DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION
PINDHARADA - Village
GANDHINAGAR - District

PREPARED BY

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YEAR:2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda,Ahmedabad– 382424 Gujarat

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ON

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Year: 2020-21

Gujarat Technological University,
Chandkheda,Ahmedabad– 382424 Gujarat

CERTIFICATE

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

Success fully submitted

Detail Project Report for
VILLAGE– PINDHARADA
DISTRICT- GHANDHINAGAR
Under

Vishwakarma Yojana: Phase-VIII

Impartial fulfillment of the project offered by

GUJARAT TECHNOLOGICAL UNIVERSITY, CHANDKHEDA
During the academic year2020-21.

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

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
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ABSTRACT

Vishwakarma yojana is best platform for final year student. Here we improving practical knowledge. Our team vision is to improving condition of village at best mode. E.g.established school, hospitals, post office, camera security, transportation facility, medical shop, electric power continuity, roads, and streetlight. Etc…, work on irrigation for farming purpose, sanitization availability in village, animal husbandry, fathering, cold storage for farmer, power connectivity to all housing and govt. Institution, digitalization of village like iot, computer based learning, training for men and women in industrial area, solar fensing for farming land, other government scheme for village used like,. Pradhan mantri gram sadakyojana, gramin Jyoti yojana, Pradhan Mantri bima fasal yojana, working on water storage tank which are mostly used in summer time.

About your village description:

Village Name: - Pindharada
District: - Gandhinagar
State/Ute: - Gujarat
Population: - Near 1900
Demographic: - Gujarati and Hindi
Govt.Health Centre:- In Gandhinagar Sector-29 And 24
Bus Stand:- In Range 10 Km
Railway Station:- In Range 12 Km
Atm:- In Range of 5 Km
Petrol Pump:- In Range 4 Km
College:- In Range of 2 Km
School:- Near 3 Km
Gram Panchayat:- In Range 4 Km
River Bank:- Near Sabarmati River
Population:- Near 1900

As per the information there will be no any critical condition specially in covid-19 situation.

As per our team proposed design view of village development, need to ensure basic requirement of village people, like solar water pump, bio gas plant, bus stand facility, pace road and street light, availability of power supply, solar fencing guard around farm. If need to establishment of solar power plant for power supply purpose, transportation connectivity, water storage available, anganwadi, hospital etc….

For the future scope of the village we need to establish small scale industry, toy industry, fishery, farming capability increasing, for security purpose need to installing CCTV in village, water availability, Wi-Fi, internet available, fertilizer, soil testing centre, new technology using in farming sector, innovation in industrial area and farming area, small industry for women based to improving Romanisation across global. Irrigation for farmer, etc..

Key Words: Innovation, Technology, Safety, Transportation and Education

ACKNOWLEDGEMENT

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

We wish to express our deep sense of gratitude to **Prof. (Dr.) Navin Sheth**, **Hon'ble Vice Chancellor, Gujarat Technological University-Ahmedabad**, for his encouragement and giving us the wonderful project.
We also express our gratitude to **Dr. K.N.Kher**, **Registrar, Gujarat Technological University-Ahmedabad** for giving us complete support.

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

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

An act of gratitude is expressed to our internal guide **Prof. Mr. Nikhil G Ravalsir from college Government Engineering College Modasa** for their invaluable guidance, constant inspiration and active involvement in our project work.

We are also thankful to all the experts who provided us their valuable guidance during the work. We express our sincere thanks to, **Dr. JayeshDeshkar, Hon'ble Director of VishwakarmaYojana project and Principal, V.V.P Engineering College and Core Committee member of VishwakarmaYojana (Dr.)JigarSevalia**, 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.
We are also thankful to **Ms. Darshana Chauhan, VishwakarmaYojana**, for all support during our work. We therefore, take this opportunity for this Project work expressing our deep gratitude and sincere thanks for her cooperation to produce this project work in the present form.
Above all we would like to thank our Parents, family members and Friends for their encouragement and support rendered in completion of the present this work.

CONTENT

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

SHORT NAME / SYMBOL	FULL NAME
UJALA	Unnatjyoti by affordable LEDs for all
IRDP	Integrated rural development program
RGVGY	Rajiv Ghandhividhyutgraminyojana
KJP	Kutirjyotiyojana
AREP	Accelerate rural electrification program
JNNSM	Jawaharlal nehru national solar mission
RVEP	Remote village electrification program
PMGY	Pradhan mantrigramodayayojana
ICDS	Intigrated child development service
TRYSEM	Training rural youth for self employment mission
NGO	Nongovernmental organization
FWP	Food for work program
SSA	Sarvashikshaabhiyan
SWOT	Strength weakness opportunity threats
US	United states
MARC	Mid-america regional council
CCDU	Communication and capacity development unit
DDWS	Department of drinking water supply
GP	Gram panchyat
MoRD	Ministry of rural development
NFHS	National family health survey
NGP	Nirmal gram puruskar
PRIS	Panchayat raj institutions
RNDWM	Rajiv ghandhi national drinking water mission
SHG	Self help group
SLWM	Solid and liquid waste management
TSC	Total sanitation campaign
UAA	Uttaranchal academy of administration
WHO	World health organization
ZP	Zillaparishad

LL	Live load
RFT	Running peet
Sqf	Square feet
Cuf	Qubic feet
RMt	Running meter
SqM	Square meter
CuM	Qubic meter
Mm	Mile meter
Cm	Centimeter
M	Meter
Km	Kilometer
Gm	Gram
Kg	Kilogram
Pt%	Percentage of steel
%	Percentage
Sp	Specification
Ibb	Individual bio gas plant
Cbb	Common bio gas plant
Gsrtc	Gujarat state road transportation corporation
Std	Standard

CHAPTER:-1. IDEAL VILLAGE VISIT FROM DISTRICT OF GUJARAT STATE (CIVIL & ELECTRICAL):-

The main aim of this project is studying the present status and techno - economic survey of village in different terms of basic and public amenities, other infrastructural facility for the need of the people of respective village. This task or work done with consultation of the local revenue authorities, like TDO and DDO, the leaders like the sarpanch and talati of respective village and prepare detailed report on survey of the available data with reference to population of the village and growth area.. the main aim of this project to reduce migration from rural to urban areas this is achieved by the concept of urbanization which means provide better amenities in rural area without changing structure of rural area.
The second task is to give the most required and suitable economical sustainable design or prototype for village and sustainable development.

1.1 BACKGROUND& STUDY AREA:-

- Rural development is necessary and important because of about 3/4 of India's population live in rural areas. Nearly half of the country's national income is derived from agricultural which is major occupation of rural India.
- From this project we understand about the village amenities and need of primary infrastructure facilities like education, health, transportation, electricity, and other physical infrastructure facilities.
- In Pindharada village we noticed some good and some less facilities by techno economic survey, smart village survey, gap analysis and conservation with village respondents we conclude some positive and negative points about the Pindharada village facility.
- So we are working on problems of villages and to solve them by preparing economical and sustainable design for village as well as rural development and sustainable development.
- In our techno economical survey we studied about physical infrastructural facilities like water facilities, electricity facility, road network and transportation facilities, drainage system etc…
- We studies about social-culture facilities like public community hall, public garden, public library, playground, administration building, etc….
- We studied about social infrastructure like education facilities, health facilities and sanitation facilities in pindharada village.

1.2 CONCEPT:- IDEAL VILLAGE, NORMAL VILLAGE:-

The Ideal Village Concept is a community village with a selfsustaining income producing project/s, independent electrification system generated from non-fuel based device, clean water facility for

drinking including water for irrigation, quality but affordable housings, school, medical facilities for human beings and animals, proper sanitation system, information center, bank, police station, retail outlet for household and agriculture needs, phone facility, connecting roads to nearby villages and towns, legal councilor.
Such community villages can contribute to the economic growth of a province and even at national level. A prosperous village can result in less political problems for governments and enhance the standard of living of the people

Self-sustaining income producing projects:-

1. Animal & Poultry Farming:-
Rearing of cattle, goats, pigs, chickens etc can also be adopted as an optional opportunity to allow the villagers to be self-sufficient in food supply, milk supply and generate income as well.
2. Community Farming:-
We should identify couple of crops such as wheat, maize, spices, dals and horticultural crops for community farming. The target market for the produce or production should be the provincial towns or at national levels. This will allow the villagers additional income to be added onto their income from farming. Undoubtedly the villagers will then be earning above national average wages which will encourage more of such villages to be implemented throughout the country.
3. Small Scale Farming:-
Since our main objective is to create sustainable income stream we will explore ways and means to develop small scale industries where ever the local resources will be able to support such an opportunity. Women based food processing unit, Reestablishment of indigenous rural occupation those who belongs particular community like fishery, Animal husbandry, carpentry etc. We can save community‘s occupation in modernized way. The industry could be for fruits juice canning, tomato paste canning, fish meat, frozen seafood processing, flour packaging and bakery. This will permit remote villages to be financially selfsustaining and the creation of employment.
4. Organic Fertilizer:-
In village we should concentrate to produce and use organic fertilizer, the farms will enjoy the benefits of being environmentally friendly, shorter harvesting period and increased production. The organic fertilizer has proven to increase production by up to 40%, insect free attack, shorten harvesting period and cause no pollution. We can use agricultural wastes as organic fertilizers by suitable composting technology. Users of organic fertilizers over time can also stop the use of chemical fertilizers, insecticide and pesticide. This will be a great plus for the environment and cost savings for the farmers and country.

1.2.1. Objectives

A model village project has the following important objectives:

- Prevent distress 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.

- Make the model village a "hub" that could attract resources for the development of other villages in its vicinity.
- Provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such villages
- Contribute towards social empowerment by engaging all sections of the community in the task of village development.
- Create and sustain a culture of cooperative living for inclusive and rapid development.

1.2.2 Model Village – Case Studies

1. Hiware-Bazaar, Maharashtra

This is a village located in the rainshadow region of the Sahyadri mountain range in Maharashtra'sAhmednagar district. Till the 1980s, farming in the village was largely rainfed, and farmerswere forced to migrate seasonally to surrounding areas for work.

From the 1990s onwards, things began to change. The village Panchayat adopted a holistic focuson a variety of activities, with community groups responsible for various aspects of the village economy and social development. Women thrift groups, MilkDairy Society and Youth Clubs are examples of such community-based organizations. The village Panchayat also focused on family planning and reforestation, for which awareness programmes and drives have frequently been organized in the village. The village Gram Sabha also launched a watershed development programme, and an annual water audit is being conducted in the village since 2004 for more efficient and equitable management of water resources. It has also contributed to greater agricultural productivity.Today, the village is considered a model for community-led, multi-sectoral growth of rural parts of the country.

2.Punsari village Gujarat

Located in Gujarat's Sabarkantha district, Punsari village has emerged as a model village with modern urban amenities such as 24X7 power supply, WiFi connectivity, CCTV cameras to ensure security, and pucca roads connecting the village with other villages and towns.

Other important features of the village include:

- A reverse osmosis plant which supplies 20 litres of water to each household at Rs 4.
- Use of solar power for agricultural purposes
- Accidental Insurance cover to one member of every household
- Air-conditioned primary schools with no dropouts
- Bus facility for all households
- Focus on behavioural change through campaigns and awareness drives. For this purpose, 120 loudspeakers have been installed in different parts of the village Punsari was awarded with the Best Gram Panchayat Award from the Centre and the State in 2011.

1.2.3 The idea of Model/Smart Village

Many argue that the developing world is exposed to the impact of climate change in two ways. Geography, exacerbated by economic weakness, has left many countries vulnerable to climate extremes and natural disasters. Additionally, much of the developing world faces an opportunity cost for climate resilient low carbon growth and socio-economic development in comparison to

established economies, which were able to utilize fossil fuels freely to support their development. Nearly 1.3 billion people across the globe remain without access to electricity today and will find it challenging to achieve parity of development should they follow conventional models of development. Many such communities are often situated in remote areas, far away from urban Centres and beyond the reach of national grid extensions. However, an exciting tranche of recent innovations in finance, renewable energy, Information and Communication Technology (ICT), mobile healthcare and biotech offer a unique opportunity for those 1.3 billion individuals to bypass the highly centralized and gas-guzzling model used by the established economies. In short, sustainable rural development can offer considerable advantages over historical approaches, reaping benefits for a demographic comprising 70 per cent of the world's poor. The 'smart village' is a model in which, energy access acts as a catalyst for a range of development outcomes. If managed correctly, technology 'leapfrogging' could lead to rapid improvements in healthcare, nutrition, education, and economic security. Villagers could thus have the opportunity to capture many of the benefits of urban life while retaining valued aspects of rural life, and ensuring balanced development at a national level. Villagers can be empowered to realize their unique ambitions by picking and choosing the aspects of modernity they wish to incorporate into their communities. In doing so, they can take control over their own future, giving them a real choice between life in a city or a smart village. Residents would consequently be able to lead healthy and fulfilling lives, achieve their development potential, earn a viable living, and stay connected to the wider world. This model must consider not just the potential outcomes, but practical ways of sourcing, financing, and sustaining the requisite energy generation. Fortunately, in many off-grid locations, renewable energy is increasingly seen as the most practical and economic option. For example, the increasing cost-effectiveness of photovoltaic-based technology applications and further scope of small hydroelectric resources offer development models involving new forms of energy generation. Sustainable energy access can enable the provision of good education and healthcare, access to clean water, sanitation and nutrition, the growth of productive enterprises to boost incomes, and enhanced security, gender equality, and democratic engagement. This vision is not without pitfalls. History is littered with expensive and ultimately flawed attempts by governments and development agencies to parachute infrastructure or technology into underdeveloped rural communities. Many of these actors have yet to realize the potential of energy access to transform lives and fail to take simple measures to promote progress. The Smart Villages Initiative aims to mitigate these difficulties. Our three-year 'smart villages' project (www.e4sv.org) will collect, analyze, and apply good practices and expertise from around the world on how sustainable energy can catalyze development. This collected knowledge will be presented directly to policy-makers and funders, enabling them to support and promote sound interventions.

1.2.4 Ancient History

Dholavira (Gujarati: ધોળાવીરા) is an archaeological site at Khadirbet in BhachauTaluka of KutchDistrict, in the state of Gujarat in western India, which has taken its name from a modern-day village 1 kilometre (0.62 mi) south of it. This village is 165 km (103 mi) from Radhanpur. Also known locally as Kotada timba, the site contains ruins of an ancient Indus Valley

Civilization/Harappan city. Dholavira's location is on the Tropic of Cancer. It is one of the five largEstHarappan sites and most prominent archaeological sites in India belonging to the Indus Valley Civilization. It is also considered as having been the grandest of cities of its time. It is located on Khadir bet island in the Kutch Desert Wildlife Sanctuary in the Great Rann of Kutch. The 47 ha (120 acres) quadrangular city lay between two seasonal streams, the Mansar in the north and Manhar in the south.The site was thought to be occupied from c.2650 BCE, declining slowly after about 2100 BCE, and that it was briefly abandoned then reoccupied until c.1450 BCE,however recent research suggests the beginning of occupation around 3500 BCE (pre-Harappan) and continuity until around 1800 BCE (early part of Late Harappan period).
Excavation was initiated in 1989 by the ASI under the direction of Bisht, and there were 13 field excavations between 1990 and 2005.The excavation brought to light the urban planning and architecture, and unearthed large numbers of antiquities such as, animal bones, gold, silver, terracotta ornaments, pottery and bronze vessels. Archaeologists believe[vague] that Dholavira was an important centre of trade between settlements in south Gujarat, Sindh and Punjab and Western Asia.
Estimated to be older than the port-city of Lothal, the city of Dholavira has a rectangular shape and organization, and is spread over 22 ha (54 acres). The area measures 771.1 m (2,530 ft) in length, and 616.85 m (2,023.8 ft) in width.Unlike Harappa and Mohenjo-daro, the city was constructed to a pre-existing geometrical plan consisting of three divisions – the citadel, the middle town, and the lower town.The acropolis and the middle town had been furnished with their own defense-work, gateways, built-up areas, street system, wells, and large open spaces. The acropolis is the most thoroughly fortified and complex area in the city, of which it appropriates the major portion of the southwestern zone. The towering "castle" stands is defended by double ramparts. Next to this stands a place called the 'bailey' where important officials lived.The city within the general fortifications accounts for 48 ha (120 acres). There are extensive structure-bearing areas which are outside yet integral to the fortified settlement. Beyond the walls, another settlement has been found.The most striking feature of the city is that all of its buildings, at least in their present state of preservation, are built of stone, whereas most other Harappan sites, including Harappa itself and Mohenjo-daro, are almost exclusively built of brick.Dholavira is flanked by two storm water channels; the Mansar in the north, and the Manhar in the south

1.3.Examples or live case Studies of Ideal village of India / Gujarat :-

Top 10 ideal villages of India:-

- ✓ Mawlynnong - Asia's cleanest village
- ✓ Punsari - The village with Wi-Fi, CCTV, ac classrooms
- ✓ Hiware bazar - The village of 60 millionaires
- ✓ Dharnai - First fully solar-powered village
- ✓ Chappar - A village that distributes sweets when a girl is born
- ✓ Kokrebellur - A village that really loves its birds
- ✓ Ballia - The village that beat arsenic poisoning with an indigenous method
- ✓ Pothanikkad - The village with a 100% literacy rate
- ✓ Bekkinakeri - The village that rid itself of open defecation by 'greeting' lota-bearers
- ✓ Shanishingnapur – A village so safe that people don't need doors

Top ideal villages of Gujarat:-

- ✓ Thamna (Anand)
- ✓ Aena(Surat)
- ✓ Moviya(Rajkot)
- ✓ Punsari(Sabarkatha)
- ✓ Dharmaj(Anand)
- ✓ Baben(Surat)
- ✓ Laxmanpura(Banaskantha)
- ✓ Anandpura(Mehsana)

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- Today, the village is considered a model for community-led, multi-sectoral growth of rural parts of the country.

Ankapoor, Telangana :-

- Ankapoor is located in the nizamabad district in the state of telangana. Ankapoor has been globally recognized as a ―model agricultural village‖ For its achievements in introducingmodern technologies in agriculture While ensuring the participation of all sections of the village community, Particularly women. Organizations like the Indian council for agricultural Research (icar), international rice research institute (irri), manila andInternational crops research institute for the semi-arid tropics (icrisat) Have formallycommended the developments in agriculture in the village.

- Some of the **important features** of the agricultural model of this village :-
- Peasant association of the village coordinates various agricultural interventions
- The decision making process is inclusive and based on consensus-building. Women have a dominant role in the utilization and supervision of labours.
- Focus on new sources of income, such as commercial cultivation of seeds, scientific crop rotation techniques.
- Sustainable agriculture with greater use of farmyard manure and lesser use of chemical fertilizers.
- Village market yards facilitate the sale of agricultural produce with minimal wastage
- Since agriculture accounts for almost the entire economic output from many villages in India, participatory agriculture, with equal focus on irrigation, watershed management and technology-led cultivation should be the way forward.

Kumbalangi Village, Kerala – A Model For Eco-Tourism :-

- Kumbalangi is essentially a fishing hamlet which has been developed as a uniqueruraltourist destination in kerala'sernakulam district. The kumb- alangiintegrated tourism village project was launched in 2004, with a Focus on Eco-tourism, while offering tourists a glimpse of the rich and Rustic life of the Indian countryside. The important attractions in kumbalangi includeorganicfarm produce used to prepare meals for tourists, toddy tappingand crab farming. To keep the village clean and serve its energy needs, households are also provided subsidies for setting up mini biogas plantsin their households.
- The kumbalangi approach could be adopted by other coastal villages to boost tourism and provide livelihood to local communities.

1.4 SWOT analysis of smart village

SWOT analysis is a strategic planning tool used to evaluate the Strengths, Weaknesses, Opportunities and Threats in a project or an organization. It is used to develop a plan that takes into consideration different factors, maximizes the potential and minimizes the impact of weaknesses and threats. Strengths describe tangible and intangible positive attributes like resources and competency available (knowledge, background, education, skills etc.) in individuals, community or organization) Weaknesses stand for those attributes of an individual, community or organization that are harmful to achieving the objectives. These are features that are under your control, but for a variety of reasons they need improvement. Opportunities are external the conditions that are helpful in achieving the objective. Threats are the external conditions that can be harmful to achieving the objective. They are major unfavorable situations in an organization's environment.

