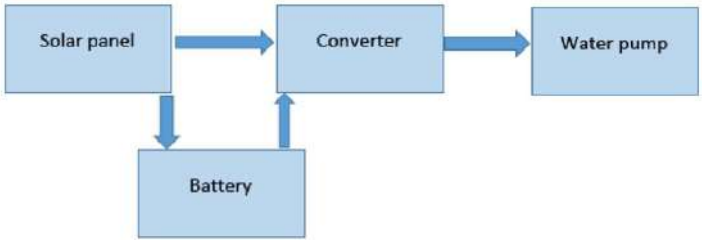
- By using this automatic system for street light controlling ,we can reduce energy consumption because the manually operated street lights are not switch off properly even the sun light comes and Also not switched on earlier before sunset
  - Low cost
  - Automated operation
  - Low power consumption
- In sunny and rainy days, on and off time differ notice which is one of the major disadvantages of using timer circuit or manual operation for switching the street light system.
- controller using ldr based Light intensity & traffic density, in the todays up growing countries will be more effective in case of cost, manpower and security as compare with today's running complicated and complex light controlling systems. Automatic Street Light Controlling .System puts up a very user friendly approach and could increase the power.
- This elaborates the design and construction of automatic street control system circuit. Circuit works properly to turn street lamp ON/OFF. After designing the circuit which controls the light of the street as illustrated in the previous sections. LDR sensor and the photoelectric sensors are

8.1.9 Electrical Design 3: Solar Powered Smart Irrigation System

- Solar energy is the most abundant source of energy in the world. Solar power is not only an answer to today's energy crisis but also an environmental friendly form of energy. Photovoltaic generation is an efficient approach for using the solar energy. Solar panels (an array of photovoltaic cells) are nowadays extensively used for running street lights, for powering water heaters and to meet domestic loads. The cost of solar panels has been constantly decreasing which encourages its usage in various sectors. One of the application of this technology is used in irrigation systems for farming. Solar powered irrigation system can be a suitable alternative for farmers in the present state of energy crisis in India. This a green way for energy production which provides free energy once an initial investment is made.

❖ System description

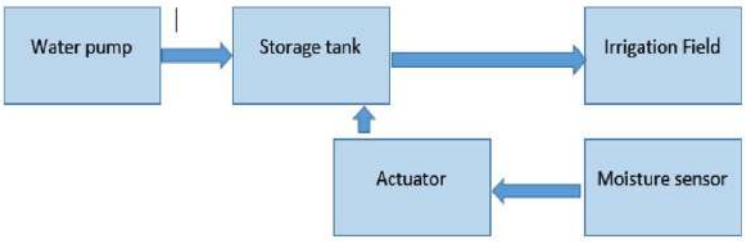
- Proposed irrigation system mainly consists of two modules- Solar pumping module and automatic irrigation module. In solar pumping module a solar panel of required specification is mounted near the pump set.



F-8.1.9-A-Diagram Block of solar pumping

❖ Solar Powered Smart Irrigation System

- Then using a control circuit it is used to charge a battery. From the battery using a converter circuit it gives power to the water pump which is submerged inside the well. Then the water is pumped into an overhead tank for storing water temporarily before releasing the water into the field.



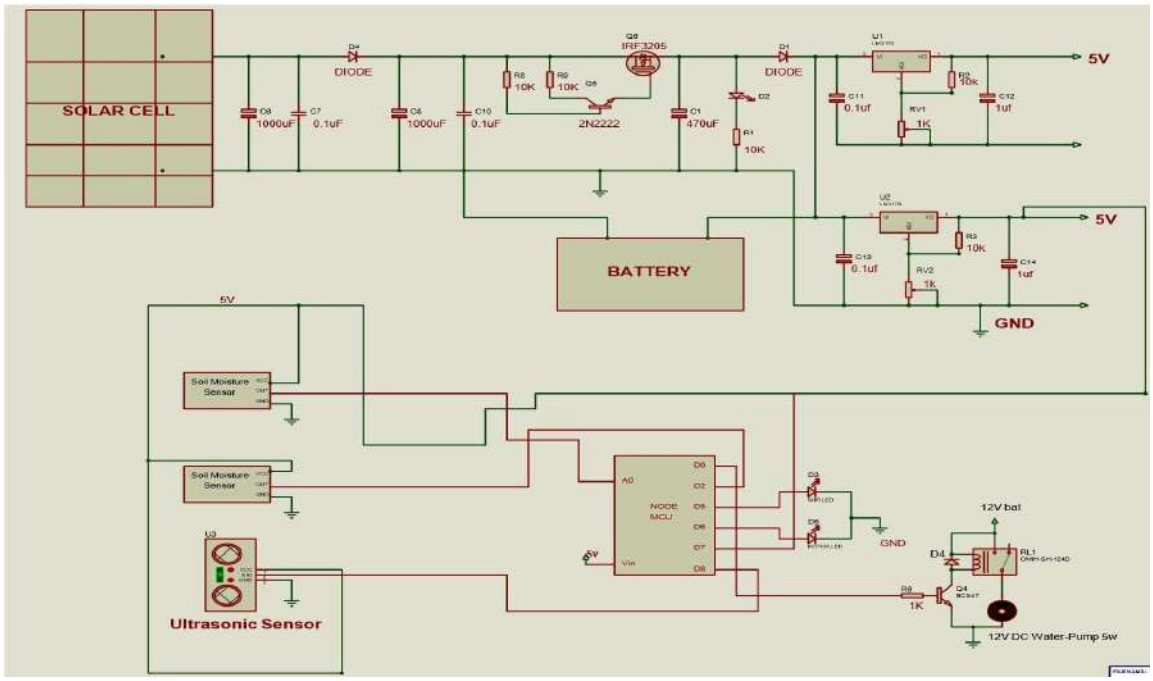
F-8.1.9-B- Block diagram

- This is given to a sensing circuit which has a reference voltage that can be adjusted by the farmer for setting different moisture levels for different crops.
- A control signal was given to a stepper motor whose rotational angle is proportional to the difference in voltage. The stepper motor in turns controls the cross sectional area of the valve to be opened controlling flow of water. Therefore the amount of water flowing is proportional to the moisture difference.

❖ Implementation

- For the implementation of the proposed system we are using a 2 HP water pump and various modules which are designed and fabricated separately and then finally they are assembled together to implement the proposed system. Solar energy is harnessed using solar panel PVL-68 that generates 53W at Nominal Operating Cell Temperature. It is 24V, amorphous silicon type solar cell.
    - Specification of the solar panel selected:
    - Array capacity --240Wp
    - Irradiance – 580 W/m2

F-8.1.9-C-Circuit Diagram



T-8.1.9-A- Load test characteristics of solar panel.

S. No	Voltage (in Volts)	Current (in Ampere)	Irradiance (W/m^2)
1	5.2	1.45	300
2	17.5	2.95	710

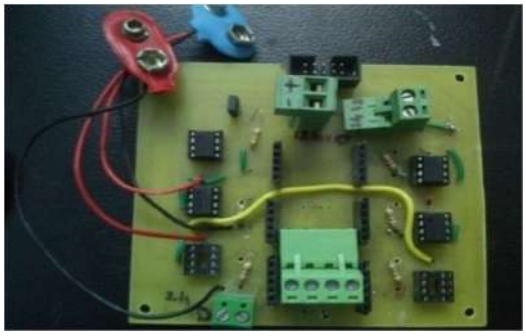
❖ **Design of converter and battery specification**

➢ An inverter is designed with a DC input of 230V D.C which is generated from 12V D.C using a boost converter. Sine PWM technique is applied to generate 230V A.C. The inverter circuit fabricated is shown in Fig. 4. As far as battery is concerned we are using a battery with 12V, 100Ah capacity for a 2HP pump.

❖ **Moisture sensor module**

➢ A moisture sensor is used to sense the level of moisture content present in the irrigation field. It has a level detection module in which we can set a reference value. This circuit can be used with analog probes that produce a voltage proportional to soil moisture such as VG400 probe shown in Fig. 3.

F-8.1.9-D- Soil Moisture Sensor probe



F-8.1.9-E--Inverter circuit.

❖ **Automatic valve regulation**

F-8.1.9-F- Automatic valve regulation circuit.

- For an automatic valve control we are using a stepper motor as an actuator control of the valve which is connected to the outlet valve of the tank. With the help of moisture sensor signal and a controller, a control pulses is given to the driver circuit that excites the stepper motor. So this way the outlet valve is slowly opened or closed depending upon the amount of moisture present in the soil of the field. When the soil moisture content reaches the required value, the valve is fully closed and power to driver circuit is killed and controller is put into sleep mode for low power consumption. When the moisture in soil is dried and reach a minimum cut-off value, the controller comes out of sleep mode and flow of water is regulated. This way the whole system works automatically.

❖ **Cost Analysis**

- With over nine hundred thousand tube wells being used in every state of India, around Rs.18 Million of energy is used for pumping water for irrigation. This amount of money used for electricity can be saved with the help of solar water pump. Annually the cost of nearly five million kilo watt hour of energy can be spared.
- Even though the initial investment is high, it can be earned back in 2 and a half years' time. If we assume the cost of power is Rs. 1.5 Million per kilo watt hour, Rs.18 Million is used for pumping water alone in a year. By using the solar water pump, we can save up to 4.8 million KWh of energy annually which saves a lot of energy. The excess energy can also be given to the grid with small modifications and investments in the circuit, which can add to the revenue of the farmer.

T-8.1.9-B- Cost analysis.

Component	Unit Cost	Quantity	Total Cost
Solar Panel (1.4m^2)	24000	4	Rs.96000
Converter Circuit	400	1	Rs.400
Battery 24V,100Ah	8250	1	Rs.8250
		Overall cost	**Rs.104650**

- By implementing the proposed system there are various benefits for the government and the farmers. For the government a solution for energy crisis is proposed. By using the automatic irrigation system it optimizes the usage of water by reducing wastage and reduce the human intervention for farmers Proposed system is easy to implement and environment friendly solution for irrigating fields. The system was found to be successful when implemented for bore holes as they pump over the whole day. Solar pumps also offer clean solutions with no danger of borehole contamination. The system requires minimal maintenance and attention as they are self starting. To further enhance the daily pumping rates tracking arrays can be implemented. This system demonstrates the feasibility and application of using solar PV to provide energy for the pumping requirements for sprinkler irrigation.

8.2 Reason for Students Recommending this Design

- Water Tank - to provide desired quantity of water
- Public Toilet - to increase sanitation
- Market- To offer self-service shop offering a wide variety of food, beverages, and household products, organized into sections
- Public Garden- It will create a garden that is enjoyable and attractive to visit for the purposes of work, rest and contemplation and that contributes positively to the environmental quality of the area.
- Cybercafe - To provide accessing the internet, playing games, chatting with friends or doing other computer related tasks and access of these is charged based on time.
- IOT Based Smart Village: To help to reduce cost through improved process efficiency, asset utilization and productivity.
- Automatic Street Light Control System: To switch ON and OFF the street light automatically.
- Solar Powered Smart Irrigation System: To utilize the solar energy from solar panels to automatically pump water from bore well directly into a ground level storage tank.

8.3 About designs Suggestions / Benefit of the villagers

- **Water Tank**: Presently, they are using water from, tank of insufficient capacity .after interaction with villagers we get to know they get water once in 2 or 3 days Thus, by introducing the water tank in the village ,villagers will get the desired supply of water for domestic purposes without making additional efforts for that.
- **Public toilet**: Some of the houses in the village do not have attached toilets . As a result they end up using the roads and the farms. Thus introducing a public toilet will help in avoiding the use of open areas which will increase hygiene and cleanliness in the village.
- **Supermarket** : By designing the supermarket in the kamrol, many needs of the villagers will be satisfied. Supermarket is a self-service shop offering a wide variety of food, beverages, and household products, organized into sections.
- **Public Garden** : It will create a garden that is enjoyable and attractive to visit for the purposes of work, rest and contemplation and that contributes positively to the environmental quality of the area.
- **Cybercafe** : The design of cybercafe is the smart concept in the kamrol village. A cybercafe is a type of business where computers are provided for accessing the internet, playing games, chatting with friends or doing other computer related tasks. And mainly internet facility will be available for all the villagers at any time.
- **IOT Based Smart Village**: There is no use of technology in village. So it will help to reduce cost through improved process efficiency, asset utilization and productivity.
- **Automatic Street Light Control System**: Currently so much energy is wasted due to mismanagement so it will switch ON and OFF the street light automatically which will not allow the waste of energy.
- **Solar Powered Smart Irrigation System**: To utilize the solar energy from solar panels to automatically pump water from bore well directly into a ground level storage tank.

Chapter:9

Proposing designs for Future Development of the Village for the PART-II Design

- An additional source of water will be available which could be used at the time of emergency or water shortage by implementing the Rain Water Harvesting system in the village households.
- Currently the villagers are dumping their solid waste at outer part of the village and burn it at a specific location. By that air pollution will increase and waste collection is not done regularly so that solid waste management system should be there in the village for cleanliness and safe environment.
- There is no any child development or maternity home or skill development center in the Davad village but for the better development of students and children there should be one skill development center in the village.
- For the smart development of the Davad village we have proposed the smart concepts of smart irrigation monitoring system.
- Most of villagers in Davad are engaged in agricultural activities like farming, Hence provision of Krishi Kendra will prove too beneficial to villagers. Farmers problems can be resolve in that Centre.
- Low cost grain storage structure can be made.
- Solar Energy Sources can be used for electricity purposes in schools and other infrastructure.
- Internal road quality can be improved to provide better transportation facilities by using waste material as filling material which is produced within the village.

Chapter:10

Conclusion of the Entire Village Activities of the Project

- From this VY Phase-VIII project, we have concluded that…
- What is basic need of village and what is amenities and prior requirement to make any village as an ideal village.
- We have surveyed of an ideal village at punsari have to determine that what is basic need & facilities to have in a village and how to providing this facilities as economicaland sustainably for superior purposes in our Davad village.
- We can also determine that what is the process needs to be done such all this work andwhat is role of villagers, Sarpanch, Local authorities, Talati, TDO, DDO for development of village and also basic and main thing is supporting to all will make sustaining design and facilities for village develops as an ideal village.
- We can say that by this project that if we want to change the society as nation or urban area then first of all the main income source and backbone of our India is villages or rural area. so we have to give all necessity amenities that cause they live better life as well as they can utilize all facilities as economical as possible also villagers can developtheir self as compare to urban area.
- Village area is far from city area hence many things like educational, health, social cultural facilities has developed by us with the help of this excellent project VY phase-VIII.
- Throughout our research, work on this that how to make village as an ideal village in mention methodology and how to do work systematically so we can make any village asan ideal village.
- Hence, we can conclude that if we want to change our society and nation then first of all change or develop village area In addition, this is the initial step to make India as a developed country so we have to serve by our skill to develop our country and “Make India As A Future Of Power” with the help of this type of project work.

Chapter:11

References refereed for this project

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- **http://eeas.europa.eu/archives/delegations/fiji/press_corner/all_news/news/2015/20150420_01_en.pdf**

Chapter:12

Annexure attachment

12.1 Survey form of Ideal Village Scanned copy

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

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

Name of Village:	Pamsari
Name of Taluka:	Talod
Name of District:	Sabarkantha
Name of Institute:	Sumarth College of Engineering & Technology.
Nodal Officer Name & Contact Detail:	MR. Brijesh Patel. 9408585906
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Talati - Aashish R. chaudhry Sarpanch - Sunandaben S. Patel
Date of Survey:	16/10/2020

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	—	—	—	—
ii)	2011	5100	2653	2447	1109

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	1532 hect. 23°20'59.46"N, 73°8'12.48"E
	Forest Area (In hect.)	—
	Agricultural Land Area (In hect.)	1015.63 hect.
	Residential Area (In hect.)	15.52 hect.
	Other Area (In hect.)	216.60 hect.
	Water bodies	Overhead tank
	Nearest Town with Distance:	Talod - 20 kms.

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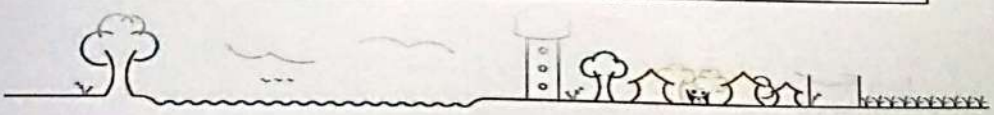
Techno Economic Survey

3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1. farming 2. Milk Production 3. Shopkipping.

4. **Physical Infrastructure Facilities:**

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated)	Yes	✓		
	• RO Water	Yes	✓		
	• Well (Covered/ Uncovered)	Yes	✓		7
	• Hand pumps	NO		✓	
	• Tube well/ Borehole	Yes	✓		7
	• River/ Canal/ Spring/ Lake/ Pond	NO		✓	
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity: 2-lac	✓		1
	Underground Sump	Capacity: —		✓	
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	Yes	✓		
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	close-100%	✓		
	If Open than Pucca / Kutchcha	—			
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	Yes	✓		
Suggestions if any:					



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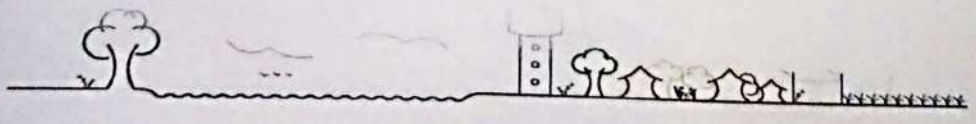
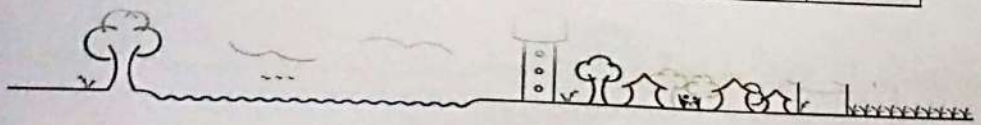
E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	WBM	✓		
	Main road	RCC	✓		
	Internal streets	cc/block	✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.	S.H-57	✓		
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO		✓	Talod-20kms
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes Good	✓		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Yes	✓		
Suggestions if any:					
C.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	UGVCL (24 hrs)	✓		24 hrs available
	Power supply for Domestic Use	Yes	✓		
	Power supply for Agricultural Use	Yes	✓		
	Power supply for Commercial Use	Yes	✓		
	Road/ Street Lights	Yes	✓		



	Electrification in Government Buildings/ Schools/ Hospitals	Yes	✓		
	Renewable Energy Source Facilities (Y/ N)	Yes	✓		
	LED Facilities	Yes	✓		
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes-3	✓		3 Nos.
	Location Condition	In Village good	✓		
	Community Toilet (With bath/ without bath facilities)	Yes with bath	✓		3
	Solid & liquid waste Disposal system available	Yes	✓		
	Any facility for Waste collection from road	Door to Door Collection	✓		
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	Tubewell, Drip irrigation	✓		
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	98% Pucca 2% Kutchha	–		

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks



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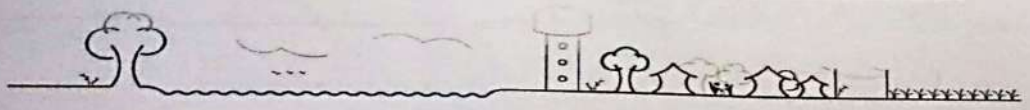
K.	Health Facilities:				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	PHC 10 beds good	✓		
	Private Clinic/Private Hospital/ Nursing Home	Private Clinic	✓		
	If any of the above Facility is not available in village than approx. distance from village: 20 kms. taluka.				
Suggestions if any:					

L.	Education Facilities:				
	Aaganwadi/ Play group	Yes	✓		8
	Primary School	Yes	✓		5
	Secondary school	Yes	✓		1
	Higher sec. School	Yes	✓		1
	ITI college/ vocational Training Center	ITI (Skill development)	✓		1
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	NO	–	–	–
	If any of the above Facility is not available in village than approx. distance from village: 20 kms. taluka				
Suggestions if any:					

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



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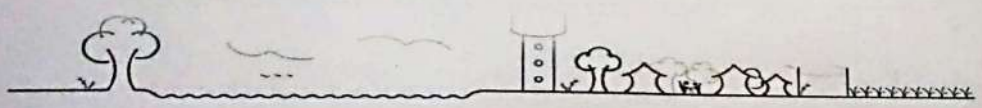
	Condition:	Good			
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	Yes In Village Good	✓		
	Public Garden Location: Condition:	No		✓	
	Village Pond Location: Condition:	No		✓	
	Recreation Center Location: Condition:	No		✓	
	Cinema/ Video Hall Location: Condition:	No		✓	
	Assembly Polling Station Location: Condition:	Yes Gov Primary School Good	✓		
	Birth & Death Registration Office Location: Condition:	Yes Panchayat Good	✓		
If any of the above Facility is not available in village than approx. distance from village: ..20.....kms. taluka					
Suggestions if any:					
N.	**Other Facilities**				
	Post-office	Yes	✓		
	Telecommunication Network/ STD booth	No		✓	



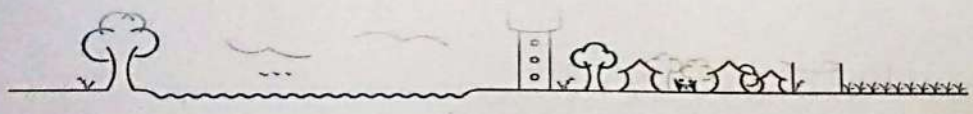
	General Market	No		✓	
	Shops (Public Distribution System)	Yes	✓		
	Panchayat Building	Yes	✓		
	Pharmacy/Medical Shop	Yes	✓		
	Bank & ATM Facility	Yes	✓		
	Agriculture Co-operative Society	Yes	✓		
	Milk Co-operative Soc.	Yes	✓		
	Small Scale Industries	Yes	✓		
	Internet Cafes/ Common Service Center/Wi Fi	Yes	✓		
	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	Yes (Eco-friendly electricity generation)	✓		
P.	Bio-Gas Plant	No		✓	
	Solar Street Lights	Yes	✓		
	Rain Water Harvesting System	Yes	✓		
Q.	Any Other	—	—	—	

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	Yes Soft Copy.



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VI
Techno Economic Survey

Recent Projects going on for Development of Village	Yes
Any NGO working for village development	No

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)	No	
2.	Additional Information/ Requirement	NO	

9. **Smart Village Proposal Design**

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	–	–	–

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

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

તલાટી કમમંત્રી
પુંસરી ગ્રામ પંચાયત
તા.તલોદ, જિ.સાબરકાંઠા.

12.2 Survey form of Smart Village Scanned copy

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

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

Name of District:	Sabarkantha
Name of Taluka:	Himmatnagar
Name of Village:	Hadiyal
Name of Institute:	Samarth College of Engineering & Technology
Nodal Officer Name & Contact Detail:	MR. Blijesh Patel 94085 85906
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sarpanch: Arpit S. Nayi.
Date of Survey:	24/10/2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	3905	2029	1876	838

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1442.36 hec.
2.	Forest Area (In hect.)	
3.	Agricultural Land Area (In hect.)	1000.78 hec.
4.	Residential Area (In hect.)	
5.	Other Area (In hect.)	61.049 hec.
6.	Distance to the nearest railway station (in kilometers):	Himmatnagar (4 K.m.)

7.	Name of Nearest Town with Distance:	Himmatnagar (4. K.m.)
8.	Distance to the nearest bus station (in kilometers):	Himmatnagar (4 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. Farmer 2. Farm labour 3. government employee
Major crops grown in the village:	1. Cotton 2. Groundnut 3. Castor

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

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Vishwakarma Yojana: Phase VIII
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Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity: 2,10,000 Ltr	✓		1
	Underground Sump	Capacity:		✓	-
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	-			-
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	C.C.	✓		-
	Main road	WBM	✓		-
	Internal streets	C.C.			-
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH-145	✓		-
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Yes No (4 km)	✗	✓	Himmatnagar 4 Km.
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	No		✓	Himmatnagar 4 Km
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	✓	✓	-	Auto, Jeep
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Yes UGVCL	✓		24 hour available

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Power supply for Domestic Use	Yes	✓		–
	Power supply for Agricultural Use	Yes	✓		–
	Power supply for Commercial Use	Yes	✓		–
	Road/ Street Lights	Yes	✓		–
	Electrification in Government Buildings/ Schools/ Hospitals	Yes	✓		–
	Renewable Energy Source Facilities (Y/ N)	Yes	✓		–
	LED Facilities	Yes	✓		–
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes	✓		2.
	Location Condition	good			
	Community Toilet (With bath/ without bath facilities)	Yes	✓		with bath
	Solid & liquid waste Disposal system available	No		✓	–
	Any facility for Waste collection from road	No		✓	–
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND	yes	✓		–
	STREAM/RIVER	–			–
	CANAL	–			–
	WELL	yes	✓		–
	TUBE WELL.	–			–
	OTHER (SPECIFY)	–			–
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	75% Pucca 25% Kutchha	✓		–

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	–			–
	Sub-Centre	–			–
	PHC	yes	✓		1
	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: ...4....kms. Himmatnagar				
	Suggestions if any:				
K.	**Education Facilities:**				
	Aaganwadi/ Play group	yes	✓		3
	Primary School	yes	✓		1
	Secondary school	No		✓	
	Higher sec. School	No		✓	
	ITI college/ vocational Training Center	No		✓	
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	yes	✓		
	If any of the above Facility is not available in village than approx. distance from village: ...4....kms. Himmatnagar.				

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Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	Good	near Panchayat	✓	
	Public Library (With daily newspaper supply: Y/N)	–	–	–	✓
	Public Garden	Good	near Temple	✓	–
	Village Pond	Good	near healthcenter	✓	–
	Recreation Center	–	–	–	–
	Cinema/ Video Hall	–	–	–	–
	Assembly Polling Station	–	–	–	–
	Birth & Death Registration	Good	Panchayat	✓	–

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

Suggestions if any:

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

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Techno Economic Survey

	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries	Good Good	For Village	✓	-
	Other Facility				

Suggestions if any:

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

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks

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1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other	Public Toilet	need of community toilet of Public toilet with bath
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?	Good	-

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	Automatic street light control system	-

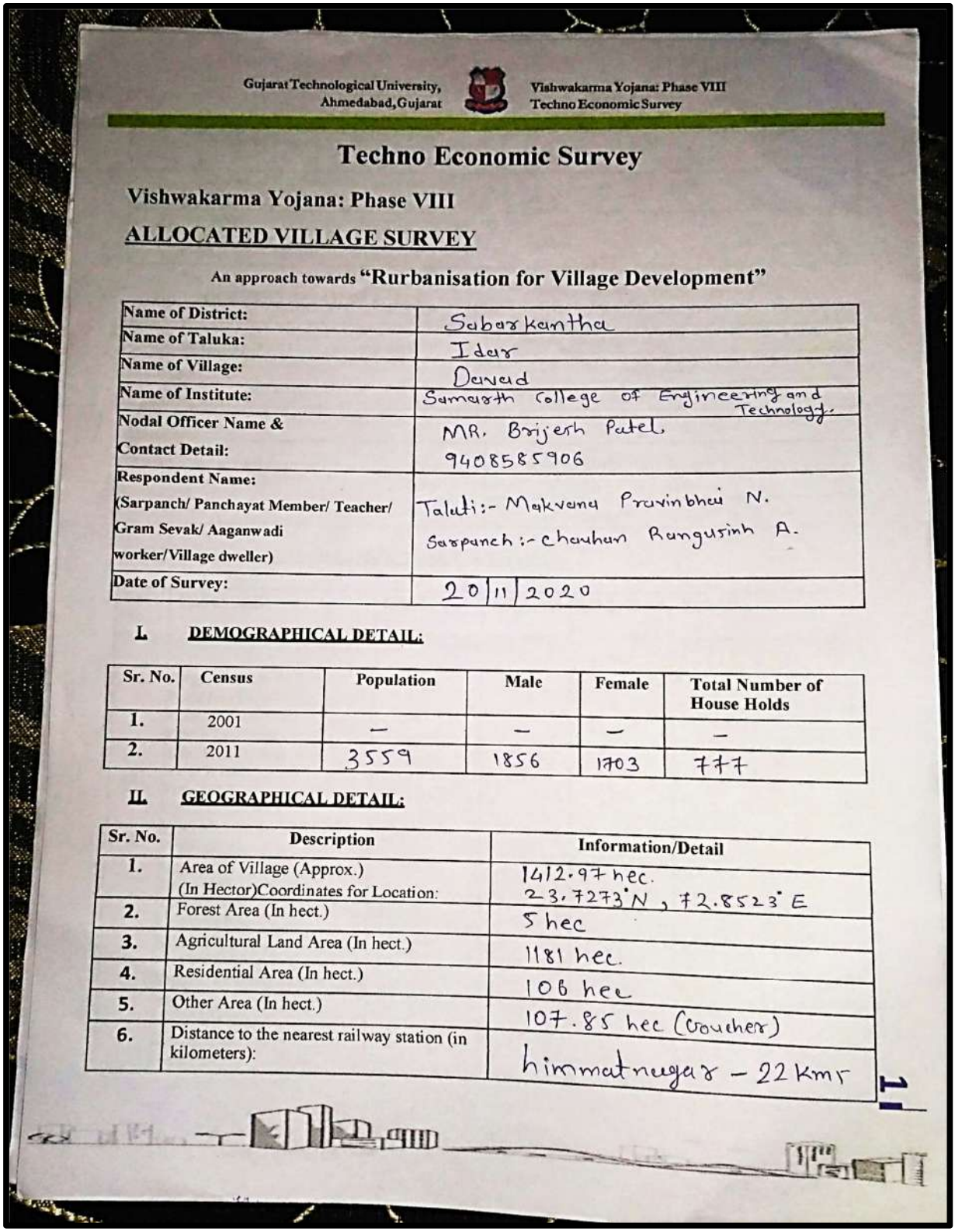
Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

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

તલાટી કમ મંત્રી
હડિયોલ ગામ પંચાયત
તા. હિંમતનગર, જિ. સા.કાં.

સરપંચ
હડિયોલ ગામ પંચાયત
તા. હિંમતનગર, જિ. સા.કાં.

12.3 Survey form of Allocated Village Scanned copy



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

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

Name of District:	Sabarkantha
Name of Taluka:	Idar
Name of Village:	Davad
Name of Institute:	Samarth College of Engineering and Technology.
Nodal Officer Name & Contact Detail:	MR. Brijesh Patel, 9408585906
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Taluti:- Makvana Pravinbhai N. Sarpanch:- Chauhan Rangusinh A.
Date of Survey:	20 / 11 / 2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	–	–	–	–
2.	2011	3559	1856	1703	777

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1412.97 hec. 23.7273°N, 72.8523°E
2.	Forest Area (In hect.)	5 hec
3.	Agricultural Land Area (In hect.)	1181 hec.
4.	Residential Area (In hect.)	106 hec
5.	Other Area (In hect.)	107.85 hec (Goucher)
6.	Distance to the nearest railway station (in kilometers):	himmatnagar – 22 kms

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

7.	Name of Nearest Town with Distance:	Idar - 25 kms
8.	Distance to the nearest bus station (in kilometers):	In village.
9.	Whether village is connected to all road for the any facility or town or City?	Yes.