1.5 Future prospect of development of Smart village

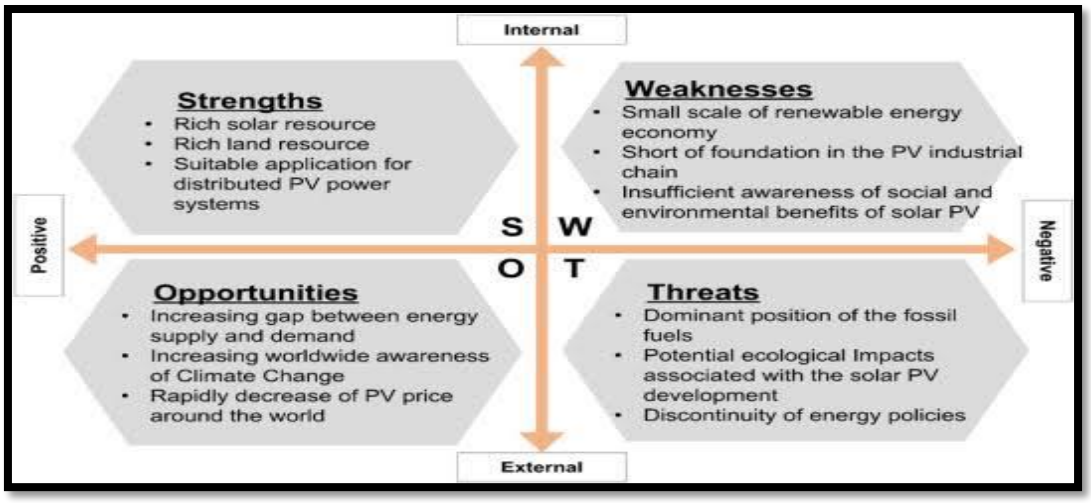
Smart Buildings – security cameras , fire safety, electricity managements
Smart Dairy-Remote supervision and monitoring in open fields and barns.
Smart Farming- Satellite data for farm activities.
Smart agriculture- Smart agricultural equipment for crop production.
Smart Weather and Irrigation-Weather forecast water levels in dams.
Smart health care –Smart beds and equipments to monitor patient.

Smart Education – Interactive learning through videos
Smart surveillance system – CC cameras and sensors to detect robbery
The future of India lies in converting each and every village into smart villages. The concept of smart village will provide the Similar kind of facilities to the villages, so that the agrarian community will remain in villages and not migrate to urban areas. Future generations will contribute immensely in development process and enjoy the traditional agriculture activity with the Use of modern technology

1.6 Benefit of visit of smart village

The infrastructure is not well developed in the village, and also there is a problem with the network connection as many of the people lose network connection when they go to the town to enjoy your vacation.The environment in the village is less polluted, and there is fresh every time which makes your mood happy in the village. It Is also saying that people living in the village help each other and understand everyone's problem and provide a solution to each other.

Fig.1.4.1 SWOT analysis



1.7 Civil Aspects required in Ideal Village

An intervention under one of these areas could have an effect across other areas as well. For example, technology could be used to improve the quality and delivery of other services such as health and education, which in turn contributes to sustainable development. Similarly, the use of renewable energy, apart from meeting energy needs, also contributes towards environmental sustainability. Village tree plantation drives could encourage a community participation, benefit the environment, prevent soil erosion and benefit agriculture, conserve water, and finally contribute to the aesthetics of the village. A number of these initiatives have already been taken in different parts of the country, but most of them have been attempted in isolation. The urgent need is to bring about a convergence of all such initiatives, for which 2 things would be essential – a) grassroots level planning; and b) mobilization of resources.

- Better health – with special focus on maternal and child health
- Practical and smart education

CHAPTER:-2. LITERATURE REVIEW - (CIVIL & ELECTRICAL):-

2.1 Introduction : Urban And Rural :

Rural :

- Generally, the area which is outside the limit of the city or town is called rural area or village.
- The area in which mostly peoples are characterized by agriculture (farms, vegetation,husbandry,etc…)
- Rural areas are those in which the scope of occupational mobility was very little.
- The area in which mostly people's life in society is very simple like (dressing, food, habits, etc…)
- The area where all administrative activities are controlled by the grampanchayat.

Urban :

- The area in which the scope of occupational mobility is very high, The area where all administrative activities are controlled by the municipality.
- The area in which mostly people are not directly connected to agriculture but depend on industries and business.
- There are basic facilities of lifestyle available like electricity, water facilities, sewage facilities and transportation.

2.2 Definition of rural areas :

Rural is mainly defined as:

- Mostly about 70 to 75% people depend on agriculture and husbandry.
- Population is less than 400 as per square km.
- The area where all decisions are taken by gram panchayat.

Rural is also defined as:

- Rural is a geographical area which is located outside the cities or town.
- Rural areas are which are predominant on agriculture activities and husbandry.
- As per the health resources and services administration department of USA, rural word is defined as an encompassing on population, housing and territory not included within the urban area.
- Rural areas are those in which the scope of occupational mobility was very little.
- According to planning commission ‘‘, a town with maximum population of 15,000 is considered as rural.

2.3. Scenario: Rural / Urban India &Gujarat As Per Census 2011(Population Growth)

Census 2011 Is The 15th Census OfIndia Since 1872

Census 2011 Was Held In Two Phases :

- House Listing &Housing Census (April To September 2010)
- Population Enumeration (9th To 28th February 2011)

Census Of India 2011 **:**

Table 2.3.1 Population Profile of India as per Census of 2001 and 2011

Context	2001	2011	Difference
iIndia	102.9	121.0	18.1
Rural	74.3	83.3	9.0
Urban	28.6	37.7	9.1

- population is more in urban areas that in rural areas.
- Rural – urban distribution: 68.84% & 31.16% Level of urbanization increased from 27.81% in 2001 census to 31.16% in 2011 census.
- The proportion of rural population declined from 72.19% to 68.84%

Census 2011 population profile of Gujarat :

Table 2.3.2 Population profile of Gujarat as per census 2011

Population size	6,04,39,692
Population size (male)	3,14,91,260
Population size (female)	2,89,48,432
Population size (rural)	3,46,94,609
Population size (urban)	2,57,45,083
Population size (rural males)	1,77,99,159
Population size (rural females)	1,68,95,450
Population size (urban males)	1,36,92,101
Population size (urban females)	1,20,52,982

2.4 Rural issues - concern - measure :-

Issues:-

- Electricity, poverty, water supply, hygienic conditions, roads, unemployment etc are some of the problems that Indian villages are still facing today.
- Village faced the problem of acute water shortage. The hand pump water had gone well below the point up to which the ground had been drilled.
- They hardly got water in the taps. Women had to travel 3 km to the River to get water. The GRAM SABHA got together to discuss the problem.
- Many people came up with short-term and long-term suggestions for dealing with the problem at hand, e.g., piping water from the river and making an overhead tank, deepening the hand pumps and cleaning the wells, conserving and recharging water through watershed development. Many people came up with short-term and long-term suggestions for dealing with the problem at hand, e.g., piping water from the river and making an overhead tank, deepening the hand pumps and cleaning the wells, conserving and recharging water through watershed development.
- A survey named called the Annual Status of Education Report (ASER), shows that even though the number of rural students attending schools is rising, but more than half of the students in fifth grade are unable to read a second grade text book and are not able to solve simple mathematical problems.

CONCERN:-

- India is Independence in 1947 but still education ratio of villages are low, may people are uneducated and also unemployed.
- India says a growing country but unfortunately poverty in villages are increases day by day,
- unemployment cause crimes are increases and urbanization is increase.
- Due to lake of facilities rural people are want to transferring and hence they goes to cities.
- Education facilities, Heath facilities, Sewage treatment, waste decomposition, and mainly is pollution of environment. They need to facilities as like town or cities in their villages but they can't unfortunately.
- So concern about villages is serious problem for India today to do something.

MEASURE:-

The nine schemes of rural development in India are as follows:

1. 20-Point Programme:-

This has been a major programme of rural development encompassing various aspects of rural people. This programme is associated with former Prime Minister Indira Gandhi, who introduced it in July 1975 for reducing poverty and economic exploitation and for the uplift of weaker sections of society. She gave the slogan _GaribiHatao' during parliamentary elections.

2. Integrated Rural Development Programme (IRDP):-

The programme was launched by the Centre in March 1976 as a major instrument of the government to alleviate poverty. Its main feature was to enable selected families to cross the poverty line in a given timeframe by taking up self-employment in various activities like agriculture, horticulture, animal husbandry, weaving and handicrafts and services and business activities.

3. Training Rural Youths for Self-Employment (TRYSEM):-

This scheme was launched in 1979 to provide technical skills (training) to rural youths (between 18-35 years) living below the poverty line, to enable them to seek employment in fields of agriculture, industry, services and business activities.

As in other schemes of poverty alleviation, in this scheme also, youths belonging to SCs and STs and exservicemen, who had passed ninth class, were given priority. One-third seats were reserved for women. The beneficiaries of this scheme after completion of training were absorbed in the IRDP scheme.

4. Food for Work Programme (FWP):-

This programme was introduced in 1977 by the then Janata government with the objective to provide employment to the unemployed/underemployed village persons during the slack season. The wages paid to the workers were in kind, i.e., food grains.

The works undertaken were flood protection, maintenance of existing roads, construction of new link roads, improvement of irrigation facilities, construction of school buildings, medical and health centers and Panchayat Ghars (community halls) etc.

5. National Rural Employment Programme (NREP):-

This is redesigned programme of FWP, planned for creating additional employment opportunities in the rural areas with the help of surplus food grains. It was started in 1980 as a part of the Sixth Plan (1980- 85). This programme was especially for those rural people who largely depended on wage employment but had no source of income during lean agricultural period. PRIs were actively Involved in this programme.Later on, this programme was merged with JawaharRozgarYojana(JRY).

6. Rural Landless Employment Guarantee Programme (RLEGP):-

Special schemes were formulated by some states such as Maharashtra and Gujarat to provide increasing employment opportunities to rural people, especially landless people. Maharashtra started the Employment Guarantee Scheme (EGS) for the unemployed in rural areas. The Gujarat government‘s scheme provided for unskilled jobs to the unemployed workers on different projects. This scheme was later on merged into JRY along with NREP.

7. JawaharRozgarYojana (JRY):-

This programme came into existence in April 1989 with the merger of the NREP and the RLEGP. Under this scheme, it was expected to provide at least one member of each poor family (BPL family) an employment for 50 to 100 days in a year at a work near his/her residence. About 30 per cent of the jobs under this programme were reserved for women. The scheme was implemented through Village Panchayats.

8. AntyodayaYojana:-

The Hindi word _antyodaya‘ is a combination of two words—ant meaning end or bottom level and udaya meaning development. Thus, as a whole, it implies the development or welfare of a person standing at the end of the queue (lowest level), that is, the poorest of the poor.

9. Mahatma Gandhi National Rural Employment Guarantee Scheme (MNREGS):-

After independence, for the development of rural society, particularly to develop the socio-economic life of the rural poor, many schemes and programme were launched from time to time but unfortunately the fruits of these programme reached to a very low proportion of these people.

It was estimated about 70 per cent of rural population was still deprived of the basic necessities of life. For the purpose of extending the benefits to rural people, a new scheme was launched and legislation was enacted under the name "National Rural Employment Guarantee Act" (NREGA).

2.5 Various infrastructure guidelines with the Norms for Villages for the provisions of different infrastructure facilities

In the Indian context, villages are the roots of the nation. In Indian an average 68.4% of the total population is living in villages as per 2011 census. Urbanization is taking place at a rapid phase in India due to employment opportunities, education, health, comforts, transportation, economic activities and better than amenities. The basic infrastructure required in rural areas is education, health, housing, drinking water. But the health, housing and education conditions are still poor. In the early 20th century, two important phenomena have emerged one is urbanization and the other one is information and communication technologies. A Rural development vision is to integrate multiple information and communication technology solutions in a secure fashion to manage a rural asset. The rural assets include local department information systems, school, libraries, transportation systems, hospitals, power plants, water supply, waste management, law of enforcement and other community services. Government has started many programs for boosting the rural infrastructure development.Public private partnership: A public private partnership (PPP) is an agreement between two or more public and private sectors, typically long term nature. Government use such a mix of public and private sectors. However, 21stcentury has seen a clear trend towards public private partnership arrangements in various government Programs. Public private partnership is a special kind of contract involved in infrastructure provision, such as schools, hospitals, transport systems, water and waste water system.Public private partnership (PPP) is the provision, long term operation and maintenance of public infrastructure by private sector. It will be initiated by the public sector with clearly defined project. Building up a PPP ventures is perplexing assignment required aptitudes of a various sort numerous which are not regularly required for customary open area ventures. Accomplishment of PPP ventures relies upon the solid open segment, they ought to have capacity to distinguish, create, arrange, obtain and oversee venture through a straightforward procedure.

OBJECTIVES

1. To know the present infrastructure scenario and identify the needs of village.
2. To understand the possibilities for implementation of public private partnership policies of infrastructure sector.
3. To explain the present scenario of PPP Projects and various opportunities and challenges of infrastructure development sector.

RESEARCH SIGNIFICANCE

This paper helps to identify and evaluate the various infrastructure required for various sectors in the village and the available schemes that are best suited for the identified infrastructure. The possible sources of funding for the identified infrastructure through the schemes, Public private partnership (PPP) and other entrepreneurs.

2.6 OTHER PROJECTS / SCHEMES OGF GUJARAT / INDIAN GOVERNMNET :-

GraminBhandaranYojana:-

Creation of scientific storage capacity with allied facilities in rural areas to meet the requirements of farmers for storing farm produce, processed farm produce and agricultural inputs. Improve their marketability through promotion of grading, standardization and quality control of agricultural produce.

Rajiv Gandhi VidhyutGraminYojana:-

Program for creation of Rural Electricity Infrastructure and Household Electrification for providing access to electricity to rural households.

Jyoti Gram Yojana:-

All the villages in Gujarat have been electrified under this scheme. Previously, people fromvillages in Gujarat used to migrate to Surat for employment in diamond polishing wherein they were subjected to abysmal living conditions. But with advent of Jyoti Gram, they have returned to the villages living a holistic family life and still continuing with the polishing in their own villages during a week while travelling once in a week to Surat for the delivery of diamonds.

It has reduced the earlier problems for delivery of women. Today in rural areas on an averagewithin 16 minutes of receiving the call an ambulance reaches the spot of emergency and medical assistance is provided. In the last few years, more than 10,000 assisted deliveries have taken place on board 108

AamAdmiBimaYojana:-

Scheme extends the benefit of life insurance coverage as well as coverage of partial and permanent disability to the head of the family or an earning member of the family of rural landless households and educational assistance to their children studying from 9th to 12th standard as an extended benefit.

Bachat Lamp Yojana:-

Reduce the cost of compact fluorescent lamps.

DeenDayalUpadhyay Gram JyotiYojana:-

It is a Government of India program aimed at providing 24x7 uninterrupted power supplies to all homes in Rural India.

GraminBhandaranYojana:-

Creation of scientific storage capacity with allied facilities in rural areas to meet the requirements of farmers for storing farm produce, processed farm produce and agricultural inputs. Improve their marketability through promotion of grading, standardization and quality control of agricultural produce.

Indira AwasYojana:-

Provides financial assistance to rural poor for constructing their houses themselves.

Indira Gandhi MatritvaSahyogYojana:-

A cash incentive of Rs. 4000 to women (19 years and above) for the first two live births.

Integrated Child Development Service:-

Tackle malnutrition and health problems in children below 6 years of age and their mothers.

Integrated Rural Development Program:-

Self-employment program to raise the income-generation capacity of target groups among the poor.

Mahatma Gandhi National Rural Employment Guarantee Act:-

Legal guarantee for one hundred days of employment in every financial year to adult members of any rural household willing to do public work-related unskilled manual work at the statutory minimum wage of rs.120 per day.

Midday Meal Scheme:-
Lunch (free of cost) to school-children on all working days.
PradhanmantriAdarsh Gam Yojana:-
Integrated development of Schedule Caste majority villages in four states.
Rajiv Gandhi GrameenVidyutikaranYojana:-
Program for creation of Rural Electricity Infrastructure & Household Electrification for providing access to electricity to rural households .
RashtrapatiKrishiVikasYojana:-
Achieve 4% annual growth in agriculture through development of Agriculture and its allied sectors during the XI Plan period.
S**ampurnGraminRojgarYojana-**
Providing additional wage employment and food security, alongside creation of durable community assets in rural areas.
Swarnjayanti Gram SwarojgarYojana:-
Bring the assisted poor families above the poverty line by organizing them into Self Help Groups (SHGs) through the process of social mobilization, their training and capacity building and provision of income generating assets through a mix of bank credit and government subsidy.
National Rural Live hood Mission:-
This scheme will organize rural poor into SHG groups and make them capable for self-employment. The idea is to develop better livelihood options for the poor.
2.7 Concept: Rurban town & its importance :
Rurban town & its importance :
Rurbanisation :

- To reduce and remove the rural-urban divide through infusion of urban patterns and services in rural systems to ensure provision of quality lifestyles and livelihood options while keeping the basic rural soul intact. Developing village with a rural soul‟ but with all urban amenities that a city may have Rurbanisation means ―To provide better amenities in Rural without changing village structure.

Importance :

- Rurbanisation combines traditional knowledge and practices with modern technology and is a distributive and participatory process bringing about cascading changes in the lifestyles of its participants.
- Reduce migration from rural to urban areas due to lack of basic services and sufficient economic activities in rural areas.
- Efficient Mass Transportation systems to improve connectivity between urban and rural areas.
- Electricity connections like street lighting that is energy efficient and eco- friendly.
- Socio cultural facilities like Community hall play grounds, Parks, Library, Garden, Eco parks, Beautification of pond (water can be stored in monsoon), Natural water sources beautification and other are provided.

2.8.Sustainable Development:

- Sustainable development is the organizing principlefor sustaining finite resources necessary to provide for the needs of future generations of life on the planet. It is a process that envisions a desirable future state for human societies in which living conditions and

resource-use continue to meet human needs without undermining the "integrity, stability and beauty" of naturalbioticsystems.

Sustainable development has three mainparts:

- Environmentalsustainability.
- Economicsustainability.
- Sociopoliticalsustainability.

2.9.Renewable energy source planning particularly forvillages

- A bottom-up energy system optimisation model is proposed in order to support planning policies for promoting the use of renewable energy sources.

A linear programming optimisation methodology based on the energy flow optimisation model (EFOM) is adopted, detailing the primary energy sources exploitation (including To reduce and remove the rural-urban divide through infusion of urban patterns and services in rural systems to ensure provision of quality lifestyles and livelihood options while keeping the basic rural soul intact. Developing village with a rural soul‟ but with all urban amenities that a city may have Rurbanisation means —To provide better amenities in Rural without changing village structure.

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Chapter 3. Smart (Cities / Village) Concept Idea and its Visit – (Civil Concept)

3.1 Introduction: Concepts, Definitions and Practices

Introduction

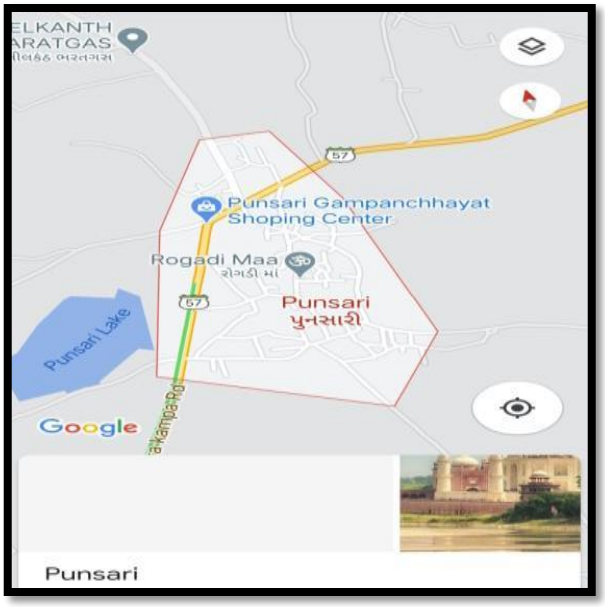
The villages of India's have different position in social and economic aspects. In 1901, there were 212.6 million peoples are living in villages and rural area. These increased to 721.1 million people in year of 2001. It will see that there is increased in population. In rural area, agriculture area and forest area is also decreased Farmers and agriculture labors to be exploited. So that Rural development phenomenon is very complex, therefore there is trying to development is required. Present project is shows the various precaution, ideas to do development of rural. It also describes the various visit of village which helps to development of village. This present project includes various rural issues and concerns and also about various infrastructure facilities in rural area.

Need of the study

In India, out of total population of 121 crores, 83.3 crores live in rural areas (Census of India, 2011). Thus, nearly 70 per cent of the India’s population lives in rural areas. These rural populations can be characterized by mass poverty, low levels of literacy and income, high level ofunemployment, and poor nutrition and health status. In order to tackle these specific problems, a number of ruraldevelopmentprogrammes are being implemented to create opportunities for improvement of the quality of life of these rural people. The rural developmental programmes intend to reduce the poverty and unemployment, to improve the health and educational status and to fulfill the basic needs such as food, shelter and clothing of the rural population. To improve the conditions of rural people

Objectives of study

The main objective of the Rural Development is improving the living standards of rural people by utilizing the easily available natural and human resources. The other objectives of rural development programmers are as follow: Development of agriculture and allied activities.Development of village and cottage industries and handicrafts. Development of socio-economic infrastructure which includes setting up of rural banks, co-operatives, schools etc. Development of community services and facilities i.e. drinking water, electricity, rural roads, health services etc. Development of Human resource mobilization.To improve the living standards by providing food, shelter, clothing, employment and education. To Increase productivity in rural areas and reduce poverty. To involve people in planning and development through their participation in decision making and through centralization of administration. To ensure distributive Justice and equalization of opportunities in the society.



3.1.1 punsari village map, 3.1.2 punsari village Gram panchayat

3.1.3 punsari village gate , 3.1.4 punsari village PHC center

Concept of Smart Village

Table 3.1.1

S	Skilled simple living and high thinking.

M	Moral, methodical and modern.
A	Aware, adaptive and adjusting.
R	Responsive for co-operative movements and collective wisdom.
T	Tecnosavy for IT and transparent mobile usage harmonic relations

Smart village Defination

Urban

An area is a human settlement with high population density And infrastructure of built environment. Urban areas are Created through urbanization and are categorized by urban Morphology as cities, towns, conurbations or suburbs."Urban area" can refer to towns, cities, and suburbs. An Urban area includes the city itself, as well as the surrounding Areas. Many urban areas are called metropolitan areas, or "greater" as in Greater New York or Greater London.

Rural

Rural areas are also known as 'Countryside' or a 'village' in India. It has a very low density of population. In rural area People practice agriculture for their livelihood. Town with a Maximum population of 15,000 is considered rural in nature. The National Sample Survey Organization (NSSO) defines An area with a population density of up to 400 per square kilometre, Villages with clear surveyed boundaries but no municipal board, A minimum of 75% of male working population involved in agriculture and allied activities.

Civil practices in smart village

It Has already been noted that the implementation of smart concepts into regional, both rural andUrban contexts has to be adapted to socio-cultural and environmental circumstances. Thus, in theCities, 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.

Most rural villages still rely primarily on biomass, such as Wood, kerosene, or charcoal for their energy needs. But Several technologies have become more affordable in Recent years, including solar panels.

1. Solar panels
2. Biogas
3. Micro-hydro electric
4. Micro-wind electric
5. Improved cookstoves
6. LEDs
7. Low-energy motors
8. DC systems

The first four technologies in this list can generate energy In rural and often remote areas. They include technologies That power lighting, mobile phones, laptops, appliances, and Small businesses and agricultural and fishing cooperatives. Other technologies produce heat, generally for cooking But sometimes for hot water. Some technologies, such as The production of a

combustible biogas, may be used for Both. Solar PV produces direct current (DC) energy, while The other technologies produce alternating current (AC).

3.2 Vision-Goals, Standards and Performance Measurement Indicators :

Out of 6,50,000 villages in India, most of them have Inadequate and rudimentary infrastructure which Fails to fulfill the primary need of villagers. Villages And other remote locations have poor educational Facilities, irregular water supply, electricity supply, Improper sanitation, transport, road connectivity and Infrastructure. India being a billion-strong nation has 68.84% of villagers less than 30 years old. Thus, a huge Resource pool is underutilized and left with poor standard Of living with meager wages. All these factors push Villagers to migrate to towns and cities in search of better Employment opportunities and quality of life.

Vison-goals activities

- Homes with access to toilet, clean drinking water and Affordable electricity.
- Diversified livelihood opportunities with micro Enterprise.
- Plans for development of people, assets, service Centric information, revenue generation and Maintaining its identity and cultural heritage.
- Interaction with government, NGOs, experts, social Entrepreneurs, etc.
- Awareness of newer technologies which can be Implemented in the village for its upliftment and Holistic development.With different schemes and drives government has Done the preliminary job to setup a platform for smart Village. There are several programs like SaansadAdarsh Gram Yojna, National Agriculture Development Program, Mahatma Gandhi National Rural Employment Guarantee Scheme, Mid-Day Meal Scheme, Integrated Child Development Scheme, Annapurna Scheme.

3.2.1 smart city indictors

(Shukla, 2016). The output is not up to the mark since they are not Being implemented in a cohesive fashion.

Smart Cities Performance Measurement Indicators

"Smart Village" is the rural analogy of "Smart City", which can bring overall development, sustainable and affordable utilities, access to good education, clean drinking water, sanitation and nutrition.

3.3 Technological Options

"Smart Village" is the rural analogy of "Smart City", which can bring overall development, sustainable and affordable utilities, access to good education, clean drinking water, sanitation and

nutrition (Holmes et al., 2015). A smart village will facilitate:Services Required for the Smart Village:

- ✓ Solar LED Street Lighting and Solar Home Lighting Systems.
- ✓ Development of Health Centres, Roads and school labs and kids play Grounds.
- ✓ Efficient public transportation Systems.
- ✓ Use of renewable energy.
- ✓ Safe Drinking Water Facility- RO Water Plants.
- ✓ Solid and liquid waste management.

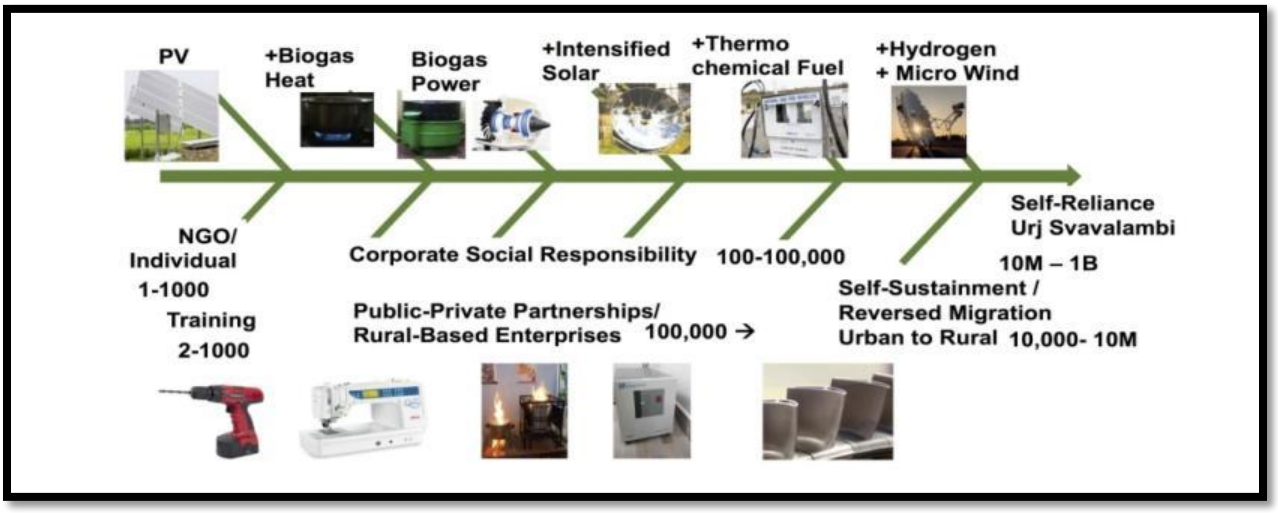
Improving sanitation conditions.

Even after 70 years of independence 25,722 villages Are un-electrified across the country where 304 million People are left in darkness ("1.3 Billion are living in the Dark", 2015). Use of kerosene for lighting lamps and Wood for cooking causes household air pollution which Is dangerous to health. Globally over 4 million people die Prematurely from illness attributable to the household Air pollution from cooking with solid fuels ("Household Air pollution and Health", 2016).Access of electricity can be considered as a foundation Stone for smart village as it helps to improve the socio-Economic infrastructure of villages. Energy (electricity) And Information and Communication Technology (ICT) Can go a long way to provide inclusive education to all And reduce social injustice (Ranade&Londhe, 2015). Government of India is running a drive to electrify All Indian villages, however there are many far flung Areas where laying down the electrical grid is difficult. Extending existing grids to remote off-grid areas is highly Expensive, which creates a need of local solutions using Renewable energy sources

3.4 Road Map and Safe Guard

This morning some 300 million Indians woke up to a day without basic access to Electricity or other energy resources. This deprives them of education, opportunity And participation as full citizens. The Smart Village Roadmap 2017 conference on Rural Energy Independence in Atlanta, Georgia, USA, on March 17, 2017 brought Together a unique set of dedicated experts in technology, marketing, education and Logistics, businesspeople, industrialists, volunteers for Non Governmental Organiza-Tions, medical doctors, and social workers from around the world. Hosted by Georgia State University's J. Mack Robinson College of Business and organized by the Global Indian Business Council, the conference was sponsored by commercial and private Entities all over the USA, with crucial support from the Consulate General of India In Atlanta. This report discusses a roadmap to bring full energy independence ('UrjSvavalambi') to the 660,000-plus villages where over 70 percent of India lives Development and Relief Fund (IDRF) based in Maryland, USA, has been arranged, sufficient to install 95 more village school PV systems.

There is no plan for us to 'electrify homes'.Our focus is to bring renewable energy systems to every village through the school, Making a difference to education. The school Teacher and students are the pioneers To adopt technologies and demonstrate how to generate productivity, employment And entrepreneurship. We see a new tech-savvy generation growing up in rural India, Leading the revolution to literally empower the villages.



3.4.1 Road map

The roadmap is a carefully-sequenced bottom-up plan to break out of the difficult challenges of education, local buy-in, technology ownership, skill development, wealth creation, financing, transport and communication logistics and enterprise growth that are needed for sustainable rural growth. The plan can complement the top-down electric power grid where it exists, but is independent of it. It starts with the village school and teacher as the pioneer, In succession, solar photovoltaic power, education and skills training prepare the villager for a climb through technology and enterprise ownership. It proceeds to clean water resources, biogas heat and power, solar thermochemical fuel generation, and rural enterprise. Collaborative micro-financing, Internet of Things connections, BlockChain technology for electronic business, advanced rural-based clean manufacturing, and leap-frog approaches for package delivery and maintenance, drive onwards to a future of plentiful clean energy and reversing urban migration. India will lead the world by example and demonstrate modern villages that respect and nurture ancient culture and tradition. We are off to a fast start. A private donor funded the first 5 systems. They have been installed at village Single Teacher Schools (STS) in Tamil Nadu by the Swami Vivekananda Rural Development Society (SVRDS), with Corporate Social Responsibility (CSR) help from TEX Biosciences, a suburban Chennai industrial concern, as well as an AAMCO battery plant. The 5th system was installed at the Training Centre of the Single Teacher Schools program, at one of the villages. In the next step, funding through the India Development and Relief Fund (IDRF) based in Maryland, USA, has been arranged, sufficient to install 95 more village school PV systems.

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3.5 Issues and Challenges

Budget Constraints

There is a huge issue of budget constraints, which essentially has limited innovative thinking and created obstacles for many other initiatives. The budget constraints have created many hindrances for a lot of smart initiatives that if properly nurtured could be more cost- effective and efficient.

Smart Technology

It is considered that smart technology for these smart villages is still in the precommercial or in some cases the conceptual stage. And since the technology is in the pre-mature or conceptual stage, it generates uncertainties regarding return on investment as far as financial parameters are concerned. This also results in apprehension of a long payback period, and investors are unwilling to invest, which contributes to financial uncertainties for smart technology initiatives

Lack of Knowledge

The other challenges related to smart village initiatives in India is the lack of knowledge of the people using modern technology. The citizens' experience of these smart technology initiatives has largely not been good for several reasons, one of which is due to the paucity of knowledge of the common people as to how to use modern digital technologies, Internet and other modern technology, and also the fact that there are very few people, especially in rural areas of India, as with other parts of the developing world, who know how to efficiently use and apply modern digital technologies, such as "smart meters" (Bracknell Forest Homes). There are other constraints that, though not so vital, also deserve mention, such as lack of technology-related skills, constraints on integration, and limited understanding and influence over the basic available services

Energy Management

Efficient use of energy in the smart village is one of the parameters of the main focus areas of a smart village ecosystem. And for the efficient use of energy, smart energy meters could be used in these smart villages. These meters help in areas such as managing energy demand, reducing overall costs, and helping to decrease pollution, resulting in less environmental damage. To make it happen, the use of information technology is essential, and the focus needs to be on the "smart grid" (www.smartgrid.org.kr/eng). This also includes monitoring of the electrical system

Designing a Smart Village

There are a few critical parameters that need to be kept in mind when designing a smart village. The two important decision methodologies that need to be focused on are (1) the scenario of investment with reference to the climate of smart villages and (2) strategies for the growth of these smart villages. In the following sections, both of these focus areas are discussed

3.6 Smart Infrastructure - Intelligent Traffic Management :

Smart infrastructure

Infrastructure:

For any settlement, a basic infrastructure is always Needed to thrive and grow. For villages to become smart, Connectivity through roads, availability of transportation Facilities, waste management systems and water Conservation bodies like construction of lakes, canals, Reservoirs, etc. from agriculture perspective is important.

Utility:

Availability of basic utilities is important. Access to Electricity, drinking water, sanitation, basic healthcare, Access to clean cooking fuel and access to internet is Necessary to make a village smart.

Education:

From the social point of view, education is a very Important domain as a society will become healthier, Safe and economically independent with education. Primary education, skill development for local pool and Community awareness will play an important role.

Security:

Security is one of the most important aspect; installation Of CCTV camera for surveillance will help smart village to Take adequate measures for social security.

Finance:

Availability of banking and micro finance facilities at Village level will encourage villagers to participate In economic affairs and will help to grow local Entrepreneurship.

Technology:

Use of technology is a key factor for making a village Smart. Digital education and use of technology through Mobile phones, mobile applications and computers, etc. Will put smart village development on a faster pace.

Alternative Energy:

Alternative energy sources are important in areas where Electrical grid supply is unavailable; as absence of Electricity can hamper several basic activities. Integration Of Renewable energy sources to existing setup will ensure Affordable and reliable power when needed.

Disaster Management:

Emergency response comprising of a CBDP and resource Inventory will make smart villages more independent to Handle emergencies.

Intelligent Traffic Management

With the increasing world population, the number of problems has increased. The problems associated with our social environment have tremendously increased. These problems involve pollution, hunger problems, traffic issues, health issues, etc. The problem to focus on today is Traffic.

In the past few decades, traffic congestion has extremely increased. The solution to this traffic congestion is some digital or intelligent system that could help in better flow of traffic and less congestion. It is the time when we should leave behind our antique systems and apply new technology and innovations in our lives. As it is quite difficult to widen the roads or make the cars small but it is possible to control them efficiently and in a better way. One of the possible solutions is an intelligent system with controls the system in a better way than the conventional ways.

If we see the conventional traffic management system, some of the traffic signals are automatic signals which use timers and some of them are manual in which a traffic warden is standing who changes the signal according to the traffic condition. The problem arises when there's a signal with timer and there is no traffic from the opposite side, but still, some people have to wait till the timer ends. This causes a huge traffic line in that opposite direction. The other problem is that the warden may provide large time to one side by mistake, which again creates a huge line in the opposite direction. Another problem is of over-speeding. Some unreasonable people of the society violate the rules which if for their own betterment. Over-speeding can cause fatal accidents and deaths too. The conventional method is to use a speed checking camera. If a vehicle crosses the speed limit, the camera tells the speed and the traffic warden runs his car behind that vehicle, stops him and gives him a warning in the form of a "Challan".

3.7 Cyber Security :

The world is experiencing an evolution of Smart Cities. These emerge from innovations in information technology that, while they create new economic and social opportunities, pose challenges to our security and expectations of privacy. Humans are already interconnected via smart phones and gadgets. Smart energy meters, security devices and smart appliances are being used in many cities. Homes, cars, public venues and other social systems are now on their path to the full connectivity known as the "Internet of Things." Standards are evolving for all of these potentially connected systems. They will lead to unprecedented improvements in the quality of life. To benefit from them, city infrastructures and services are changing with new interconnected systems for monitoring, control and automation. Intelligent transportation, public and private, will access a web of interconnected data from GPS location to weather and traffic updates. Integrated systems will aid public safety, emergency responders and in disaster recovery. We examine two important and entangled challenges: security and privacy. Security includes illegal access to information and attacks causing physical disruptions in service availability. As digital citizens are more and more instrumented with data available about their location and activities, privacy seems to disappear. Privacy protecting systems that gather data and trigger emergency response when needed are technological challenges that go hand-in-hand with the continuous security challenges. Their implementation is essential for a Smart City in which we would wish to live. We also present a model representing the interactions between person, servers and things. Those are the major element in the Smart City and their interactions are what we need to protect.

3.8 Retrofitting- Redevelopment- Greenfield Development District Cooling :

Retrofitting

Retrofitting means providing something with a component or feature not fitted during manufacture or adding something that it did not have when first constructed. It is often used in relation to the installation of new building systems, such as heating systems, but it might also refer to the fabric of a building, for example, retrofitting insulation or double glazing.The process of retrofitting involves the careful balancing of different elements and their effects on the overall performance of a building. A change in one part of a building can affect another, and sometimes this is only apparent after irreversible defects have occurred.

Redevelopment

Redevelopment is conceptually similar to land readjustment, with the exception that it happens in existing urban areas and often involves a rezoning by the government of a given area from a low-density (single-family housing) to higher-density (mixed-use or commercial) development. It is also accompanied by a provision of infrastructure improvements (mass transit, such as metro lines) that can support such up-zoning.As part of this process, a government assembles the individual private properties and undertakes a new higher development plan and delivers the necessary infrastructure. At the end, the government returns to each landowner a share of the overall new development that is equivalent to their original land or property ownership. It retains a share of the development that it then sells to recover the cost of the infrastructure improvement.

Greenfield Development District Cooling

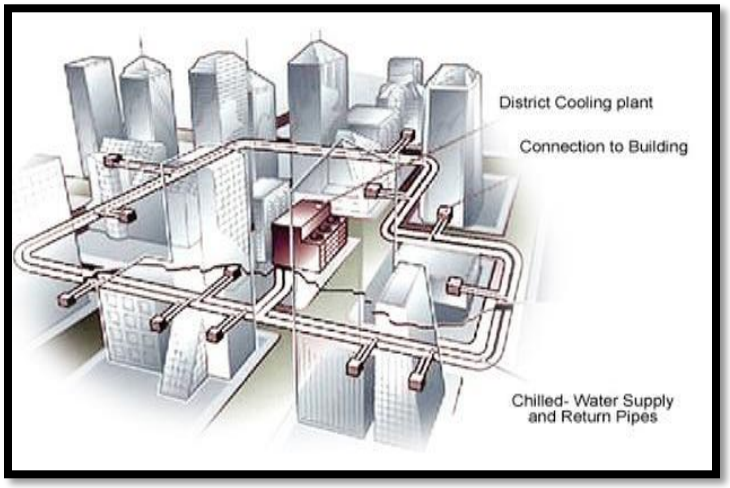
India has the largest population facing risks due to lack of access to cooling across all settings. Cooling is a developmental need and by 2050, India is set to be the largest consumer of space cooling in the world. District cooling can help rein in the environmental impacts such growth has typically entailed in other countries. In addition, district cooling can provide much needed

flexibility and resilience to a power system that will see massive increases in renewables over the coming decades.

District cooling is now locked into the city's Smart City Plan and Area-Based Development plan which has helped to anchor the project. The 2019 Climate Resilient Cities Action Plan also lists district cooling alongside other key measures to address cooling and improve climate resilience such as urban greening. District cooling is also seen as a key technology to reducing power demand – summer months in Rajkot see a 40% higher average monthly power demand, due to cooling

HOW DOES DISTRICT COOLING WORK?

The fundamental idea behind modern district cooling is the use of local energy sources: heat, cold and fuel sources that under normal circumstances would be lost or remain unused. Cooling is produced centrally and the cooling media – cold water – is distributed to customers via a closed pipe network. A heat exchange process inside a substation located in the customer's premises transfers heat from the customer's internal cooling circuits into the network. This surplus heat can later be used in heating.Sources of free cooling that can be harnessed include rivers, lakes, sea and ground water. Heat energy can also be converted into cooling through an absorption process. Depending on local circumstances, free or inexpensive heat sources can include biofuels, solar panels and surplus heat from electricity co-generation (CHP). In addition to sources of free cooling and absorption, district cooling can also make use of heat pumps that produce heat and cold energy simultaneously in the same process. Large-scale industrial chillers used in district cooling often consume less than half the electricity need of individual chillers.Besides the use of local energy sources, another major advantage of district cooling is the ability to store cooling energy over time. One way to do this is to store cold water in tanks. Storage makes it possible to cut peak load and significantly optimize production.



3.8.1 District Cooling plant

THE MARKET FOR DISTRICT COOLING

Cooling is needed in many kinds of buildings, including office buildings, shopping centers, hospitals, hotels, data centers, manufacturing plants and homes. Even though peak consumption occurs during hot weather, cooling is often needed throughout the year. Over 40% of commercial and institutional buildings in Europe already have cooling systems, and this figure is set to grow

to 60% by 2020. A district cooling business is easy to start in a new building area, especially in a dense city center filled with commercial buildings. New buildings are easily designed to be suited for district cooling.Comfort cooling is also becoming more common in residential buildings. Rising standards of living mean that people are willing to pay for more comfortable living conditions. Environmental awareness channels the demand towards sustainable and eco-friendly solutions. Stricter building standards are encouraging low-energy houses that reduce cooling needs with insulation and other passive methods, but there is also need for additional mechanical cooling, and the method used to produce it must be sustainable.Cooling is critical for data centers, manufacturing equipment and many industrial processes. The availability of inexpensive and sustainable cooling is a key factor in location decisions in hi-tech industries.