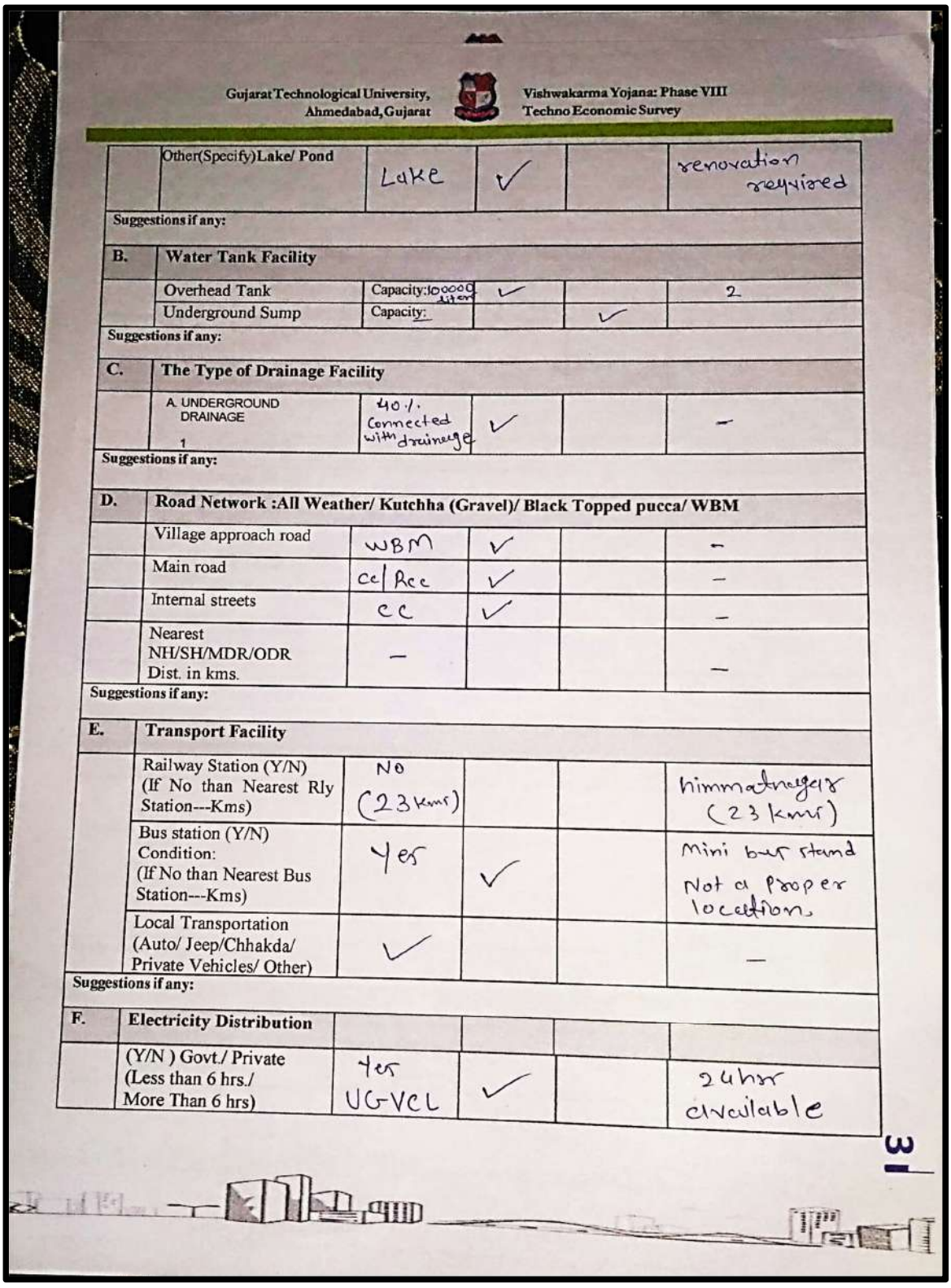
III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1. farmer 2. farm labour 3. other work

Major crops grown in the village:	1. Cotton 2. Castor beam 3. Tobacco

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER**				
	Piped Into Dwelling	Yes	✓		-
	Piped To Yard/Plot	Yes	✓		-
	Public Tap/Standpipe	Yes	✓		-
	Tube Well Or Bore Well	Yes	✓		-
2.	**DUG WELL**				
	Protected Well	NO		✓	-
	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/**	Lake	✓		renovation required
	Irrigation Channel	Canal	✓		Not a Permanent Canal
	Bottled Water				
	Hand Pump				



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Other(Specify)Lake/ Pond	Lake	✓		renovation required
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:100000 Liter	✓		2
	Underground Sump	Capacity:		✓	
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1	40% Connected with drainage	✓		–
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	WBM	✓		–
	Main road	CC/RCC	✓		–
	Internal streets	CC	✓		–
	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)	No (23 Kms)			himmatnagar (23 kms)
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes	✓		Mini bus stand Not a proper location.
	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)	Yes UGVCL	✓		24 hrs available

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Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Power supply for Domestic Use	Yes	✓		–
	Power supply for Agricultural Use	Yes	✓		–
	Power supply for Commercial Use	Yes	✓		–
	Road/ Street Lights	Yes	✓		–
	Electrification in Government Buildings/ Schools/ Hospitals	Yes	✓		–
	Renewable Energy Source Facilities (Y/ N)	NO		✓	–
	LED Facilities	NO		✓	–

Suggestions if any:

G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	NO		✓	–
	Location Condition				
	Community Toilet (With bath/ without bath facilities)	NO		✓	–
	Solid & liquid waste Disposal system available	NO		✓	–
	Any facility for Waste collection from road	NO		✓	No facility available

Suggestions if any:

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

Suggestions if any:

I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	60% Pucca 40% Kutchha	✓		–

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Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	Yes	✓		4
	Sub-Centre	–	–	–	–
	PHC	Yes	✓	–	1
	BLOCK PHC	–	–	–	–
	CHC/RH	Yes	–	–	1
	District/ Govt. Hospital	–			
	Govt. Dispensary				
	Private Clinic	Yes	✓		1
	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: Idar kms. 25 kms				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	Yes	✓		4
	Primary School	Yes	✓		3
	Secondary school	Yes	✓		2
	Higher sec. School	Yes	✓		1
	ITI college/ vocational Training Center	NO		✓	–
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	NO		✓	–

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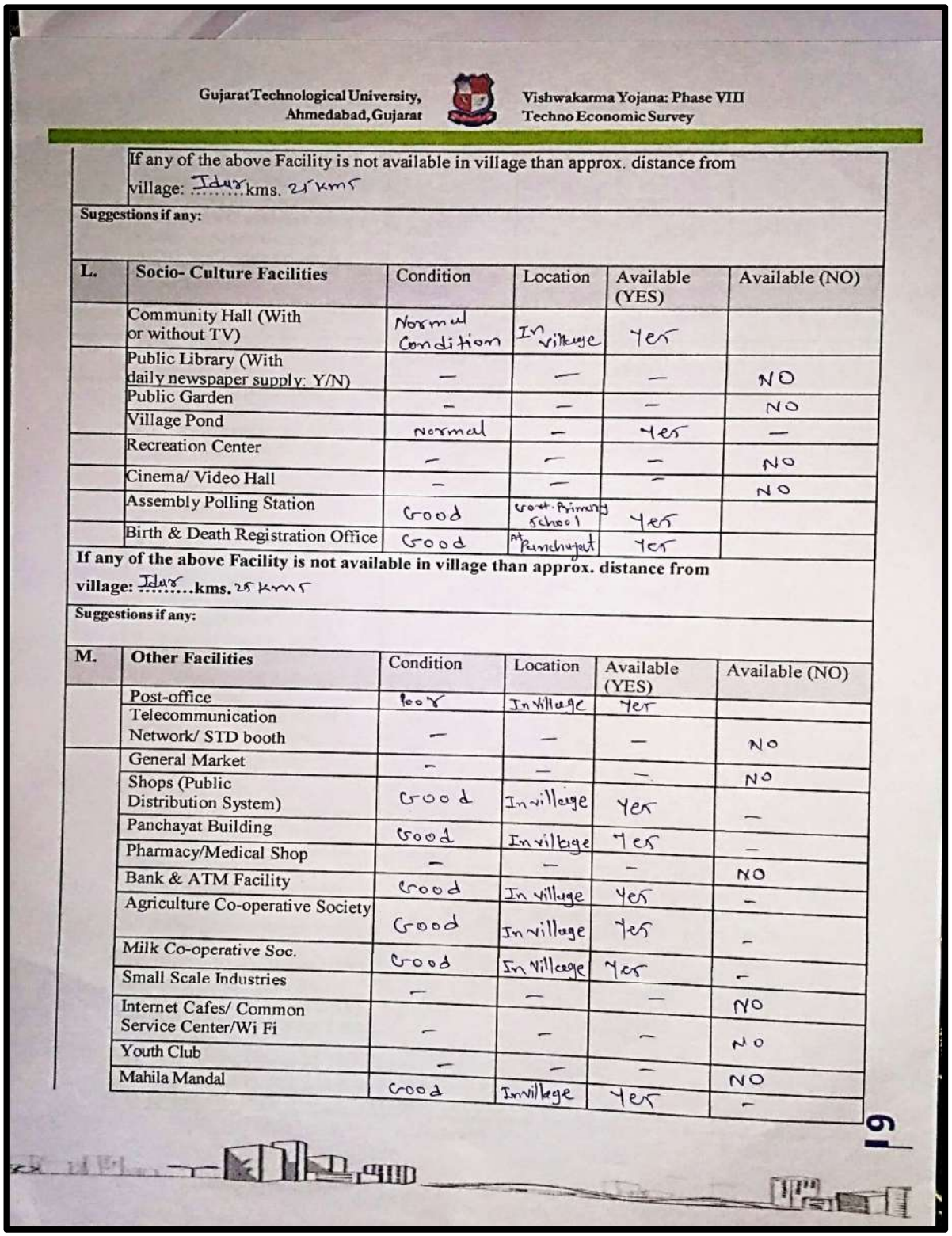

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

If any of the above Facility is not available in village than approx. distance from village: Idar kms. 25 kms

Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	Normal Condition	In village	Yes	
	Public Library (With daily newspaper supply: Y/N)	–	–	–	NO
	Public Garden	–	–	–	NO
	Village Pond	Normal	–	Yes	–
	Recreation Center	–	–	–	NO
	Cinema/ Video Hall	–	–	–	NO
	Assembly Polling Station	Good	Govt. Primary School	Yes	
	Birth & Death Registration Office	Good	At Panchayat	Yes	

If any of the above Facility is not available in village than approx. distance from village: Idar kms. 25 kms

Suggestions if any:

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

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries	Good Good — —	In Village — —	Yes Yes — —	 NO
	Other Facility	—	—	—	—

Suggestions if any:

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

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

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VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

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

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	Public Toilet, Public garden, Automatic street light Control system	—

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

12.4 Gap Analysis of the Allocated Village

VILLAGE GAP Analysis					
Village Facilities	**Planning Commission/UDPFI Norms**	**Village Name:**	**DAVAD**		
		Population:		**3559**	
		Existing	**Required as per Norms**	**SmartVilage /Cities / Heritage Future Projection Design**	**Gap**
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 population	4	2	-	2
Primary School	Each Per 2500 population	3	2	-	1
Secondary School	Per 7,500 population	2	0	-	2
Higher Secondary School	Per 15,000 Population	1	0	-	1
College	Per 125,000 Population	0	0	-	0
Tech. Training Institute	Per 100000 Population	0	0	-	0
Agriculture Research Centre	Per 100000 Population	0	0	-	0
Skill Development Center	Per 100000 Population	0	0	-	0
Health Facility				-	
Govt/Panchyat Dispensary or Sub PHC or Health Centre	Each Village	1	1	-	0
Primary Health & Child Health Center	Per 20,000 population	1	0	-	1
Child Welfare and Maternity Home	Per 10,000 population	1	0	-	1
Multispeciality Hospital	Per 100000 Population	0	0	-	0
Public Latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets & kutcha house)	0	1	-	-1
Physical Infrastructure Facilities					
Transportation		**Adequate**			
Pucca Village Approach Road	Each village	**Adequate**	-	-	-
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	**Inadequate**	Pickup stand at main highway	-	-
Drinking Water (Minimum 70 lpcd)		**Adequate**			
Over Head Tank	2/3 of Total Demand	**Adequate**	1	1	0
U/G Sump	1/3 of Total Demand	**Adequate**	1	1	0
Drainage Network - Open		**Adequate**	30% open	-	-
Drainage Network - Cover		**Adequate**	70% covered		-
Waste Management System		**inadequate**			

Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	1	1	-	0
community hall and Public Library	Per 15000 Population	0	0	-	0
Cremation Ground	Per 20,000 population	1	1	-	0
Post Office	Per 10,000 population	1	1	-	0
Gram Panchayat Building	Each individual/group panchayat	1	1	-	0
APMC	Per 100000 Population	0	0	-	0
Fire Station	Per 100000 Population	0	0	-	0
Public Garden	Per village	0	1	-	-1
Police post	Per 40,000Population	0	0	-	0
Shopping Mall	Shops are available in village				
Electrical Design					
Electricity Network		**Adequate**			
Any Smart Village Facility					
Technology					
		ESR cap	0		
		Sump cap	0		
		Lat	0		

12.5 Summary Details of All the Villages Designs in Table form as Part-I and Part-II

Samarth College Of Engineering And Technology , Himatnagar			
No.	**Village Name**	**Part 1**	**Part2**
1	**Davad**	**Water tank**	**Solid Waste Management**
		Public Toilet	**Rain Water Harvesting**
		Public Garden	**LOW COST GREENHOUSE**
		Cyber Cafe	**Lake Development**
		Market	**Skill Development Center**
		IOT Based Smart Village	**Low cost Grain Storage Structure**
		AUTOMATIC STREET LIGHT CONTROL SYSTEM	**IOT Based Cattle Health Monitoring System**
		Solar Powered Smart Irrigation System	**Sun Tracking Solar Panel**
			Smart Agriculture Monitoring System Using IOT

12.6 Drawings (If, required,A1, A2, A3 design is not visible then Only)

- **All the images and drawings are attached in the chapter along with design.**

12.7 Summary of Good Photographs in Table Format (village visits, Ideal, Smart Village or any other)

Ideal Village : Punsari	
	
Primary School	**Aanganwadi**

Water Tank

Public Toilet

Allocated Village : Davad

Distribution Of Mask

Public Health Care Centre

Primary School

Temple

12.8 Village Interaction with sarpanch Report with the photograph

Village Interaction With Sarpanch/Talati Letter

Vishwakarma Yojana Phase-VIII
Davad Village , Idar Taluka , Sabarkantha District
Village Code : 383225

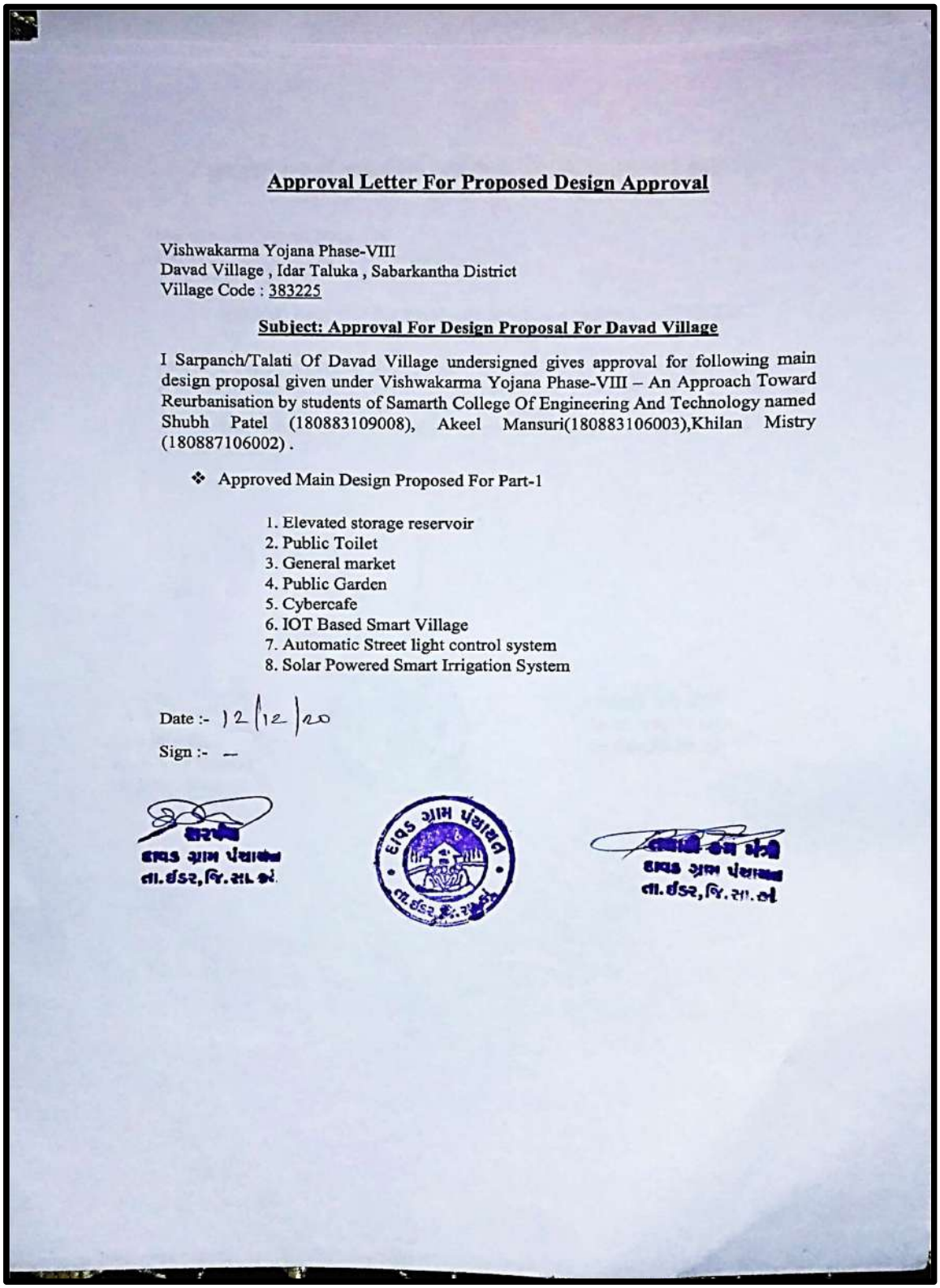
Subject: Village Interaction Form With Sarpanch/Talati of Davad Village

I Sarpanch/Talati Of Davad Village undersigned gives approval for Village Interaction Activity given under Vishwakarma Yojana Phase-VIII – An Approach Toward Reurbanisation by students of Samarth College Of Engineering And Technology named Shubh Patel (180883109008), Akeel Mansuri(180883106003),Khilan Mistry (180887106002) .

Date :- 12/12/20

Sign :- —

12.9 Sarpanch Letter giving information about the village development



Approval Letter For Proposed Design Approval

Vishwakarma Yojana Phase-VIII
Davad Village , Idar Taluka , Sabarkantha District
Village Code : 383225

Subject: Approval For Design Proposal For Davad Village

I Sarpanch/Talati Of Davad Village undersigned gives approval for following main design proposal given under Vishwakarma Yojana Phase-VIII – An Approach Toward Reurbanisation by students of Samarth College Of Engineering And Technology named Shubh Patel (180883109008), Akeel Mansuri(180883106003),Khilan Mistry (180887106002) .

- Approved Main Design Proposed For Part-1

1. Elevated storage reservoir
2. Public Toilet
3. General market
4. Public Garden
5. Cybercafe
6. IOT Based Smart Village
7. Automatic Street light control system
8. Solar Powered Smart Irrigation System

Date :- 12/12/20

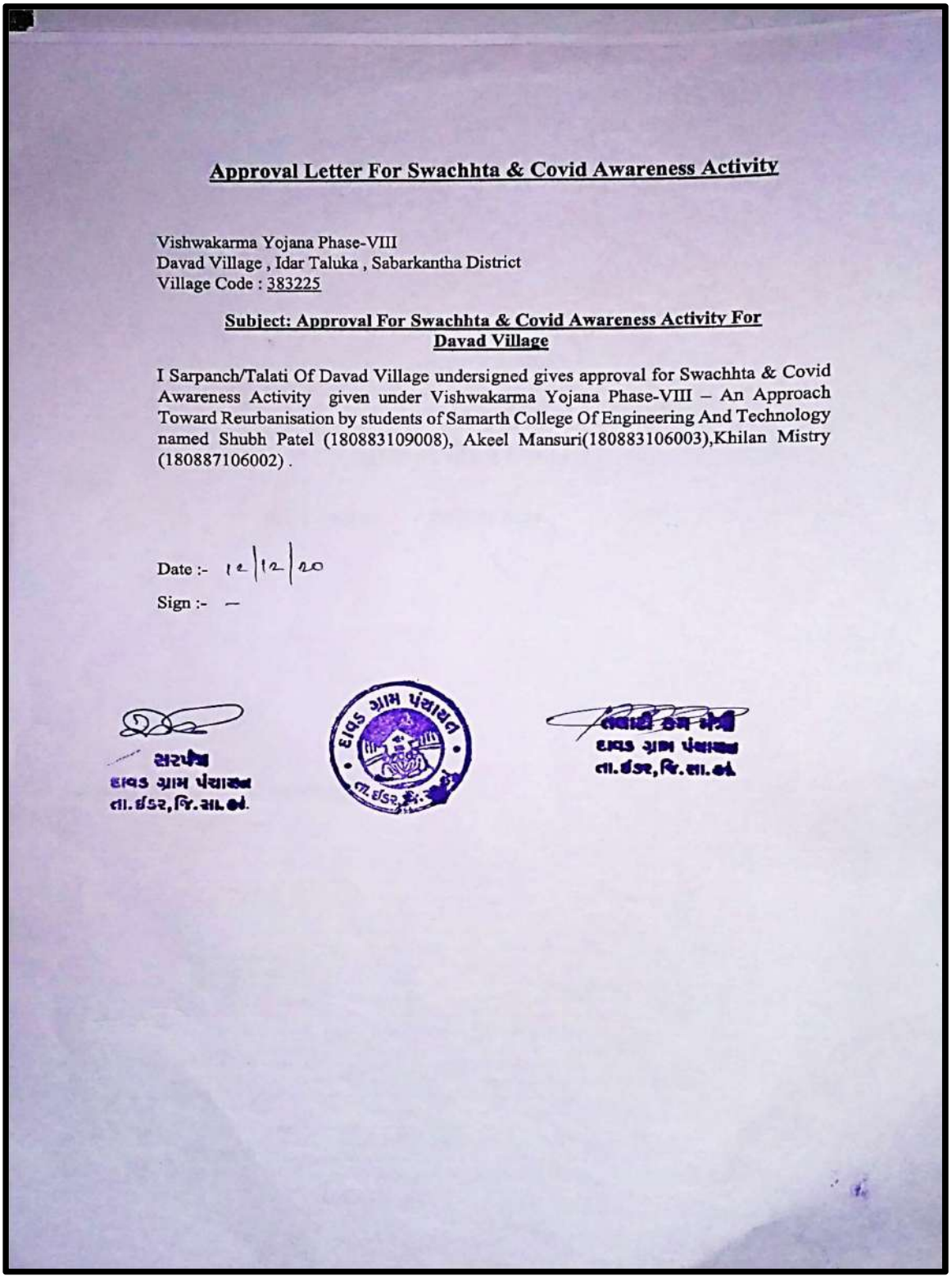
Sign :- —

દાવડ ગ્રામ પંચાયત
તા.ઈડર,જિ.સા.કાં

દાવડ ગ્રામ પંચાયત

દાવડ ગ્રામ પંચાયત
તા.ઈડર,જિ.સા.કાં

❖ **Approval Letter For Swachhta & Covid Awareness Activity approval**



Approval Letter For Swachhta & Covid Awareness Activity

Vishwakarma Yojana Phase-VIII
Davad Village , Idar Taluka , Sabarkantha District
Village Code : 383225

Subject: Approval For Swachhta & Covid Awareness Activity For Davad Village

I Sarpanch/Talati Of Davad Village undersigned gives approval for Swachhta & Covid Awareness Activity given under Vishwakarma Yojana Phase-VIII – An Approach Toward Reurbanisation by students of Samarth College Of Engineering And Technology named Shubh Patel (180883109008), Akeel Mansuri(180883106003),Khilan Mistry (180887106002) .

Date :- 12/12/20

Sign :- —

સરપંચ
દાવડ ગ્રામ પંચાયત
તા.ઈડર,જિ.સા.કાં.

દાવડ ગ્રામ પંચાયત
તા.ઈડર,જિ.સા.કાં.

VY-PHASE-VIII-PART-II

Chapter:13

From the Chapter- 9 future designs of the aspects (Feasibility, Construction, Operation and maintenance of various design options in Rural Areas along with cost with AutoCAD designs / planning with any software)

13.1 Design Proposals

13.1.1 Civil Design 1: Rain Water Harvesting System

- Rainwater harvesting is an important environment friendly approach – dubbed as a Green Practice which has double benefit in both keeping the groundwater table undisturbed and charging the aquifer. Such a green practice encouraged in form of Community Development Program can find its popularity when it shows the manifold benefits of, in one hand, bringing people together to collective thinking on 'green' approaches , innovating approaches to save earth by harping on their creative notes, achieving nobler feelings saving water for future; on the other hand, rainwater as well as run-off storm water stored in a planned way save the earth from soil erosion, flood; recharge the aquifers to give a shot in the arm to the decreasing groundwater table.
- The increasing urbanization lead to concentrated population density at places resulting into uneven drawing of ground water. This is ensuing into draught and drying up of river beds at places where domestic and industrial use of water is rising. This places if shift focus towards using rainwater, the groundwater there may gradually fall back to its normal level thus ensuring the eco-balance not lost. The extensive and unplanned usage of groundwater not only disturbed the natural water table but also has made the groundwater contaminated and, in many a place, totally unfit for any use.

❖ Objective of Project Proposal

- To aid towards the greater objective of water management and conservation and to increasing recharge of groundwater by capturing and storing rainwater, rainwater harvesting from rooftop run-offs and natural water bodies augment the community development.
- As such, this is a step towards a potential alternative arrangement against poor maintenance and monitoring of a centralized piped ground water supply.
- To minimize cost of draining storm water, get rid-off water logging in the vicinity and put into use all the water bodies in and around the campus for some good purpose.
- To attract the notice of the state and administration on good practices those are environment friendly and help to eradicate pollution and possible green-house effects.

❖ Need for rainwater harvesting

- **Reasons for rainwater harvesting: Why**

1. **Increasing water needs/demands**

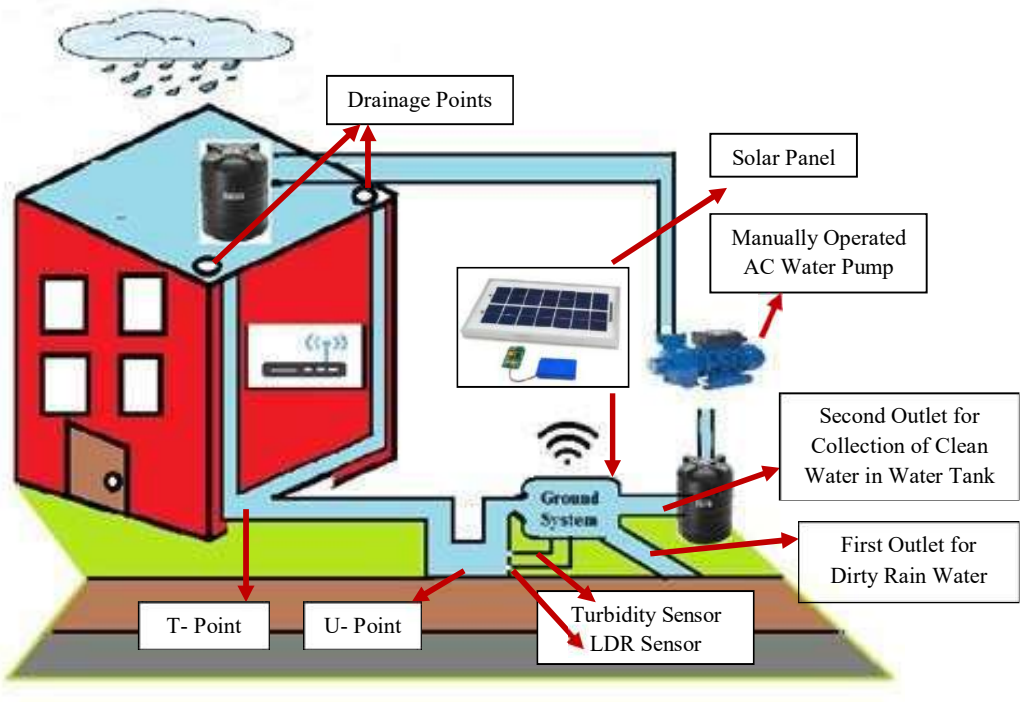
- The rapid rise in human population has made optimum use of fresh water imperative.
- Urban water supply systems in particular are under tremendous pressure to meet the needs of the population as well as industry and large-scale construction.
- The increased need for water results in lower groundwater tables and depleted reservoirs. Many piped water supply systems fail.

2. Variations in water availability

- The availability of water from sources such as lakes, rivers and shallow groundwater can fluctuate strongly.
- Unchecked rainwater runoff is causing soil erosion.
- Collecting and storing rainwater can provide water for domestic use in periods of water shortage.