ENVIRONMENTAL BENEFITS

An important step in combating climate change is replacing old-fashioned energy production systems with modern, efficient and environmentally friendly solutions. District cooling represents the modern approach: it replaces inefficient individual electric cooling systems with an effective centralized system that utilizes local energy sources.The majority of comfort cooling in Europe and around the world is today produced by small, electrically driven cooling machines. These conventional chillers are inefficient, consuming as much as twice the primary energy of large-scale industrial chillers used in district cooling. District cooling can moreover be part of a multi-generation process, where electricity, heat and cooling are produced simultaneously as eco-efficiently as possible. When natural sources of cold water, surplus heat and waste heat are used to produce district cooling, its primary energy factor can be five to ten times less than that of cooling systems based on conventional chillers.Thanks to its efficiency, district cooling is an effective way to reduce greenhouse gases and also other harmful emissions in an urban environment. Replacing conventional systems with district cooling significantly reduces carbon dioxide, nitrogen oxide, sulphur dioxide, particulate and other emissions.

3.9 Strategic Options for Fast Development :

The strategy template consists of Standard local development strategy components, such as

Description of assets and opportunities of the village as well as challenges and needs and a SWOT analysis; A clear intervention logic including a hierarchy of objectives to respond to SWOT, key actions to achieve objectives, expected outputs and results;Planning of financial and human resources;Specification of the capacity needed for implementation, management and monitoring procedures.Components that reflect the basic principles of the ‘smart village’ conceptStakeholder engagement: sections for describing the methods of engaging the local community at all stages from needs assessment, through strategy development, to planning actionsLinks to existing local strategies: sections for describing how the strategy builds on existing strategies and work at the local level, to avoid the duplication of efforts.

Links to programmes/ strategies at higher administrative level: sections for describing how the strategy contributes to the objectives of higher-level (micro-regional/ LAG, regional, national) strategies and programmes. This can ensure that the strategy is not developed in isolation, and could contribute to identifying relevant funding sources later on.

Smart solutions: it is recommended that proposed solutions include a series of innovative elements (digital, social, technological or other innovations) that can help the village to overcome its challenges in a ‘non-traditional’ way).

3.10 India’s Urban Water and Sanitation Challenges and Role of Indigenous

The world's towns and cities are growing rapidly. By 2050, 70 per cent of the world's population, some 6.4 billion people, are expected to live in towns and cities, almost doubling the current urban population. Water utilities struggle to keep pace with this rapid urbanization with urban utility water coverage in many low and middle income countries declining in recent years as they fail to keep pace with growth. Governments and utilities face the constant challenge of balancing the need for water services to be financially self-sufficient with the critical need for poor households to have access to consistent (as opposed to intermittant) service. Lack of wastewater treatment and proper sanitation facilities have a significant impact on the urban environment and the health of citizens. Many countries are also struggling with the availability of water.

1. Urban Water Supply in India

This section provides an analysis of the current situation in urban water supply in India. It presents this analysis in three parts: household, water distribution and treatment systems, and water sources.

a. Arrangements and Access

Households Arrangements: Historical Trends and Distribution the distribution of households according to the primary source of drinking water reported by Census 2011. Nearly 70 per cent households have access to tap water, out of which 62 per cent have access to treated tap water. Thus, nearly 40 per cent of urban Households have no access to public supply, and have to depend on other sources of water.Moreover, not all households that have access to public supply have access to it within the Premise. Only 49 per cent of households have access to piped water supply within Their premises.

b. Water Distribution Systems and Treatment

Incomplete Coverage and Inadequate Infrastructure As highlighted in the earlier section, there is incomplete coverage by public supply. While there are several challenges with service standards, expansion of coverage remains a critical issue. This is especially a concern for smaller towns, many of which might not have any kind of infrastructure system in place. However, given the general concerns with operations and maintenance, highlighted below, it is essential that adequate O & M systems are put in place to ensure sustainability of the new infrastructure being created.

c. Water Sources for Indian Cities

Indian cities depend on either surface water, or ground water, and more commonly on a mix of ground and surface water. Whether the city is getting water from surface or ground sources, there are a set of environmental concerns with both, which are highlighted in this section.

3.11 Initiatives in village development by local self-government :

Local self-government operates at the lowest level of society. It works at the grass root level to the people touching their everyday lives. Local self-government, to borrow a phrase from Sydney Webb, is "as old as the hills".This can be more true of India than any other country of the world. There is sufficient evidence to establish the fact that the institution of local self-government is almost, pre-historic, and the conception of local self-government is indigenous to the Indian soil. Municipal governments have flourished in India since times immemorial. While empires rose and fell, village panchayats which formed an integral part of the national life, helped to preserve democratic traditions in social, cultural, economic and political life, survived the onslaughts of centuries of political upheavals and saved Indian society from disintegration. The existence of local bodies in ancient India is a positive proof of the inherent genius of our people to manage local affairs efficiently and on a decentralized basis. Local government is government at the village and district level. Local governments got a fillip after the 73rd and 74th Constitution Amendment

Acts. Later in 1992, the 73rd and 74th constitutional amendments were passed by the Parliament. The 73rd Amendment is about Rural Local Governments (which are also known as Panchayati Raj Institutions or PRIs) and, The 74th amendment made the provisions relating to Urban Local Governments (Nagarpalikas).The 73rd and 74th amendments have created uniformity in the structures of Panchayati Raj and Nagarpalika institutions across the country. The 73rd and 74th Amendments came into force in 1993.Rural Local Governments (or Panchayat Raj Institutiions) under this comes Zilla Panchayat , Mandal Or Taluka Panchayats and Gram Panchayats. Then comes Urban Local Governments (or Nagarpalikas) which has Municipal Corporations, Municipal councils and Nagar Panchayats.in 1882, Lord Ripon believed that the aim of Local Self Government was to train the Indians to manage their own affairs themselves

3.12 Smart Initiatives by District Municipal Corporation :

The Government of India launched the Smart Cities Mission on 25th June, 2015 with an objective to promote sustainable and inclusive cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions. Gandhinagar secured 9th rank among 30 new cities announced on 23rd June, 2017 by Ministry of Urban Development (MoUD) for development as smart cities under the Smart City Mission. The implementation of the Mission at the City level is being done by a Special Purpose Vehicle (SPV) created for the purpose. The SPV plans, appraises, approves, releases funds, implements, manages, operates, monitors and evaluates the Smart City development projects. A Special Purpose Vehicle (SPV), Gandhinagar Smart City Development Limited (GSCDL), is formed for Gandhinagar city to incorporate Smart Solutions.

The initiatives taken by Vadodara Municipal Corporation are

i. Installation of CCTV camera
ii. Make a green houses
iii. Make solar roof system
iv. Biogas plant system

3.13 Any Projects contributed working by Government / NGO / Other Digital Country Concept

The Digital India initiative mainly consists of three components that form the fundamental characteristics of the programme: universal digital literacy, delivering all government services to citizens digitally, and development of secure and stable digital infrastructure. The initiative also aims to connect rural areas with high-speed internet networks.

- BharatNet
- Bharatmala
- Startup India
- Standup India
- Make in India
- Sagarmala
- Industrial corridors
- UDAN-RCS
- E-Kranti

3.14 How to implement other Countries smart village projects in Indian village context (Regarding Environment , Employment) :

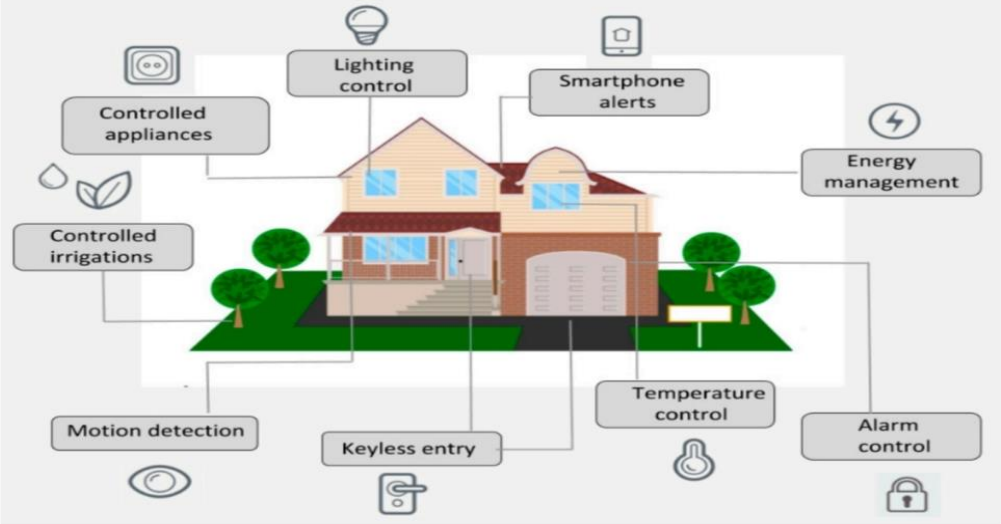
1. Locally produced and locally consumed energy: In villages if the mountains, hilly area are present then use of solar Energy & wind energy then energy is produce in that village itself & use For development of village.
2. Creation of job: Generally village people migrate from village to city for purpose of job. If village becomes smart so all the job requirements are fulfills & People not migrate from one place to another.
3. Contribution to global environment: The system can reduce reliance on fossil fuels &contribute to reduction Of green house gases such as carbon dioxide .Energy consumption Optimization 25-30% average energy saving.

3.15 An IoT-Based Smart Home Automation System

3.15.1. Introduction

The Internet of Things (IoT) is a system that allows devices to be connected and remotely monitored across the Internet. In the last years, the IoT concept has had a strong evolution, being

Fig.3.15.1 An IoT-based smart home depicting the use of smart sensing devices for different



purpose

currently used in various domains such as smart homes, telemedicine, industrial environments, etc. Wireless sensor network technologies integrated into the IoT enable a global interconnection of smart devices with advanced functionalities. Awireless home automation network, composed of sensors and actuators that share resources and are interconnected to each other, is the key technology to making intelligent homes. A “smart home” is a part of the IoT paradigm and aims to integrate home automation. Allowing objects and devices in a home to be connected to the Internet enables users to remotely monitor and control them. These include light switches that can be turned on and off by using a smartphone or by voice command, thermostats that will adjust the

indoor temperatures and generate reports about energy usage, or smart irrigation systems that will start at a specific time of a day, on a custom monthly schedule, and thus will control water waste. Smart home solutions have become very popular in the last years. Figure 1 shows an example of a smart home that uses different IoT-connected utilities. One of the greatest advantages of home automation systems is their easy management and control using different devices, including smartphones, laptops and desktops, tablets, smart watches, or voice assistants. Home automation systems offer a series of benefits; they add safety through appliance and lighting control, secure the home through automated door locks, increase awareness through security cameras, increase convenience through temperature adjustment, save precious time, give control, and save money. Several home automation systems involved with IoT have been proposed by academic Researchers in the literature in the last decade. In wireless-based home automation systems, Different technologies have been used, each of them with their pros and cons. For example, Bluetooth-based automation [4–6] is low cost, fast, and easy to be installed, but it is limited To short distances. GSM and ZigBee are widely used wireless technologies as well. GSM Provides long-range communication at the cost of a mobile plan of the service provider that Operates in the area. Zigbee [7–12] is a wireless mesh network standard that is designed To be low-cost and with low power consumption, targeted at battery-powered device In wireless control and monitoring applications. However, it has a low data speed, lo Transmission, as well as low network stability, and has a high maintenance cost. Wi-Fi Technology is used in [9,11–18]. The advantages of Wi-Fi technology over ZigBee or Z-Wave Are related to price, complexity (meaning simplicity), and accessibility. First, Wi-Fi-enabled Smart devices are usually cheap. In addition, it is easier to find do-it-yourself devices that Use Wi-Fi, resulting in a less expensive option. Second, Wi-Fi is already a necessity and it Is in most homes, so it is easier to buy devices that are already Wi-Fi-enabled. Finally, Wi-Fi is characterized by simplicity, meaning that a user must connect only a minimal Number of devices for a home automation setup. Since it is very common, the investment On extra hardware is avoided; A user only needs the basic setup for a home automation System. However, Wi-Fi is not designed to create mesh networks, it consumes ten times More energy than similar devices using ZigBee, Z-Wave, or Bluetooth for example, and Many Wi-Fi routers can only allow up to thirty devices connected at once. As compared To Ethernet, Wi-Fi brings several advantages, including the easy connection and access of Multiple devices, the expandability (adding new devices without the hassle of additional wiring), lower cost, or single access point requirement. The cons include limited distance to cover (a Wi-Fi network with standard equipment can be limited in range through wall.

What makes our proposal different from others is highlighted . it is different in terms of the technologies used, the controllers, the type of communication, the user interface, and most of all the applications regarding what solutions it can offer in terms of a smart home. The communication technology represents a key point to achieve successful operation in a home automation system. In many papers in the literature, the authors combine several communication technologies; for example, the authors use either a wired or a wireless technology to connect the sensors with the nodes, a wireless technology to send data from nodes to storage centers, etc. Ethernet and/or a Wi-

Fi local network are usually enough for a working qToggle setup. Most low-cost devices for IoT usually support Wi-Fi, and most households are able to provide enough wireless coverage with several low-cost devices. The best node and the selection of the processor (controller) for an IoT-based home automation system are chosen considering the necessities and the characteristics a user wants for the system. Even if most automation systems presented in the literature use Arduino boards, the Raspberry family are frequently used as well, since they are more potent than the Arduino boards and have powerful computing abilities that allow the implementation of more demanding software and algorithms. Hence, we chose the Raspberry Pi board for the proposed system. Our system has not only a research scope, but we intended to develop a system that can be successfully used in practice and as well as monetized in the future. The microcontroller used for the proposed system is the ESP8266 chip, due to its size, ultralow power consumption, powerful on-board processing, and storage.

3.15.2. Materials and Methods

3.15.2.1. System Architecture and Design

The classic Ethernet and/or a Wi-Fi local network are usually enough for a working qToggle setup. The different hardware used in the system includes Raspberry Pi 3 or 4 boards (any model), ESP 8266 Wi-Fi modules, and smart devices. The Raspberry Pi Version used for this project is Raspberry Pi 4, due to the improvements brought, as Compared to previous versions. For example, Raspberry Pi 1 and 2 do not have Bluetooth (it is needed for controlling the thermostats). An important feature of the Raspberry Pi is The row of general-purpose input/output (GPIO) pins. A 40-pin GPIO header is found on All current Raspberry Pi boards [44]. The three roles of a Raspberry Pi board in a qToggle Setup are the following: the board could act as a qToggle device when it is equipped With peripherals (sensors or relay boards), it could also act as a master hub for other Devices, and, finally, it could help install the ESP firmware on some devices, when running Tuya Convert OS (Tuya is a Chinese smart devices platform that offers cloud services for ESP8266/ESP8285-based devices). Tuya Convert OS helps replace this proprietary Tuya Firmware with a custom firmware, without disassembling the device. An important fact Is that it works only for Tuya-based devices. In fact, Tuya Convert OS is a customized Raspbian OS image that runs Tuya Convert with a friendly user interface. The main part of the home automation system based on IoT is the microcontroller. The ESP 8266 Wi-Fi module represents a set of efficient highly integrated wireless Systems On Chip (SoCs), which provides a complete and standalone Wi-Fi network solution. The ESP8266EX version is one of the most integrated Wi-Fi chips in the industry. In addition to Its Wi-Fi functionalities, ESP8266EX integrates an enhanced version of L106 Diamond series 32-bit processor from Tensilica (company based in Silicon Valley, in the semiconductor Domain), with on-chip SRAM. ESP8266EX has seventeen GPIO pins, which can be assigned To various functions by programming the appropriate registers, two power pins, one Ground pin, reset pin, and two clock pins. The devices used by qToggle are usually sensors Or actuators with an upstream network connection. Keeping the device firmware updated Is probably one of the most essential tasks, and it is often neglected when dealing with a Large number of

devices. qToggle facilitates this task by allowing updates of the firmware Very simply for devices of different types and models. The qToggle API is an intuitive HTTP API that enables remote controlling of basic hardware ports, such as GPIOs or Analog-to-digital converters (ADC). The idea behind qToggle is to control programmable systems having a TCP/IP stack Via simple HTTP requests. For example, these systems can be single-board computers or TCP/IP-enabled microcontrollers. API functions are grouped into the following categories:

- Device management—general status and configuration of the device;
- Port management—port information and configuration;
- Port values—reading and writing values from and to ports;
- Notifications—event notifications;
- Reverse API calls—API calls via reverse HTTP requests.

API specifications may seem quite complex, offering a wide range of functionalities And use cases. However, most of them are optional, and only a small set of functions are Mandatory for a qToggle implementation. The qToggle ecosystem is composed of a qToggleServer, qToggleOS, espQToggle, Add-ons, and other tools and packages that are specific to certain setups and use cases. The main component is qToggleServer, which is written in Python. It acts as a hub and Provides the user-friendly web app. qToggleOS is an operating system (OS) ready to Be used with Raspberry Pi boards and runs qToggleServer. espQToggle is a custom Firmware for ESP8266/ESP8285 devices and implements the qToggle API. Finally, add- Ons are optional pieces of software that enhance the functionality of qToggleServer. A Device used by qToggle will describe itself, indicating its configuration, its supported Optional functionalities, and what ports it exposes. Each port, in its turn, will describe Itself, indicating its identifier, type, configuration, and so on. By combining master–slave Relationships between simple devices and hubs in a network, a complex tree topology Is obtained. Thus, a large number of smart devices can be easily managed, as shown in Figure 2. The type of communication in Figure 2 is Wi-fi or Ethernet. Consumers .

3.15.2.2. Configuring the Web Application

qToggle Server provides a user-friendly interface, named frontend, which comes in the form of a progressive web application (PWA). It is designed to be used on smartphones, tablets, but also on laptops/desktop machines. Firstly, the application should be installed and, being a PWA, it should be added to the home screen. After installation, the qToggle app will be found in the applications list of the device, and it can be uninstalled whenever the user wants to. When the user logs in for the first time (see Figure 3a), an admin with an empty password should be used. However, for security reasons, it is highly recommended to set a password in the Settings page of the app. The dashboard is the section where users will spend most of the time when using qToggleServer. Here, they can create panels and groups of panels, as shown in Figure 4. In the panel edit mode, the user can perform various tasks, for example add, move around, remove, resize, or configure widgets. Widgets usually require selecting one or more ports. Ports values will be displayed and/or changed by the widget upon interaction. An example is given in Figure 5. The ports section is only

accessible to administrators. In this section, the user may add, remove, and configure ports (see Figure 6). If users have slave devices management enabled in qtoggle server. conf (by default they are enabled), the first thing they will have to do is to select the device whose ports will be edited.The first device in the list represents the hub (the master device) itself. An important fact is that only administrators can add, remove, and configure slave devices .

3.15.3 Real Home Case Study

Fig.3.15.3.1 Working with widgets: dashboard layout (a), widget properties (b).

In the following, the use of qToggle in a real home will be presented. The scenario consists of a two-floor house with five rooms, two bathrooms, kitchen, pantry, shed, gar- age, and garden. In this case, qToggle is used for various purposes, such as:

- Controlling the indoor temperature (thermostats and air conditioning (A/C));
- Controlling the lights (on–off);
- Monitoring the power and the energy;
- Controlling the doors—gates, garage door, or both at the same time (open–close);
- Security—the alarm;
- Garden sprinklers.

3.15.3.1. Controlling Temperatures and A/C

The purpose of controlling the indoor temperatures is to maintain thermal comfort and to save energy cost. In this case, the thermostats system offers the following advantages: the ability to

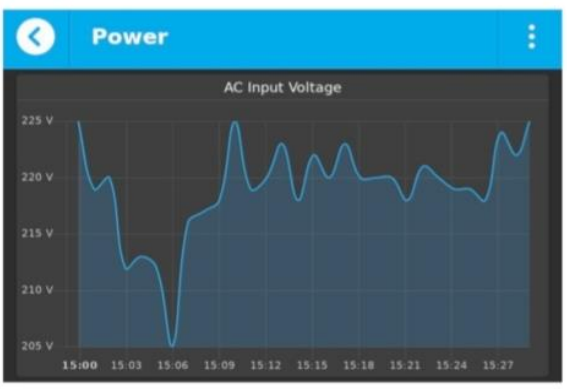
access and control the indoor temperature anytime and from anywhere using qToggle app on the mobile phone, as presented in Figure 8a, the ability to monitor and separately set the temperature in individual rooms (not every room has the same heating requirements), and, finally, the ability to enable scheduling (lower the temperature during the day, when nobody is home, or during vacation). In this way, manual adjustments are eliminated to save time.

3 15.3.2. Controlling the Lights

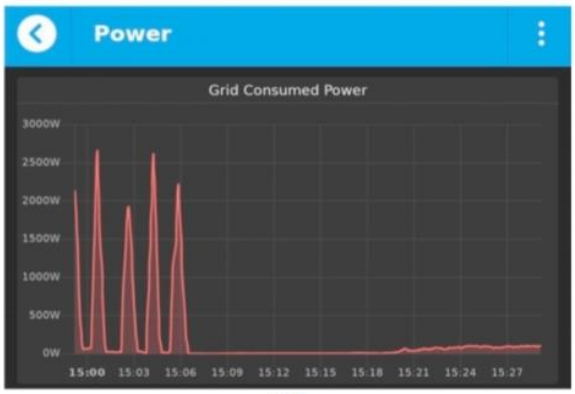
The proposed lighting control system on the qToggle app is shown in Figure 9. One Of its main advantages is, of course, the comfort. Smart lights can, without any doubts, Make our everyday life easier. Another advantage is related to energy saving. Big houses, With many rooms, can waste a lot of energy by simply leaving the lights on where they are Not needed. In addition, many people forget the lights on somewhere in the house, when Going to bed or leaving the house. In these cases, it is easy to see where lights are on and to Control them using the mobile app. In addition, a smart lighting control system supports Home security by providing increased protection. For example, this means that while away On holiday, the lighting system could periodically switch on and off lighting in the house, As if someone were actually home. The light can be controlled through qToggle app, or Using Google Home assistant and the voice command “turn on/off the light in … room”.

3.15.3.3. Energy and Power Monitoring

Nowadays, the whole world is looking for sustainable and energy efficient solutions To make our planet greener, so the use of renewable energy sources, such as solar energy to The maximum



(a)



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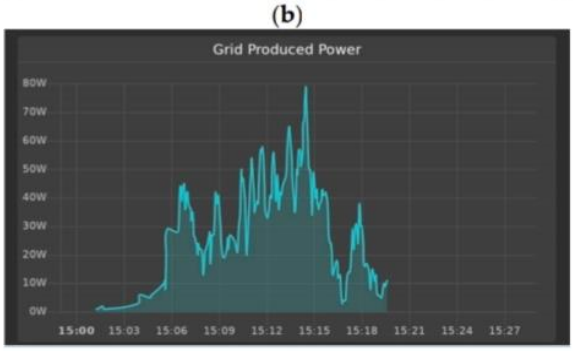
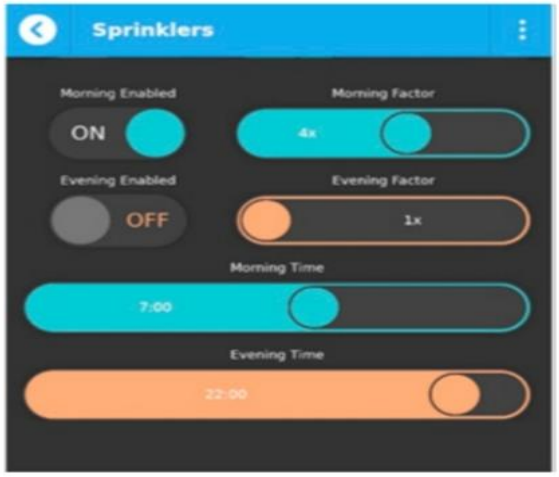


efficiency possible is the best solution. Photovoltaic panels convert the sun's Rays into electrical power and have become more affordable than ever. Combining the Energy savings of solar systems with the smart technology, the benefit of renewable energy In a home is maximized. Home solutions can be fully automated using solar power. In Addition to cutting energy bills and providing energy efficiency, solar power-based home Solutions provide for the reduction of individual carbon footprint, give off zero emissions, And reduce overall environmental damage. For this case study, thirty-three photovoltaic (PV) panels have been installed, in two stages:

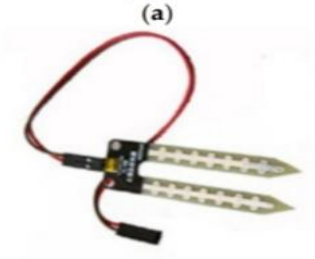
Fig.3.15.3.3 An example of monitoring the power with qToggle: AC Input Voltage (a); House Power (b); Gris Consumed Power (c); Grid Produced Power (d).

3.15.3.4. Access Control and Security

Access control involves controlling entrances, gates and doors, in this case study, the Gates and the garage door, specifically. Various options can be chosen: to fully open or Close only the gates, only the garage door, or both at the same time, or to keep half open One of them or both, as shown



(a)

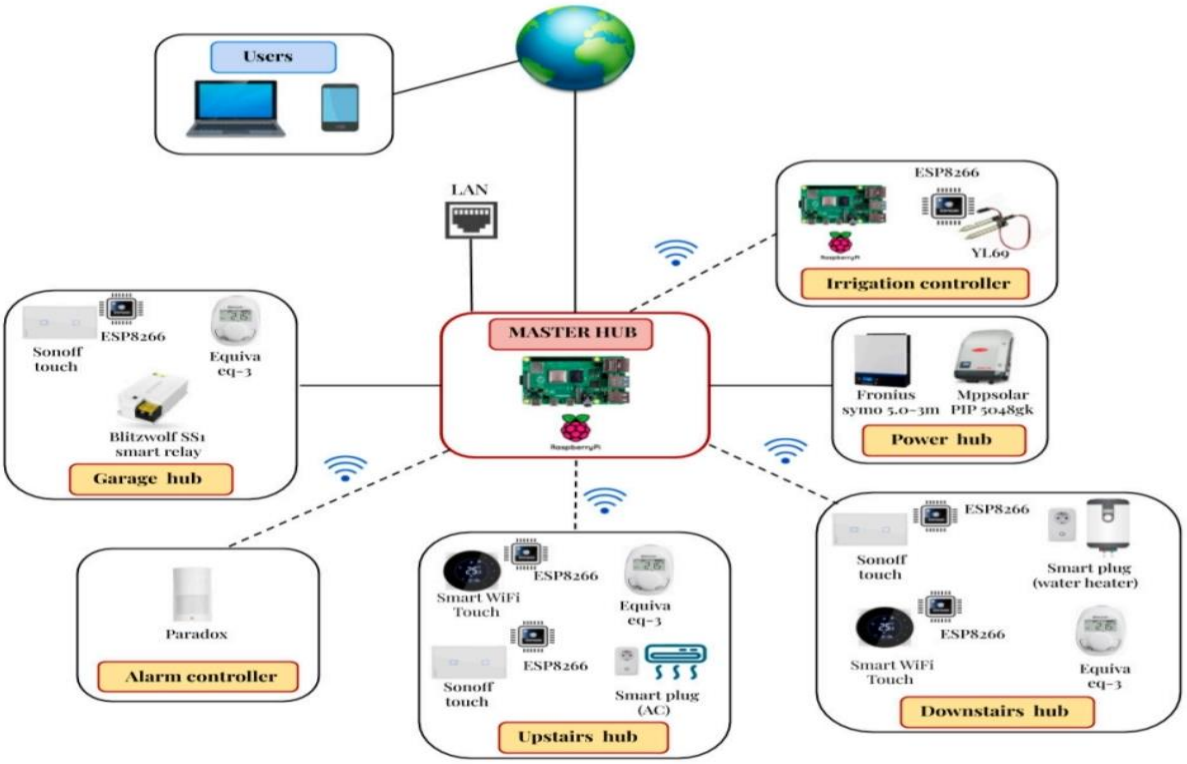


in Figure 12a. Access control can be done manually, using The app, and by vocal commands, using Google assistant on a smart watch. To control Gate motors and the garage door, we used two Blitzwolf SS1smart relay boards that enable Remote opening/closing. This allowed us to mimic the conventional gate remote control Using our Wi-Fi-based system.

Fig.3.15.3.4 Controlling the irrigation system with qToggle (a) and the YL 69 sensor (b).

3.15.3.5. Controlling the Irrigations

Automated irrigation systems help people control the water used in their gardens or fields and, thus, to avoid water waste, to save energy and time, and to minimize water bills. Using an automatic system based on valves instead of the classical manual irrigation also avoids human errors, for example forgetting to irrigate one day, not being able to do it, or forgetting to turn off the water after irrigation. The proposed irrigation system is based on Raspberry Pi and controls a number of pop-up sprinklers. The system inside the well contains: electric valves (Rain Bird DV/DVF valves), one standard 1.1 kW water pump, a Raspberry Pi board connected to the house LAN, and a pressure switch (Easy Press II model, with a maximum pressure of 10 bar). Figure 13a



shows how the irrigation system can be controlled using the qToggle app.

Fig.3.15.3.5 qTogglearhitecture for the presented case study.

The qToggle architecture for this case study is composed of a Master hub connected to The house LAN and six hubs connected to the Master hub:

- Upstairs hub—controls lightning and HVAC systems upstairs
- Downstairs hub—controls lighting and temperatures downstairs
- Power hub—in charge with energy and power monitoring
- Garage hub—controls lights, temperature, and access
- Alarm controller—motion monitoring and alarm system

3.15.4. Discussion and Future Work

In this project, we proposed a simple solution for home automation based on ESP8266 chips and Raspberry Pi boards. Both choices are cost effective, small, and easy to work with. Moreover, the proposed qToggle system uses a very basic core API, allowing for a more flexible network design. qToggle is aimed to be a complete smart home prototype, with a lot of functionalities—automation, control, monitoring, and security—and it is a system that could be continuously developed and improved. One contribution of this paper involves the reviewing of the recent (last 10 years) papers published in the literature, commercial solutions, and open source home automation systems (Tables 1 and 2), so that the paper could be considered a survey. As compared to other papers in the literature, the proposed paper details the implementation of the solution (both hardware and software). Most smart home systems presented in the literature [4–34] have been made with fewer functionalities, using different technologies, controllers, type of communication, user interface, etc., and this is emphasized in Table 1. qToggle works with a selected list of devices, imposing a unitary API, firmware, and so on. We provide the open source firmware, meaning that no hacks and no 3rd party hubs or clouds are required; all devices speak the same language (API) and are controlled the same way. The supported devices are tested thoroughly, with a well-documented installation procedure. This does not mean that other devices cannot be added to qToggle: there are add-ons that provide bridges and adaptation layers to different peripherals, networks, and technologies. Regarding the number of devices, qToggle is highly scalable thanks to its master–slave architecture. One device can be at the same time a master to other slave devices and a slave for another master, at a higher place in the hierarchy. The core of qToggleServer, as well as the firmware that runs on ESP8266-based devices, are entirely asynchronous, meaning that a request can never block the functioning of the device. In turn, this allows for a relatively large number of incoming requests per second to each device, increasing the scalability of the system. In this paper, we present a real case study (a real home) and all the features the proposed system (including the app) offers to make life easier and cheaper. The proposed solution can be implemented by any used using the code available on Github and can be used successfully in reality. This paper offers a description on how the system is implemented, how the app can be installed and configured, what functionalities are covered, and what devices can be used in order to have a smart home. qToggle's strengths lie in its simplicity and flexibility. In addition, we intended to provide a low-cost home automation system. It is well known that the deployment and maintenance of a commercial home automation system come with a high cost. This cost is even higher if the number of devices that compose the system and used technologies grows. Usually, a

CHAPTER:-4.ABOUT PINDHARADA VILLAGE

4.1 Introduction about Pindharada village

Pindharada village is located in the Gandhinagar taluka of Gandhinagar district of Gujarat state. Nearest town from Pindharada village is unava which is 6 km away from pindharada.

PIN CODE: 511240

DISTRICT: Gandhinagar

STATE: GUJARAT

Area of village	596.10 hectre
Total population	1858
No of household	418
Male population	937
Female population	921
Age group between 0-6	219
Male between 0-6	107
Female between 0-6	112
Schedule cast population	55
Literates	1321
Agriculture labour	217

Table 4.1.introduction of pindharada village

Caste data as per census 2011

In pindharada village, most of the village population is Schedule Caste (SC) constitutes 2.96 % of total population in Pindharada village. The village Pindharada currently doesn't have any Schedule Tribe (ST) population.

Work profile as per census 2011

In Pindharada village out of total population, 588 were engaged in work activities. 97.96 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 2.04 % were involved in Marginal activity providing livelihood for less than 6 months. Of 588 workers engaged in Main Work, 117 were cultivators (owner or co-owner) while 217 were Agricultural laborers.

4.1.2 Justification/Need of study

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.

4.1.3 Study Area (broadly defined)

Pindharada village is located in Gandhinagar taluka in Gandhinagar district of Gujarat state. It is a small village consisting population of 1858 only.. Total area of the village is 596.13 hectares. It includes 315.10 hectares land for agricultural purpose and 285.93 hectares land for Residential area. The nearest town to the pindharada is Gandhinagar which is 13 km away from village. The other nearest town is the unava that is 6 km away from the village. The village has bus station, Gram Panchayat, Community Hall, Primary School and Secondary and Higher Secondary School, Primary Health Centre (PHC) etc. The nearest river is Sabarmati River and it is the main source of irrigation for village. Pindharada is about 50 km from Modasa. It is the small town. Nearest villages from pindharada are unava , mansa.. It is 141 m above sea level. The total land area of village pindharada is 596.10 hectares. Out which 315.1 hectares land is Agricultural land and the rest of the land is used as Residential area. The Total Population of pindharada is 1858 as per census 2011. There are 937 male in the village and 921 females are there. Literacy rate for male in the village is 90.72% and that for female is 70.38%.

4.1.4 Objective of study

- Prevent distress 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.
- Make the model village a “hub” that could attract resources for the development of other villages in its vicinity. Provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such villages
- Contribute towards social empowerment by engaging all sections of the community in the task of village development.
- Create and sustain a culture of cooperative living for inclusive and rapid development.

4.1.5 Scope of study

Scope and Importance of Rural Development Rural development is a dynamic process, which is mainly concerned with the rural areas. These include agricultural growth, putting up of economic and social infrastructure, fair wages as also housing and house sites for the landless village

planning, public health, education and functional literacy, communication etc. Rural development is a national necessity and has considerable importance in India because of the following reasons. 1. About three – fourth of India's population live in rural areas, thus rural development is needed to develop nation as whole 2. Nearly half of the country's national income is derived from agriculture, which is major occupation of rural India. 3. Around seventy per cent of Indian population gets employment through agriculture. 4. Bulks of raw materials for industries come from agriculture and rural sector 5. Increase in industrial population can be justified only in rural population's motivation and increasing the purchasing power to buy industrial goods. 6. Growing disparity between the urban elite and the rural poor can lead to political instability The main objective of the rural development program is to raise the economic and social level of the rural people.

4.1.6 Methodology

- Having detailed and updated information on all aspects of a village – the VILLAGE DATABASE
- Getting the village people together, and interested and involved in the planning and development processes and activities – GETTING PARTICIPATION
- Systematically preparing plans for various kinds of developmental activities, executing them and managing the systems and projects developed – PLANNING, EXECUTING and MANAGING.

4.1.7 Available Methodology for development of related to Civil :

Designing a Rural Areas Development Project is a condition of finding rational solutions for The rural areas involved. The process of building a rural development project must address:

1. The main nature-related criteria which include:
- Classification potential of arable land soils,
- Environmental protection with elements of landscape shaping and cultural heritage Protection
2. Design and technical criteria which include studies in the localization of nature objects.
3. Economic analysis of the implementation of a rural areas development project which Comprise:
- A balance of property resources belonging to the State Treasury and municipalities, Possibilities to increase the State Treasury's property resources under the structural Pension programme and the Farmers' Social Insurance Act,
- Potential income source of people living in rural areas.
4. Legislation-related criteria include:
- Defining the legal status of a designed Rural Areas Development Project,
- Defining entities competent to design a Project,
- Procedures of granting legal status to a designed Project.
- The implementation of tasks mentioned in sections 1 and 2 should comprise the following Detailed solutions:
- A proposal of shaping agricultural and forest production space,
- A proposal of locating areas which require cultivation and land management,

- Localization of protected areas and protection zones for flowing and impounded waters,
- Localization of areas for village housing construction which where land consolidation and Division of properties has to be done,
- Farm tourism development programme as a contemporary source of farmer's income.

4.2 Pindharada Village Study Area Profile :

Area of village	596.10 hectre
Total population	1858
No of household	418
Male population	937
Female population	921
Age group between 0-6	219
Male between 0-6	107
Female between 0-6	112
Schedule cast population	55
Literates	1321
Agriculture labour	217

Table 4.2.study area profile

The total geographical area of village is 596.10 hectares. Pindharada has total population of 1858 peoples. There are 418 houses in pindharada Village. As per census 2011 there are 937 male and 921 females are there in the village pindharada. There are total 219 children out of which 107 are male and 112 are female.

4.2.1 Study Area Location with brief History land use details :

Pindharada village is located in Gandhinagar taluka in Gandhinagar district of Gujarat state. It is a small village consisting population of 1858 only. Total area of the village is 596.13 hectares. It includes 315.10 hectares land for agricultural purpose and 285.93 hectares land for Residential area. The nearest town to the pindharada is Gandhinagar which is 13 km away from village. The other nearest town is the unava that is 6 km away from the village. The village has bus station, Gram Panchayat, Community Hall, Primary School and Secondary and Higher Secondary School, Primary Health Centre (PHC) etc. The nearest river is Sabarmati River and it is the main source of irrigation for village.

No of household	418
Primary school	1
Tap water	Yes
Tube well	Yes
Bus stand	Yes
Sub post office	Yes
Pucca road	Yes
WBM road	Yes
Kutccha road	Yes
Assembly polling	Yes

PHS	1

Table 4.2.1 land use details

4.2.2 Base Location map, Land Map, Gram Tal Map:

Fig.4.2.2 Base map of pindharada village

4.2.3 Physical & Demographical Growth :

The total geographical area of village is 596.10 hectares. Pindharada has total population of 1858 peoples. There are 418 houses in pindharada Village. As per census 2011 there are 937 male and 921 females are there in the village pindharada. There are total 219 children out of which 107 are male and 112 are female.

Literacy rate: - Pindharada village has higher literacy rate compared to Gujarat. In 2011, literacy rate of Pindharada village was 80.60 % compared to 78.03 % of Gujarat. In Pindharada Male literacy stands at 90.72 % while female literacy rate was 70.21 %.

Caste profile: - pindharada village, most of the village population is Schedule Caste (SC) constitutes 2.96 % of total population in Pindharada village. The village Pindharada currently doesn't have any Schedule Tribe (ST) population.

Work profile: - Pindharada village out of total population, 588 were engaged in work activities. 97.96 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 2.04 % were involved in Marginal activity providing livelihood for less than 6 months. Of 588 workers engaged in Main Work, 117 were cultivators (owner or co-owner) while 217 were Agricultural laborers.

4.2.4 Economic generation profile / Banks:

In pindharada village, main source of economy are as follow…

- Agricultural people or Cultivators
- Husbandry

- Marginal activity like own shops, house made things, milk selling etc.
- Agricultural Labor or workers
- Dairy Farming and shepherd most of peoples are related only with seasonal agricultural products and husbandry products.

4.2.5 Actual Problem faced by Villagers and smart solution :

After interaction with sarpanch and villagers of pindharada village , we found there are many problems in village like:-

- There is water problem in some houses
- There are lack connectivity of electricity
- There is lack of education facilities
- There is lack of social and physical infrastructure in village

Smart solution: -

- Public bus stand
- Public toilet
- Community hall
- Bank
- ATM
- Crematorium
- Solar system
- Super market

4.2.6 Social scenario -Preservation of traditions, Festivals, Cuisine :

Social scenario:-

1. **Art and Culture of Gujarat**

The vast array of handcrafted products displaying intricate Gujarati art forms are not only popular in our country, but are a well-known entity all across the globe. These products include furniture, jewellery, embroidered garments, leatherwork, metalwork, baked clay articles and mirror work. Gujarat serves as the producer of some of the most creative and elegant furnishings that include bedcovers, quilts, cushion covers and table mats. Intricate dainty patterns are woven on the patola sarees with high precision. The traditional art forms of the state play a significant role in preserving its rich heritage. The state of Gujarat is a trove of rich heritage and cultural history. The structures and monuments built with ancient technology stand tall in their domineering stature. The city of Sidhpur, for example, displays the relics of old centuries through its colourful mansions that belong to the Dawoodi Bohra Muslim community. The ancient city of Baroda (now, Vadodara) is where the royal family of Gaekwad established their kingdom in the 18th century. The sweeping Laxmi Vilas Palace located in this city displays Indo-Saracenic architecture.