❖ PROPOSED SYSTEM

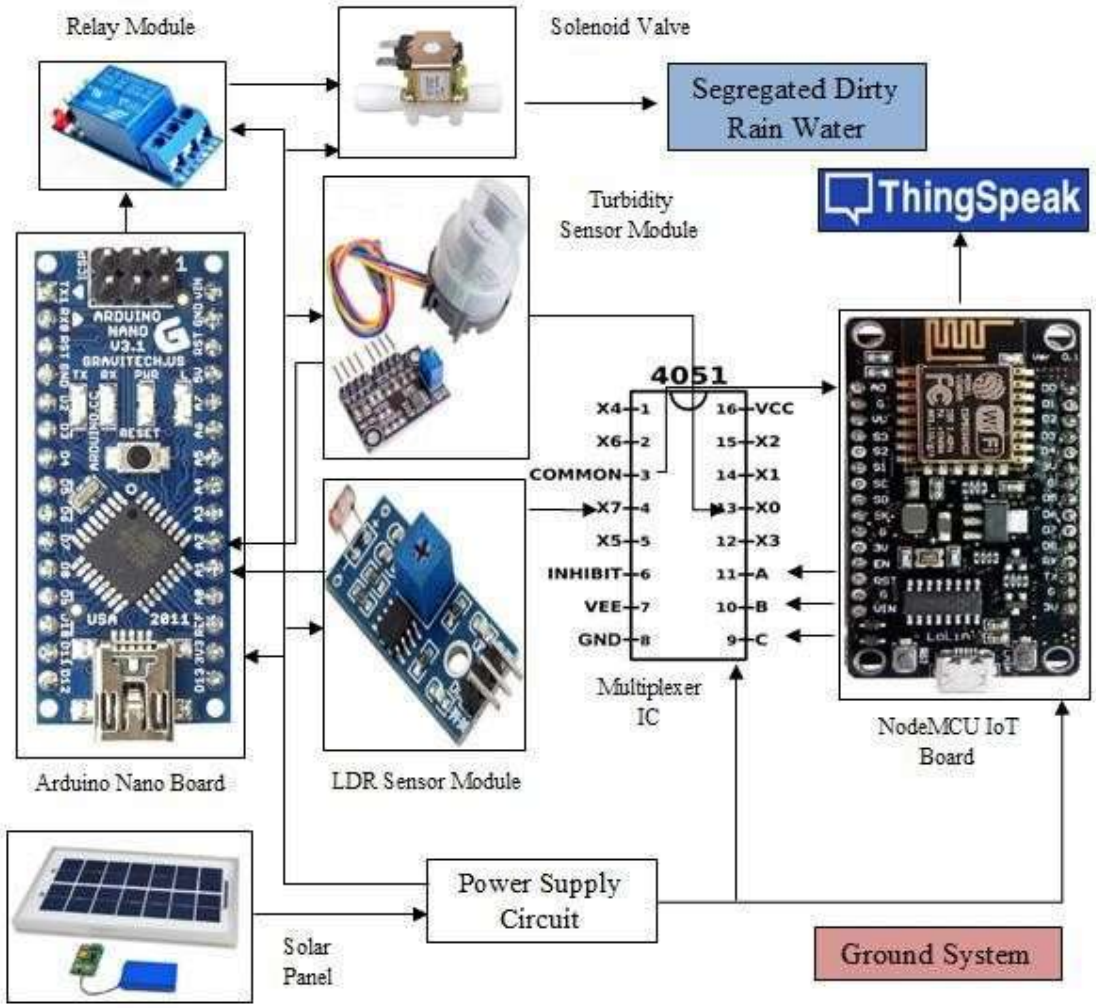
- The proposed layout of the self-sustainable low cost rainwater harvesting system. However, the actual sites may have different layout and can be deal on case to case basis accordingly. As shown in figure, the roof is the collection point of the rainwater. There are two drainage points at the roof connected with the PVC pipes. The PVC pipes are further connected together using a T-point at its two different ends at the ground side. One of the PVC pipe would be connected at T-point with a little slope. The third end of the T-point would be connected to the ground system with a U curve.
- This curve leads settle down dust particles at one end of the U curve before raising the water into the other side. The LDR and turbidity sensors are fixed at the U-point using a suitable mechanical arrangement, so that they are properly exposed to the rainwater. The ground system would be mounted in between the PVC pipe and the ground water tank using a suitable mechanism. The water would be segregated in ground water subsystem. There would be two outlets from ground subsystem. First outlet would be used for dirty water to direct it towards the ground for purpose of gardening.



F-13.1.1-A- Layout of the self-sustainable low cost rainwater harvesting system

❖ Description of the Ground System

- The ground system is powered up using a solar panel. It consists of an Arduino Nano board connected to relay, turbidity and LDR sensor module. The turbidity sensor module is used to measure the haziness of water and the LDR sensor is used to detect the colour of rain water for acid rains (also considered as dirty water). Both these sensor values are utilized to segregate the rain water as clean and dirty.
- A threshold (in terms of Nephelometric Turbidity Unit) is set for the Turbidity sensor. Similarly, a colour values is used to identify the colour of rainwater. Both these threshold values are used to trigger the relay and send the dirty water into the ground for gardening purpose. A NodeMCU IoT board is also used to send the sensor values on the Thing Speak cloud. A cloud interface is used to monitor the status of both the sensors from a remote place. A 4051 multiplexer is used to select one of the sensor values (LDR or Turbidity) and send it to Node MCU at its A0 (analog pin). NodeMCU sends the select signal values on the A, B, C pins of the multiplexer IC to select one of channel for acquiring the value of LDR or Turbidity sensor.



F-13.1.1-B-Block diagram of the ground system for rainwater harvesting

❖ Working Flow of the Ground System

- Figure shows the operation of the ground system. The ground system operation is controlled by two boards i.e. Arduino Nano and NodeMCU. The system powers up and default conditions of the actuators are set. In the default condition, the relay is OFF and solenoid valve is OFF. It ensures that the rain water is directed towards the second outlet. Afterwards, the LDR and turbidity sensor gets activated. LDR senses the colour of rainwater and turbidity sensor senses the haziness of rainwater. The sensed values of the sensor are given to Arduino Nano and NodeMCU for performing their respective actions.
- NodeMCU Section: The turbidity and LDR sensor output is also connected at one of input pin of the 4051 multiplexer IC. The NodeMCU sends the select signal on A, B, C (select pins) pin of 4051 multiplexer IC. The multiplexer IC then output one of the sensor values and NodeMCU receives it at its analog pin. Further, NodeMCU send this signal on to the ThingSpeak cloud for monitoring purpose. The complete process repeats itself again and again as long as power is ON in the system.
- The schematic of the ground system is shown in figure. It utilizes two boards Arduino- Nano and NodeMCU. The analog pins A1 and A2 of the Arduino Nano board are connected to the turbidity and LDR output pin respectively. The output pins of turbidity and LDR are also connected to the X0 and X7 input pin of the 4051 multiplexer IC. The common output pin (X) of multiplexer IC is connected to analog pin A0 of NodeMCU board. The digital pin D4 of NodeMCU board is connected to the three select pins A, B, C of the 4051 multiplexer IC. The digital pin D8 of Arduino Nano board is connected to the relay input. The output of relay is utilized to control the solenoid valve. The complete system is powered using a solar panel whose outputs are connected to SV1-1 and SV1-2 input of power management circuit.

❖ Ground System Cost

- This cost includes the cost of the individual components as shown in table and the cost of PCB manufacturing.
- $\boldsymbol{Ground\ System\ Cost = Cost\ of\ Equipments + Cost\ of\ PCB\ Manufacuring}$ **(1)**
- $\boldsymbol{Total\ Cost\ of\ Equipments = \Sigma\ (Unit \times (Per\ Unit\ Cost))}$ **(2)**
- $\boldsymbol{Cost\ of\ PCB\ Manufacuring\ (depends\ upon\ size\ and\ type) = Unit \times (Per\ Unit\ Cost)}$ **(3)**
- Using equation 2 and depicted in table 2, the total cost of equipment is Rs. 2856 (approx).
- Using equation 3, the cost of a single layer PCB is Rs. 250 (approx).
- The exact cost depends upon the selection of vendor, size, type and number of PCB required. Using equation 1,

- $\boldsymbol{Ground\ System\ Cost = 2856 + 250 = Rs.\ 3106\ (approximately)}$

T-13.1.1-A- Equipment's cost

S.No.	Equipment Name	Unit	Price/Unit	Total Cost
1.	Arduino Nano	1	160	160
2.	NodeMCU	1	329	329
3.	Program cable for Arduino Nano (Small Mini USB –B Type)	1	42	42
4.	Program cable for NodeMCU (Small Mini USB –C Type)	1	100	100
6.	Turbidity Sensor Module	1	1000	1000
7.	LDR Sensor Module	1	55	55

8.	Solenoid Valve	1	450	450
9.	Relay Module	1	100	100
10.	Multiplexer IC (4051)	1	20	20
11.	Solar Panel	1	500	500
12.	Power Circuit	1	100	100

❖ Total Implementation Cost

- $\boldsymbol{Total\ Implementation\ Cost} = Cost\ of\ PVC\ Pipes\ (depend\ upon\ size\ in\ inch) + Cost\ of\ Ground\ System + Cost\ of\ Ground\ Water\ Tank\ (depends\ upon\ capacity\ in\ liters) + Miscellaneous\ Cost$ (4)
- $\boldsymbol{Cost\ of\ PVC\ Pipes} = Length\ of\ PVC\ Pipe\ from\ Roof\ Top\ to\ Ground\ System\ (in\ mt) \times (Per\ mt\ Cost) + Cost\ of\ T\ Point\ (depend\ upon\ size\ in\ inch) + Cost\ of\ U\ Point\ (depend\ upon\ size\ in\ inch)$ (5)
- $\boldsymbol{Cost\ of\ TPoint} = Unit \times (Per\ unit\ cost)$ (6)
- $\boldsymbol{Cost\ of\ UPoint} = Unit\ of\ elbows \times (Per\ unit\ cost)$ (7)
- $\boldsymbol{Cost\ of\ Ground\ Water\ Tank}\ (depends\ upon\ capacity\ in\ liters) = capacity\ in\ liters \times (Per\ liter\ cost)$ (8)
- $\boldsymbol{Miscellaneous\ Cost} = Labour\ Cost + Basic\ material\ required\ during\ fiitting$ (9)

- $\boldsymbol{Labour\ Cost} = (Fiting\ rate\ of\ pipe\ per\ mt \times Total\ length\ of\ PVC\ pipe\ including\ T\ and\ U\ points) \times (Per\ Labour)$ (10)

❖ Cost Analysis of Village house

- The total roof area exposed to the rain is the area of roof sections excluding the area of roomand toilet section as shown in Figure.
- All the dimensions are given in millimetre.
- $\boldsymbol{The\ roof\ area\ exposed\ to\ the\ rain} = (6600 \times (7500 + 6000)) - (2400 \times 3000) = 89100000 - 7200000 = 81900000\ mm2 = 81900\ mt2$..
- The drain pipe from the top roof leaves the water on the extended roof of the floor below it i.e. the roof with area 6000 x 6600 mm2 as shown in Figure. In this case, the PVC pipe is placed at this roof's edge.
- The length of PVC pipe required from roof edge to ground System is approx. 12 mt. There is no requirement of T-point as there is only one drain pipe.
- Total 5 elbows are required. The cost of PVC pipe (4 inch) is Rs. 100/mt and cost of one elbow (4 inch) is Rs. 50. The cost of ground water tank liter tank is Rs. 4.1/lit.
- Only one labour is required having rate of Rs.100/mt for pipe fitting and Rs. 250 for basic material.
- Using equation 5, 6, and 7, $\boldsymbol{Cost\ of\ PVC\ Pipes} = 12 \times 100 + 0 + 5 \times 50 = \boldsymbol{Rs.\ 1450}$
- Using equation 8, $\boldsymbol{Cost\ of\ Ground\ Water\ Tank} = 1000 \times 4.1 = \boldsymbol{Rs.\ 4100}$
- Using equation 9 and 10, $\boldsymbol{Miscellaneous\ Cost} = 100 \times 12 + 250 = \boldsymbol{Rs.\ 1450}$
- Using equation 4, $\boldsymbol{Total\ Implementation\ Cost} = 1450 + 3106 + 4100 + 1450 = \boldsymbol{Rs.\ 10106}$

13.1.2 Civil Design 2: Solid Waste Management System

- At present, there is no collection and disposal mechanism. The Davad Gram Panchayat does not have any infrastructure to collect and transport the waste and there is no specified location for the waste disposal.
- Majority of the respondents dump their biodegradable waste (68.04%) and non biodegradable (67.71%) waste in dustbins which is ultimately thrown in the open fields. A very less proportion of households (1.48%) dispose bio-degradable waste in a safe manner. Safe disposal of bio-degradable waste includes disposing solid waste in an identified place, composting, burying, re-using in the garden and having the GP collect the waste and feeding it to the cattle.
- As far as the volume of waste generated is concerned, there is no specific measured data that is available. The national waste generation average can be taken as a basis for designing a management solution for solid waste disposed from the area.

❖ **Existing Solid Waste Management System**

Waste Generation	Collection and Transportation	Disposal
Total estimated Solid Waste Generated: ✓ 1.5 – 2 tonnes per day (based on an estimate of 250g per person per day) **Types of Solid Waste:** ✓ **Biodegradable:** Animal waste, vegetable waste ✓ **Non-Biodegradable:** Plastic bags, papers, glass **Solid Waste Sources:** ✓ HH, Weekly markets, Schools/Anganwadis,	✓ Currently there is no scientific system to daily collect and/or transport the solid waste generated ✓ Once in 2 to 3 months, waste is collected from the roads/drains and transported to an open area outside the village ✓ This process is contracted out by the GP	**Current Disposal methods** ✓ **Vegetables & Food Waste:** Given to livestock, reused in field ✓ **Plastics:** Thrown outside in the open area, fields, drains or burnt

F-13.1.2-A-Existing Solid Waste Management System in Davad Gram Panchayat

- the absence of a systematic solid waste handling method due to which the following issues are being faced
- Accumulation of waste at open spaces, street sides/drains, leading to environmental degradation
- Unhygienic conditions prevailing in the area leading to various health and sanitation related diseases

❖ Existing Liquid Waste Management System

- At present, there is a very inconsistent drainage system present in the gram panchayat. A majority of the households as inferred from the baseline data discharge the waste water from the households to be released onto public streets/broken storm water drains. Due to flow of waste water into public areas, it has become a major source of bad odour, disease in the panchayat.
- In the absence of systematic liquid waste handling methods, following issues are being faced:
- From few houses, the waste water flows directly into the streets which is leading to puddles forming in front of the households
- The discharges from the toilets/bathrooms are mostly let on to the storm water drains which are either broken or choked
- The waste water gets collected at various points of the village due to nonfunctioning drains and blockages in it at different points
- The Davad GP lacks the basic infrastructure across the whole value chain of SLWM. Thus, there is an urgent need to bring in the improved, efficient and sustainable SLWM system for clean and green GP as well as there is need to connect all the houses to the waste water management system.

❖ Proposed SLWM System

- The solutions have been proposed based on the inputs given by the Gram Panchayat and the baseline survey findings and existing situation assessment.
- Ideally, domestic waste should be collected within 12 hours‟ intervals every day. If kept beyond 24 hours, it generates unpleasant odours and attracts flies. Beyond 24 hours, foul smell generates and further beyond 48 hours ends up in bad odour and begins to stink and after 72 hours along with the bad odour formation of maggots take place which is the prime reason for nuisance of domestic flies in and outside homes. Thus to achieve 100% ZWM, collecting garbage every 12 hours is strongly suggested to all concerned.
- **THE PRIMARY SYSTEM AS KEY POINT TO ZERO WASTE IS IMMEDIATE COLLECTION OF ANY DOMESTIC WASTE AND SEGREGATION AT SOURCE.**

❖ Salient Features of the Model

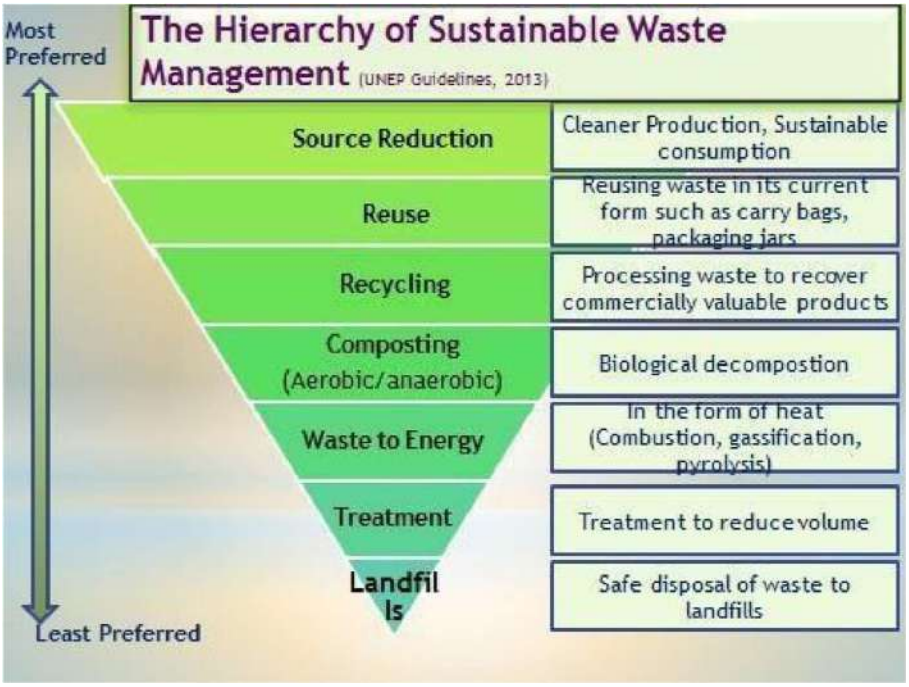
- Complete thrust on awareness and behaviour change
- Basic infrastructure to aid and sustain the behaviour change envisaged
- Systematically collect & transport segregated solid waste with dedicated service delivery team
- Complete community and Gram Panchayat ownership to execute, manage, monitor, evaluate proposed SLWM system
- Complete transparency and accountability with management & reporting system and having a dedicated monitoring committee consisting mainly of local villagers
- Self-sustainability of operation and maintenance is ensured with the help of user fee collection and waste by-products. The monthly expenditure for the project can be met from the user fee collection itself if it is made mandatory and everybody adheres to it from the first month itself. Keeping in mind the practical constraints in this maintenance support should be given to the GPs which has to be a part of the SLWM budget. The monthly subscription collected by the service delivery team is accounted for by the SLWM Committee and will be used towards paying the wages for the workers involved in the system.

❖ **The long-term benefit of this model:**

- The long-term benefit of this project will be:
- This proposed project will comprise of systematic waste collection in Residential areas Shops, composting of organic waste, recycling of inorganic waste and scientific disposal of non-recyclable waste.
- Establishing the principle of cost recovery from Waste.
- Spreading the concept and practice of converting waste to wealth.
- Civil society can be transformed as informed and sensitized by means of motivation and involving them in similar projects and initiatives in their own territory.
- Creating employment and enterprise opportunities in Green Industry especially among Self Help Groups (Both Women & Men).
- Education and involvement of Youth in general and students in particular in environmental governance.
- A well designed Information system, Info-bank and access through internet.

❖ **Proposed Solid Waste Management System**

- The SOLID AND LIQUID RESOURCE MANAGEMENT MODEL is based on the sustainable hierarchy of waste management which lays more focus on Reduction to Recycling based on decentralized concepts.



F-13.1.2-B- Hierarchy of Sustainable Solid Waste Management

- This hierarchy can only be achieved by way of DECENTRALISATION of Waste management. This model is a culmination of awareness to systemized and scientific management. Fool proof monitoring and effective documentation are key pillars which will take us to the objective of ZERO WASTE.

❖ Two method have been used in this process :

a) Open Window Composting

- Composting takes places in the open air in large, elongated, uniform prism shaped 'piles' of waste known as windrows.
- The waste feedstock is mechanically shredded and placed into long windrows on a solid, non-permeable surface. Water may be added, depending on the moisture content of the waste.
- The windrows are turned regularly, either with a wheeled loader or by a specialist windrow turner machine (pulled along by a tractor / dedicated vehicle). The windrows are turned several during the compost process, which takes in the region of twelve to sixteen weeks.

• Onsite composting

- In this Composting method are going to compost small amount of wasted food can compost onsite. Composting can significantly reduce the amount of wasted food that is thrown away. Yard trimmings and small quantities of food scraps are not appropriate for onsite composting.

• Vermicomposting

- Red worms in bins feed on food scraps, yard trimmings, and other organic matter to create compost. The worms break down this material into high quality compost called castings. Worm bins are easy to construct and are also available purchase. One pound of mature worms (approximately 8001,000 worms) can eat up to half a pound of organic material per day. The bins can be sized to match the volume of food scraps that will be turned into castins.

b) Mechanical composting

- A mechanical composting plant is a combination of various units which perform specific function. The waste is fed to a slowly moving conveyor belt and the non-decomposable material such as plastic, glass, metals are manually removed by labourers standing on either side of the conveyor belt. The waste is thus subjected to size reduction when the surface area per unit weight is increased for faster biological decomposition. Size reduction also helps in reducing fly breeding in the decomposting mass. This is commonly carried out either in Hammermills or Rasp mills. Hammermills are high speed (600-1200 revolutions per minute) compact machines but consume large energy.
- The stabilization is carried out in open windows provided over flagstone paved or cement concrete paved ground. These windrows are turned every 5 days to ensure aerobic decomposition. Various types of equipment such as front end loaders/windrows reshifters are used for turning of windrows.
- At the end of the 3 to 4 weeks period, the material is known as green or fresh compost wherein the cellulose has not been fully stabilized. It is hence stored in large sized windrows for 1-2 months either at the plant or the farms. At the end of the storage period, it is known as ripe compost. It may be sometimes subjected to size reduction to suit kithchen garden and horticulture requirements.

6) Disposal by hog feeding

- Disposal by hog feeding is not procedure in india. Garbage disposal into sewers including BOD and TSS increases by 20-30%. Refuse is ground well in grinders and then fed into sewers.

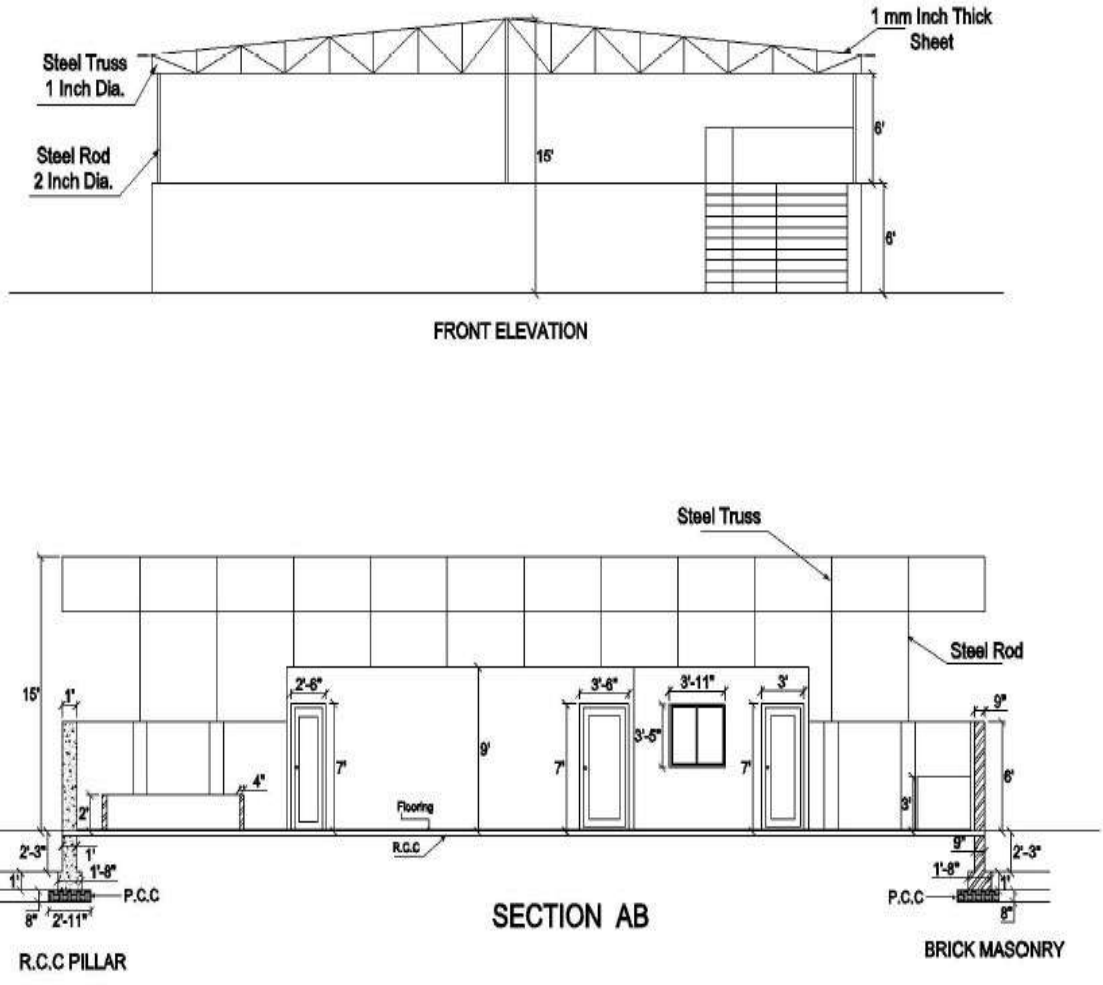
7) Salvaging procedure

- Materials such as metal, paper, glass, rags, certain types of plastic and so on can be salvaged, recycled, and refused.

8) Recycling

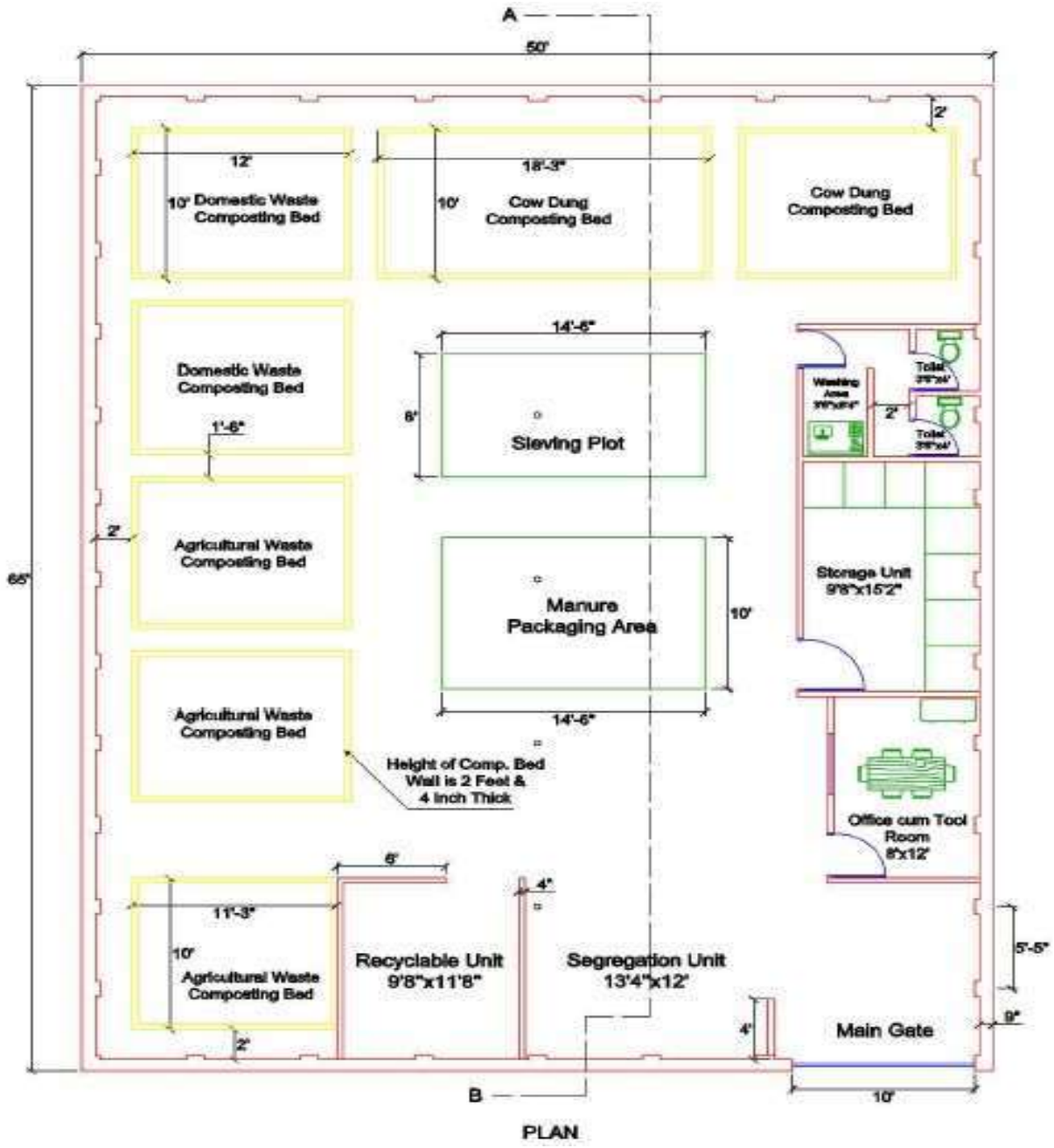
- Plastic, bags, containers, tins and glass will often be recycled since they are likely to be scare commodities in many situations. In most developing countries contexts there exist a strong tradition of recycling leading to lower volumes of waste than in many more developed societies.

❖ SWM SUSTAINABLE DESIGN



F-13.1.2-C- Plan and Section of Solid Waste Management

F-13.1.2-D- Plan of Solid Waste Management



❖ CONCEPT OF SWM

- Waste is any item beyond use in its current form and discarded as unwanted. It can be solid with respective management methods.
- Solid and fluid, hazardous and non-toxic wastes are generated in our households, offices, school, hospitals, and industries. No society is immune from day to day issues associated with waste disposal. How waste is handled often depends on its source and characteristics, as well as any local, state, and federal regulations that govern its management. Practices generally differ for residences and industries, in urban and rural areas, and for developed and developing countries.