There are several other brilliant palatial buildings like the Naulakha Palace, Prag Mahal Palace, Vijay Vilas Palace and Lakhota Palace which are treasured insights into the legacy of architectural marvels. The Mahabat Maqbara mausoleum is an example of the splendid craftsmanship of Indo-Islamic architecture. It was built during the 19th century at Junagadh, a historical city located at the bottom of Girnar Hills.

The majestic mosque of Jama Masjid is situated in the city of Ahmedabad is an example of architectural ingenuity with its fine, intricate details and splendid design. The Sidi Bashir Mosque

with the Jhulta Minara and the Sidi Saiyyed Mosque are monuments of exquisite Islamic architecture.

Music

The folk music of Gujarat is known as SugamSangeet and has acclaimed world-wide fame. The range of musical instruments utilized in Gujarati folk music includes turi, manjira, ektaro, jantar, zanz pot drum, prabhati, dhol and ravanhattho. Bhajans are also incorporated in their folk songs. Bardic tradition is another major type of folk Gujarati music.

Dance Forms

Since Gujarati people are quite enthusiastic and amiable, they have many traditional forms of dance. The four major forms of dance are DandiyaRaas, Garba, Padhar, and Garbi. Dandiya Raas is performed by both men and women and utilizes the movement of bamboo sticks, known as Dandiyas. It has ancient roots and was believed to be played by the beloved Gopis of Lord Krishna.Garba is usually performed by the females in a circular formation. It is performed with reverence of the feminine form of the divinity. Garbi is traditionally performed by only the men and incorporates the use of instruments like dhol and manjiras.Padhar is mainly performed by the rural communities near Nal Lake.

2. Customs and Traditions of Gujarat

Due to many religions coexisting in the state, Gujaratis believe in various Gods and Goddesses. Embracing different religious faiths, Gujaratis demonstrate a vibrant mix of Hinduism, Islam, Jainism, and Buddhism. This amalgamation of cultures is quite evident in their beliefs, customs, traditions, institutions, and practices. The natives display a balanced lifestyle due to the perfect system of learning, a blend of religious practices and the development of artistic traits.

3. Languages and Religions

Although Gujarati is the mother tongue of the natives of Gujarat, many other languages are widely spoken throughout the state. Gujarati is an Indo-Aryan language derived from Sanskrit and is the 26th most widely used language in the world. Gujarati has about 11 different dialects, spoken in various parts of the state.

Since the state of Gujarat shares its border with Maharashtra, Madhya Pradesh and Rajasthan; a small section of its population speak the native languages of the neighbouring states, namely Marwari, Marathi, Hindi along with Urdu and Sindhi.

The natives of Kutch-a semi-arid region in Gujarat-speaks Kachchi language, which is quite an important language of the area.

4. Fairs and Festivals

The fairs and festivals of Gujarat showcase the real vibrancy and colours of its diverse culture. Thousands of people flock to Gujarat to witness the extravaganza during festivals like Navratri Mahotsav, Deepawali, Rathyatra and Kite festival. There are some fairs as well that are organized in the state every year, namely- ShamlajiMelo, Bhadra Purnima Fair, and Mahadev Fair. The RannUtsav is a major festival and witnesses an exquisite carnival of music, dance and natural beauty.

5. Food of Gujarat

A traditional and authentic Gujarati meal consists of dal, roti, rice, vegetables, salad, chaas, farsan followed by a sweet dish. Gujarati cuisine is quite similar to that of Maharashtra, and most of the

Gujaratis are vegetarian. Some of the famous Gujarati delicacies include dhokla, fafda, khandvi, dhal Dhokli, Undhiyu, handvo, Ganthia, dal Wada, khakhra, and Thepla.
In Gujarati dishes, the flavors are a blend of sweet, spicy and sour tastes. Each region of the state has a distinctive flavor associated with its local food. A typical Gujarati dinner includes bhakri-shak or khichdi-kadhi. The Gujaratis are noted for their sweet tongue, and hence every meal is followed by a sweet dish or sometimes even jaggery.

4.2.7 Migration Reasons / Trends :

Migration reasons

Although there are several factors responsible,

- lack of employment opportunities in the rural sector and the 'urban pull' factor caused by relatively greater employment opportunities are equally important. Over the years, economic factors have eclipsed other factors like environment, socio-cultural, political etc.
- poverty
- Landholding system
- fragmentations of land
- opportunities
- Large family-size and natural calamities.

Migration Trends:-

Cluster analysis and similar types of classifying techniques are effective for developing simple menu interfaces. This paper extends the use of cluster technique to a more complex In-migration system of Gujarat that consists of 34 destinations. Cluster analysis may also benefit the government policy makers by providing the trends of migration process. knowing how many people, who are likely to come into Gujarat during current decade along with their special reasons, can greatly help that area's planners and policy makers to prepare for them. In this study, we apply various cluster analysis techniques to detect some basic patterns and trends in the in-migration process of Gujarat state in terms of degree of homogeneity of various destinations of India with respect to migration reasons. From Census 2001, we find that in-migration trend in Gujarat seem to have become somewhat more homogeneous, although the results are not unequivocal and considerable differences remain, leaving scope for further integration.

4.3. Data Collection pindharada village (Photograph/Graphs/Charts/Table) :

4.3.1 Describe Methods for data collection :

The method of data collection is :-

1. Techno economic survey :- We go to the village and make a survey about village and villagers facilities and available infrastructure.
2. Personal interview :- we interaction direct to the villagers and collect the available data and instructions about village.
3. Field survey:- we go to the village and Survey the village to go one by one all the main sites or field available in village. Good source for providing extra information about a certain group , can use videography.
4. Questionery survey :- we go to village and make certain types of questions and after analyzing the answer from different people we find the problem available in village.This type of survey is easy to analyze problem.

4.3.2 Primary details of survey :

Pindharada village is located in Gandhinagar taluka in Gandhinagar district of Gujarat state. It is a small village consisting population of 1858 only.. Total area of the village is 596.13 hectares. It includes 315.10 hectares land for agricultural purpose and 285.93 hectares land for Residential area. The nearest town to the pindharada is Gandhinagar which is 13 km away from village. The other nearest town is the unava that is 6 km away from the village. The village has bus station, Gram Panchayat, Community Hall, Primary School and Secondary and Higher Secondary School, Primary Health Centre (PHC) etc. The nearest river is Sabarmati River and it is the main source of irrigation for village. Pindharada is about 50 km from Modasa. It is the small town. Nearest villages from pindharada are unava , mansa.. It is 141 m above sea level. The total land area of village pindharada is 596.10 hectares. Out which 315.1 hectares land is Agricultural land and the rest of the land is used as Residential area. The Total Population of pindharada is 1858 as per census 2011. There are 937 male in the village and 921 females are there. Literacy rate for male in the village is 90.72% and that for female is 70.38%.

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

In pindharada village average size of house is 700 to 1000 sq ft.

Geo Tagging:-The key objective of geo-tagging is to track progress of construction of individual houses through geo-tagged photographs, under the Beneficiary led Individual House Construction component of the mission.

4.3.4 No of Human being in One House :

In pindharada village total population of village is 1858. And average no of human being in one house is 5 .

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

In village main business of village is agriculture and dairy products. So available material like milk, Other grocery, agricultural material, ash ,milk products ,sand , gravel etc.

4.3.6 Geographical Detail:

Total area of the village is 596.13 hectares. It includes 315.10 hectares land for agricultural purpose and 285.93 hectares land for Residential area.

Net area sown :- 540 ha.

Total irrigated land :- 496 ha.

Total non irrigated land :- 47 ha.

Well tubes :- 496 ha.

4.3.7 Demographical Detail – Cast Wise Population Details / Which ID proof using by villagers

No of population :- 1858

No of house :- 418

SC caste :- 55

ST caste :- 0

Literacy :- 80.60 %

Total worker :- 588

4.3.8 Occupational Detail – Occupation wise Details / Majority business :

In Pindharada village out of total population, 588 were engaged in work activities. 97.96 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while

2.04 % were involved in Marginal activity providing livelihood for less than 6 months. Of 588 workers engaged in Main Work, 117 were cultivators (owner or co-owner) while 217 were Agricultural laborers.

4.3.9 Agricultural Details / Organic Farming / Fishery :

Major occupation of village is agriculture. The main crop of village is seasonally like cotton , rice , tobacco ,corn , sugar ,Wheat etc.

4.3.10 Physical Infrastructure Facilities – Manufacturing HUB / Ware Houses :

a) Drinking Water:

There is tap water system in the village. There is 100% treated water is distributed in the village. The main source of water for the village is Sabarmati River which is only 1 km away from the village. There are 2 wells and tank in the village. There are 2 wells in the village out of which one well is covered and other well is uncovered. There is underground sump having the capacity of 1 lakh litre.

b) Drainage Network:

There is underground drainage facility in pindharada. It is closed type drainage system. The drain water is discharged directly in to its nearby water body.

c) Transportation and Road Network:

There is bus station in the village. All the roads in the village are of C.C roads. Internal road having width of 5.5 m. There is no railway station in the village. People use the nearest railway station of Gandhinagar town which is 13 km away from the village. People use their own vehicles for the local transportation.

4.3.11 Tourism development available in the village for attracting the tourist :

In pindharada village there are no tourism activities are available. And there is no heritage or attractive location available in village.

4.4 Infrastructure Details (With Exiting Village Photograph) :

4.4.1 Drinking Water / Water Management Facilities :

Is tap water system in the village. There is 100% treated water is distributed in the village. The main source of water for the village is Sabarmati River which is only 1 km away from the village. There are 2 wells and and tank in the village. There are 2 wells in the village out of which one well is covered and other well is uncovered. There is underground sump having the capacity of 1 lakh litre.

Fig.4.4.1 drinking water facilities

4.4.2 Drainage Network / Sanitation Facilities :

There is underground drainage facility in pindharada. It is closed type drainage system. The drain water is discharged directly in to its nearby water body. Sanitation is Done daily by villagers and there is no any solid waste collection system available in the village. No Government sweepers are coming daily for other waste collection and for cleaning of the village.

Fig.4.4.2 drainage facilities

4.4.3 Transportation & Road Network :

There is bus station in the village. All the roads in the village are of C.C roads. Internal road having width of 5.5 m. There is no railway station in the village. People use the nearest railway station of Gandhinagar town which is 13 km away from the village. People use their own vehicles for the local transportations.

Fig.4.4.3 Transportation facilities

4.4.4 Housing condition :

We visited village and make field survey and we survey that the major infrastructure like panchayat , school, anganwadi, assembly polling, are pucca construction. Major infrastructure made by brick , sand and RCC . And minority house are made by kuccha material like sand , gravel or clay.We observed that , Pucca construction : 70% kutccha construction : 30 %

Fig.4.4.4 housing facilities

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

In pindharada village there are some social infrastructure available. In village there are 2 anganwadi,1 primary school, 1 PHS center, 1 pick up stand, 1 sub post office, 1 panchayat building, 1 birth dead register office. There are no recreational infrastructure available and no community hall are available.

Anganwadi	Yes
Primary school	Yes
Secondary school	No (near 10km)
CHC	No (near 10 km)
PHC	No (near 5 km)
PHS	Yes
Tap water	Yes
Hand pump	No
Community toilet	No
Bio gas or recycling waste management	No
Sub post office	Yes
Pacca road	Yes
Kaccha road	Yes
WBM road	Yes

Fig. 4.4.5.1 Road of PindharadaVillage

Fig 4.4.5.2 Pindharada Village School

Fig 4.4.5.3 Pindharada Village Overhead Water Tank

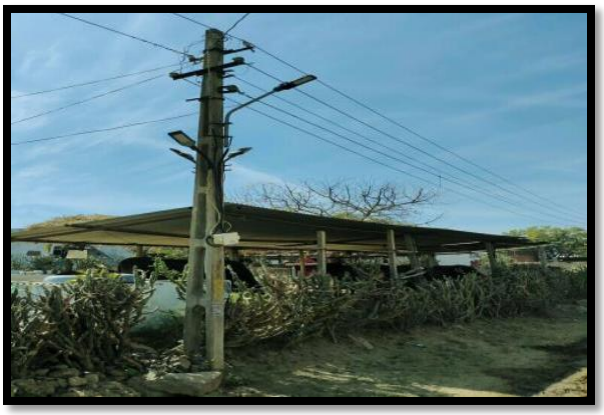
Fig 4.4.5.4 Pindharada Village Garbage

Fig 4.4.5.5 Pindharada Village Parab

Fig 4.4.5.6 Pindharada Village Anganvadi new

Fig 4.4.5.7 Pindharada Village Aandanvadi

Fig 4.4.5.8 Pindharada Village Voting Centre



4.4.5.9 street lights pindharada village

Fig 4.4.5.10 Pindharada Village electricity

Fig. 4.4.5.11 Shops in pindharada village. **Fig. 4.4.5.12 Bus stand**

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

In the pindharada village as per the interaction with the villagers the maintenance is required in the village Pond. Water tank is present but is not in good condition and village officials have said that new water Tank will be constructed in place of current water tank with higher capacity. Panchayat building, Anganwadi, Public library and primary school are also in good working condition. So the estimate of Proper maintenance of village pond is required. Dairy is operated under a good pukka condition Building.Main steps of condition assessment will be a) To record the damage if any, and find out the causes for distress b) To assess the extent of distress and to estimate the residual strengths of structural components and the system including the foundation.The building's condition "gives a measure of the effectiveness of current maintenance programmes because it determines the remaining useful life of components or systems and compares it with the full economic life expected, given good maintenance.

4.4.7 Technology Mobile/ WIFI / Internet Usage Details :

In pindharada village almost 90 % people have smart mobile phones. And they use internet in there smart Phone. But there is no facilities available like free wifi or internet.The concept of sustainable development envisages primary emphasis on manipulation and management of physical / natural systems not only to maximize yields but to stabilize the system and to minimize use of non-renewable input demands, thus representing an integrated approach of appropriate modern technology with traditional techniques. Modern day technologies have opened new vistas of development; integration of these technologies with traditional techniques can pave way for sustainable development of rural population and provide employment to rural unemployed youth, marginal farmers and laborers to discourage migration from villages.We visited village and make field survey and we survey that the major infrastructure like panchayat , school, anganwadi, assembly polling, are pucca construction. Major infrastructure made by brick , sand and RCC . And minority house are made by kuccha material like sand , gravel or clay.We observed that , Pucca construction : 70% kutccha construction : 30 %

4.4.8 Sports Activity as Gram Panchayat :

In pindharada village there are no sports activities organize by the panchayat but in lhelmahakumbh school students participate the sports activities.

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

In pindharada village there are no socio cultural facilities available. In village only school play ground available and school garden available for the villagers. There are no other infrastructure available in village.

4.4.10 Other Facilities (e.g. like foot path development-Smart toilets-Coin operated entry, self-Cleansing, waterless, public building) :

In pindharada village there are no Other facilities are available like foot path , Smart toilet ,self cleansing, and public buildings.

4.4.11 Any other details :

In pindharada village 1 tube well and pucca road are available. There are full electricity available. And also some solar street light is available.

4.5 Existing Institution like - Village Administration – Detail Profile

4.5.1 Bachatmandali :- There is no bachatmandali in pindharada village

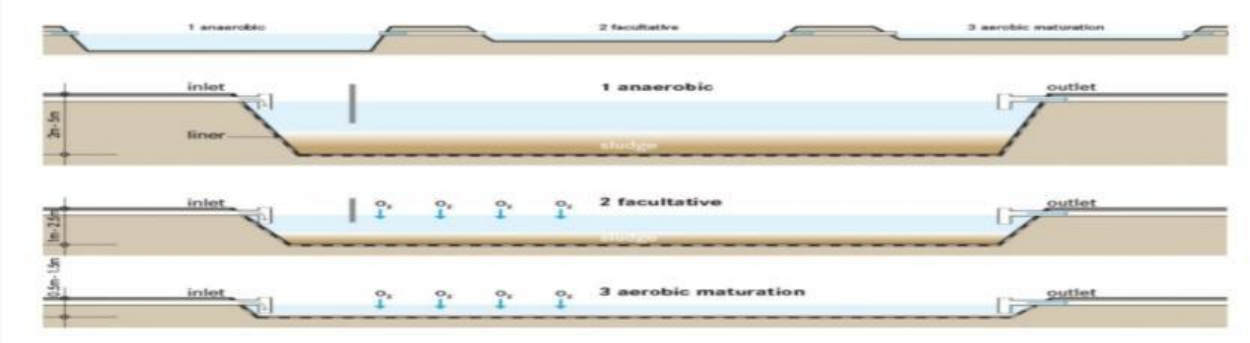
4.5.2 Dudhmandali:- There is one dudhmandali in pindharadavillage.The photo of dairy above the page.

4.5.3 Mahila forum:- There are running mahila forum but there is no separate place for mahila forum.

4.5.4 Plantation for the air pollution:- There is nothing for air pollution system

Chapter 5. Technical Options with Case Studies (FOR ANY ONE TOPIC,Take a new conceptdesign , prototype model with actual costing)

5.1 Technical Options For Liquid Waste Managemnent In Rural Areas:



Pond	BOD Removal	Pathogen Removal	HRT
Anaerobic Pond	50 to 85%		1 to 7 days
Facultative Pond	80 to 95%		5 to 30 days
Maturation Pond	60 to 80%	90%	15 to 20 days

Table: 4.1.1 Comparison of the treatment performance of different waste stabilisation ponds

Fig. 5.1 Waste stabilization system

5.1.1 Stabilization Pond System For Waste Water Treatment:

Waste or Wastewater Stabilization Ponds (WSPs) are large, man-made water bodies in which Blackwater, greywater or faecal sludge are treated by natural occurring processes and the influence Of solar light, wind, microorganisms and algae. The ponds can be used individually, or linked in a Series for improved treatment. There are three types of ponds, (1) anaerobic, (2) facultative and (3) Aerobic (maturation), each with different treatment and design characteristics. WSPs are low-cost For O&M and BOD and pathogen removal is high. However, large surface areas and expert design Are required. The effluent still contains nutrients (e.g. N and P) and is therefore appropriate for the Reuse in agriculture , but not for direct recharge in surface waters.

Design Criteria

Anaerobic ponds are built to a depth of 2 to 5 m and have a relatively short detention time of 1 to 7 days. Facultative ponds should be constructed to a depth of 1 to 2.5 m and have a detention time Between 5 to 30 days. Aerobic ponds are usually between 0.5 to 1.5 m deep with a detention time Of 15 to 20 days. If used in combination with algae and/or fish harvesting, this type of pond is effective at removing The majority of nitrogen and phosphorus from the effluent. Ideally, several aerobic ponds can be Built in series to provide a high level of pathogen removal.

5.1.2 Duckweed Based Waste Water Treatment With Pisciculture:

The duckweed based waste water treatment system in conjunction with pisciculture is one such Technology that has the potential of offering effective wastewater treatment besides providing

Economic returns as well as generating employment opportunities in the rural areas. The duckweed Is a small free floating aquatic plant often seen growing in thick mats on nutrient rich fresh and Brackish waters in tropical and semi tropical climate all over the world.It belongs to botanical family Lamnaceae consisting of four genera namely; Lemma, Spirodela, Wolffia and Wolffiella of which first three genera are commonly found in India. The duckweed Has the ability to bio accumulate up to 99% of the nutrients, dissolved solids and even heavy and Toxic elements of wastewater up to certain extent. These are permanently removed from Wastewater as plants are harvested. Hence, it reduces Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), suspended solids, bacterial and helminthic pathogens, some Organic compounds, ions of potassium, nitrogen, phosphate and even heavy metals of wastewater To a level quite safe for disposal.

5.1.3 Root Zone Treatment System:

'Root Zone' is a scientific term used to cover all the biological activity among different types of Microbes, the roots of plants, water soil and the sun. It consists planted filter-beds containing Gravel, sand and soil. The RZWT system utilises nature's way of biologically processing domestic & industrial effluents. This effective technology called Decentralised Wastewater Systems (DEWATS) was developed in 1970s in Germany and has been successfully implemented in Different countries mainly in Europe and America.The root zone wastewater treatment system makes use of biological and physical-treatment Processes to remove pollutants from wastewater. Due to its natural process, there is no need to add Any input such as chemicals, mechanical pumps or external energy. This reduces both the Maintenance and energy costs.In India, this project was first executed by Bremen Overseas Research and Development Association (BORDA) in the Auroville global community. Since the last 15 years, Auroville Located in South India near Pondicherry has been experimenting with such natural wastewater recycling systems. Auroville has now become a pioneer in the Root Zone Wastewater Treatment System and has enabled many such plants across India. One such treatment plant is now implemented in Arvind Eye Hospital, Pondicherry.