❖ Costing and Finances

NO.	DESCRIPTION	QUANTITY (in ft)	QUANTITY	RATE (Rs)	PER	AMOUNT (Rs)
1.	Excavation for foundation, pits, trenches, compound wall etc. upto 2m depth below existing ground level in any type of soil except rock.	2034.55 ft^3	57.6 m^3	205	m3	11,808
2.	PCC 1:4:8 using 40 mm and down size graded stone aggregates including machine mixing, providing formwork.	396.34 ft^3	11.22 m^3	2604	m3	29,217
3.	Brick masonry upto G.L providing and constructing 230 mm & above thickness brick masonry in CM 1:5.	747.2 ft^3	21.15 m^3	3198	m^3	67,638
4.	RCC for Column providing 1:1.5:3 mix for using 20mm and down size graded crushed aggregate including providing and fixing necessary plywood/ steel shuttering, scaffolding, machine mixing, compacting by vibrators, curing, hacking the surface to receive plaster etc. complete.	421.6 ft^3	11.93 m^3	4792	m^3	57,168
5.	Reinforcement supply, fabrication, hoisting and placing in position HYSD reinforcement bars conforming to IS 1786 - Latest Edition Grade FE 415.		3340kg	54876	Metric Tonne	1,83,285
6.	R.C.C Slab providing and laying RCC 1:2.4 concrete using 20mm and down size graded crushed aggregate including providing and fixing necessary steel/ plywood shuttering, scaffolding, hacking the surface to receive plaster, machine mixing, compacting by mechanical vibrators, curing, etc complete.	1089 ft^3	30.83 m^3	3692	m^3	1,13,825
7.	Providing and fixing 20mm & higher thickness Kota stone (2' x 2'/1.5') with 25mm to 50mm bedding CM 1:3, cement slurry and machine polishing on one side for flooring and shelf slab including curing, chipping, finishing the joints, scaffolding etc.	3250 ft^2	301 m^2	700	m2	2,10,700
8.	Brick masonry of super structure providing and constructing 230 mm & above thickness brick masonry in CM 1:5.	1300 ft^3	36.81 m^3	3198	m^3	1,17,718
9.	Providing and laying 15mm thick smooth cement plastering with Niru/ Lime Finish in 1:4 CM in single coat to all the interior walls of sales room & other buildings.	5687 ft^2	528.33 m^2	130	m^2	68,683
10.	Wood Work For Door Window providing and fixing door shutters made of Aluminium panel sheets 3"x1.5" aluminium styles and rails and EPDN rubber for pasted sealing with Aluminium frame, hinges, handles, tower bolts, etc..		6 Nos	2500	No.	15000

11.	Providing corrugated G.S. sheet roofing including vertical/ curved surface fixed with polymer coated J or L hooks, bolts and nuts 8 mm diameter with bitumen and G.I. limpet washers or with G.I. limpet washers filled with white lead and including a coat of approved steel primer and two coats of approved paint on overlapping of sheets complete.	3380 ft^2	314 m^2	1010	m^2	3,17,140
12.	Providing & fixing of Urinals supplying and fixing coloured (pastel colours) vitreous china flat back urinal of size 300mmx400mm with integrated overflow of Hindustan Sanitary.		2 No.	1200	No.	2,400
13.	Providing & fixing Washbasin providing and fixing coloured wash basins of size 550 x 400mm without pedestal including the accessories		1 No.	2987	No.	2,987
14.	Providing and fixing coloured Counter Top washbasin of Parryware(550 0418)/ Oval Hindware make including accessories		1 Counter	14068	No.	14,068
15.	Mild Steel Tubes & pipes of all diameters as per IS1161		2394.54 kg	61	Kg	1,46,067
16.	Supplying, erecting and fixing in position prefabricated structures using structural steel sections, plates, flats, square bars, rods etc. at all elevations using structural steel sections conforming to IS:2062, including cutting, welding or bolting, supply of bolts/ nuts/washers etc., complete as per drawings.		2394.54 kg	76	Kg	1,81,985
					Total	**15,39,690**
					5% Contingency	**76,985**
					3% Work charge establishment	**46,191**
					Add 7% Electrification	**1,07,778**
					GST 12%	**1,84,762**
					Operation and Maintenance per Year	**1,50,000**
					Grand total	**21,05,316**

T-13.1.2-A-Cost And Finance Of Solid Waste management

13.1.3 Civil Design 3: LOW COST GREENHOUSE

- The greenhouse is now better understood as a system of controlled environment agriculture, with a precise control of air, temperature, humidity, light, carbon dioxide, water and plant nutrition. The main purpose of greenhouse technology is to provide a good growing environment for successfully growing high quality plants round the year. The growing of fruits, flowers and vegetables under greenhouse is common practice.
- To establish a poly house, the farmer has to invest 900-1000/- Rs. for one m area using tubular framed structure.

❖ Benefits or advantages of Greenhouse Farming

- Following are the benefits or advantages of Greenhouse Farming:
- It helps in achieving 10 to 12 % higher yield compare to normal farming methods. It depends on greenhouse type, crop type and environment control facilities used.
- Crop reliability increases using greenhouse farming.
- It expands growing season for farmers. Hence it is possible to produce floricultural crops throughout the year. It is also possible to produce vegetables and fruit crops during off-season.
- The major advantage is that it minimizes external threats to the crops under cultivation.
- It helps in growing different variety of crops.
- It helps to produce disease free and genetically superior transplants continuously. Efficient utilization of chemicals and pesticides are used to control pest and diseases.
- It is most useful in monitoring and controlling the instability of various ecological system.
- Modern techniques of hydroponic, Aeroponics and nutrient film techniques are possible only under greenhouse framing.

❖ Disadvantages of Greenhouse Farming

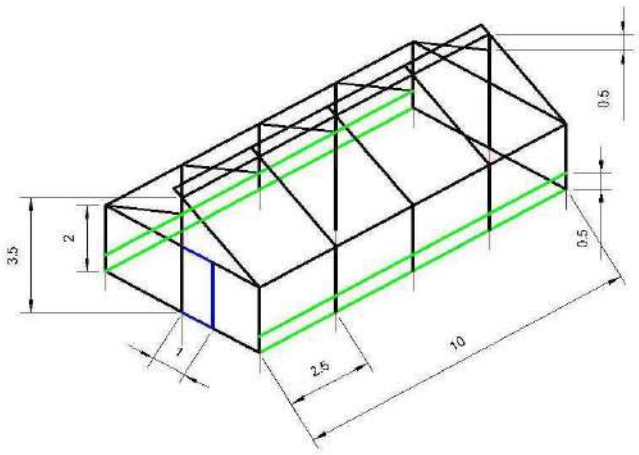
- Following are the drawbacks or disadvantages of Greenhouse Farming:
- It requires high upfront and operating expenses.
- It requires careful precautions to eliminate any pest or diseases in order to make sure that consecutive crop production does not get affected.
- Poor pollination takes place in greenhouse farming.
- There is lack of awareness among farmers which requires training.
- It requires regular periodic inspection.
- Migration birds may be affected due to greenhouse.

❖ DESIGN OF GREENHOUSE

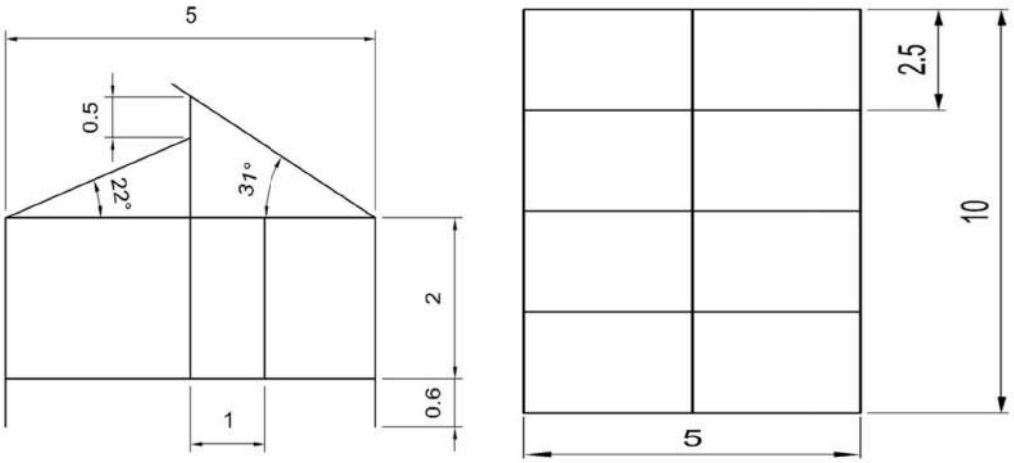
- **Overall Dimensions of Low Cost Greenhouse of Area 50 m2**

- Length of greenhouse = 10m
- Width of greenhouse = 5m
- Distance between Side poles = 2.5m
- Distance between centre poles = 2.5m
- Depth of foundation = 0.6 m
- Height up to gutter = 2.0 m
- Height up to top = 3.5 m
- Top ventilation = 0.5 m
- Side ventilation = 0.5 m
- The length of line joining between left side pole to central pole = 2.7 m

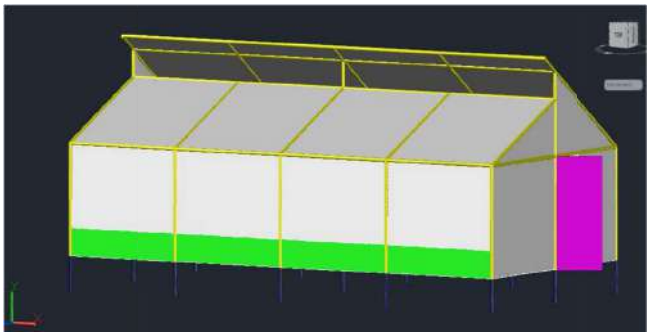
- The length of line joining between right side pole to central pole = 2.91 m
- Angle between line joining towards central pole to left side pole = 220 m
- Angle between line joining towards central pole to right side pole = 310 m



F-13.1.3-A- Line Diagram of Low Cost Greenhouse



F-13.1.3-B- Front And Side View



F-13.1.3-C- Isometric View of Greenhouse

❖ MATERIALS REQUIRED

- **Wooden Posts**

➢ The wooden posts of instance casuarina wood were used. The average diameter considered for the posts as 6.2 cm. These wooden posts are used for main structure like side posts and central posts. The height of the side posts and central posts would be 3 m and 4.2 m long respectively. A proper selection of these posts will help in maintaining the symmetry of the structure.

- **Bamboos**

➢ Usually a light weight, small diameter bamboos were used. The average diameter of the bamboos taken was 6.2 cm. The length of bamboos used was 5.5 m. These bamboos were generally used for making the frame of the green house.

- **Coal Tar**

➢ Wood, which comes in contact with the soil, is easily susceptible to decay. So, special treatment was given to the wood. Coal tar was applied to the wood which gives the protection against the decay and against termites. Even natural decay resistance woods, such as redwood and cypress should be treated.

- **Cladding Material**

➢ UV stabilized 200-micron polyethylene of size 140 square meters are used for 50 square meters of floor area. Size of cladding material will depend upon side areas and frame area of the greenhouse.

- **Insect Proof Net**

➢ Insect proof net was used to prevent the entry of insects into the greenhouse. The net was covered along the side and top ventilations. Size of the insect proof net will be 15 square meters for 50 square meters of floor area which is equivalent to ventilation area.

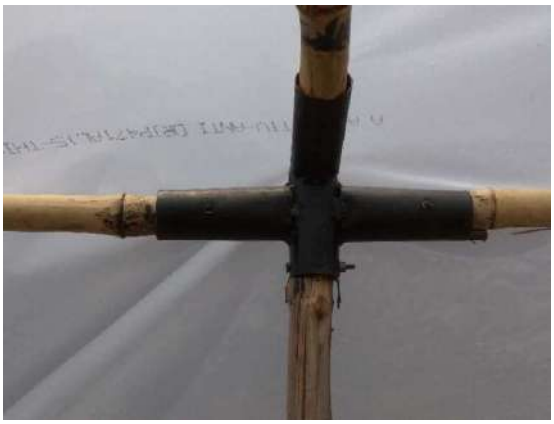
❖ CONSTRUCTION

➢ All wooden posts were applied with coal tar to prevent from termite and moisture attack and wrapped the poles (posts) with 1000 gauge black LDPE film with the help of polypropylene ropes. The centre posts were made to stand firm and straight in the length-wise direction. All the holes were dug of about 600 mm depth and posts were inserted in holes and filled with cement concrete groute (with the proportion of 1:3). One bay structure was completed first and the subsequent bays were constructed one after the other. Side posts were kept in position as per design.

➢ Frame work was very essential and was done by using low weight smaller diameter bamboos. It was difficult to attach or fix the bamboos to the wooden posts. There were so many techniques for fixing the bamboos on the wooden posts. One of the techniques was by using welded GI pipe with nut and bolt mechanism. This mechanism was chosen because; GI pipe has more strength and ability to overcome the external loads. Using nut and bolts, the bamboos and wooden posts were firmly fixed with the help of welded GI pipe. The holes required for inserting nut and bolt mechanism were drilled using drilling machine.

- **Bamboos Fitted into MS Pipes with Nut and Bolt Mechanism**

- In this mechanism,3 no's MS pipes of 63 mm dia. are welded together with nut & bolt arrangement. Welding should be done based upon the angle between the side post and line joining the side and central posts and it's also concern with the number of attachments to the particular post. Nut & bolts are used for fitting the wooden posts and bamboos in the GI pipe as shown in Fig. The holes for nut & bolts are drilled by the drilling machine.
- The GI pipes of two different diameters were welded together with an angle which was based upon the design and layout of the system. Diameter of pipes will depend upon diameter of bamboos and wooden posts.



F-13.1.3-D- Bamboos Fitted into MS Pipes with Nut and Bolt Mechanism

- **Wooden Strips with Nails- Poly Grip Mechanism**

Polyethylene film was wrapped; rolled on the wooden posts and bamboos tightly by wooden strips placed over and with gentle hammering to fix the cladding material on the bamboo framework. Typical dimensions of the wooden strip were 1" × 0.5" (breadth × height). Overall length of wooden strips will depend upon the length of wooden posts and bamboos. Nails of size 1.5" will be used to fix the wooden strip on the cladding material by gentle hammering as shown in Figure 7. 20×20 cm wide trenches were dug along the greenhouse, throwing the soil outwards so that it was used for burying the edge of insect proof net.

F-13.1.3-F- Frame Structure

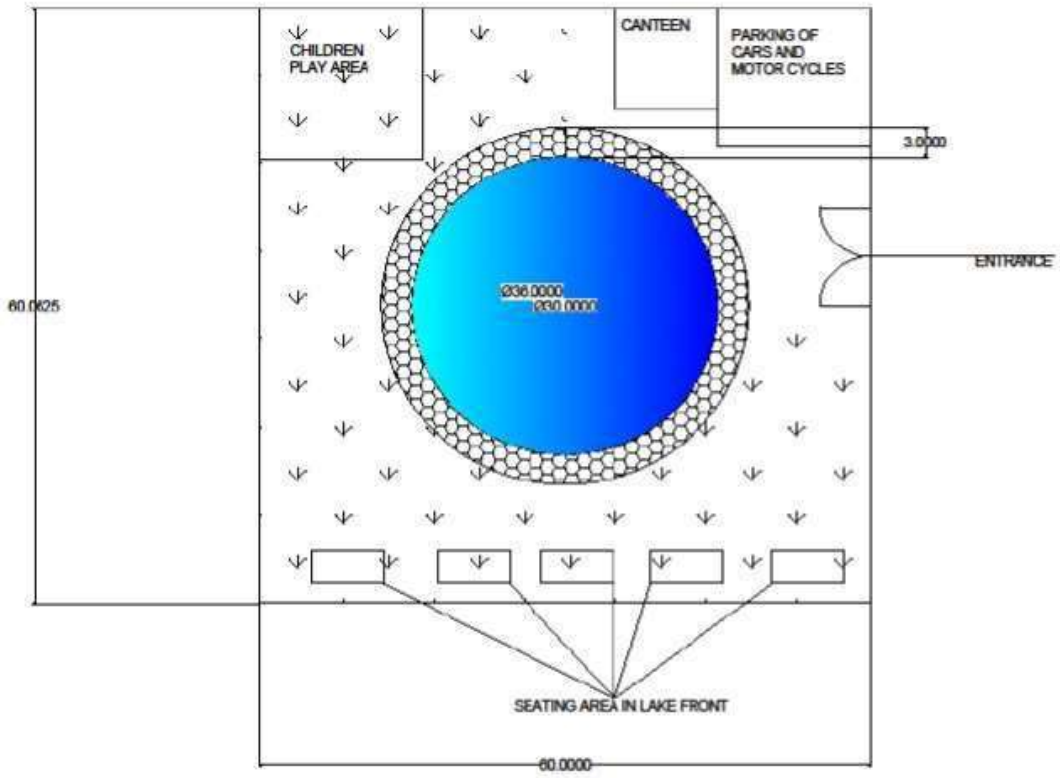
❖ COST OF GREENHOUSE

S. No	Item	Specification	Quantity	Approx. Rates(Rs)	Approx. Cost(Rs.)
1	Casurina wood	7.5 cm dia, 4.2 m long 7.5 cm dia, 3.0 m long	03 No's 10 No's	@ 180/ piece @ 160/ piece	540/- 1600/-
2	Bamboo	6.2 cm dia, 5.5 m long	24 No's	@ 110/ piece	2640/-
3	M.S. Pipe	6.3 cm dia, 6 m long	2 No's	@ 600/ piece	1200/-
4	Polyethylene sheet	200 microns, UV stabilised	140m^2	@ 60/ m^2	8400/-
5	Installation of Drip System				5000/-
6	Miscellaneous				1000/-
Sub – Total					**20380/-**
7	10 man-days @ 300				3000/-
Grand Total					**23380/-**

T-13.1.3-A- Cost Analysis of Low Cost Greenhouse (10 M × 5 M × 3.5 M)

13.1.4 Civil Design 4: Lake Development

LAKE FRONT



F-13.1.4 -A-Lake Development Plan

❖ **Measurement Sheet**

Sr. no	Item description	No .	Length (m)	Width (m)	Height (m)	Total Quantity
1	Providing Site Clearance etc. co1nplete	1	24	24	1	576 Sq. M.
2	Providing iron jail on periphery boundary wall	1	60	60	2.1	7560 Sq. M.
3	Providing walking track in garden periphery	1	30	3	-	90 Sq. M.
4	Providing sand pit in garden	1	10	10	-	100 Sq. M.
5	Paver Block	1	30	3	-	90 Sq. M.
6	Providing RCC seating benches in garden	10	0	0	0	10 Nos.
7	Providing Iron strip Gate	1	0	0	0	1 Nos.
8	Providing Tigard plants in periphery of garden	59	0	0	0	59 Nos.
9	Steel railing around the lake	1	30 dia	-	-	30

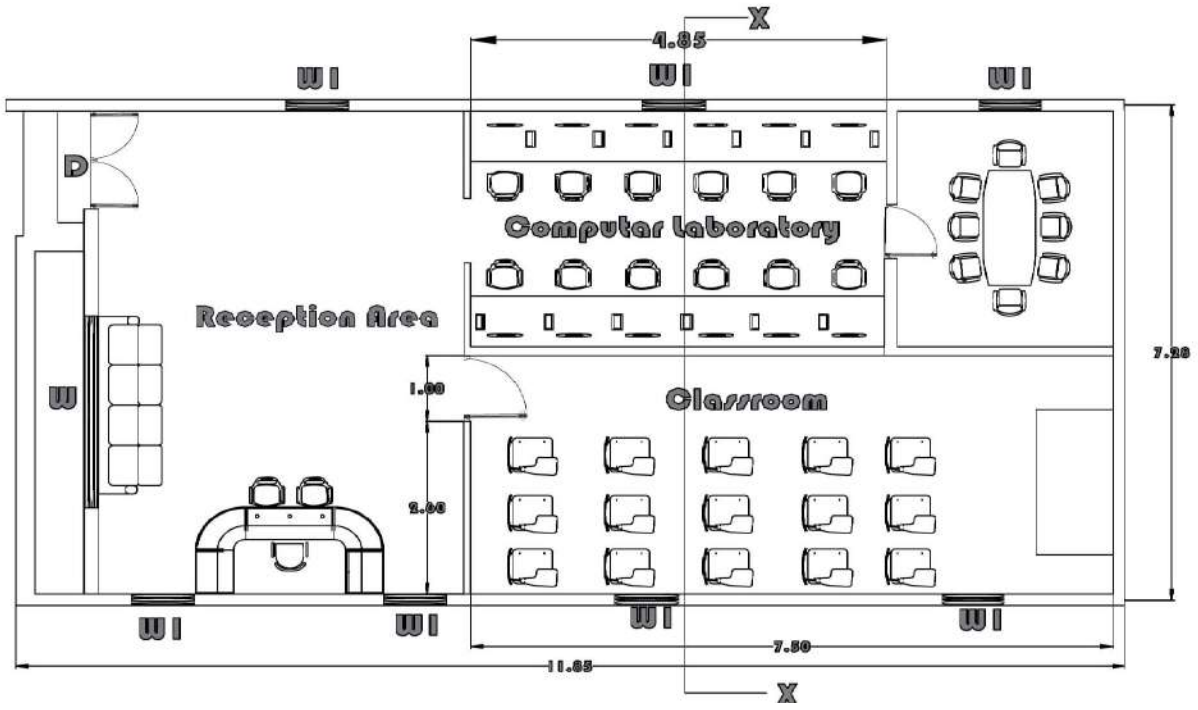
T-13.1.4-A-Measurement Sheet

❖ **Abstract Sheet**

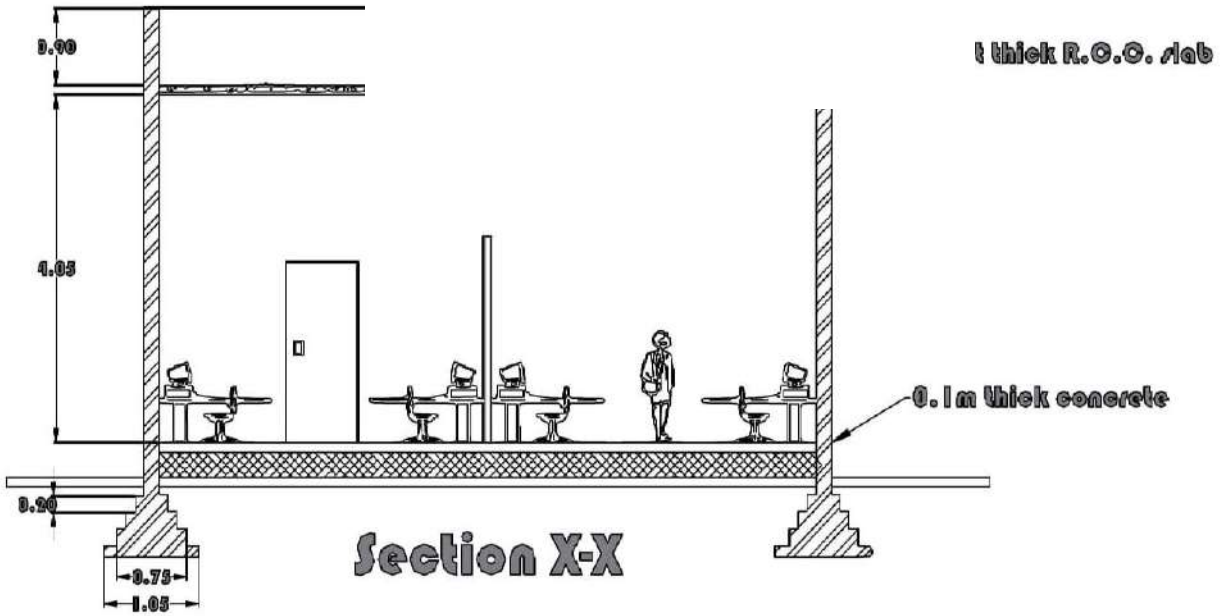
Sr. No.	Item description	Total Quantity	Rate	Total Amounts
1	Providing Site clearance etc. complete	576 Sq. M.	8	2688/-
2	Providing iron jali in the periphery of boundary wall	7560 Sq. M.	150	925000/-
3	Providing walking tracks in garden periphery	90 Sq. M.	0	0
4	Providing sand pit in garden	100 Sq. M.	0	0
5	Paver Block	90	72	6480/-
6	Steel railing	30 dia	20	45324/-
7	Providing RCC seating benches in garden	10 Nos.	1200	12000/-
8	Providing Iron strip Gate	1 Nos.	900	900/-
9	Providing Tigard plants in periphery of garden	59 Nos.	500	9500/-
	Total Amounts:			1021892/-
	Contractor's profit 10%			102189/-
	Total construction cost			**1124081/-**

T-13.1.4-B-Abstract Sheet

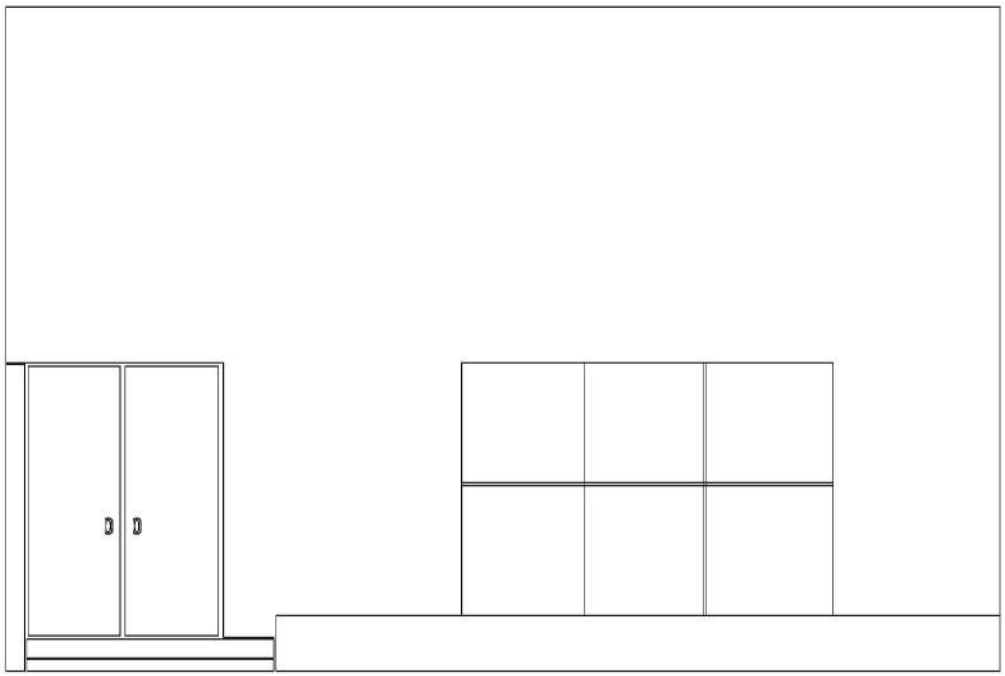
13.1.5 Civil Design 5: Skill Development Center



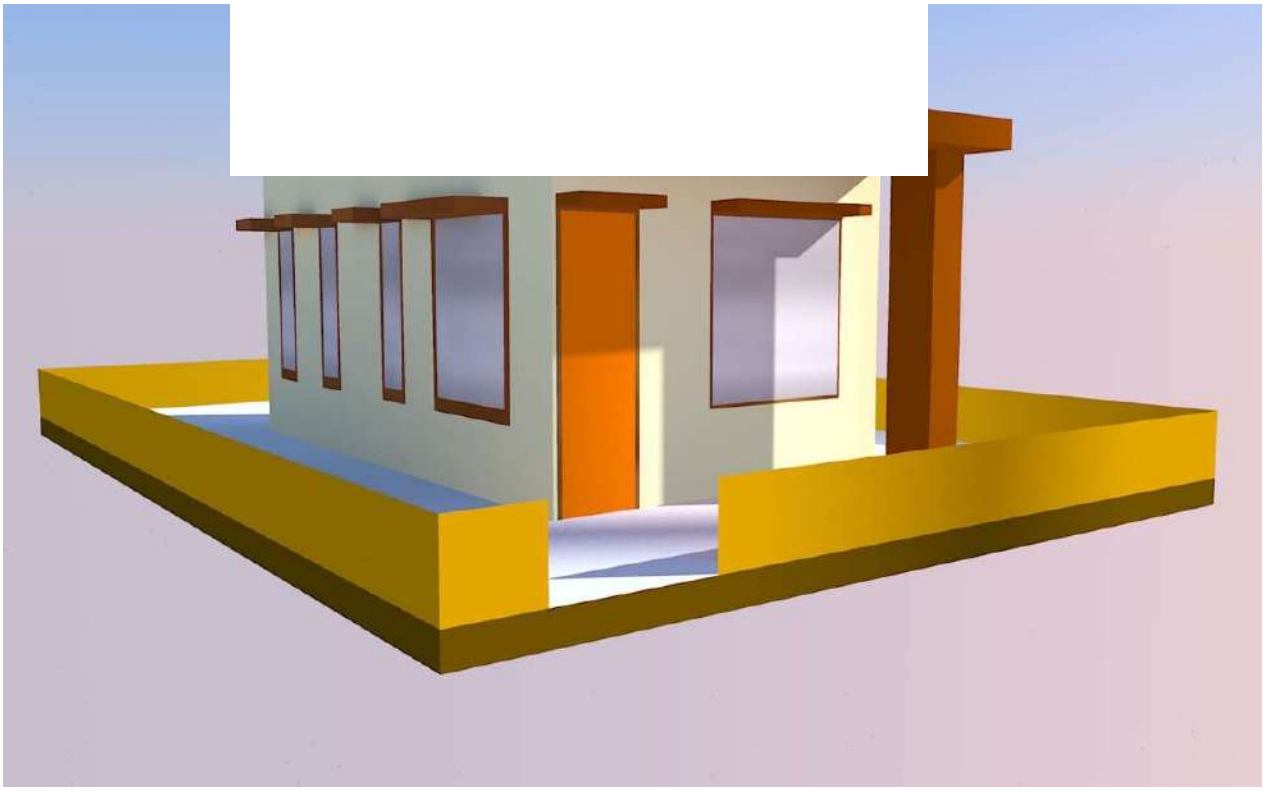
F-13.1.5-A-Plan of skill development center



F-13.1.5-B-Section of skill development center



F-13.1.5-C-Elevation of skill development center



F-13.1.5-D-3D view of skill development center

❖ **Measurement Sheet**

Sr No	Description	Unit	No	Lengh	Width	Height/ Depth	Quantity
1	Earthwork						
	For External Wall	CuM	1	39.450	0.900	1.200	42.606
	For Server Room Wall	CuM	1	6.000	0.900	1.200	6.480
	Total						**49.086**
2	Earth Filling	CuM	1	11.850	7.275	0.500	43.104
3	PCC						
3.1	1:4:8 (1 Cement : 4 coarse sand (zone-III) : 8 graded stone aggregate 40 mm nominal size)						
	For Foundation:						
	External Wall	CuM	1	39.450	0.900	0.100	3.551
	Server Room Wall	CuM	1	6.000	0.900	0.100	0.540
	Below Flooring	CuM	1	12.150	7.575	0.100	9.204
	Total						**13.294**
4	Brickwork upto plinth						
4.1	Cement mortar 1:6 (1 cement : 6 coarse sand)						
	External Wall:						
	Step 1	CuM	1	39.450	0.600	0.200	4.734
	Step 2	CuM	1	39.450	0.500	0.200	3.945
	Step 3	CuM	1	39.450	0.400	0.200	3.156
	Step 4	CuM	1	39.450	0.300	0.800	9.468
	Server Room Wall:						
	Step 1	CuM	1	6.000	0.600	0.200	0.720
	Step 2	CuM	1	6.000	0.500	0.200	0.600
	Step 3	CuM	1	6.000	0.400	0.200	0.480
	Step 4	CuM	1	6.000	0.300	0.800	1.440

	Total						**24.543**
5	Brickwork for Superstructure						
5.1	With F.P.S.(non modular) bricks						
	External Wall	CuM	1	39.450	0.300	4.050	47.932
	Server Room Wall	CuM	1	6.000	0.300	4.050	7.290
	Parapet Wall	CuM	1	39.450	0.100	0.900	3.551
	Total						**58.772**
6	RCC Work						
	Slab	CuM	1	12.150	7.575	0.100	9.204
	Total						**9.204**
7	Flooring Work						
7.1	25 mm thick	SqM	1	11.850	7.275		86.209
	Total						**86.209**
8	12 mm cement plaster of mix :						
8.1	1:6 (1 cement: 6 fine sand)						
	Main wall	SqM	1	38.250		4.050	154.913
	Server Room Wall	SqM	1	12.000		4.050	48.600
	Deduction						
	Window W	SqM	-0.5	3.000		0.500	(0.750)
			-0.5	3.000		0.500	(0.750)
			-0.5	3.000		0.500	(0.750)
	Door D	SqM	-0.5	1.500		2.100	(1.575)
	Door D1	SqM	1	0.800		2.100	1.680
	Total						**201.368**
9	18mm Plaster						
	Main wall	SqM	1	38.250		5.150	196.988
	Deduction						
	Window W	SqM	-0.5	3.000		0.500	(0.750)
			-0.5	3.000		0.500	(0.750)
			-0.5	3.000		0.500	(0.750)

	Door D	SqM	-0.5	1.500		2.100	(1.575)
	Total						**193.163**
10	Painting Works						
	Internal:						
	Main wall	SqM	1	38.250		4.050	154.913
	Server Room Wall	SqM	1	12.000		4.050	48.600
	Deduction						
	Window W	SqM	-0.5	3.000		0.500	(0.750)
			-0.5	3.000		0.500	(0.750)
			-0.5	3.000		0.500	(0.750)
	Door D	SqM	-0.5	1.500		2.100	(1.575)
	Door D1	SqM	1	0.800		2.100	1.680
	External:						
	Main wall	SqM	1	38.250		5.150	196.988
	Deduction						
	Window W	SqM	-0.5	3.000		0.500	(0.750)
			-0.5	3.000		0.500	(0.750)
			-0.5	3.000		0.500	(0.750)
	Door D	SqM	-0.5	1.500		2.100	(1.575)
11	Wooden Flush Door						
	D	SqM		1.500		2.100	3.150
	D1	SqM		0.800		2.100	1.680
	Total For Door						**4.830**
12	Windows						
	W	SqM		0.800		2.100	1.680
	W1	SqM		0.800		2.100	8.400
	Total For Window						**10.080**

❖ **Abstract sheet**

Sr No	Description	Unit	Quantity	Rate	Amount
1	Excavation	CuM	49.09	352.45	17,300.36
2	Earth Filling	CuM	43.10	219.65	9,467.88
3	PCC				-
3.1	1:4:8 (1 Cement : 4 coarse sand (zone-III) : 8 graded stone aggregate 40 mm nominal size)	CuM	13.29	5,789.60	76,967.67
4	Brickwork upto Plinth				-
4.1	Cement mortar 1:6 (1 cement : 6 coarse sand)	CuM	24.54	6,157.45	151,122.30
5	Brickwork Above Plinth				-
5.1	With F.P.S.(non modular) bricks	CuM	58.77	7,722.65	453,877.52
6	RCC Works	CuM	9.20	9,763.80	89,862.35
7	KotastoneFlooeing				-
7.1	25 mm thick	SqM	86.21	1,531.85	132,058.87
8.1	12 mm cement plaster of mix :				-
8.2	1:6 (1 cement: 6 fine sand)	SqM	201.37	254.25	51,197.69
9	18 mm Cement Plater	SqM	193.16	416.55	80,461.84
10	Painiting Works	SqM	394.53	90.00	35,507.70
11	Wooden Flush Door	SqM	4.83	5,000.00	24,150.00
12	Windows	SqM	5.03	3,500.00	17,587.50
13	Chairs	Nos	29.00	500.00	14,500.00
14	Computer System	Nos	29.00	18,000.00	522,000.00
	Total Amount				**1,676,061.67**
	Contingencies		**3%**		**50,281.85**
	Total Cost for Smart-Center				**1,726,343.52**

13.1.6 Civil Design 6: Low cost grain storage structure

- Food grains are required to be stored for human food, for animal feed, for seed and for sale or barter. Recent advances in the irrigation science and introduction of hybrid varieties of cereals has resulted in the upsurge in the food grain production. Grains produced in the country is stored at farmers, traders, government , semi-government and cooperative levels in various types of storage structures. A survey of the existing farm storage structures reveals that the grain losses take place due to lack of utilization of scientific methods of storage and improved storage structures. Improved storage structures are the most important factor in preservation of damage free grains. It prevent stored grain from spoiling, preserves seed grain viability, reduces running cost of storage, permits effective pest control practices and facilitates convenient and economical grain loading and unloading operations. Farmers store grains usually in bulk in different types of storage structures constructed from locally available raw materials. Some of the most commonly used indoor and outdoor structures are primarily made of mud, paddy straw or reed and split bamboo. Mud structures are neither completely moisture-proof nor airtight.

❖ MATERIALS AND METHODS

- **Theoretical Design of Paddy Storage Structure of 1 Tonne Capacity**

- Paddy storage structure of 1 tonne capacity is theoretical designed considering following criteria.

- **Diameter and Height of the Bin**

- Weight of paddy to be stored = 1000 kg
- Bulk density of paddy varies from 550 kg/m3 to 610 kg/m3 . The minimum value was selected for design. Thus design bulk density of paddy is 550 kg/m3.
- Volume of paddy to be stored = (Weight of paddy to be stored / Bulk density of peddy)

$$= (1000 / 550)$$

$$= \mathbf{1.82\ m^3.}$$

- Natural angle of repose of paddy = 300
- By Rankine's theory, height and diameter of the bin was taken as 1.6 and 1.2 m.

- **Design of Roof**

- The roof is designed as a circular R. C. C. slab with overhang of 200 mm.
- Design load = $5.25 \times 1.5 = 7.875\ kN/m^2 \approx 8\ kN/m^2.$
- Let the bending moment and shear force for circular slab could be calculated as follows

  - M_r = Bending moment in radial direction
  - M_r at Edge = 0 at Center $= (3 \times w \times a^2) / 16$

$$= (3 \times 8 \times 12) / 16$$

$$= 1.5\ kN\text{-}m$$

  - $M\theta$ = Bending moment in circumferential direction
  - $M\theta$ at Edge $= (2 \times w \times a^2) / 16$

$$= (2 \times 8 \times 12) / 16$$

$$= 1\ kN\text{-}m$$

- Mθ at Center = (3 x w x a^2) / 16
  = (3 x 8 x 12) / 16
  = 1.5 kN-m

V_r = Shear force in radial direction
V_r at Center = 0.5 x w x a = 0.5 x 8 x 1
= 4 kN

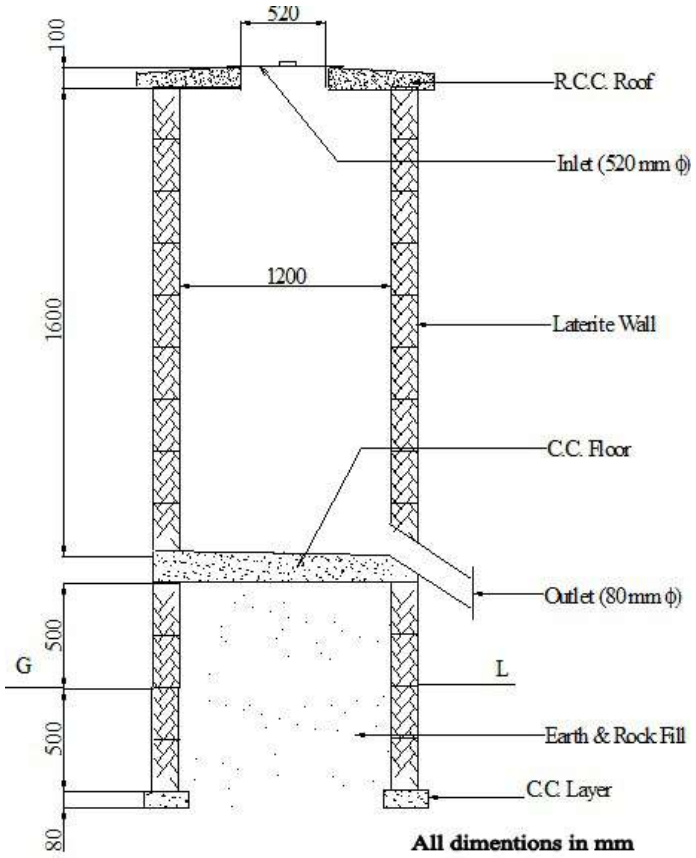
- Maximum bending moment at center ($_{Mr\ max}$) = 1.5 kN-m
- Maximum bending moment at edge (Mθmax) = 1 kN-m

- Percentage of steel at center (pt) is given by

$$P_t = 50 \times \frac{\left(1-\sqrt{1-\frac{4.6}{f_{ck}}\times\frac{M_{r\,max}}{bd^2}}\right)}{f_y/f_{ck}}$$

$$= 50 \times \frac{\left(1-\sqrt{1-\frac{4.6}{20}\times\frac{1.5\times10^6}{1000\times100^2}}\right)}{250/20}$$

= 0.0696



F-13.1.6-A- Elevation Of Grain Storage Structure

Where ,
f_{ck} = Characteristic compressive strength of concrete (for M20 concrete, f_{ck} = 20 MPa)
f_y = Yield strength of mild steel = 250 MPa
Take factor of safety = 3,

- Thus design percentage of steel = 0.0696 × 3 = 0.2088
- Area of steel required at center per meter length of slab = Ast
  = (P_t / 100) x 1000 x t_s

where,

- ts = thickness of slab = 100 m
- Ast = (0.2088 / 100) x 1000 x100 = 208.8 mm2
- Thus, design percentage of steel = 0.0463 × 3 = 0.1389
- Area of steel required at edge per meter length of slab = Ast
  = (0.1389/100) x 1000 x 100
  = 138.9 mm2

- **Design of Wall**

➢ Lateral pressure exerted by paddy on wall Ph = K a γ h
Where , Ka = coefficient of active pressure given by
= [(1 - sin Ø) / (1 + sin Ø)]
= [(1 - sin 300) / (1 + sin 300)]
= 0.3333

➢ Permissible tensile stress of cement mortar (Fs) = 3300 kg m^2

Thickness of wall (t) = [(Ph x D) / (2 x Fs)]
= [(293.33 x 1.2) / (2 x 3300)]
= 0.053 m

- Volume of stone masonry = Volume of the masonry × Total height
  = (Outside cross-sectional area – Inside cross-sectional area) × Height
  = (π / 4) x (1.52^2 - 1.22^2) x (1.6 + 1.0)
  = 1.654 m3
- Number of Stones = (Total volume of masonry / Volume of one stone)
  = 1.654 / (0.38 x 0.25 x 0.15)
  = 116
- Taking into account the size reduction of stones while cutting and giving curvature total 160 stones were used.

- **Design of foundation**

- Load per unit area to be supported by the foundation Load of paddy= 212.21 kg m^{-1}
- Load of stone masonry=2456.14 kg m^{-3}
- Total load of laterite stone masonry of wall = 2500 kg i.e. 530.52 kg m^{-1}
- LOAD OF ROOF = 10 / [(π / 4) x (1.5^2 - 1.2^2)]
  = 15.71 KG M^{-2}
- TOTAL LOAD OF ROOF PER UNIT CROSS-SECTIONAL AREA = 816.33 + 15.71 = 832.04 KG M-2

Load of roof per unit perimeter = 112.32 kg m-1
Load of floor = 126.75 kg/m
Total load on foundation (Pf) = 5984.05 kg m-2
Design depth of foundation = 285 × 3 = 855 mm

- **Width of foundation**

- Total load on foundation per unit length =212.21 + 530.52 +112.32 + 126.75 = 981.8 kg m-1
- Load on foundation per unit length = (Width of foundation (wf)/Safe bearing capacity of soil)
  = (981.8 / 15000)
  = 0.065 m
- Design width of foundation = 0.065 × 2 = 0.13 m = 130 mm.
- Thus total stress on the wall= 165.786 + 3929.82 + 832.04 + 981.48 = 5909.13 kg m-2
  = 5.791 N/cm2

❖ **Cost Analysis**

T-13.1.6-A- Cost Analysis

Sr. No.	Item	Approximate Cost	Quantity	Amount
1	Laterite Stone (40cm×25cm×15cm)	Rs.10 per piece	170 pieces	Rs.1700
2	Cement	Rs.145 per bag	10 bags	Rs.1450
3	Sand	Rs.2000 per brass	0.25 brass	Rs.500
4	Stone Chips	Rs.8 per pot	50 pots	Rs.400
5	M. S. Bars	Rs.17 per kg	25 kg	Rs.425
6	Binding Wire	Rs.25 per kg	1 kg	Rs.25
7	Nails (2")	Rs.25 per kg	1 kg	Rs.25
8	Labour			Rs.3000
Total				Rs.**7525**

13.1.7 Electrical Design 1: IOT Based Cattle Health Monitoring System

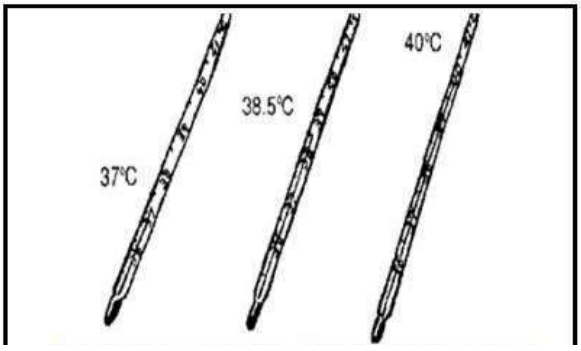
- In recent times, animal welfare had become an increasing concern due to a shift from small sized labor based farms to much larger autonomous and industrialized farms.
- In 2001, A system was invented in which data was manually entered in to the integrated electronic data base system. The prior objective of the system was that it could allow the persons to identify their animals with the help of electronic identification units. They were mainly of the form of collars, ears tags and bolus in the stomach.
- In 2003, The bovine mobile observation operation unit was designed to communicate with a variety of sensors. It used Bluetooth links to send the data back to a farmer, a veterinarian etc. microchip PIC micro-controller is the important components of BMOO. For this purpose the animals should be within 10 meters range which is used to prevent the spread of disease.

❖ PROPOSED SYSTEM

- Sensors base technology use for biomedical application, size is the one of the important constraint. The sensors base device must be moderate in size and weight. However the sensors use in such device must able to detect body temperature and heart beats which is play important role in medical treatment and diagnosis.
  - Sensor Technology
  - Communication
  - Software

1. Sensor Technology :

- The sensors are used for automatic measurement of various health factors. Such type of sensors would be mounted on the cattle's body, which continuously observe the body issues of the cattle like heartbeat rate, body temperature etc. and delivers output in the type of electrical signs. These signs are then compared to a standard limit of normal values. The Sensors such as respiration sensor, humidity sensor and rumination sensor are used in the advanced cattle health monitoring system .



F-13.1.7-A- Arduino uno

2. Body temperature Sensor

- In sensor technology, sensors are used to sense the body temperature of the cattle. LM35 is used as the body temperature sensor. The normal body temperature of the cattle is 38.5-39.5 degree Celsius. If the temperature of the cattle is less than the normal temperature the cattle may suffer from diseases like milk fever, indigestion and poisoning.

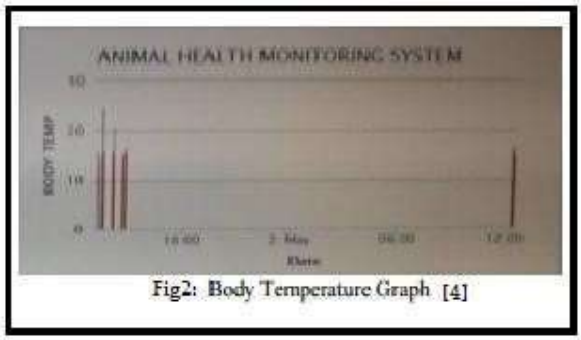


Fig2: Body Temperature Graph [4]

F-13.1.7-B- Body temperature Sensor

3. Heart Beat Sensor

- The normal heartbeat of an adult cattle is between 48 and 84 beats per minute. This sensor will detect stress as well as animal's anxiety. The heartbeat sensor generally used is a stethoscope. It is kept behind cow's elbow to listen over the left side of the cow's chest. The elevation of the heart rate can lead to a sign of pain.

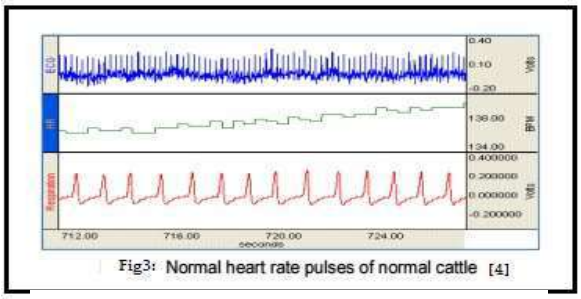


Fig3: Normal heart rate pulses of normal cattle [4]

F-13.1.7-C- Heart Beat Sensor

4. Motion sensor

- Motion sensors use electronic accelerometers to record the lying, walking and standing behavior of animals. These sensors are used with aim of monitoring the movement behavior of cattle for improving animal's health and production. If the data is automatically collected on large numbers and in continuous period of time then the health of the cattle can be improved to a large extent. This data can be used by the stakeholders for management and disease control decision.

❖ Communication:

- We can send the animal health graph to the doctor's mobile using ESP8266 WIFI module. This WIFI module sends the signals through the IOT technology. So by observing this graph doctor can tell about the animal health. Arduino UNO has enough memory to transform the signs arriving from the datagaining unit through sensors into a ESP8266 WIFI module for communication and then the signals are given to the software for examining and displaying the data. The main function is when the animal will suffer from disease people use to take that animal to the doctor for diagnosis but sometimes doctors will not be available in hospitals so using this advance monitoring system we can sense the various activities of animals like body temperature, respiration , heartbeat, motions etc.

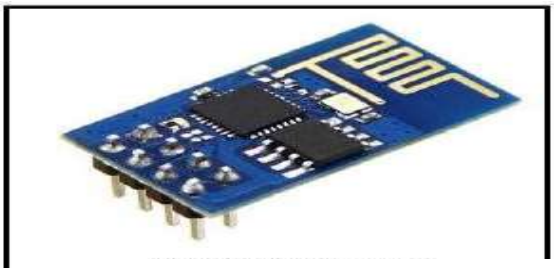
1. Arduino UNO

- The Arduino UNO micro controllers are readily available for a wide variety of applications. The Arduino UNO microcontroller cost is low. Now a days instead of PIC microcontroller Arduino UNO is used because it is more flexible. The signals arriving from the sensors are finally sent to the WIFI module through Arduino and from the WIFI module to health monitoring app.

F-13.1.7-D- Arduino UNO

2. ESP8266 WIFI module

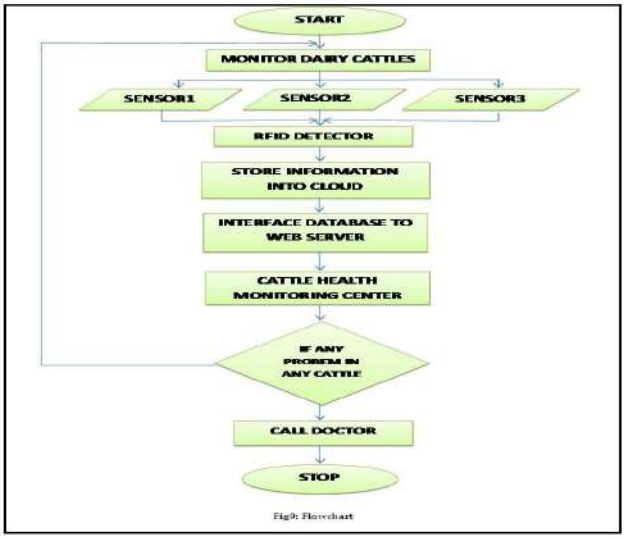
- The ESP8266 Wi-Fi module are low cost, small and maintain Wi-Fi connection and encryption in client mode and access point mode. Wi-Fi module communication is done through simple serial RX and TX lines using "AT" i.e. attention type commands and data.



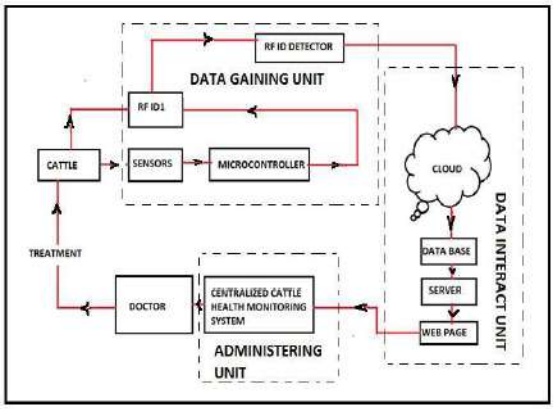
F-13.1.7-E- ESP8266 WIFI module

❖ METHODOLOGY

- The Architecture of E-Cattles health monitoring system using IOT consists of three significant units that are namely:
- Data Gaining Unit.
- Data Interact Unit.
- Administering Unit
- Data gaining unit consist of different types of biomedical sensors like body temperature sensor, blood pressure sensor, humidity sensor, heart beat rate detection sensor which is interfacing with microcontroller.
- The sensors are used for simple and general automatic measurement of numerous health factors. Such type of health sensors will be mounted on the cattle body which continuously observe the body issues of the cattle like temperature, heart beat rate etc and deliver output in the type of electrical signal. These signal are then compared to a standard limit of normal values set as the starting point in data administering unit.
- If administering unit are observed major changes or abnormal changes in particular cattle then they can contact to nearer animal care doctor or if some causes doctor will not available in nearer hospital then using IOT administering unit controlling person can send the health graph to the doctor. So by observing this graphs doctor can tell about the animal health information and proper treatment which to be apply on cattle in absence of doctor during emergency



F-13.1.7-G- Flowchart



F-13.1.7-H-Diagram

❖ Cost Analysis

T-13.1.7-A-Cost Analysis

Item	Cost(Rs.)
Body temperature Sensor	500/-
Heart Beat Sensor	625/-
Motion sensor	250/-
Arduino UNO	980/-
ESP8266 WIFI module	400/-
Total Cost	**2755/-**

13.1.8 Electrical Design 2: Sun Tracking Solar Panel

- In remote areas the sun is a cheap source of electricity because instead of hydraulic generators it uses solar cells to produce electricity. While the output of solar cells depends on the intensity of sunlight and the angle of incidence. It means to get maximum efficiency; the solar panels must remain in front of sun during the whole day. But due to rotation of earth those panels can't maintain their position always in front of sun. This problem results in decrease of their efficiency. Thus to get a constant output, an automated system is required which should be capable to constantly rotate the solar panel.

❖ **STRUCTURE OF ASTS**

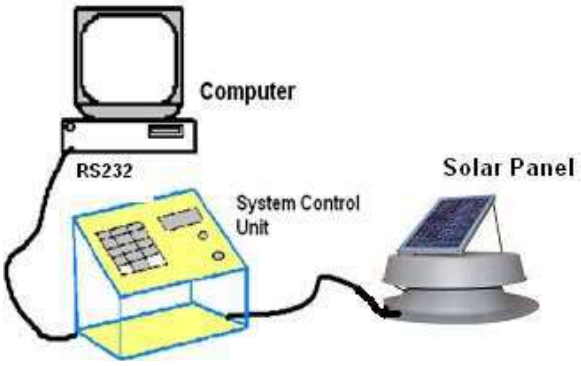
- ASTS is a hybrid hardware/software project. Its general structural diagram is shown in figure.

❖ **The software includes:**

- VB 6.0 based GUI.
- Microsoft Access database.
- Embedded Software (written in C) for microcontroller AT89c52.

❖ **The hardware includes:**

- Solar panel assembly structure containing six functional sensors, stepper motor and solar cells.
- System Control Unit containing LCD, Keypad, Error Indicators and Emergency Stop switch.
- Complete PCB containing two microcontrollers (89c52). First one is the "Master Microcontroller" which controls the automatic operation of ASTS. While second one, the "Slave Microcontroller" serially communicates (RS232) with VB software in computer.



F-13.1.8-A- General Assembly of ASTS

❖ **WORKING OF ASTS**

1. Basic Principle

- The basic functional blocks of this system are six sensors1, and their operation depends upon the intensity of light falling on solar panel. All sensors (each with different functionality) send their output to microcontroller AT89c52. Then the microcontroller executes predefined task in its software. These sensors are being used with following names and functionality.

2. Sun Tracking Sensors (STS)

- Step-1 shows that when the sun is in front of solar panel, both sensors i.e. STS-1 and STS-2 are getting same amount of light.
- In step-2, after some time as the earth rotates the solar panel gets repositioned with respect to sun and STS-1 obtains less amount of light. At this point the LDR i.e. STS-1 sends signal to the microcontroller. Then the controller1 rotates motor, resulting the rotation of solar panel towards the sun.
- Finally step-3 shows the reorientation of solar panel. The process continues until the end of day.

3. **Night Time Fault Detector (NTFD)**

- In routine work of the system if a general fault2 occurs during nighttime then the next morning it would not work. So at the next sunrise, this sensor detects whether the solar panel is ready for tracking or not. As shown in figure-4, the NTFD is mounted in east of the solar panel so in normal conditions it does not work because it gets lesser intense light (predefined) as compared to the middle sensors i.e. STS-1 and STS-2, but as the fault arises, it starts working.

4. Day Time Fault Detector (DTFD)

- Except some special conditions e.g. cloudy weather etc, the ASTS is supposed to track the sun the whole day. If the panel stops rotation then DTFD detects this type of fault. The mounting strategy of this sensor is same as that of NTFD except that it is mounted in the west.

5. Night and Cloud Detection

- In a cloudy day light intensity is less than a normal day. Similarly during night, light intensity is far less than a cloudy day. So the night and cloud sensors work on this principle to detect the event. To sense a smaller change in light intensity cloud sensor is more sensitive than the Night sensor.

❖ CONTROL STRATEGY OF ASTS

- Automatic Control
- Manual Control

F-13.1.8-D- Sensor mounting assembly on solar panel

❖ Automatic Control

- With the help of an efficient algorithm (written in C) only one Master Microcontroller1 is being used to manage the automatic operation of ASTS. This controller has following functions:
- Senses all of six sensors.
- Drives stepper motor.
- Controls the warning indicators e.g. buzzer, LED's etc.
- Communicates (by parallel port) with the slave microcontroller.
- The central driving components of automatic control are only six sensors. Their operation has been explained on the previous page.

❖ Manual Control

- As no human made system is so perfect so an unpredictable fault may occur in the any system. That is why a manual control option was also kept in ASTS. While designing this part of control two objectives were kept in mind:
- The manual control should work efficiently.
- It should be as user friendly as possible.
- Following two approaches have been used to accomplish the manual control.
- Stand Alone system control Unit
- Computer based control unit

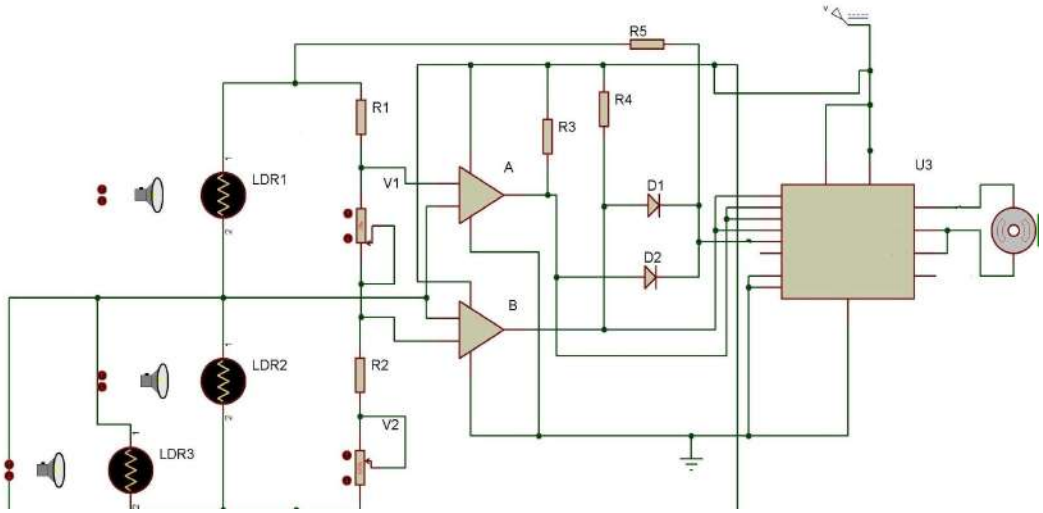
❖ Stand Alone System Control Unit

- It is a simple user interface, which includes onboard LCD, Keypad , Buzzer and a complete PCB of the system circuit.

- The LCD (Hitachi HD44780) displays different messages, which can help the user in manually operating the system. While the keypad includes keys of Numeric Digits, Emergency Stop, clock wise rotation and counter clockwise rotation. Using keypad a user can manually rotate the solar panel by entering angle from 0o to 180o. The angle value is limited to only 180 values because after sunrise, the earth almost rotates only 180 degrees and then the sun disappears.
- The advantage of this unit is that to run the system does not need computer but its disadvantage is that at a time it controls only one solar panel.

❖ **Computer Based Control Unit**

- This is completely software based control, written in VB.
- It incorporates a GUI (figure-6) and a Database, linked with Microsoft Access. Using this software the computer serially communicates (RS232) with the ASTS. The Slave microcontroller (89c51) of the system makes this communication successful. Due to some fault if the solar panel stops rotating, then with the help of this software a user can:
- Rotate the solar panel manually.
- Stop all operations of ASTS (in emergency case).
- The database of this system can be used to keep records, which can be retrieved even after a long time. While saving the new data, the database automatically takes the date and time from the computer and keeps them saved along with the data, entered by the human being.
- The advantages of computer-based control include:
- Facility of Database.
- At a time this software can handle three ASTS systems.
- It has an attracting GUI.
- Although ASTS is a prototype towards a real system, but still its software and hardware can be used to drive a real and very huge solar panel. A small portable battery can drive its control circuitry. Therefore by just replacing the sensing instrument, its algorithm and control system can be used in RADAR and moveable Dish Antennas.



F-13.1.8-F-Circuit diagram of system

- The performance of solar tracker unit is evaluated by recording the open circuit voltage and short circuit current output of stationary solar panel and tracked solar panel. The current sensor module is used to measure current consume by motor. Data logger is used to log motor's current data at interval of 20 seconds from 7:00 to 18:00 hrs. Short-circuit current of PV panel is measured using digital multimeter at interval of 15 min. from 7:00 to 18:00 hrs.