5.1.4 Anaerobic Decentralized Waste Water Treatment System:

The anaerobic treatment process is increasingly recognized as the core method of an advanced technology for environmental protection and resource preservation and it represents, combined with other proper methods, a sustainable and appropriate wastewater treatment system for developing countries. Anaerobic treatment of sewage is increasingly attracting the attention of sanitary engineers and decision makers. It is being used successfully in tropical

Thereraging results from subtropical and temperate regions. In this review paper, the main characteristics of anaerobic sewage treatment are summarized, with special emphasis on the up flow anaerobic sludge blanket (UASB) reactor. The application of the UASB process to the direct treatment of sewage is reviewed, with examples from Europe, Asia and the Americas. The UASB reactor appears today as a robust technology and is by far the most widely used high-rate anaerobic process for sewage treatment.

5.1.5 Aerobic Dewats:

Aerobic digestion is a biological wastewater treatment. Once sediments and substances such as oil are removed from wastewater in the primary treatment stage, aerobic treatments are used to break down organic matter through the use of oxygen. Aerobic biological processes use natural microbial colonies and molecular oxygen to decompose organic substances in the wastewater. The microbes

feed on undesired biological substances in the water, creating aggregates or "flocks" of organic substances and microorganisms that settle to the bottom of the container. This sludge is stable and usually can be disposed of easily. Aerobic treatment is typically part of a multistage water treatment process. The technology is not confined to use as an intermediate stage, but can also be used for finishing water and to augment other types of treatments.

5.1.6 Sokage Pit System:

A soak pit, also known as a soak way or leach pit, is a covered, porous-walled chamber that allows water to slowly soak into the ground. Pre-settled effluent from a collection and storage/treatment or (semi-) centralized treatment technology is discharged to the underground chamber from which it infiltrates into the surrounding soil. If there is no intention or no need to reuse wastewater, collected storm water or grey water, soak pits can offer a cost-efficient opportunity for a partial treatment of waste- grey- or storm waterfrom a primary treatment. As wastewater (grey water or black water after primary treatment) percolates through the soil from the soak pit, small particles are filtered out by the soil matrix and organics are digested by microorganisms. The wastewater effluent is absorbed by soil particles and moves both horizontally and vertically through the soil pores. Sub-soil layers should therefore be water permeable in order to avoid fast saturation. High daily volumes of discharged effluents should be avoided. Thus, soak pits are best suited for soil with good absorptive properties; clay,

Hard packed or rocky soil is not appropriate. Soak pits are used the same way as leach fields, but Require less space as well as less operation and maintenance. But they generally can also receive Less influent and the groundwater pollution may be higher than with leach fields.

Fig.5.1.6.1 Soak pit

5.1.7 Study Technological Options At Household Level Management

It will always be better to manage and treat domestic grey water generated in the house in the Area/courtyard/land surrounding the house. The following technological options will be suitable For this purpose:

- Kitchen Garden with piped root zone system
- Kitchen Garden without piped root zone system
- Leach pit
- Soakage Pit

5.1.8 Kitchen Garden With Piped Root Zone System, Kitchen Garden Without Piped Root Zone System And Leach Pit:

Kitcehn Garden With Piped Root Zone System:

With this methodology, treated grey water can be utilized to grow vegetables, flowers or fruits in The court-yard of the house.

Applicability:

Houses with adequate court-yard.

Action:

House owner will do the installation of the system with the help of trained person.

Description:

The system has following components:

- A grease trap to collect silt (450mm x 350mm x 300mm)
- Perforated non pressure PVC pipe (50mm diameter and length as per requirement)
- Digging of trench (150mm to 200mm depth and 200mm width)
- Filling of trench with gravel of size (20 to 25mm size)
- Laying of perforated pipe
- Covering the trench with polythene sheet
- Putting the soil layer (50mm thickness over the polythene sheet)
- Construct a leach pit (900mm diameter with honey comb masonry and water tight cover)
- Put a layer of earth over (25mm thickness) over the pit cover

Operation and maintenance (O&M):

- Periodical cleaning of the grease trap (every week)
- Cleaning of perforated pipes (once in a year).

Materials required:

- Bricks (150 bricks)
- Fine Sand (15 gamlas)
- Cement (1/3 bag)
- 50mm non-pressure PVC pipe and length as per requirement
- Pit cover (1000mm diameter and 50mm thickness 3 to 4kg in height
- Polythene sheet.

Approximate cost (2006 price level):
Rs.80/- per meter length including labor cost.

Advantages:

- Simple and cost effective technology
- Percent utilization of water to produce vegetables and fruits
- Prevents water stagnation
- Prevents vector breeding.

Limitations:
Use of strong detergent may be harmful to the plants grown in the kitchen garden.
Kitchen Garden Without Piped Root Zone System:
With this methodology also, grey water can be utilized to grow vegetables, flowers or fruits in the Court-yard of the house.
Applicability:
Houses with adequate court-yard.
Action
House owner will do the installation of the system with the help of trained mason.
Description:
The system has following component:

- A grease trap to collect silt (450mm x 350mm x 300mm)
- A simple bed of appropriate size to absorb the available water
- Let the grey water flow into the bed
- Plant suitable vegetable or flowers at both the side of the trench.

Operation and maintenance (O&M):
Periodical cleaning of the grease trap (every week).
Materials required:

- Bricks (50 bricks)
- Fine sand (5 gamlas)
- Cement (1/2 gamlas).

Approximate cost (2006 price level):
Rs 50/- per square meter including labor cost.
Advantages:

- Simple and cost effective technology
- Cent percent utilization of water to produce vegetables and fruits
- Prevents water stagnation
- Prevents vector breeding.

Limitations:
Use of strong detergent may be harmful to the plant grown in the kitchen garden.
LEACH PIT:
Leach Pit is a brick lined pit constructed in honeycomb masonry having a volume of about 0.75 Cubic meters.
Advantages:

- It can handle large volume of water during peak period of water generation and is better suited Than soak pits.
- Prevents stagnation of greywater.
- Prevents vector breeding.

Applicability:
Houses without adequate space for kitchen garden where waste water discharge is relatively more And pit structure is such that it enhances the leaching effect.
Action:
House owner will do the installation of the leach pit with the help of trained mason.
Description:

- Selection of site-the leach pit can be located at any convenient space near the house, keeping a Safe distance between the wall and the pit as 1m.
- Digging of the pit-dig the pit (a diameter of 1.75m and a depth of 1m).
- Construct the pit in circular fashion with honey combing in alternate layers. The pit can be Constructed with single brick (100mm) with a mortar in the ratio of 1:6.
- Connect the drain pipe coming from the house to the leach pit via a grease trap.
- A P-trap is necessary between the pit and the outlet from the house to avoid vectors entering the Leach pit.
- The pit should be covered with RCC cover or flag stone slab. The diameter of the cover should Be 100mm more than that of the pit.

OperationOperation and maintenance (O&M):

- Periodical cleaning of the P-trap
- Periodical removal of the sludge from the pit.

5.2 Technical Options For Solid Waste Management In Rural Area:

5.2.1 Technical Options For Composting Of Wastes:

Composting is one of the options for treatment of solid waste. In composting process the organic Matter breaks down under bacterial action resulting in the formation of humus like material called Compost. The value of compost as manure depends on the quantity and quality of feed materials Poured into the compost pit.
Composting is carried out in two ways:

1. Aerobically (in presence of oxygen) and
2. Anaerobically (in absence of oxygen).

5.2.2 Pile Method, Nadep Method, Baglore Method, Indore Method And Coimbatore Method:

Pile method:
Composting is a simple way to add nutrient-rich humus which fuels plant growth and restoresVitality to depleted soil. It's also free, easy to make and good for the environmentStarting Your Compost Pile:
Layering:
Layer 1- The organic materials layer can be vegetable wastes, sod, grass clippings, leaves, hay, Straw, chopped corncobs, corn stalks, untreated sawdust, twigs less than ½ inch in diameter, or Garden debris. Remember the proper C: N ratio and mix accordingly. Your bulkier organic Materials do best in the first ground level layer. As your pile settles, these items tend to allow for More air spaces. Shred or chop up materials for greater surface area. The organic layers should be

Between 6-8 inches thick. Materials that tend to mat such as grass clippings should be either mixed In or placed in 2-3 inch layers within this 6-8 inch layer.
Layer 2 – Animal manures, fertilizers or starters serve as activators that accelerate the ignition or Initial heating of your pile. They all provide a nitrogen source for the microbial community. Some Provide proteins and enzymes. If manure from a grain eating animal is available, add 1-2 inch layer. If this is not available, add one cup of 10-10-10 or 12-12-12 commercial fertilizer per 25 square feet. If using a commercial starter, follow label directions.

Care:

Temperature plays an important role in the composting process. Decomposition occurs most rapidly between 110° to 160°F. Within two weeks, a properly made compost pile will reach these temperatures. At this time, you will notice your pile settling which is a good sign that the pile is working properly,

Nadep method:

The NADEP method of making miracle compost was first invented by a farmer named N.D.Pandharipande living in Maharashtra (India). The method, which has become popular among the farmers in Western India, now bears his name. The process basically involves placing selected layers of different types of compostable materials in a simple, mud-sealed structure designed with brick and mud water. The system permits conversion of approximately 1 kg of animal dung into 40 kg of rich compost which can then be applied directly to the field. The multiplication factor is significant in view of the fact that in the tropics, there is rapid decomposition of organic materials in the soil. This organic matter must be replaced and replenished if agricultural fertility is not to go on declining. The problem is there that a scarcity of compostable materials, particularly animal dung, prevailing within the country. Thus, even if all available organic materials, including dung, were religiously and scrupulously collected, they would still not be sufficient to replace the organic constituents of the vast quantities of India's fast-degrading soils. The NADEP method of composting actually enables the farmers to get around the difficulty of the generation of mass and to increase the quantity of compost rapidly within a given frame of time and without any significant additional expense.

Bangalore method

This is an anaerobic method conventionally carried out in pits. Formerly the waste was anaerobically stabilised in pits where alternate layers of MSW and night soil were laid. The pit is completely filled and a final soil layer is laid to prevent fly breeding, entry of rain water into the pit and for conservation of the released energy. The material is allowed to decompose for 4 to 6 months after which the stabilised material is taken out and used as compost.

Indore method :

The Indore Composing Method is an ideal system of preparing organic manure or compost which replaces chemical fertilizers and enhances the crop-yield, without any ill side-effects.

Materials:

Stalks of cotton, maize, millet and the pulses. (Ideally they should be chopped to a particle size below 2 inches)

Construction:

Start building the heaps by laying a lattice of old branches at the bottom. Divide the base area of the heap into a 6 (roughly equal) transverse sections, five of which are filled and one left vacant. Make each section of 7 layers (figure 1) of 9 inch thickness. In a 9 inch layer, have 4 inches of dry

waste, 3 inches of green weeds and leaves, 2 inches of manure and a sprinkling of urine-earth-wood ash. Take a 6-8 ft. long pole with a 2 inch diameter and probe vertically through the working, gradually increasing the size of the hole to 4 inches by waggling the pole. See that the pole remains in its position and ensure that the air-vent continues to the top of the completed section. The first pole should be at a distance of not more than 2 feet from the heap, with a maximum distance of 4 feet between two successive holes.

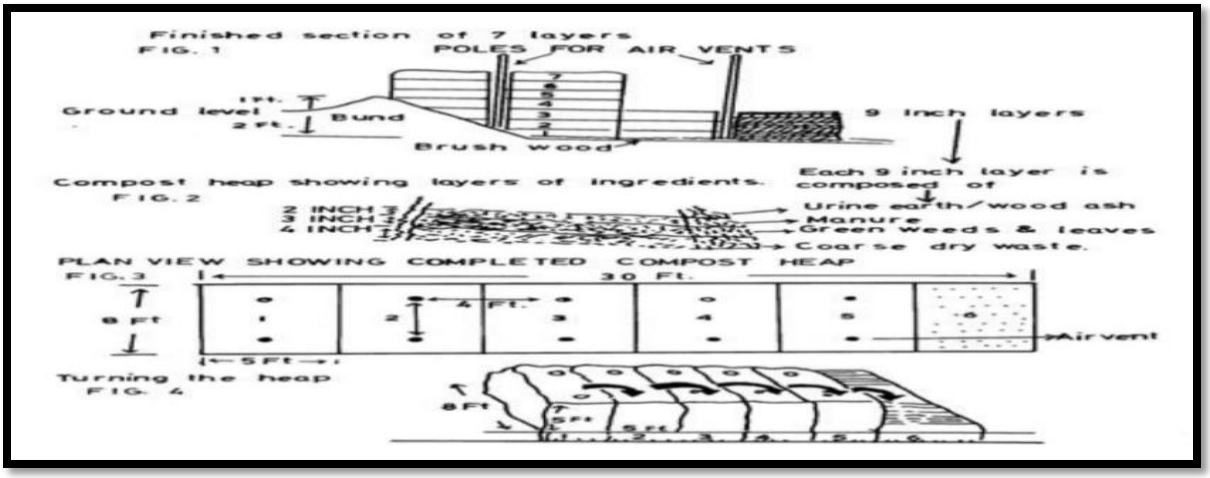


Fig. 5.2.2.1 Indor composting method

Coimbatore method:

Composting is done in pits of different sizes depending on the waste material available. A layer of Waste materials is first laid in the pit. It is moistened with a suspension of 5-10 kg cow dung in 2.5 To 5.0 I of water and 0.5 to 1.0 kg fine bone meal sprinkled over it uniformly. Similar layers are Laid one over the other till the material rises 0.75 m above the ground level. It is finally plastered With wet mud and left undisturbed for 8 to 10 weeks. Plaster is then removed, material moistened With water, given a turning and made into a rectangular heap under a shade. It is left undisturbed Till its use.In Coimbatore method, there is anaerobic decomposition to start with, following by aerobic Fermentation. It is the reverse in Bangalore method. The Bangalore compost is not so thoroughly Decomposed as the Indore compost or even as much as the Coimbatore compost, but it is bulkiest.

5.2.3 VERMI COMPOSTING:

Vermi composting involves the stabilization of organic solid waste through earthworm Consumption which converts the material into worm castings. Vermi composting is the result of Combined activity of microorganisms and earthworms. Microbial decomposition of biodegradable Organic matter occurs through extracellular enzymatic activities (primary decomposition) whereas Decomposition in earthworm occurs in elementary tract by micro-organisms inhabiting the gut (secondary decomposition). Microbes such as fungi, actinomycetes, protozoa etc. are reported to Inhabit the gut of earthworms. Ingested feed substrates are subjected to grinding in the interior part Of the worms gut (gizzard) resulting in particle size reduction. Vermi technology, a tripartite System which involves biomass, microbes and earthworms is influenced by the abiotic factors such As temperature, moisture, aeration etc. Microbial ecology changes according to change of

abiotic Factors in the biomass but decomposition never ceases. Conditions unfavourable to aerobic Decomposition result in mortality of earthworms and subsequently no vermi composting occurs.

Fig. 5.2.3.1 Vermi composting method

Advantages:

- Conversion of cattle dung and cattle dung based biogas slurry, kitchen/food waste, leaves etc.(organicorganic solid waste) into high quality organic manure which are otherwise wasted
- It is a fast process which requires only 40-45 days as compared to the conventional process
- The process is free from foul odour
- Complete destruction of weed seeds
- Vermicompost contains plant growth hormones and anti fungula elements which leads to high Value addition and profitability
- Prevents vector breeding
- Prevents insanitary conditions
- The technology is simple and it is easy to adopt and replicate
- Requires very little land area

5.2.4 Windrow Composting:

Composting using the windrow method requires some management to set up windrow piles, turn Them periodically, and monitor the composting process. Compost forms as microbes in the manure Decompose the organic wastes. Since this method requires a moist environment containing oxygen,

Fig.5.2.4.1 **Window method**

Composting using the windrow method requires some management to set up windrow piles, turn Them periodically, and monitor the composting process. Compost forms as microbes in the manure Decompose the organic wastes. Since this method requires a moist environment containing oxygen, Farmers must aerate the material by turning the piles two to four times during the process.The researchers estimated the costs of managing compost piles that were 50 feet long, 12 feet wide, And 3 feet high, using manure and bedding from the UW-RF farm. The team considered four Scenarios for composting: investing in a tractor-drawn compost turner; hiring custom help with a Compost turner; using an existing front-end loader; and renting a bulldozer.The team examined both the labor costs of composting and the equipment investment for a 60-Cow dairy farm. They based these values on an economics model developed by Brian Holmes of The UW-Madison engineering department, and Rick Klemme, a CIAS economist. This format Allowed the River Falls researchers to compare the economics of composting to several other Manure management methods, from daily haul to higher-investment, long-term storage systems.

5.2.5.Thermophilic Composting:

Thermophilic composting is the practice of breaking down biological waste with thermophilic (heat-loving) bacteria. Thermophilic composting is distinct from vermicomposting (which uses Worms). Thermophilic compost heaps must be quite large, 1m3Or larger. Grass cuttings, wood chips and sawdust should be put into thermophilic compost heaps; food Scraps are more suited to vermicomposting. The key advantage of thermophilic composting is that The high temperatures kill diseases. Human faeces composted by worms is not safe to use on food-Plants, but several months of thermophilic composting will render it quite harmless.

Fig.5.2.5.1**Thermophilic method**

All the Organisms that cause human diseases are adapted to live around human body temperature. Higher Temperatures kill them. Compost that stays at 50°C (122°F) for 24 hours will be safe to use to grow food. A temperature of 46°C (115°F) will kill pathogens within a week. 62°C (143.6°F) will kill pathogens in one hour.

The bacteria that make compost need oxygen. This can be provided by sticking holes in the heap with pipes or sticks. Or you can pile in coarse materials like hay when building the compost heap, to create little pockets of air.

5.2.6 MARC METHOD:

In many areas, for example in Greece and in the south of Italy, the exhausted grape marc is Generally utilized in the distilleries as low-caloric fuel for steam production. However, problems Arise because of the contaminated smoke production, mainly due to the combustion of the seed oil Which cannot be extracted in a profitable way. A possible solution could be composting of the Production of bio-fertilizers or yeast production for animal feed or feed supplement. Composting usually takes place on the field. The material is accumulated in the piles and is Mixed and agitated by mechanical means. However, this method is not controllable and the Compost is not of high quality. Proper composting takes place only in well-controlled Environments. The temperature, moisture content and good aeration are the main parameters for a Good composting process. If the agitation and aeration are not sufficient, anaerobic processes occur With detrimental effects on the final product. The composting takes place at mesophilic Temperature. In countries where climate is warm, thermophilic processes are applied as they are Faster and more efficient. In some cases, vermicomposting has been applied with the good results.

5.2.7 Biogas Technology:

When biodegradable organic solid waste is subjected to anaerobic decomposition, a gaseous Mixture of Methane (CH4) and Carbon-dioxide (C02) known as Biogas could be produced under

Favourable conditions. The decomposition of the waste materials are mainly done by the fermentation process which Is carried out by different group of microorganisms like bacteria, fungus, actinomycetes etc. The Group of microorganisms involved for biogas generation is mainly the bacteria.

The biogas technology can be used for management of bio degradable solid waste (portion) Generated from:

• Household
• Community
• Commercial establishment

Design and Construction of Biogas Plants:

There are many designs and models of biogas plants in operation with each one having some Special characteristics and each popular model having some basic components. The biogas plants Have following components for proper functioning of these designs.

- Digester or fermentation chamber
- Gas holder or gas dome
- Inlet (pipe or tank)
- Outlet (pipe or tank)
- Mixing tank
- Gas outlet pipe
- Inlet and outlet displacement chambers (for fixed dome biogas plants)
- Inlet and outlet gates

Advantages:

Biogas plants help in not only decomposing the solid waste but also produce good amount of clean fuel and environment friendly organic manure. Biogas is a clean fuel which does not make cooking

Fig.5.2.7.1 Bio-Gas plant

Limitations:

- High cost for the lower middle and low income group in rural Plan
- Lack of availability of required technical infrastructure in rural areas.

5.2.8 Toilet Linked Biogas Plant:

In India in initial stages, because of its massive availability, cattle dung was used as a feed material for biogas plant. Human excreta is one such alternative feed material to biogas plant. At present, human excreta treatment is a major sanitation problem in the country. If it is used imaginatively in biogas plant, it can become an asset instead of a nuisance. Human excreta management in a biogas plant will give three benefits-health, energy and organic manure. Thus, the waste can turn into wealth.

Operation and Maintenance:

- Toilets connected to the Biogas plant should be kept clean and used regularly
- Scum formation creates problem in the digester. To minimize scum formation, it is necessary to prevent entry of undesirable foreign material into the digester except human excreta
- It is necessary to remove sludge from the digester once in 5 to 10 years by suitable pumping Arrangement
- Effluent from the plant should preferably be disposed of in a compost pit
- Antiseptic and disinfectants should not be used for cleaning the toilets. Occasionally organic Soaps/organic detergents may be used
- Top of the vent pipe provided at the point of inlet chamber, need to be covered with nylon mesh So as to prevent the passage of mosquito or any insets..