❖ **Total installation cost for Tracked system on 1 kW systems**

T-13.1.8-A- Total installation cost for Tracked system on 1 kW systems

Sr. No.	Specification	Rate	Weight	Requirement	Weight (kg)	Cost (Rs.)
1	**250 Watts** PV Panel	12500/-	19.5kg	4 nos.	78	50000
2	**Frame** for holding 4 PV panels – G.I. 1.5" square pipe, thickness 1.5 mm	650/- per pipe (20 ft)	8 kg / per pipe (20 ft)	15852 mm ~= 52 ft	20.8	1690
3	**Center Rod** – Hollow pipe - G.I. 1.5", thickness 2.2 mm	750/- per pipe (20 ft)	9 kg / per pipe (20 ft)	3963 mm ~= 13 ft	5.85	488
	Total weight of rotating parts =				**105**	
4	**Center Assembly-** 4 sq.ft. MS sheet of thickness 3 mm + Hollow pipe - G.I. 2.0", thickness 2.2 mm				-	1500
5	**Bearings**-1"	125/-	-	4 nos.	-	500
6	**Gearbox** - Worm Gear ratio - 15:1	2500/-	-	1 no.	-	2500
7	Chain and sprockets	500/-	-	-	-	500
8	Solar tracking device	500/-	-	1 no.	-	500
9	Metal Gear Motor	600/-	-	1 no.	-	600
10	Miscellaneous	-	-	-	-	500
11	Fabrication and labour charges 30% on item no. 2,3,4					1103
	Total installation cost for Tracked system					**59881**

13.1.9 Electrical Design 3: Electric Bicycle

- An electric bicycle, also named as an e-bike is a bicycle with a motor which can be used for movement. The electric bike is an electrically-helped gadget that is intended to convey the electromagnetic energies to a present bike along these lines alleviating the client of creating the vitality which is fundamental to run the bike. It contains a solid engine and enough battery control that simply needs charging to help in slope climbing, create more noteworthy motoring speeds and gives totally free electric transportation. The crucial structure of an electric bike drive contains a controller that controls control stream the battery to the electric motor. It suggests the power gave from electric motor is used to run e-bike.The power demonstration parallel along the power conveyed by rider by means of pedal on the bicycle. The instrument such as motor, battery, pic controller is selected on the required criteria and also durability of the instrument. By using this method, we can upgrade the traditional bicycle of villagers to the electric bicycle at very low cost.

❖ METHODOLOGY

- First step is to select the materials which are required set up an electric bicycle, they are Motor, Battery, Controller,etc. The second step the most important step the designing of the fixture. The next step is to fabricate the designed fixture by selecting the material and by suitable operation. The next step is to assemble the selected material and fabricated material to the bicycle. The last step is check the speed and distance travelled by the bicycle.

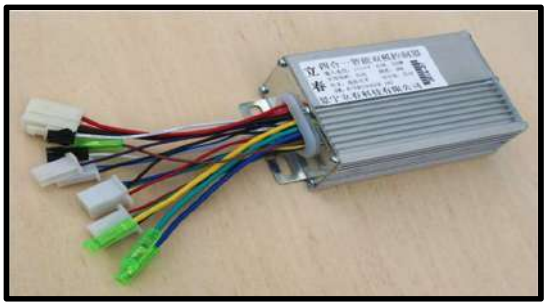
❖ MATERIAL SELECTION

- DC Geared Motor: Here 250 watt with maximum of 2100rpm speeds and 24volts motor is selected. The current rating of the battery is 7.5amp.
- Battery: 12v and 7.5 amp hour lead acid batteries of 2 numbers are used and they are associated in parallel. Battery stores the electrical vitality produced and uses it to run the engine.

F-13.1.9-A- DC Geared Motor

F-13.1.9-B-Battery

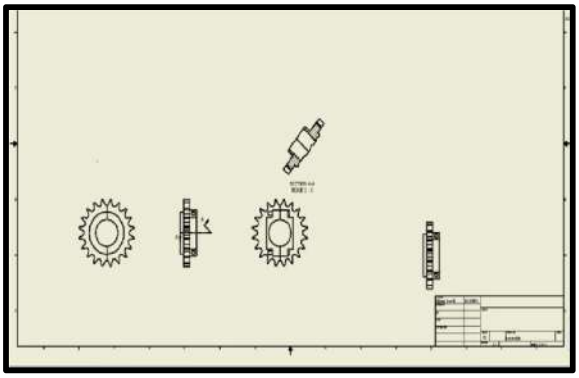
- Controller: The controller is an electronic circuit that controls the speed of an electric engine and furthermore fills in as a dynamic brake Power required for the motor is provided by battery through controller.

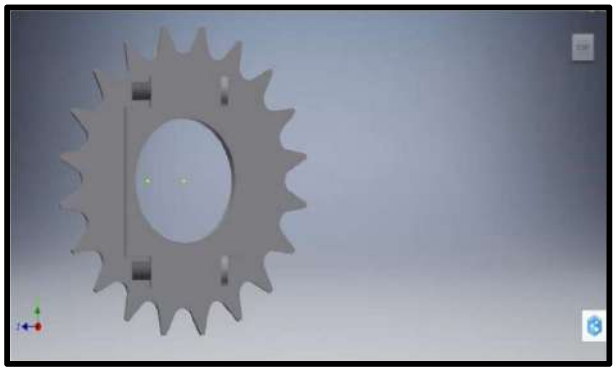


F-13.1.9-C- Controller

❖ **MODELLING**

- **Determine the Specifications of the Sprocket**





1. Bore diameter – 35.5 mm
2. Bottom diameter – 78 mm
3. Pitch diameter – 82 mm
4. Outer diameter – 85 mm
5. Hub diameter – 56 mm
6. Face width – 2.5 mm
7. Material used – Medium carbon mild steel
8. Number of teeth – 20

- **Drawing the First Sprocket Tooth**

- To draw the main tooth of the sprocket gear, this is cultivated as pursues.
- Pick a begin point and draw upwards 1/2 of the pitch, out to the correct some separation (longer than anticipated rigging range).
- Pivot the line stretching out to the right up a point of [360°/(Number of tooth *2)].
- Adhere to a meaningful boundary from the upwards and stretching out line to the crossing point of the calculated line. Crossing point draw a line downwards the length of the pitch, and draw circles whose distances across are the roller measurement in addition to 0.005" at that point at each finish of that line.
- Clean up the reference geometry loaded up with messy the illustration and after that draw a line on the rears of the two circles that will be the length of the pitch.
- From the focal point of the reference line draw a line out that is 20% the length of the Pitch and another that is 60% the length of the Pitch. Toward the finish of the 20% line draw a vertical line which converges the two circles.
- Toward the finish of the 60% line draw a vertical line that is 10% the length of the Contribute and expands equitably the two bearings.
- Utilizing the 20% line and the line on the rear of the circles as trim limits to trim down the circles.
- Draw a sunken curve that goes about as an augmentation from the cut circles end to the one finish of the 10% line.
- With a span that is 8% of the pitch filets the two circular segments together.
- Completion the Sprocket Utilize Round Example After the principal tooth is drawn and once the reference geometry is cleared (1), completing the apparatus is a basic two stages process. First utilizing the roundabout example instrument to design the tooth around the begin point per the quantity of teeth. After that draw the required focus entire sizes is same as that of begin point and eradicate the begin point and any extra reference geometry.

- **Fabrication**

➢ To make the sprocket the material selection is important factor. Medium carbon steel is selected as the material. Medium carbon steel typically has a carbon in the range of 0.31% to 0 .61% and a manganese content ranging from 0.060% to 1.65%.

➢ It has a tensile strength 500-700MPa and Brinell hardness number ranges between170 and 210.AISI 1045 steel is characterized by good welding property, good machinability, and has high strength and impact properties in either the normalized or in hot rolled condition. Milling operation is carried out to get the final product.Horizontal milling machine is used for manufacturing the split sprocket. The final product is shown in below figure.

F-13.1.9-D-Fabricated Gear

- **Assembly**

➢ The fabricated Split sprocket is fixed to the rear wheel hub using allen key.Motor is attached to the rear wheel shaft using provided fixture.The chain connection given to the motor shaft to the split sprocket.The battery and contrller is fixed to the main frame of the bicycle.Speed of bicycle is controlled by thumb throttle.Connections are given to the motor and battery through controller.Distance travelled by the bicycle with fully charged battery=28.900km.

❖ **Cost Analysis**

Sensor	Cost (Rs.)
DC Geared Motor	2500/-
Battery	500/-
Controller	200/-
Fabricated Gear	500/-
Labour	250/-
Total Cost	**3950/-**

13.2 Reason for Students Recommending this Design

- We recommended rain water harvesting to provide a potential alternative arrangement against poor maintenance and monitoring of a centralized piped ground water supply.
- Villagers can use surface water instead of groundwater in daily works like washing, watering land like irrigation and gardening, cooking .
- We recommended Solid waste management system because Insect/mosquito breeding in stagnant water pools on waste sites and waste resulting in the spread of disease.
- There are significant health risks due to the existence of vermin, insects, flies and scavenging animals particularly to workers and neighbouring residents. Nuisance caused to the neighbourhood due to odour and flies.
- Farmers in the village were not aware of the benefits of greenhouse in agriculture. So we designed a greenhouse which is affordable to all farmers and also explained them how it will increase their yield at low cost.
- Lake was not developed and there were waste everywhere around it . Due to this , village was not looking aesthetically good . So we suggested lake development plan.
- Skill Development center is program started by government of India to streamline the skill development efforts in the state and create an environment in which not only provide skill training but also employment to the youth to meet the growing market demand for skilled manpower and equip them for continuous development and learning in a changing enterprise environment in India and the world.As village has no skill development centre , we recommended it and designed according to requirement.
- Farmers are going to store generally 59–70% of overall production for their consumption and surplus amount has been stored into small storage structures made with readily available materials in local because they have to store small amount of grain only due to their small land holdings as well as cannot afford the price and maintenance of advance and big storage structures 20% food grain was lost due to improper storage structure and inadequate storage practices and these food grain losses have very high quantitative and monetary value on the world level
- We recommended smart agriculture monitoring system because for a long time, farmers used to figure the ripeness of soil in recent days and affected presumptions to establish which form of food. They didn't care about the weather, water level, and climate conditions in particular, which were more terrible for an agriculturalist. Given a few doubts, they use pesticides that contribute to a genuine effect on the yield if the inference is not right. Profitability relies on the last step of the crop that farmers rely on.
- Sun tracking solar panel is used in remote areas the sun is a cheap source of electricity because instead of hydraulic generators it uses solar cells to produce electricity. While the output of solar cells depends on the intensity of sunlight and the angle of incidence. It means to get maximum efficiency; the solar panels must remain in front of sun during the whole day. But due to rotation of earth those panels can't maintain their position always in front of sun. This problem results in decrease of their efficiency. Thus to get a constant output, an automated system is required which should be capable to constantly rotate the solar panel.
- IOT based health monitoring system is suggested because animal welfare had become an increasing concern due to a shift from small sized labor based farms to much larger autonomous and industrialized farms. The prior objective of the system was that it could allow the persons to identify their animals with the help of electronic identification units. They were mainly of the form of collars, ears tags and bolus in the stomach.
- We suggested to upgrade normal bicycle of villagers to electrical bicycle at very cheap cost.As most villagers can not afford vehicles it will help them to reach their destination with low effort and fast.

13.3 About designs Suggestions / Benefit of the villagers

- Rain water harvesting is provided to beat the insufficiency of waters to fulfill needs. To capture decrease in ground water levels. To upgrade accessibility of ground water at explicit spot and time and use downpour water for reasonable improvement. To build invasion of downpour water in the subsoil which has diminished radically in urban regions because of clearing of open territory.
- Solid waste management system will protect human health and improve quality of life among people living in rural areas. It will reduce environment pollution and make rural areas clean It will promote recycling and reuse of solid waste. Effective waste management reduces pollution considerably. The green house gases like methane and carbon di oxide that is emitted from waste accumulated also reduces in the process. Effective waste management keeps the environment clean as not much waste will be accumulated in the surroundings. There will be considerable reduction in the landfills.
- Due to use of greenhouse in agriculture the yield may be 10-12 times higher than that of out door cultivation depending upon the type of greenhouse, type of crop, environmental control facilities. Reliability of crop increases under greenhouse cultivation. Ideally suited for vegetables and flower crops.
- Due to construction of grain storage structure, farmers will have more control and planning over crops and transportation. There will be improvement in quality of grains in origin. There will be greater flexibility and control for grain distribution.
- IoT based cattle health monitoring system efficiently and accurately monitors behavior of the dairy cows and allows to detect a particular physiological status like estrus and some health problem (e.g., mastitis). This task is supported by IoT infrastructure consisting of hardware devices, the cloud system, and the end-user application. New innovative techniques of data measurement, including the aggregate behavior indicator, enable us to precisely discriminate cow activities.
- Due to use of sun tracking solar panel , the solar energy can be reused as it is non-renewable resource. This also saves money as there is no need to pay for energy used (excluding the initial setup cost). It will help in maximizing the solar energy absorption by continuously tracking the sun.
- Smart agriculture monitoring system will ensure quality containment and elimination of inventory due to improved output efficiency. Farmers would be able to minimize the chances of reducing the yield by being able to see any irregularities in crop growth or animal welfare. Farmers will see increased market productivity by the integration of procedures. Farmers can automate several processes through the development chain, such as fertilizer, fertilization, or pest control, by using smart devices.
- Electrical bicycle will help them to reach their destination with low effort and fast. Also it will cause no pollution. It runs on rechargeable batteries so it can be charges by solar panel and it will save cost of fuel.
- Skill development centre will help villagers to improve their skills and educate them about various market trends and make them job ready. Provide fresh skill development training to school dropouts, college dropouts and unemployed youth through short term courses Recognise the skill available of the current work force through skill certification Engage States in the implementation of the scheme leading to capacity development of the states Improved quality of training infrastructure along with alignment of training with the needs of the industry Encourage standardization in the certification process and initiate a process of creating a registry of skills
- Lake development project will improve the aesthetics of village. It will also act as recreational place where villagers will come to relax.

Chapter:14

Technical Options with Case Studies

14.1 Civil Engineering

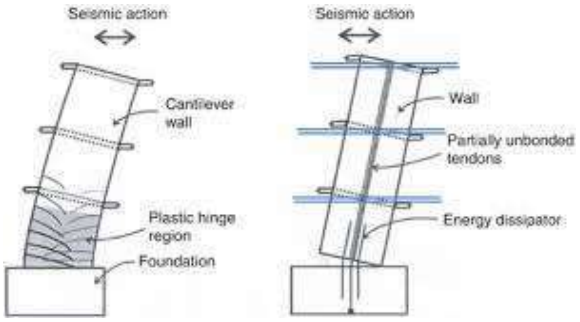
14.1.1 Advanced Earthquake Resistant

- Earthquake-resistant structures are structures designed to protect buildings from earthquakes. While no structure can be entirely immune to damage from earthquakes, the goal of earthquake-resistant construction is to erect structures that fare better during seismic activity than their conventional counterparts. According to building codes, earthquake-resistant structures are intended to withstand the largest earthquake of a certain probability that is likely to occur at their location. Currently, there are several design philosophies in earthquake engineering, making use of experimental results, computer simulations and observations from past earthquakes to offer the required performance for the seismic threat at the site of interest.
- These range from appropriately sizing the structure to be strong and ductile enough to survive the shaking with an acceptable damage. The conventional approach to earthquake resistant design of buildings depends upon providing the building with strength, stiffness and inelastic deformation capacity which are great enough to withstand a given level of earthquake-generated force. This is generally accomplished through the selection of an appropriate structural configuration and the careful detailing of structural members, such as beams and columns, and the connections between them. But more advanced techniques for earthquake resistance is not to strengthen the building, but to reduce the earthquake-generated forces acting upon it.
- Among the most important advanced techniques of earthquake resistant design and construction are:

1. Base Isolation
2. Energy Dissipation Devices

1. Base Isolation Method of Earthquake Resistant Design

- A base isolated structure is supported by a series of bearing pads which are placed between the building and the building's foundation. A variety of different types of base isolation bearing pads have now been developed. The bearing is very stiff and strong in the vertical direction, but flexible in the horizontal direction.This shows an earthquake acting on both a base isolated building and a conventional,fixed-base,building.



F-14.1-A- Base Isolation Method

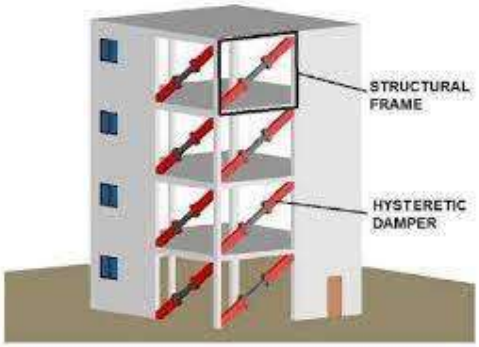
- As a result of an earthquake, the ground beneath each building begins to move. It is shown moving to the left. Each building responds with movement which tends toward the right. The building undergoes displacement towards the right. The building's displacement in the

direction opposite the ground motion is actually due to inertia. The inertial forces acting on a building are the most important of all those generated during an earthquake.

- It is important to know that the inertial forces which the building undergoes are proportional to the building's acceleration during ground motion. It is also important to realize that buildings don't actually shift in only one direction. Because of the complex nature of earthquake ground motion, the building actually tends to vibrate back and forth in varying directions. By contrast, even though it too displacing, the base-isolated building retains its original, rectangular shape. It is the lead-rubber bearings supporting the building that are deformed.

2. Energy Dissipation Devices

- The second of the major new techniques for improving the earthquake resistance of buildings also relies upon damping and energy dissipation, but it greatly extends the damping and energy dissipation provided by lead-rubber bearings. As we've said, a certain amount of vibration energy is transferred to the building by earthquake ground motion. Buildings themselves do possess an inherent ability to dissipate, or damp, this energy.



F-14.1-B-Energy Dissipation Devices

- However, the capacity of buildings to dissipate energy before they begin to suffer deformation and damage is quite limited. The building will dissipate energy either by undergoing large scale movement or sustaining increased internal strains in elements such as the building's columns and beams. Both of these eventually result in varying degrees of damage. So, by equipping a building with additional devices which have high damping capacity, we can greatly decrease the seismic energy entering the building, and thus decrease building damage.
- Accordingly, a wide range of energy dissipation devices have been developed and are now being installed in real buildings. Energy dissipation devices are also often called damping devices. The large number of damping devices that have been developed can be grouped into three broad categories: Friction Dampers: these utilize frictional forces to dissipate energy Metallic Dampers : utilize the deformation of metal elements within the damper Viscoelastic Dampers : utilize the controlled shearing of solids Viscous Dampers: utilized the forced movement (orificing) of fluids within the damper.

- **Construction Methods**

1. Base-isolation are designed in buildings.It is a building designed to reduce amount of energy that reaches the building during earthquake.
2. Flexible joints and automatic shut off valves can be installed. Protecting Against Earthquake Damage Prepare a Seismic Risk Map for the globe which identifies rock types, liquefaction potential, landslide potential. Extensive geological surveying has to be done to identify all active faults, including hidden faults. Earthquake Resistant Design of Structures Enact building codes to design and build earthquake-resistant structures in high seismic risk areas. wood, steel and reinforced concrete are preferred as they tend to move with the shaking ground (unreinforced concrete and heavy masonry tend to move independently and in opposition to the shaking, battering one another until the structure collapses).

14.1.2 Seismic Retrofitting of Buildings

- **Goals of Seismic Retrofit**

- The goals of seismic retrofit refer to the actions to be taken with reference to the attributes for seismic design, in qualitative terms. They can be summarized as follows:
- To increase the lateral strength and stiffness of the building.
- To increase the ductility in the behaviour of the building, this aims to avoid the brittle modes of failure.
- To increase the integral action and continuity of the members in a building iv. To eliminate or reduce the effects of irregularities
- To enhance redundancy in the lateral load resisting system, this aims to eliminate the possibility of progressive collapse.
- To ensure adequate stability against overturning and sliding.

- **Objectives of Seismic Retrofit**

- The objectives of seismic retrofit are quantitative expressions to achieve the goals of retrofit. Of course for a non-engineered building, the objective may not be quantifiable. The implicit objective is to provide adequate lateral strength by strategies that have been tested or proved to be effective in past earthquakes. The retrofitted building should not collapse during a severe earthquake.
- Objectives of seismic retrofit can be summarized as follows:
- Public safety only: The goal is to protect human life, ensuring that the structure will not collapse upon its occupants or passersby, and that the structure can be safely exited. Under severe seismic conditions the structure may be a total economic write- off, requiring tear-down and replacement.
- Structure survivability: The goal is that the structure, while remaining safe for exit, may require extensive repair (but not replacement) before it is generally useful or considered safe for occupation. This is typically the lowest level of retrofit applied to bridges.
- Structure functionality: Primary structure undamaged and the structure is undiminished in utility for its primary application.
- Structure unaffected: This level of retrofit is preferred for historic structures of high cultural significance.

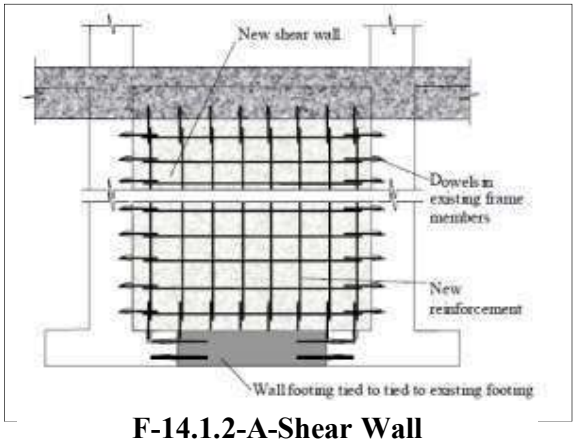
- **SEISMIC RETROFIT STRATEGIES/TECHNIQUES**

- This section presents an overview of the process used to develop a retrofit strategy once deficiencies of the existing buildings have been detected and performance objectives have been apparently determined. The retrofit strategies can be grouped under global and local strategies. A global retrofit strategy targets the seismic resistance of the building. A local retrofit strategy targets the seismic resistance of a member, without significantly affecting the overall resistance of the building. It may be necessary to combine both local and global retrofit strategies under a feasible and economical retrofit scheme.

- **Global Retrofit Strategies**

14.1.2.1 Adding Shear Wall

- Shear walls can be introduced in buildings with frames or in buildings with flat slabs or flat plates. In the latter type of buildings, since there are no conventional frames, the lateral strength and stiffness can be substantially inadequate. A new shear wall should be provided with an adequate foundation. The reinforcing bars of the wall should be properly anchored to the bounding frame.

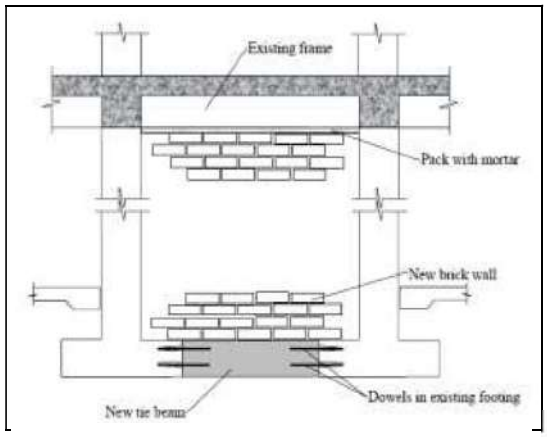


F-14.1.2-A-Shear Wall

- Shear walls resist two types of forces: shear forces and uplift forces. Connections to the structure above transfer horizontal forces to the shear wall. This transfer creates shear forces throughout the height of the wall between the top and bottom shear wall connections. The strength of the lumber, sheathing and fasteners must resist these shear forces or the wall will tear or "shear" apart.

14.1.2.2 Adding Infill Wall

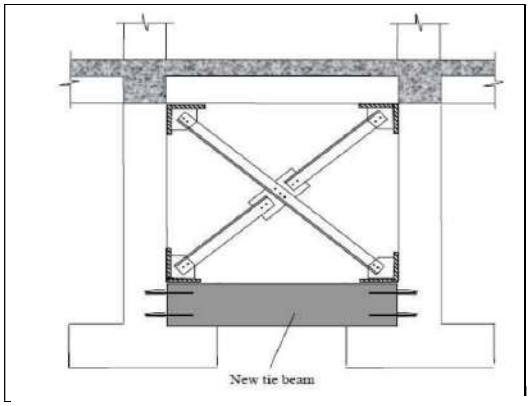
- Addition of infill walls in the ground storey is a viable option to retrofit buildings with open ground storeys. In absence of plinth beam, the new foundation of the infill wall should be tied to the existing footings of the adjacent columns. Else, a plinth beam can be introduced to support the wall. The lateral load resistance and the energy dissipation capability of a frame increase with infill. This is a viable option for the building (with open ground storey) addressed. Infill walls with reinforced concrete masonry units can act as shear walls.



F-14.1.2-B- Infill Wall

14.1.2.3 Adding Bracing

- Steel braces can be inserted in a frame to provide lateral stiffness, strength, ductility, energy dissipation, or any combination of these. The braces can be added at the exterior frames with least disruption of the building use. For an open ground storey, the braces can be placed in appropriate bays to retain the functional use. The connection between the braces and the existing frame is an important consideration. One technique of installing braces is to provide a steel frame within the designated bay. Else, the braces can be connected directly to the frame with plates and bolts.



F-14.1.2-C- Bracing

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

❖ **ADVANCED CONSTRUCTION TECHNIQUES**

1. 3D PRINTING

- 3D printing is a construction process that fabricates three dimensional solid objects from a digital program file. The fabrication of a 3D printed object is accomplished by laying down layers of a specified material until the object is totally fabricated. Each layer of the material is a thin horizontal cross section of the fabricated object. By way of analogy, 3D printing is somewhat like glue laminated timber, also called "glulam," in that each thin layer laid down by a 3D printer bonds to the previous thin layer to fabricate an entire object. 3D printed objects can take on any shape. The fabricated objects are produced from a virtual design of the desired object. Virtual designs can be created by a CAD file using a 3D modeling application, a digital model, a 3D model or an Additive Manufacturing File.
- A 3D model may also be created by use of 3D scanners that generate a 3D model that feeds into 3D modeling software to create the needed 3D model. Potential Impact on Construction, Project Management, and Claims Mitigation – Assuming that a project design is accurate and sufficiently complete, the Navigant Construction Forum™ anticipates that 3D printing should allow for pre-fabrication of various components needed to complete the constructed project. For example, in the early 2000s, Cornell University undertook a large student housing project. In an effort to save cost and time on this program, Cornell pursued the idea of "prefabricated" bathrooms for the new dormitories. Although 3D printing did not exist at that time, commercially at least, such prefabricated components could reduce construction duration, increase construction quality and decrease the need for rework, thus saving time and cost for the contractor.

2. 4D BIM

- 4D BIM is a term widely used in the CAD industry. The term refers to "an intelligent linking of individual CAD components or assemblies with time or schedule related information."8 As such, the term 4D BIM refers to the "fourth dimension" – time. Thus, 4D BIM is 3D BIM plus the schedule. The idea of 4D BIM or 4D scheduling is somewhat akin to a time machine. The concept is to allow project participants to visualize all schedule activities and events in advance of when these activities or events are underway. Being able to visualize both the design as well at the construction plan well in advance of actual construction should help superintendents, foremen, and craft labor see what it is they are to construct, in what order, and allow them to gain confidence in the plan.
- Further, seeing the project being built visually should allow project participants to foresee and avoid problems such as having multiple trades working in the same small space at the same time – something that is difficult to spot when reviewing a typical critical path method ("CPM") schedule. As one of the author's previous senior managers used to frequently comment, "Bad news delivered early is useful information. Bad news delivered late is a disaster."
- 4D visualization is a dress rehearsal for the foremen, and catching weeks ahead of time means you can be that much more efficient when the labor and the foremen are on the jobsite. It's the human equivalent of clash detection. … 4D visualization … supports lean principles and pays huge dividends in safety, efficiency and quality. … As the team reviews the 4D model they believe that the work can be done as the schedule and model show. … We are going to see some major efficiency gains."

❖ ADVANCED CONSTRUCTION MATERIAL

1. Air Cleaning Bricks

- Indoor air quality (IAQ) is becoming a more important concern for commercial real estate as we gain a better understanding of how built environments affects the health of those who live and work in them. There is no shortage of ways to improve IAQ, but most of them require active energy use to filter the air. That approach emits more carbon and other pollutants into the air over the long term.
- Carmen Trudell, assistant professor at Cal Poly San Luis Obispo's school of architecture and founder of Both Landscape and Architecture, has invented a passive system that makes use of the bricks on the outside of the building to filter out the heavier particles in the air as it enters the space.

2. Self–compacting Concrete (SCC)

- SCC was developed by the Japanese initially as a Quality Assurance measure, but now is being widely used for concrete structures worldwide. In India, one of the earliest uses of SCC was for some components of structures at Kaiga Atomic Power Project. Many components of the structures were very heavily reinforced and the field engineers found it difficult to place and compact normal concrete without honeycombs and weaker concrete. SCC was successfully used.SCC leaving the batching plant is in a semi-fluid state and is placed into the formwork without the use of vibrators. Due to its fluidity, SCC is able to find its way into the formwork and in between the reinforcement and gets self-compacted in the process.
- SCC is particularly useful for components of structures which are heavily reinforced. The fluidity is realized by modifying the normal mix components. In addition to cement, coarse and fine aggregates, water, special new generation polymer based admixtures are used .

❖ ADVANCED CONSTRUCTION EQUIPMENT

1. Bulldozers

- Bulldozers are another type of soil excavating equipment which are used to remove the topsoil layer up to particular depth. The removal of soil is done by the sharp edged wide metal plate provided at its front. This plate can be lowered and raised using hydraulic pistons. These are widely used for the removal of weak soil or rock strata, lifting of soil etc.

F-14.1.3-B- Bulldozer

2. Excavators

- Excavators are important and widely used equipment in construction industry. Their general purpose is to excavation but other than that they are also used for many purposes like heavy lifting, demolition, river dredging, cutting of trees etc. Excavators contains a long arm and a cabinet. At the end of long arm digging bucket is provided and cabinet is the place provided for machine operator.

F-14.1.3-A-Excavators

14.1.4 Engineering Aspects Of Soil mechanics - Environmental Impact Assessment

- **DEFINITION**

➢ The systematic identification and evaluation of the potential impacts (effects) of proposed projects, plans, programs, or legislative actions relative to the physical, chemical, biological, cultural and socio economic components of the total environment.

- **PURPOSE**

➢ The purpose of Environmental Impact Assessment is to enhance projects by helping present, minimize, mitigate or compensate for any adverse environmental and social impacts. Development institutions and many developing Countries have introduced EIA requirements and regulations into their development activities.

- **Goal**

The goals for Environmental Impact Assessment need to be achieved in order to:

➢ Fulfil the individual responsibility to preserve and protect natural environment for future generations.
➢ Assume for all citizens safe, beautiful, productive and aesthetically and pleasing surroundings.
➢ Make beneficial uses of the natural environment without deteriorating and degradation risk to health or safety or other undesirable consequences.
➢ Presence important historical, cultural, and natural aspects of our National heritage and maintain, where possible.
➢ Maintain high standards of living by balancing between population and resource use.
➢ Enhance the quality of renewable resources.

- **Environmental Impact Assessment requires statement covering the following five major areas:**

➢ The environmental impact of the proposed action.
➢ Any adverse environmental effects that cannot be avoided. Then should the proposal be implemented?
➢ Alterations to the proposed action.
➢ The relationship between the local short-term uses of the human environment and the maintenance and enhancement of the long-term productivity.
➢ Any irreversible and irretrievable commitment of resources that would be involved in the proposed action should be implemented.

- **SCOPE**

Environmental Impact Assessment is required to:

➢ Determine the extent of mitigation planning and mitigation identification responsibility which an agency should undertake prior to issuance of an EIS.
➢ Develop methodology or procedure for systematically addressing cumulative impacts of proposed actions.
➢ Establish a usable methodology or procedure for conducting a reasonable foreseeability analysis at the consequences of a proposed action.

14.1.5 Water Supply-Sewerage system-Waste Water- Sustainable development Techniques

- It is well known that the demand for water for different uses is on the rise in India. While the Standing Subcommittee of the Ministry of Water Resources, Government of India estimates that the total water demand across all sectors in India will rise from 813 Billion Cubic Metres (BCM) in 2010 to 1093 BCM in 2025 and 1447 BCM in 2050, the National Commission on Integrated Water Resources Development puts these figures at a maximum of 843 BCM and 1180 BCM compared to a maximum of 710 BCM in 2010.
- Water security is the availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water related risks to people, environments and economies.

- **Technologies for Wastewater Treatment**

  - Centralised treatment of wastewater is normally used for urban areas where water supply is normally adequate to generate sufficient waste water for its flow in the sewer system. As seen in section 3, there is a big gap in treatment capacity for domestic wastewater. There is also a gap in treatment of industrial wastewater, mainly generated from small-scale industries. Wastewater treatment systems can be classified as conventional or centralized wastewater treatment systems and decentralised systems of wastewater treatment.
  - Open defecation is highly prevalent in rural areas in India. Given the dispersed and unplanned development in rural areas and the technical expertise required to operate them, it is not practical to provide centralized sewage treatment systems in rural areas. Various types of decentralized systems are in use in rural areas chief among them being pit latrines and septic tanks.

- **Conventional or Centralised Wastewater Treatment**

  - The Sewage Treatment Plants (STPs) are based on different technologies to treat waste water. However, only a few sewage treatment plants in India are functioning satisfactorily. Many STPs in urban areas are non-functional due to various problems associated with the centralised treatment system. Due to lack of required operational and maintenance facilities, untreated and semi -treated waste water flows into rivers causing severe health and environmental problems.
  - Primary treatment removes large objects and reduces oils, grease, sand, grit and coarse solids. This is usually done using large sedimentation tanks and rotating screens to remove floating and larger materials.

- **Decentralised systems for wastewater treatment**

  - Decentralised waste water treatment systems can be built to suit site conditions and varying inflows. The length of the sewer networks required are smaller and a variety of simple and natural treatment methods can be used which need no mechanisation. As a result, it is possible to achieve cost effective sanitation in addition to reusing the water and nutrients near the source of waste generation.
  - The houses in rural areas are not built in a planned manner and are not close to one another like in urban areas. Houses may be in the middle of large farms so that they are isolated. Hence in rural areas decentralised waste water treatment systems are more suitable. Currently, even in urban areas about 70% of the population is served by on site sanitation systems.

The performance of the various treatment systems depends on the influent characteristics and temperature. The performance can be defined by the approximate BOD removal rates, as follows:

- 25 to 50% removal rates for Septic and Imhoff tanks
- 70 to 90% removal for anaerobic filters and baffled septic tanks
- 70 to 95% removal for constructed wetland and pond systems.
- Decentralised systems for wastewater treatment can be divided into three broad categories:
- **Soil-based systems**, which include subsurface infiltration, rapid infiltration/soil aquifer treatment, overland flow, and slow rate systems
- **Aquatic systems**, which include waste stabilization ponds and floating aquatic plant systems
- **Wetland systems**, which include free water surface and subsurface flow systems

Case study:

- The wastewater treatment system for individual household building in Ahmedabad city is based on fixed film biofilter technology (FFBT). The system treats domestic wastewater (both black and grey) and locally reuses treated water for meeting its horticultural water requirements – setting a good example of sustainable decentralised water management practice in unsewered residential area and demonstrating resource value of wastewater.

- **Location and water–wastewater scenario**
  - The DWWT project is implemented in an individual household building located in Ahmedabad City, Gujarat. The present source of water supply to city is mainly from river Narmada. The average water supply in the city is around 106 lpcd. The city generates 50 MLD sewage but 55 per cent untreated sewage is disposed in the nallah. Several areas in the city are still to be connected to sewer network. The local body has a deficit of `10 million in water account and the city has very limited . Keeping in mind the potential of local reuse a DWWT system was designed .The project is good example of treatment of wastewater generated from individual household building demonstrating a potential of local reuse for meeting horticultural water requirements.

F-14.1.5-A-Location of house

- **Technical specificatio**
  - The details of FFBT ocess, details of O&M, system performance (physic tewater) and the benefits have been discussed in fo

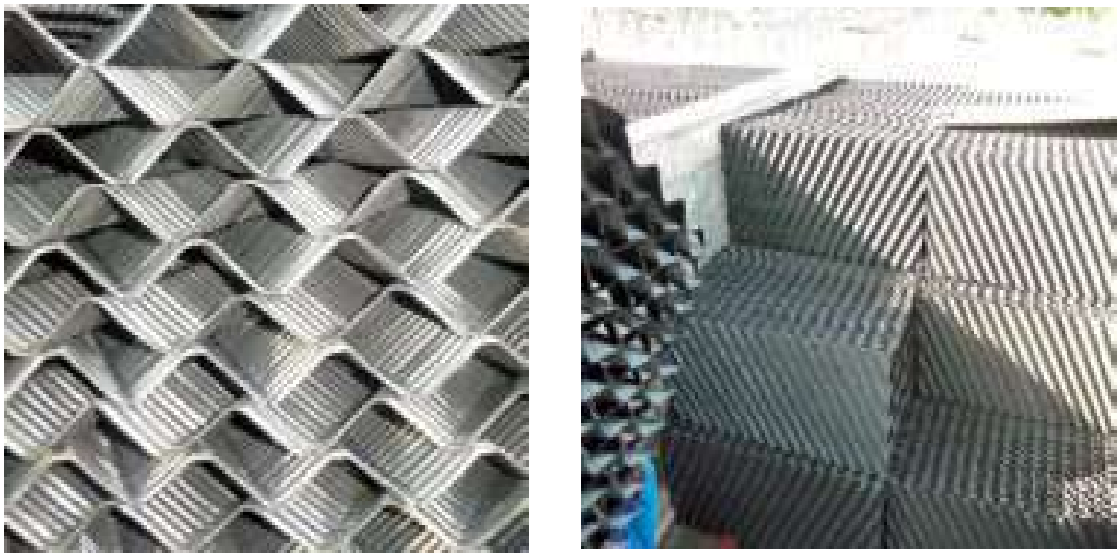
- **Fixed film biofilter technology (FFBT)**
  - FFBT is a decentralised wastewater treatment technology. In 2004, Pollution Control Board made wastewater treatment systems mandatory for schools, hotels, institutions and individual house owners to dispose their waste in a proper manner and suggested FFBT as preference. The technology is becoming popular among the individual house owners and residential colonies since it is environment friendly and economical compared to septic tanks and soak pits. The technology aims at bio-degradation of the wastewater contaminants by providing sufficient surface area required for the growth of micro-organisms (microbial culture) for optimumtime duration. This retention time ensures maximum microbial growth. The culture consumes the contaminants from the wastewater and breaks them down as part of their food cycle.

Parameters	Details of DWWT System
Year of implementation	2010
Technology detail	FFBT
Type of building	Individual residential household (4 persons)
FFBT Plant capacity	1 KLD
FFBT Plant area	2.8 sq.m
Wastewater reused (180 days)	90 Kilo litre per annum (500 liters per day)
Green area irrigated	240 sq.m
Capital cost of system (2010)	`35000
O&M costs (per annum)	`800-1000
Savings (per annum)	`10000

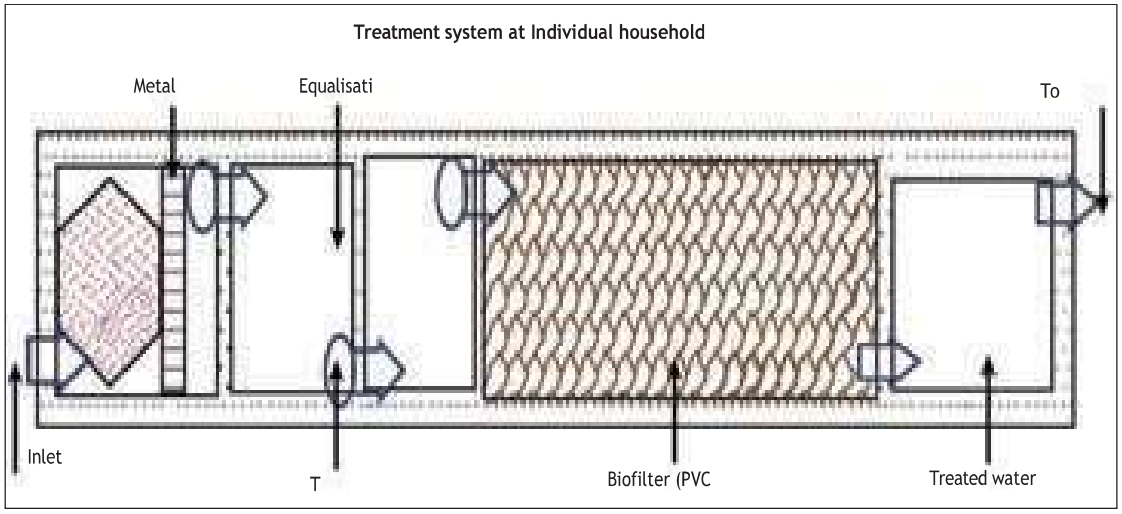
T-14.1.5-A- Details of DWWT System

  - The microbial on and treatability studies of the respective sites. ite is monitored at regular intervals to check the var / (flow). Whereas in the treatability study, the spec epending on the characteristic of wastewater, con ents that is required .
  - The microbial culture contains naturally occurring carbon degrading organisms, lipolytic organisms (helps in degradation of oil and grease), proteolytic organisms (helps in the degradation of protein), nitrogen fixing, nitrifying and ammonifying organisms (for maintaining C/N ratio for effective degradation) along with phosphorus solubilising microorganisms (helps in converting phosphates into available form for better degradation) and actinomycetes (helps in the degradation of more complex organic matter) .

- **Salient features of FFBT**
  - No smell / odour or nuisance
  - Land area requirement ranges from 2-3 sq.m per KLD
  - No skilled labour requirement for O&M
  - Natural processes based wastewater treatment uses cultured microorganisms .



F-14.1.5-B-PVC media support made up of plastic



F-14.1.5-C-Schematic diagram showing the treatment process of FFBT

- **Treatment system, design and construction**
  - The wastewater is treated in three stages - preliminary treatment, primary treatment and secondary treatment as follows:
  - Preliminary treatment includes screening for which bar screens are provided, while primary treatment includes grit chamber/settler/septic tanks depending on the type of wastewater. This is followed by an equalisation tank which helps in equalising the flow of the wastewater before it enters the bio filter chamber. The water level is maintained 2 to 3 inches below the level of the biofilter. Secondary treatment is provided by the fixed biofilter. Microorganisms find surface area for their growth on the fixed film wherein the maximum treatment occurs. The treated water is collected in a tank for usage thereafter it can be reused.

F-14.1.5-D-Underground FFBT based wastewater treatment system

F-14.1.5-E-Piping and equalization tanks

S.No	Parameter	Inlet	Outlet	CPCB standard
1.	pH	8.32	7.20	6.5 - 8.5
2.	COD (mg/l)	580	40	<250
3.	BOD (mg/l)	260	4	<30
4.	Total Solids (mg/l)	1,130	680	
5	TDS (mg/l)	800	668	<2100
6	TSS (mg/l)	330	12	<30
7	Chlorides (mg/l)	60	60	<600
8	Sulphates (mg/l)	22	20	<1000
9	Oil & Grease (mg/l)	Nil	Nil	

T-14.1.5-B-Treatment efficiency of FFBT

- Pipes are laid from the source of generation to the treatment unit. The inlet and outlet pipes are placed diagonally opposite to each other in each chamber to avoid short-circuiting and backflow. Outlet pipe of each chamber is placed at a lower level of the inlet pipe. A swivel pipe is required to maintain the level of wastewater flow through the system.32,33 A sump is required to be placed at the treated water outlet tank to pump out water for usage (see Diagram 6: Schematic diagram showing the treatment process of FFBT).

- **System performance including O&M**
  - The O&M of a FFBT based treatment system is simple. To maintain good performance of the system, oil and grease layer should be skimmed regularly if a grease trap is present. The system also requires removal of settled grit and sludge and cleaning of the PVC filter every 1-3 years.

- **Socio-economic and environmental benefits**
  - The treatment of wastewater at source of generation and local availability of treated water for appropriate non-potable use at individual household building scale has not only resulted socio-economic benefits to the building owner but also provides environmental benefits.

- In economic terms the availability of 90 KL of treated water per annum for meeting horticultural water requirement has resulted estimated `9000-10000 per year savings to the building owner that would otherwise be required to water supply from private tankers.

- **Cost Calculation**
  - **Land requirement**
    - Depending on the total volume, total area of the land required to install different units of DWWT can be calculated. This is influenced by the nature of wastewater and depth of the unit tanks.
    - Settler 0.5 m2/m3 daily flow
    - Anaerobic baffled reactor : 1 m2/m3 daily flow
    - Constructed wetland: 30 m2/m3 daily flow
    - Anaerobic ponds: 4 m2/m3 daily flow
    - Facultative aerobic ponds:25 m2/m3 daily flow.
  - **Installation**
    - This includes activities like excavation, plastering, brick work, plumbing , flooring etc along with the cost of construction material. The different items which are required for construction are walls of solid cement blocks with outside and inside plastering for water tightness, PCC base, PVC pipes , baffle walls, gravel filter media, RCC slab, perforated slabs, vent pipes and plants/reeds like cana, cattails, bulrushes etc. The cost component pertaining to the construction and installation varies from cities to cities. Typically , for installation of a plant of 8-10 KLD capacity would cost around Rs. 2.5-3 lakhs.
  - **Operation & maintenance**
    - Decentralised wastewater treatment systems are low cost on site treatment approach but continuous operation and maintenance is necessary for the sustainability and to maintain the desirable performance of the plant. The annual operation and maintenance cost for the plant is generally in the range of Rs. 3000-5000. Regular de-sludging of the settler and baffled reactor is required in the span of 1-3 years in order to meet the effluent standards. Replacement of filter media is also necessary when treatment efficiency goes down. The normal period of cleaning the gravel filter media is in the interval of 8 – 10 years.
  - **Cost summary of DWWT components for 1 KLD plant is :**

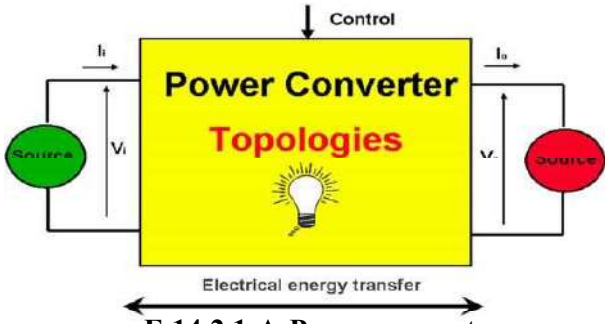
Components	Surface area requirement (sqm/KL)	Capacity (Cum/KL)	% of Total cost(approx)
Settler		1	10
Reactor	1	1.73 (inner); 3 (outer)	40
Planted filter	5	4	30
Storage sump	-	1	10
Polishing Pond	1	0.88	5
Misc			5

T-14.1.5-B- Cost summary of DWWT components

14.2 Electrical Engineering

14.2.1 Design of Power Electronics converter

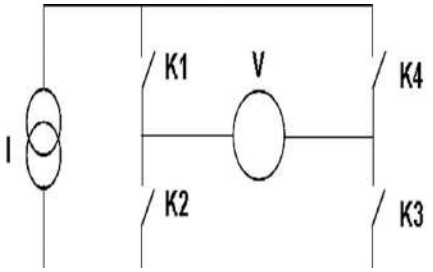
- The task of a power converter is to process and control the flow of electric energy by supplying voltages and currents in a form that is optimally suited for the user loads.
- Energy was initially converted in electromechanical converters (mostly rotating machines). Today, with the development and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



F-14.2.1-A-Power converter

- **Direct link topology converters**

- A direct converter is an electrical network composed of switches only and is unable to store energy. In such a converter, the energy is directly transferred from the input to the
- output (assuming the losses can be neglected); the input power is equal to the output power at any time.



F-14.2.1-B- Basic configuration of voltage–current direct converter

- **Indirect converters**

- It is not possible to directly interconnect two sources of the same nature with switches. It i necessary to add components to generate a intermediate buffer stage of a different typ without active energy consumption (capacitor c inductance). This buffer stage is a voltage sourc (capacitor) if the energy transfer is between two current sources, and it is a current source .

- **Power converter classification**

- The crossed cells correspond to reversibility incompatibilities between the input and output sources.
- Two symmetric cells, with respect to the diagonal D, represent two reversible topologies.
- Two topologies corresponding to two cells symmetric with respect to the point O are dual.

- **Synthesis of power converters**

- **Synthesis method**

- A general and systematic method to design power converter topologies goes as follows:
- determine the nature of input and output sources. Next choose the basic structure;
- from the specifications, define the voltage and current reversibilities of the input and output sources corresponding to one configuration of the general table.
- from the basic structure, identify the different phases of operation according to the reversibilities and to the energy transfer control. If necessary, simplify the configuration (shortcircuit or open switches).

14.2.2 Electronic Soft Starter for 1/3 Phase Induction Motor for Agriculture

- **INTRODUCTION**

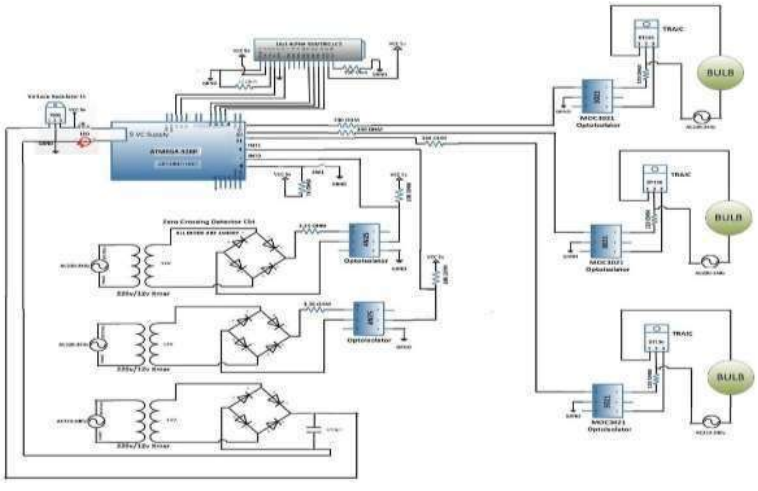
➢ The ac motor starters are increasingly becoming popular due to its controlled soft-starting capability. The ac motor starter provides limited starting current and hence conventional electromagnetic line starters and reduced voltage starters are replaced with ac motor starters. Thyristor -based soft starters have many desirable properties and provide a viable solution to starting problems in three phase induction motors. These power semiconductor based starters are cheap, simple, and reliable and occupies less volume.

- **OPERATING PRINCIPLE OF SOFT STARTER**

➢ A soft starter provides reduced voltage to stator windings of three phase induction motor by controlling the acceleration of an electric motor. A three phase induction motor is a self-starting motor and electromagnetic torque is produced due to an interaction between revolving magnetic field around rotor and rotor current. Initially during starting, a rated voltage is applied which causes high current to flow through stator windings. Now this high current is greater than the rated current which can cause heating of the stator windings and eventually damaging the insulation applied on stator windings.

➢ A soft starter provides reduced voltage and hence reduced torque on electric motor. A soft starter comprises of solid state devices like thyristors. The supply voltage to the motor is controlled by power semiconductor devices like thyristors. In a three phase induction motor, the torque is proportional to the square of the starting current which in turn, is proportional to the applied voltage. The starter works on the principle described above. Therefore, the torque and the current can be controlled by applying the reduced voltage at the time of starting of an electric motor.

- **CIRCUIT DIAGRAM**

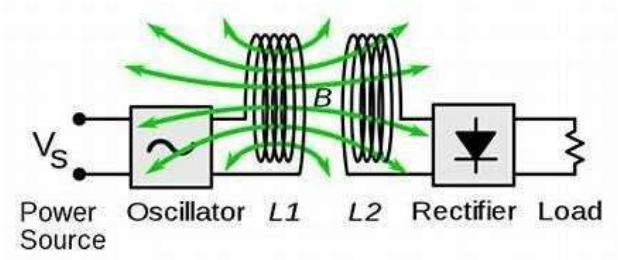


➢ The circuit diagram of soft-starting of three phase IM is shown in Fig.1. The circuit diagram comprises of voltage regulator, zero crossing detector, bridge rectifier, 4N25 opt-Isolator, Atmega 328P microcontroller and TRIAC circuit. TRIAC circuit performs the role of soft starter in each phase of three phase induction motor. TRIAC circuit basically consists of two antiparallel SCRs connected back to back. This soft starter is used to give soft starring to Induction motor.

➢ A 12 V DC regulated supply is obtained with the help of step-down transformer and bridge circuit. The step down transformer converts 230V to 12V ac supply and then it is fed to bridge circuit. The bridge circuit in turn converts ac supply to dc supply. This dc supply is given to regulator IC to get positive 12V dc regulated supply. The main part of the circuit is zero crossing detector circuit which is made up of four diodes connected to form bridge rectifier circuit and output of bridge rectifier is fed to 4N25 optoIsolator.

14.2.3 Advanced Wireless Power Transfer System

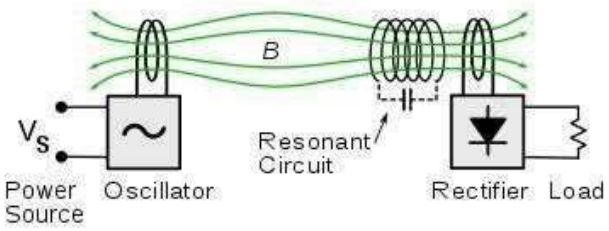
- **WIRELESS POWER TRANSFER METHOD**
- **INDUCTIVE COUPLING**



F-14.2.3-A-inductive coupling

➢ 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 upto few cm and separation distance is very less than the coil diameter.

- **MAGNETIC RESONANCE COUPLING WPT**



F-14.2.3-B-Magnetic resonance

➢ This is also one of the important method for transferring power based on near field technique. It generally overcome nonresonant inductive coupling. This type of coupling used the concept of resonance. At resonance we know that natural frequency and excitation frequency are same. This leads to the maximum amplitude, that means a maximum amount of energy is transferred between two coils. Here the receiver and transmitter coils are tuned to be at same resonant frequency .This allow us to transfer significant amount of power by increasing distance between coils [7]. These type of system are used for building mid range power transfer. Mid range can be specified by distance upto 10 times the diameter of the transmitting coil. Magnetic resonance coupling have several advantage such as efficiency increases with decrease in the radiation and power loss and range can be increase upto some meter and it is directional. The mainly disadvantage is that selection of resonance frequency which tunes with the natural frequency and it cannot be used for long range application.

- **MICROWAVE WPT**

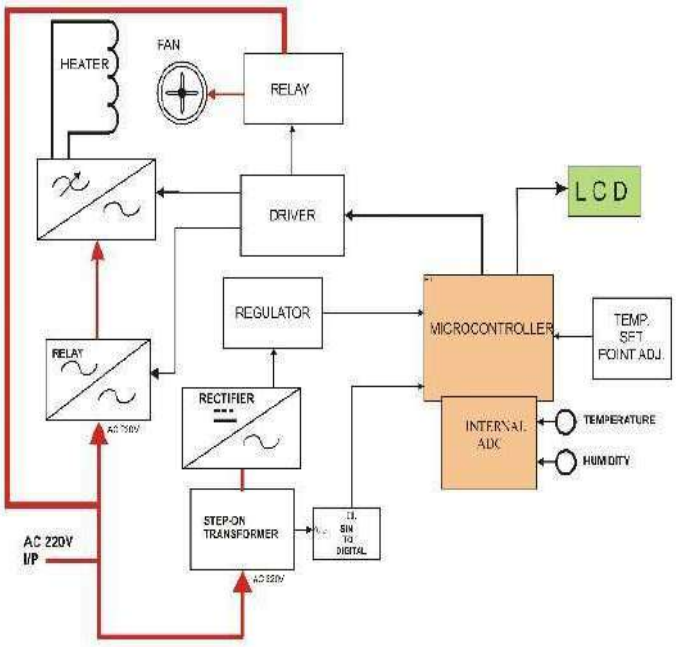
➢ This is one of the type of far-field technique of WPT which have range upto KM, with power transfer upto MW. This method uses microwave frequency ranging from 1GHZ to 1000GHZ generated from the microwave generator. First the microwave is generated by microwave generator which pass through the coax-waveguide adapter to the waveguide circulator .Then a tuner and directional coupler are used to separate wave according to their propagation direction.

14.2.4 Industrial Temperature Controller

- The concept of this is to create an automatic temperature control system to control the temperature of a system. This circuit maintains the temperature of the system in a particular range. Automatic control plays an everincreasing role in human way of life. The problem of the precise control of temperature of liquid flowing through a tank containing heater is one which is important and familiar in the process-control industry. In rainy season, the most common problem is drying the clothes. Due to humidity it takes a long time for drying. During winter season, room temperature must be maintained in order to ensure the human convenience. This project mainly includes the temperature control of heater, temperature control of surrounding in winter, voltage control i.e. it works as stabilizer & also as dryer in rainy seasons.It consists of Temperature sensing unit, LCD module, switching device, driver, a fan and heater. It will operate based on the value or range of Temperature in the system which is detected by Temperature of the sensor.

- **PRINCIPLE**

- This mainly includes a closed loop system in which the feedback element is the actual temperature of the heater that is to be monitored. On basis of this feedback, the temperature of the heater can be easily maintained within the required range. The basic of this project is to replace manual settings of fan in accordance with temperature so that it detects temperature variation automatically and control its speed. The application dictates that temperature settings are usually kept constant for long periods of time .



F-14.2.4-A-Block Diagram

- **CONSTRUCTION**

- **Power supply:-**

- The single phase ac voltage, typically 230V i ps that ac voltage down to 12v. A diode rectifier the ge that is initially filtered by a simple capacitor filter t

- A regulator circuit removes the ripples and a the input dc voltage varies. This voltage regulation is usually obtained using one of the popular voltage or IC 7805.The same 230 v supply is given to heater.

- **Zero crossing detector:-**

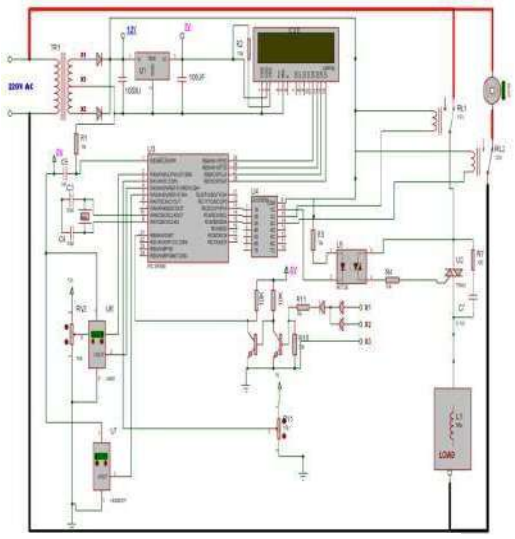
- A zero crossing detector is a one type of voltage comparator, used to detect a sine waveform transition from positive and negative, that coincides when the i/p crosses the zero voltage condition. In alternating current, the zero-crossing is the instantaneous point at which there is no voltage present. In a sine wave or other simple waveform, this normally occurs twice during each cycle. It is used to create firing pulse to the TRIAC for positive and negative cycle.

- **The Full Wave Rectifier(Center tap):-**

➢ (12VAC to 12VDC) A Full Wave Rectifier is a circuit, which converts an ac voltage into a pulsating dc voltage using both half 12V cycles of the applied ac voltage. It uses two diodes of which one conducts during one half cycle while the other conducts during the other half cycle of the applied.

- **Voltage Regulator(IC 7805):-**

➢ (12VDC to 5VDC) The voltage regulator is designed to automatically maintain a constant voltage level, where they stabilize the DC voltages used by the processor and other elements.



F-14.2.4-B-Circuit Diagram

- **DRIVER:-**

➢ A Microcontroller digital logic output pin supplies 10mA of current. External devices such a mA and they need more voltages. In order to control s ıt, a transistor-based driver circuit is used to amplify cı age and current levels are in perfect range, the transisto lled by the lower current digital logic signal.

- **LCD :-**

➢ LCD (Liquid Crystal Display16*2) screen is an electronic display module and find a wide range of applications. In this project it is used to show temperature and humidity.

- **Thyristor/TRIAC:-**

➢ These are Static devices used to perform switching action . Here it is used to control voltage across heater (resistive coil) by applying firing pulse. Firing pulse is generate by micro-controller for particular voltage.

- **Relay:-**

➢ Relay is a switching device used to perform switching action. The relay before fan is used switching of fan .The relay before the Resistive coil(Heater) is use for protection of circuit from high and low voltages.

- **Potential Transformer:-**

➢ It is used to measure voltage towards Heater. If the voltage across heater is greater than the rated voltage then controller switch the relay and does not allow that voltage send to further circuit. Same action will takes place for low voltage instant.

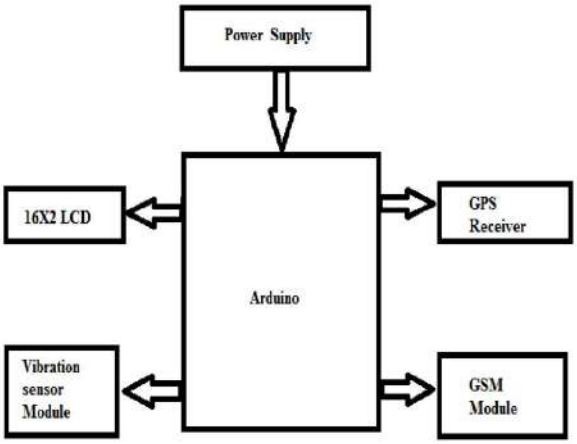
14.2.5 Accident Alerts in Modern Traffic Signal Control System -Camera Surveillance System

- In our daily life we are facing a lot of problems; main thing is traffic congestion which becomes more serious day after day. It is said that high tome of vehicles, the scanty infrastructure and the irrational distribution of the development are the main reasons for augmented traffic jam. The major cause leading to traffic jam is the large number of vehicles which is caused by the most population and the development of economy. India is the second most populous country in the world and is a fast growing economy. It is seeing terrible road congestion problems in its cities. Infrastructure growth is slow as compared to the growth in number of vehicles, due to space and cost constraints. Also, Indian traffic is non-lane based and Chaotic.

❖ **WORKING MODULE**

- **ARDUINO:**

- The Arduino UNO is a widely used open-source microcontroller board based on the ATmega328P microcontroller and developed by Arduino.cc. The arduino is the major control unit to detect or alert when an accident occurs. It collects the data from vibration sensor, GPRS and GSM modules and reflects the output either in display system or through a message. Here vibration sensor plays a major role. This vibration sensor will receive the vibrations of the vehicle which in turn acts as a accident detection module. Arduino gathers the information from all other modules and sends the message to the receiver though GSM module.



F-14.2.5-A-Block diagram of accident detection and alert system

- **GSM MODULE:**

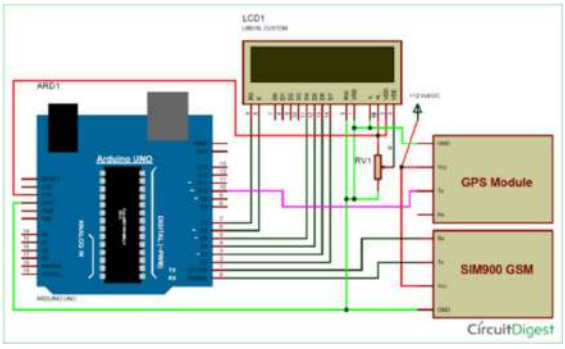
- For providing communication between the GPS, GSM and the allocated mobile number GSM SIM900 module is preferred. The name SIM900 says that, it is a tri band work ranging a frequency of 900MHz to 1900 MHz such as EGSM900 MHz, PCS 1900 MHz and DSC 100 MHz Receiving pin of GSM module and transmitting pin of GPS module are used for communication between the modules and the mobile phone.

- **GPS MODULE:**

- To find the location on the earth the whole is divided into some coordinates where the location can be easily captured by a module called GPS module. Here the GPS used is SIM28ML. This GPS module will find the location of the vehicle and the information fetched by the GPS receiver is received through the coordinates and the received data is first send to arduino and the information is transmitted to the saved contact through GSM module. The frequency is operated in the range of 1575.42 MHz and the output of GPS module is in NMEA format which includes data like location in real time.

- **LCD MODULE:**

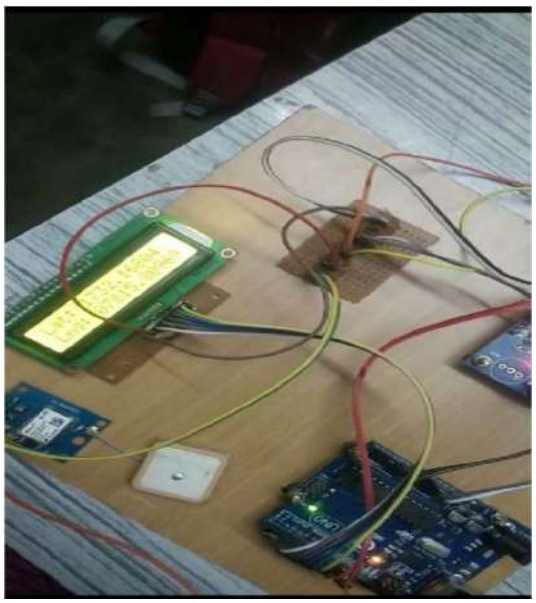
➢ To display the numbers, alphabets and special characters an LCD module with 16x2 alphanumeric types is used. Using the higher bit data lines of LCD pins such as pin 11,12,13 and 14 are interfaced to digital pins of Arduino such as pin 8,9,10 in 4 bit mode as shown in the below figure. RS and E pins of LCD are connected to pin 12 and 13. To perform the write operation on LCD the read/write pin is connected to ground.



F-14.2.5-B- Working module of accident detection and alert system

➢ The controller used in this project is Arduino which is used for controlling all the modules in the circuit. The two major parts other than controller is GPS module which is used as a receiver and other module is GSM. To receive the coordinates of the vehicle GPS module is used and GSM will send the received coordinates to the user through SMS. There is an additional LCD which is used for displaying status message or coordinates. When a person is driving the vehicle met with an accident then the vibrations of the vehicle is received by the vibration sensor and the sensor acts as a accident detection module which further send the information to the micro controller and the location of the vehicle is received through GPS module and the coordinates of the vehicle is send to the GSM module. The received information is send to arduino uno. The received coordinate's information is collected and is send to the respected person through SMS.

➢ Whenever accident of vehicle is occurred then the device sends messages to given mobile number.



F-14.2.5-C- Interfacing controller with LCD

F-14.2.5-D-Interfacing controller with all other modules

- The proposed system deals with the accident alerting and detection. Arduino is the heart of the system which helps in transferring the message to different devices in the system. Vibration sensor will be activated when the accident occurs and the information is transferred to the registered number through GSM module. Using GPS the location can be sent through tracking system to cover the geographical coordinates over the area. The accident can be detected by a vibration sensor which is used as major module in the system.

❖ **Cost Analysis :**

No.	Item	Cost(Rs.)
1	ARDUINO	2999/-
2	LCD MODULE	150/-
3	GSM MODULE	1599/-
4	GPS MODULE	1200/-
5	FIRE SENSOR	749/-
6	SMOKE SENSOR	149/-
7	MOTION SENSOR	99/-
8	PROXIMITY SENSOR	199/-
9	IR SENSOR	139/-
	TOTAL COST	**7283/-**

Chapter:15

Smart and/or Sustainable features of Chapter 8 & 13 designs, Impact on society. (For Allocated village development, villagers happiness, comfortable and for enhancement of the village)

Sr. No	Design name	Period	Amount Expenditure	Benefit
1	Public Toilet	Immediately	2,30,000	It will maintain health and hygiene of village.
2	Public Garden	Immediately	14,125	It will provide space for kids to play and socialize.
3	Water Tank	6 Months	54,50,000	It will increase the supply of water to the village.
3	Lake Development	8-9 months	11,24,081	It will improve Aesthetics of village.
4	Market	Long Term (3-5 years)	3,86,623	It will provide platform to farmers to sell their products.
5	Solid waste management system	2 year	26,80,810	It will provide health and hygiene to the villagers.
6	Skill development centre	1.5 year	17,26,343	It will provide necessary skills to the youth of village to get job.
7	Cyber cafe	1 year	1,94,142	It will provide fast internet service and computers.
8	Rain water harvesting system	6 months	10,106	It will provide alternate source of water .
9	Low cost grain storage structure	3 months	7,252	It will reduce the waste of seeds and save money of farmers by providing storage.

❖ **Market**

➢ It will provide platform to farmers to sell their products. It will increase income of farmers. It will generate revenue for village.

❖ **Solid waste management system**

➢ It is very important to provide solid waste management system in Davad village.As the system is not available currently , villagers throw waste in open land which can cause harmful disease. It will provide healthy environment and hygiene to the villagers.

❖ **Public Toilet**

➢ It is very important to provide sanitation facilities to villagers and visitors. To maintain health and hygiene of village. To promote social inclusion and equality. To issue privacy and basic human decency. According to new governmental policy there should be public toilet in village. Public toilet may be funded by Swachh Bharat Mission of National Govt.

❖ **Skill Development Centre**

➢ Skill development centre is necessary to provide in village. It will provide necessary skill to the youth of village and it will make them job ready .

❖ **Lake development**

➢ Lake is situated at the entry of village. Due to throwing waste by villagers, it is prone to cause water bourn diseases to villagers as well as mosquitoes which are very dangerous. So due to development, aesthetic view of village will improve.

❖ **Public Garden**

➢ There is no public garden available in village. Public garden will help to improve air and soil quality , Increase biodiversity of plants and animals Reduce “food miles” that are required to transport nutritious food , Can replace impervious structures and improve water infiltration , Can reduce neighbour hood waste through composting , Positively impact the urban micro-climate .

❖ **Low cost grain structure**

➢ It will provide low cost storage structure for financially not capable farmers to store the grain and seed. It will provide protection against moisture , rain to the grain . Also it will save farmer’s money.

❖ **Rain water harvesting system**

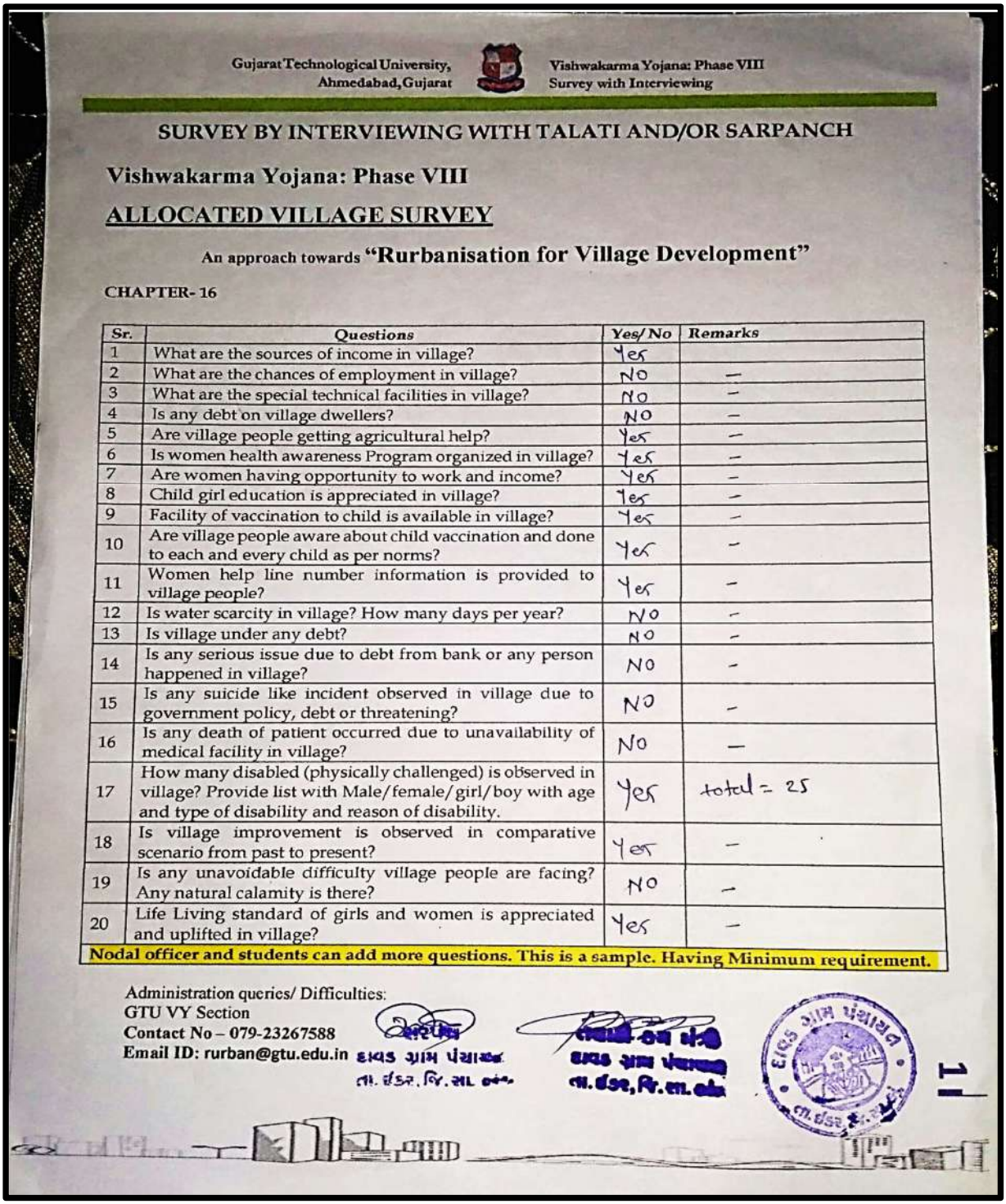
➢ It will store the water running off from surface of home. It will also provide alternate source of water supply to the household. Water from the rain water harvesting system can be used for drinking , irrigation , cooking etc.

❖ **Water tank**

➢ Another water tank will increase the supply of water to the village . It will also increase water supply for irrigation purposes. Now high quantity of water can be stored.

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	
2	What are the chances of employment in village?	NO	–
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	–
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	–
9	Facility of vaccination to child is available in village?	Yes	–
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes	–
11	Women help line number information is provided to village people?	Yes	–
12	Is water scarcity in village? How many days per year?	NO	–
13	Is village under any debt?	NO	–
14	Is any serious issue due to debt from bank or any person happened in village?	NO	–
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	NO	–
16	Is any death of patient occurred due to unavailability of medical facility in village?	NO	–
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.	Yes	total = 25
18	Is village improvement is observed in comparative scenario from past to present?	Yes	–
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	NO	–
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes	–

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

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

દાવડ ગ્રામ પંચાયત
તા. ઈડર, જિ. સા.કાં.

દાવડ ગ્રામ પંચાયત
તા. ઈડર, જિ. સા.કાં.

દાવડ ગ્રામ પંચાયત
તા. ઈડર

11

Chapter:17

Irrigation / Agriculture Activites And Agro Industry, Altenate Technics And solution

- Main agriculture activities includes the purchasing and planting of seeds on a cash crop farm, the purchasing of quality breeding stock on an animal husbandry farm, or the diet and care of a specific type of livestock on an animal production farm .
- Dairy farm and farmers uses the special technique for detection of animal health related diseases and it require the continuous or daily to daily base observation which again require the excessive labor if we consider the dairy farm cattle's health monitoring. sometime such technique gives the wrong result which was different from the actual health status of cattle's. This can cause the harmful effect on the cattle health.
- so as alternate solution we proposed automatic health monitoring system which keep the record health parameter fast and accurate so that proper treatment use.
- It is given in **13.1.7** section of report .
- For a long time, farmers used to figure the ripeness of soil in recent days and affected presumptions to establish which form of food. They didn't care about the weather, water level, and climate conditions in particular, which were more terrible for an agriculturalist. Given a few doubts, they use pesticides that contribute to a genuine effect on the yield if the inference is not right. Profitability relies on the last step of the crop that farmers rely on.
- As a solution we provided smart agriculture monitoring system which is in section 13.1.9 of this document.
- Food grains are required to be stored for human food, for animal feed, for seed and for sale or barter.production. Grains produced in the country is stored at farmers, traders, government semi-government and cooperative levels in various types of storage structures. A survey of the existing farm storage structures reveals that the grain losses take place due to lack of utilization of scientific methods of storage and improved storage structures. Improved storage structures are the most important factor in preservation of damage free grains. It prevent stored grain from spoiling, preserves seed grain viability, reduces running cost of storage, permits effective pest control practices and facilitates convenient and economical grain loading and unloading operations. Farmers of the village can store grains usually in bulk in different types of storage structures constructed from locally available raw materials.
- So as a solution , we designed a low cost grain storage structure which is in section 13.1.6.

Chapter:18

Social Activities – Any Activates Planned By Students e.g Teaching Learning activities, awareness camp, business idea for SELF HELP GROUP OR ANY OTHER

- **Due to the situation of COVID-19 virus, we were not given any permission from village authorities to do any type of activity.**

Chapter:19

DAVAD VILLAGE SAGY Questionnaire Survey form with the Sarpanch Signature

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Davad Gram Panchayat: Davad Ward No. 3

Block: Idar District: Sabarkantha

State: Gujarat L S Constituency: Sabarkantha Parliumentary Constituency

1. Family Identity and Size

Name of Head of Household	Patel Girishkumar dahyalal.							Male/ ~~Female~~	male
SECC Survey ID:	-	Family Size	5	Over 18	3	6 to 18	2	Under 6	0

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]	4	Life Insurance	1. All Adults 2. Some Adults ✓ 3. None	AABY	1. ~~Yes~~ 2. No	Kisan Credit Card	Yes / ~~No~~
Poverty Status Year[2]:	1. ~~BPL~~ 2. ✓ APL	Health Insurance	1. All Adults 2. Some Adults ✓ 3. None	RSBY	1. ~~Yes~~ 2. No	MGNREGS Job Card Number	-
PDS (If NFSA is not implemented)	Annapurna	Antyodaya	BPL	APL ✓	Is any woman in the family member of an SHG? ~~Yes~~ / No		
PDS (If NFSA is implemented)	Annapurna	Antyodaya	Priority	Other			

2. Adults (above 18 years)

Name	Age	Sex M/F / O	Disability Status Y/N	Marital Status[3]	Education Status[4]	Adhaar Card (Y/ N)	Bank A/C (Y/N)	Social Security Pension[5]
Patel Girishkumar dahyalal	54	M	N	2	05	Y	Y	0
Patel Kapilaben Girishbhai	51	F	N	2	05	Y	Y	0
Patel Jigiben Girishbhai	21	F	N	1	08	Y	N	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
Patel Smitkumar Girishbhai	16	M	N	NO	04	Y	9th	N
Patel Tirthkumar Girishbhai	11	M	N	NO	03	Y	6th	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
—	—	-	-	—	—	—	—	-

[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: 3
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: NO ~~Yes~~ / No	Kitchen Garden : NO ~~Yes~~ / No
Compost Pit: None ~~Individual~~/ ~~Group~~/ None	Biogas Plant: None ~~Individual~~/ ~~Group~~/ None

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

Source of Water		Distance
Piped Water at Home	Yes / ~~No~~	at home
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	9	2. Cultivable Area	9
3. Irrigated Area	9	4. Uncultivable Area	0

13. Principal Occupations in the Household

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

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

15. Agriculture Inputs

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

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

Name	Unit	Quantity
Cotton	kg	3000
Castor been	kg	4500
Tobacco	kg	1200

17. Livestock Numbers

Cows: 1	Bullocks: 0	Calves: 0
Female Buffalo: 2	Male Buffalo: 0	Buffalo Calves: 2
Goats/ Sheep: 0	Poultry/ Ducks: 0	Pigs: 0
Any other: Type –		No. –
Shelter for Livestock: ~~Pucca~~ / Kutcha / ~~None~~		
Average Daily Production of Milk(Litres): 14		

18. What games do Children Play
Cricket
badminton

19. Do children play musical instrument (mention)
–

Schedule Filled By: Student
Principal Respondent:
Date of Survey: 15-06-21

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: Davad

b. Block: Idar

c. District: Sabarkantha

d. State: Gujrat

e. Lok Sabha Constituency: Sabarkantha Parliamentary Constituency.

f. Number of Wards in the Gram Panchayat: 10

g. Number of Villages in the Gram Panchayat: 1 (Davad)

h. Names of Villages: Davad

Demographic Information

Number of Households 777 Total Population 3559 Male 1856 Female 1703

SC ~~HHs~~ 434 ST ~~HHs~~ 20 OBC HHs 144 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	NO	Idar-25kms
b.	Nearest Primary Health Centre (PHC)	Yes	
c.	Nearest Community Health Centre (CHC)	Yes	
d.	Nearest Post Office	Yes	
e.	Nearest Bank Branch (Any)	Yes	
f.	Nearest Bank with CBS Facility	NO	Idar-25kms
g.	Nearest ATM	Yes	
h.	Nearest Primary School	Yes	
i.	Nearest Middle School	Yes	
j.	Nearest Secondary School	Yes	
k.	Nearest Higher Secondary School / +2 College	Yes	
l.	Nearest Graduate College	NO	Idar-25kms
m	Nearest ITI / Polytechnic Centre	NO	Idar-25kms
n	Kisan Seva Kendra	NO	Idar-25kms

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	Yes	
p	Nearest Agro Service Centre	NO	Idar-25kms
p	MSP based Government Procurement Centre	NO	
q	Milk Cooperative /Collection Centre	Yes	
r	Veterinary Care Centre	Yes	
s	Ayurveda Centre	NO	Idar-25kms
t	E – Seva Kendra	NO	Idar-25kms
u	Bus Stop	Yes	
v	Railway Station	NO	Hmt-25kms
w	Library	NO	Idar-25kms
x	Common Service Centre	NO	Idar-25kms

IV. Sports Facilities in the Gram Panchayat

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

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 4

b. Number of villages without Angan Wadi Centres –

Names of such villages: –

c. Schools (Number)

Primary Private: 1 Primary Govt.: 2

Middle Private: 1 Middle Govt.: 2

Secondary Private: 1 Secondary Govt.: 1

Higher Secondary Private: 1 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)			4			✓	
b.	Kerosene			4			✓	
c.	Other (mention)			4			✓	

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	Davad	
b.	Hand Pump Coverage in Villages:	Covered Yes- 1 nos / Not Covered	Davad	
c.	Coverage under Covered Drains:	Covered Yes / Not Covered	40% Village Covereded (Davad)	
d.	Coverage under Open Drains:	Covered / Not Covered	—	
e.	Villages with Household Electricity Connection (Numbers)	Connected Yes / Not Connected	724 houses Connected (Davad)	

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	2920.78	d.	Pasture / Grazing Land	266.52	g.	Check Dam	—
b.	Irrigated Land	2310.44	e.	Forests/ Plantations	12.35	h.	Wells/Bore Wells	1-2
c.	Un-irrigated Land	—	f.	Other Common Land	—	i	Tanks /~~Ponds~~	2

[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)	70
b)	Number of Households receiving pension (old age, widow, disability)	45
c)	Number of eligible Households who are not receiving pension	25
d)	Number of Households eligible for Ration Card	777
e)	Number of eligible HHs having ration cards	777
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	536
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	536
h)	Number of active Job Card holders under MGNREGA	301
i)	Number of Job Card holders who completed 100 days of work during 2013-14	-
j)	Number of shops selling alcohol	0
k)	Number of BPL families	200
l)	Number of landless households	150
m)	Number of IAY beneficiaries	-
n)	Number of FRA[2] beneficiaries	-
o)	Number of Community Sanitary Complexes	-
p)	Number of Households headed by single women	30
q)	Number of Households headed by physically handicapped persons	23
r)	Total number of Persons with Disability in the village	23
s)	Number of SHGs	-
t)	Number of active SHGs	-
u)	Number of SHG Federations	-
v)	Number of Youth Clubs	-
w)	Number of Bharat Nirman Volunteers	-

Name and Signature of Surveyor and Respondent'

Akeel Subh Khilam Surveyor	ડાવડ ગ્રામ પંચાયત PRI Respondent (Preferably Gram Panchayat Chairperson)	ડાવડ ગ્રામ પંચાયત Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	15-6-21 Date of Survey

[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: Davad

b. Ward Number: total = 10

c. Gram Panchayat: Davad

d. Block: Idar

e. District: Sabarkantha

f. State: Gujrat

g. Lok Sabha Constituency: Sabarkanth Parliamentary Constituency.

h. Number of Habitations / Hamlets in the Gram Panchayat: Hltr = 777

i. Names of Habitations / Hamlets: -

Demographic Information

Number of Households 777 Total Population 3559 Male 1856 Female 1703

SC ~~HHs~~ 434 ST ~~HHs~~ 20 OBC HHs 144 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	Yes	
b.	Nearest Middle School	Yes	
c.	Nearest Secondary School	Yes	
d.	Kisan Seva Kendra	NO	Idar - 25 kms
e.	Milk Cooperative /Collection Centre	Yes	
g.	Health Sub Centre	Yes	
h.	Bank	Yes	
i.	ATM	Yes	
j.	Bus Stop	Yes	
k.	Railway Station	NO	Himmatnagar-25kms

[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	NO	Idar-25kms
m	Common Service Centre	NO	Idar-25kms
n	Veterinary Care Centre	Yes	

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

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: None *(1-All 2-None 3-Some)*
If 3 mention the name of the habitations not covered: –

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

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)* - None
If 3 mention the name of the habitations not covered: –

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

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

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

vii. Education, ICDS
a. Number of Anganwadi Centres: 4
c. Schools (Number)
Primary Private: 1 Primary Govt.: 2
Middle Private: 1 Middle Govt.: 2
Secondary Private: 1 Secondary Govt.: 1
Higher Secondary Private: 1 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	2920.78	d.	Pasture / Grazing Land	266.52	g.	Check Dam	–
b.	Irrigated Land	230.44	e.	Forests/ Plnatations	12.35	h.	Wells/Bore Wells	1-2
c.	Un-irrigated Land	–	f.	Other Common Land	–	I	Tanks /Ponds	2

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	301
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	200
5	Number of landless households	150
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'

Akeel Subh khilam 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)	15-06-21 Date of Survey

Chapter:20

TDO-DDO-Collector email sending Soft copy attachment in the report

7/9/2021 Gmail - Development scenario of Davad village, Idar , Sabarkantha

Gmail khilan mistry <mistrykhilan@gmail.com>

Development scenario of Davad village, Idar , Sabarkantha
1 message

khilan mistry <mistrykhilan@gmail.com> Fri, Jul 9, 2021 at 11:24 PM
To: tdoidar@gmail.com, collector-sab@gujarat.gov.in, ddo-sab@gujarat.gov.in

Respected Sir/Madam

- **We are the students of Samarth College of Engineering & Technology,Himatnagar,Sabarkantha affiliated to Gujarat Technological University-GTU. GTU has been assigned to Vishwakarma Yojanaa-VY in which students survey various village and design 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 the our project in which we will shortly notify about Davad Village profile of issues for development and our design work for them which is asbelow.**

Village : Davad		Population: 5100(As of Census 2011)
Key Issue	Remark	Design Given
Water Scarcity	Water storage capacity of existing water tank 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.	· Lake Modification · Rain Water Harvesting system · Water tank
Solid Waste Management	Open waste disposal can be seen everywhere in the village.	Waste utilization through composting (due to farming is one the main occupation)
Toilet	Almost 90% have household toilet , under SBA toilet was needed.	· Public Toilet
Recreational Area	Currently Village does not have any recreational place except for one temple near gamtal.	· Garden
Market	Currently , there is no market place available for farmers to sell their goods.	· General market
Skill Development	Village does not have a skill development center which will provide skill to the youth of village to upgrade their skills to current market trends.	· Skill development center
Internet and computer use	Villagers have to travel 4 km far to reach cybercafé to use internet and computer for various purposes.	· Cyber cafe
Wastage of electricity	Due to ineffective administration , village street lights some times remain on during day .	· Automatic solar street light

Sr. No	Design name	Period	Amount Expenditure	Benefit
1	Public Toilet	3 Months	2,30,000	It will maintain health and hygiene of village.
2	Public Garden	6 Months	14,125	It will provide space for kids to play and socialize.
3	Water Tank	6 Months	54,50,000	It will increase the supply of water to the village.
3	Lake Development	8-9 months	11,24,081	It will improve Aesthetics of village.
4	Market	Long Term (3-5 years)	3,86,623	It will provide platform to farmers to sell their products.
5	Solid waste	2 year	26,80,810	It will provide health and

https://mail.google.com/mail/u/0?ik=6521a4b7f8&view=pt&search=all&permthid=thread-a%3Ar7856401127660728430&simpl=msg-a%3Ar785144367... 1/2

	management system			hygiene to the villagers.
6	Skill development centre	1.5 year	17,26,343	It will provide necessary skills to the youth of village to get job.
7	Cyber cafe	1 year	1,94,142	It will provide fast internet service and computers.
8	Rain water harvesting system	6 months	10,106	It will provide alternate source of water .
9	Low cost grain storage structure	1 months	7,252	It will reduce the waste of seeds and save money of farmers by providing storage.

Detailed Project Report Of Delasa Village

Please find here with attached,

Best REGARDS,
Khilan Mistry , Shubh Patel & Akeel Mansuri
U.G.Civil Engineering
Samarth College of Engineering And Technology
EAIL: mistrykhilan@gmail.com
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Chapter:21

Comprehensive report for the entire village

- It is located 22 KM toward North from District head quarters Himmatnagar and70 KM from state capital Gandhinagar. Davad Pin code is 383255. Davad is surrounded by vadali taluka towards North , idar Taluka towards East, Ilol Taluka towards South. Idar, Kheralu, Himmatnagar are nearby cities to Davad. The most of peoples of the village depend on agriculture. Himmatnagar rail way station are the very nearby railway station to Davad.
- We have visited the ideal village Punsari and that visit helped us to know about the type of infrastructure needed by the village. With help of techno-economic survey and gap analysis and also studying / surveying our ideal village Punsari , we were able to broadly define requirements of development for people of Davad village.
- In the Davad village, the basic requirements like public toilet, any recreational area, etc. were not existing. By implanting given design proposals, all the missing amenities can be provided which will stop the migration of rural people towards the urban area which will in turn reduce pressure on cities.
- The amenities designed under this Vishwakarma project phase VIII will be helpful for better development of the village as physically as well as socially, which improves the overall lifestyle of people along with nation with preserving nature bit by bit. 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 labor as a resource.
- Economic profile of Davad is good. Most of peoples income source are farming etc. Most of peoples live in Davad are depend of farming and some peoples have dairy farming also in side of farming.

- Various infrastructure facilities which we observed in Davad village are as below

    - Physical Infrastructure Facilities: Such as, Houses, Communication facilities, Electricity, Drainage Line, Water Lines, Road Network, etc.
    - Social Infrastructure Facilities: Such as, Schools, Community hall etc.
    - Socio-Cultural Infrastructure Facilities: This facilities are not available at village such as, Library, Auditorium, Recreational activities, etc.
    - Sustainable Infrastructure Facilities: This facilities are not available at village such as, Natural Resources (petrol, diesel), Biogas plant, Rain Water harvesting, etc.
    - Repair & Maintenance of Existing building: The Provision shall apply to the Repair, Alteration, and change of occupancy, addition and relocation of existing building and is to be maintained also.

- During an interaction with people of Davad village we understood their problems and issues like:
    - There is a waterlogging problem during rainy season,
    - There is no Public Library available in the village,
    - There is no RCC road in the village,
    - Other than these the villagers have no any issues and they are satisfied with the work of Sarpanch and Talati of Davad village.

- Maintenance is required at a places such as

  - At Some area of village Road network
  - Anganwadi
  - Panchayat building
  - Panchayat building is in bad condition, So It must need maintenance to proper work done for villagers.
  - Road network of some area is not in good condition, So It should need the proper maintenance. It can be increase the easily movement within the village.
  - It is necessary to maintain drainage system of the village, so spreading of epidemic may be reduced.

- There are following structures need to build up to Progress of village and there people:

  - Physical Infrastructure Facilities should needed such as: water tank , drainage system, cybercafe, sanitation facilities, skill centre etc.
  - Social Infrastructure Facilities should needed such as: General market etc.
  - Socio-Cultural Infrastructure Facilities should needed such as: Govt. grocery shop, Public Library, Auditorium, Recreational activities, public garden etc.
  - Sustainable Infrastructure Facilities should needed such as: Solar street lights , Biogas plant, Rain Water Harvesting, etc.
  - Also solid waste management system is must require in village as villagers tend to throw waste in open land which can cause diseases.
  - A lake development will improve aesthetics of village.
  - IOT based smart irrigation system will help farmers efficiently.