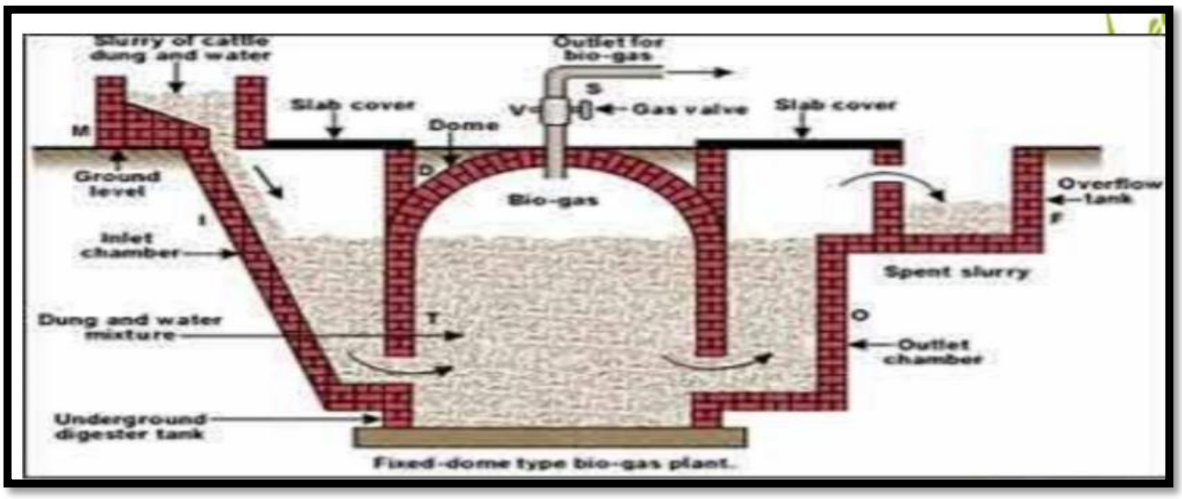
In many areas, for example in Greece and in the south of Italy, the exhausted grape marc is Generally utilized in the distilleries as low-caloric fuel for steam production. However, problems Arise because of the contaminated smoke production, mainly due to the combustion of the seed oil Which cannot be extracted in a profitable way. A possible solution could be composting of the Production of bio-fertilizers or yeast production for animal feed or feed supplement. Composting usually takes place on the field. The material is accumulated in the piles and is Mixed and agitated by mechanical means. However, this method is not controllable and the Compost is not of high quality. Proper composting takes place only in well-controlled Environments. The temperature, moisture content and good aeration are the main parameters for a Good composting process. If the agitation and aeration are not sufficient, anaerobic processes occur With detrimental effects on the final product. The composting takes place at mesophilic Temperature.

Fig.5.2.8.1 **Toilet linked biogas plant**

Advantages:

- Hygienic and economically efficient management of human night soil

- The biogas plant also provides rich manure
- It reduces cooking time and saves fuel cost.



Limitations:

- High cost for the lower middle and low income group in Limitations
- Lack of availability of required technical infrastructure in rural area.

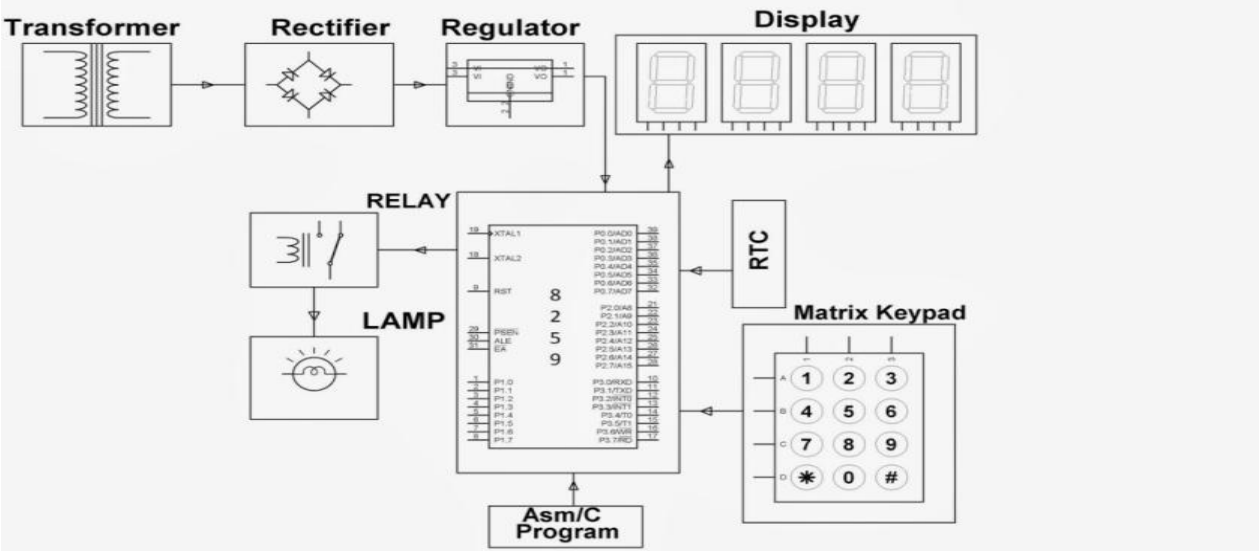
5.3 Electrical Concept (Programmable Load Shedding)

ABSTRACT

In today's world, there is a continuous need for automatic appliances with the increase in standardof living, there is a sense of urgency for developing circuits that would ease the complexity of life.The project is designed to operate an electrical load multiple number of times as per the program. It overcomes the difficulties of switching the load ON/OFF manually. This proposed has an inbuilt real time clock (RTC) to keep tracking the time and thus to switch ON/OFF the load accordingly.

Load shedding is what electric utilities do when there is a huge demand for electricity that exceeds the supply. Thus in a distribution system it needs to be precisely controlled for specific period of time. Programmable load shedding time management system is a reliable circuit that takes over the manual task of switch ON/OFF the electrical devices with respect to time. It uses real time clock (RTC) interfaced to a microcontroller of 8051 family. While the set time equals to the real time, then microcontroller gives command to the corresponding relay to turn ON the load and then another command to switch OFF as per the program. Multiple ON/OFF time entry is the biggest advantage with this project.

BLOCK DIAGRAM

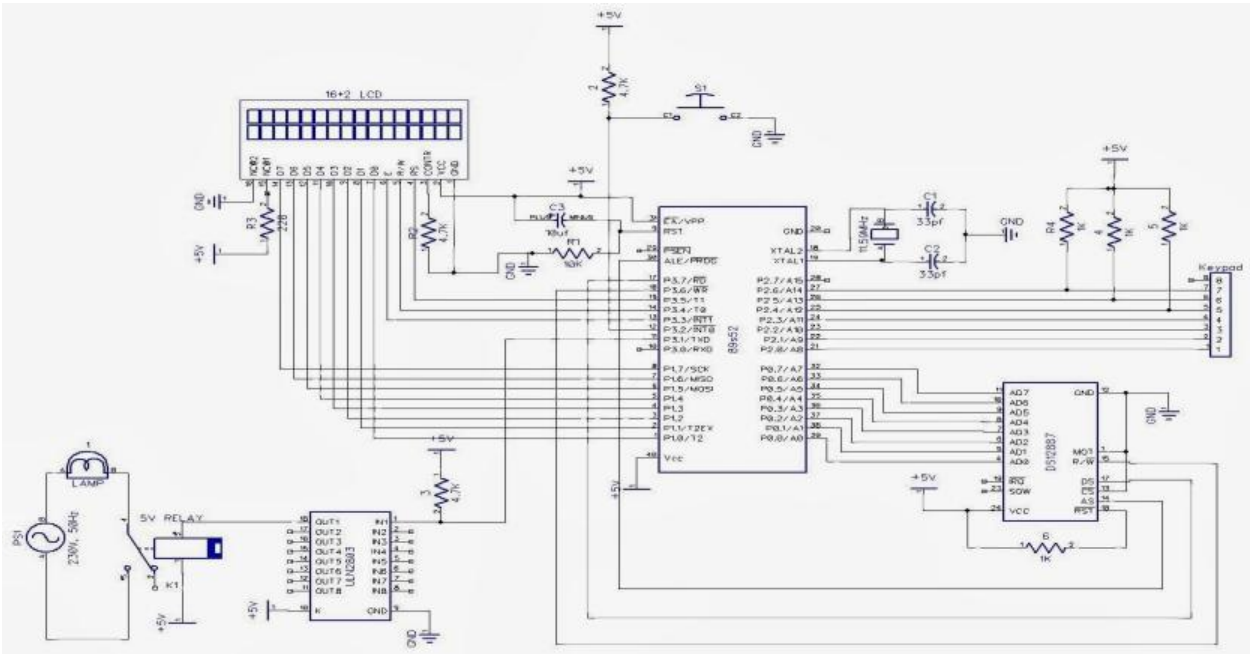


CIRCUIT DIAGRAM

5.3.1 SOFTWARE IMPLIMENTATION

ALGORITHM

STEP 01: Start.
STEP 02: Initialize RTC.
STEP 03: Initialize LCD.
STEP 04: Turn on relay.
STEP 05: Display time on LCD.



STEP 06: If pin P3.2=0 then go to step 7 else goto step8.

STEP 07: Read character ‘n’ from keypad.
STEP 08: If n=1 then goto step 10.
STEP 09: Update the current time and goto step13.
STEP 10: If n=2 then goto step11 else goto step12.
STEP 11: set the power off alarm time and power off interval, goto step13.
STEP 12: Display “try again” and go to step 13.
STEP 13: If current time matches the alarm time then go to step14 else go to step5.
STEP 14: Turn off the relay.
STEP 15: Set the new value of alarm time as the power on time.
STEP 16: display the current time and power on time on LCD.
STEP 17: If current time matches the alarm time go to step 16.
STEP 18: Turn on relay and go to step5.
STEP 19: END.

5.3.2 Management through Energy Harvesting Concept:

Energy harvesting is the process by which ambient energy is captured and converted into electricity for small autonomous devices, such as satellites, laptops and nodes in sensor networks without the need for battery power. Energy harvesting applications reach from vehicles to the smart grid.

With electronic circuits now capable of operating at microwatt levels, it is feasible to power them from non-traditional sources. This has led to energy harvesting, which provides the power to charge, supplement or replace batteries in systems where battery use is inconvenient, impractical, expensive or dangerous. It can also eliminate the need for wires to carry power or to transmit data. Energy harvesting can power smart wireless sensor networks to monitor and optimize complex industrial processes, remote field installations and building HVAC. In addition, otherwise wasted energy from industrial processes, solar panels, or internal combustion engines, can be harvested for useful purposes. A key component in energy harvesting is a power converter that can operate with ultralow voltage inputs.

Now that we have described why it is feasible and what it can do, how does energy harvesting actually work? Put simply, it is a process that:

- Captures minute amounts of energy
- Accumulates that energy
- Stores the energy
- Maintains the stored energy as a power source
- Typical energy harvesting inputs include:
- Sol include
- Thermal energy
- Wind energy
- Salinity gradients
- Kinetic energy

Today, energy harvesters do not usually produce enough energy to perform mechanical work, however they provide small amounts of power to support low-energy electronics. In most cases, the "fuel" " for energy harvesters is naturally present and may be considered free. Using natural sources in remote areas for energy harvesting is an attractive alternative to inconvenient utility and battery power. These natural energy sources may be available maintenance-free for a lifetime. Energy harvesting can also be an alternative energy source that supplements the primary power source and enhances its reliability.

Energy harvesters are intended for applications requiring very low average power, but require periodic pulses of higher load current. For example, in many wireless sensor applications the circuitry is only powered to make measurements and transmit data periodically at a low duty cycle. Energy harvesting is becoming more feasible today because of the increased efficiency of devices capable of capturing, storing, and producing electrical energy. This can be accomplished with the help of very efficient, very low-voltage input step-up converters. Also, improved low-voltage, high-efficiency microprocessors may allow them to become participants in energy

5.3.3 Energy Harvesting IC

Linear Technology's LTC3108, a highly integrated dc-dc converter is intended for energy harvesting. It can harvest and manage surplus energy from extremely low-input voltage sources such as TEG (thermoelectric generators), thermopiles. and small solar cells.

The circuit in Fig. 13-1 uses a small step-up transformer to boost the input voltage to an LTC3108 that provides a complete power-management solution for wireless sensing and data acquisition. It can harvest small temperature differences and generate system power instead of using traditional battery power. The LTC3108 is available in a small, thermally enhanced12-lead (4mm × 3mm) DFN and a 16-lead SSOP packages.

The LTC3108 utilizes a MOSFET switch to form a resonant step-up oscillator using an external step-up transformer and a small coupling capacitor. This allows it to boost input voltages as low as 20mV, high enough to provide multiple regulated output voltages for powering other circuits. The frequency of oscillation is determined by the inductance of the transformer secondary winding and is typically in the range of 20kHz to 200kHz. For input voltages as low as 20mV, a primary-secondary turns ratio of about 1:100 is recommended. For higher input voltages, this ratio can be lower.

The ac voltage produced on the secondary winding of the transformer is boosted and rectified using an external-charge pump capacitor (from the secondary winding to pin C1) and the rectifiers internal to the LTC3108. The rectifier circuit feeds current into the VAUX pin, providing charge to the external VAUX capacitor and the other outputs.

LDO Output

A 2.2V LDO can support a low-power processor or other low-power ICs. The LDO is powered by the higher value of either VAUX or VOUT. This enables it to become active as soon as VAUX has charged to 2.3V, while the VOUT storage capacitor is still charging. In the event of a step load on the LDO output, current can come from the main VOUT capacitor if VAUX drops below VOUT. The LDO requires a 1µF ceramic capacitor for stability. Larger capacitor values can be used without limitation, but will increase the time it takes for all the outputs to charge up. The LDO output is current limited to 4mA typical.

For pulsed-load applications, size the VOUT capacitor to provide the necessary current for a pulse on load. The capacitor's value will be dictated by the load current, duration of the load pulse, and

the voltage droop the circuit can tolerate. The capacitor must be rated for whatever voltage has been selected for VOUT by VS1 and VS2 .

There must be enough energy available from the input voltage source for VOUT to recharge the capacitor during the interval between load pulses. Reducing the duty cycle of the load pulse allows operation with less input energy. The VSTORE capacitor may be a very large value (thousands of microfarads or even Farads) to provide holdup at times when the input power may be lost. Note that this capacitor can charge all the way to 5.25V (regardless of the settings for VOUT), so ensure that the holdup capacitor has a working voltage rating of at least 5.5V at the temperature for which it will be used. Fig. 13-2 plots the time for voltage to build up to its final value for a given input voltage and the input transformer turns ratio. The LTC3108's extremely low quiescent current (<6µA) and high-efficiency design ensure the fastest possible charge times for the output reservoir capacitor.

The main output is pin-selectable via VS1 and VS2 for one of four fixed voltages (2.35V, 3.3V, 4.1V, or 5V) to power a wireless transmitter or sensors. A second switched output can be enabled by the host to power devices that do not have a micropower shutdown capability. The addition of a storage capacitor provides continuous power even when the input energy source is unavailable.

A power-good comparator monitors VOUT. The PGD pin is an open-drain output with a weak pull-up (1MΩ) to the LDO voltage. Once VOUT charges to within 7% of its regulated voltage, the PGOOD output goes high. If VOUT drops more than 9% from its regulated voltage, PGD goes low. The PGD output is designed to drive a microprocessor or other chip I/O and is not intended to drive a higher current load such as an LED. Pulling PGOOD up externally to a voltage greater than VLDO will cause a small current to be sourced into VLDO. PGOOD can be pulled low in a wire-OR configuration with other circuitry.

VOUT2 is an output that can be turned on and off by the host, using the VOUT2_EN pin. When enabled, VOUT2 is connected to VOUT through a 1.3Ω P-channel MOSFET switch. This output, controlled by a host processor, can be used to power external circuits such as sensors and amplifiers, that do not have a low power sleep or shutdown capability. VOUT2 can be used to power these circuits only when they are needed.

Piezoelectric Energy Harvesting

Linear Technology's LTC3588-1 is an ultralow quiescent current power supply for energy harvesting and/or low current step-down applications (Fig. 13-3). The IC interfaces directly to a piezoelectric or alternative ac power source, to rectify a voltage waveform and store harvested energy on an external capacitor, bleed off any excess power via an internal shunt regulator, and maintain a regulated output voltage by means of a nanopower high-efficiency synchronous buck regulator.

The LTC3588-1 has an internal full-wave bridge rectifier accessible via the differential PZ1 and PZ2 inputs that rectifies ac inputs such as those from a piezoelectric element. The rectified output is stored on a capacitor at the VIN pin and can be used as an energy reservoir for the buck converter. The low-loss bridge rectifier has a total drop of about 400mV with typical piezo generated currents (~10µA). The bridge is capable of carrying up to 50mA. One side of the bridge can be operated as a single-ended DC input. PZ1 and PZ2 should never be shorted together when the bridge is in use. When the voltage on VIN rises above the UVLO rising threshold the buck converter is enabled and charge is transferred from the input capacitor to the output capacitor. A wide (~1V) UVLO hysteresis window is employed with a lower threshold approximately 300mV above the selected

regulated output voltage to prevent short cycling during buck power-up. When the input capacitor voltage is depleted below the UVLO falling threshold, the buck converter is disabled. Extremely low quiescent current (450nA typical) in UVLO allows energy to accumulate on the input capacitor in situations where energy must be harvested from low power sources.

You can configure the LTC3588-1 for use with dc sources such as a solar panel as shown in Fig. 13-3 by connecting them to one of the PZ1/PZ2 inputs. Connecting the source in this way prevents reverse current from flowing in each element. Current limiting resistors should be used to protect the PZ1 or PZ2 pins. This can be combined with a battery backup connected to VIN with a blocking diode.

Analog Devices' ADP5091/92 is an intelligent integrated energy harvesting nano-powered management solution that converts dc power from PV cells or thermoelectric generators (Fig. 13-4).The IC charges storage elements such as rechargeable Li-Ion batteries, thin film batteries, super capacitors, or conventional capacitors, and powers up small electronic devices and battery-free systems.

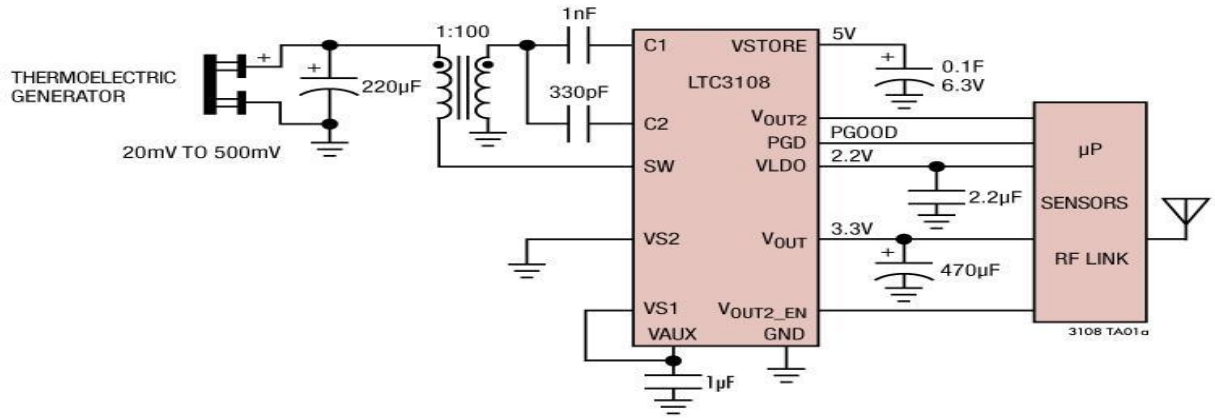
The ADP5091/92 provides efficient conversion of the harvested limited power from a 16 μW to 600 mW range with sub-μW operation losses. With the internal cold-start circuit, the regulator can start operating at an input voltage as low as 380 mV. After a cold startup, the regulator is functional at an input voltage range of 80 mV to 3.3 V. You can program an additional 150mA regulated output with an external resistor divider or VID pin.

By sensing the input voltage, the control loop keeps the input voltage ripple in a fixed range to maintain stable dc-to-dc boost conversion. The OCV dynamic sensing mode and none-sensing mode both programming regulation points of the input voltage allow extraction of the highest possible energy from the harvester. A programmable minimum operation threshold (MINOP) enables boost shutdown during a low light condition. As a low light indicator for microprocessor, the LLD is the MIONP comparator output. In addition, the DIS_SW pin can temporarily shut down the boost regulator and is RF transmission friendly.

The charging control function of ADP5091/92 protects rechargeable energy storage, which is achieved by monitoring the battery voltage with programmable charging termination voltage and shutdown discharging voltage. In addition, a programmable PGOOD flag with programmable hysteresis monitors the SYS voltage.

An optional primary cell battery can be connected and managed by an integrated power path management control block that is programmable to switch the power source from the energy harvester, rechargeable battery, and primary cell battery.

The ADP5091/92 is available in a 24-lead LFCSP and is rated for a −40°C to +125°C junction temperature range.



5.3.4 Moisture Monitoring System

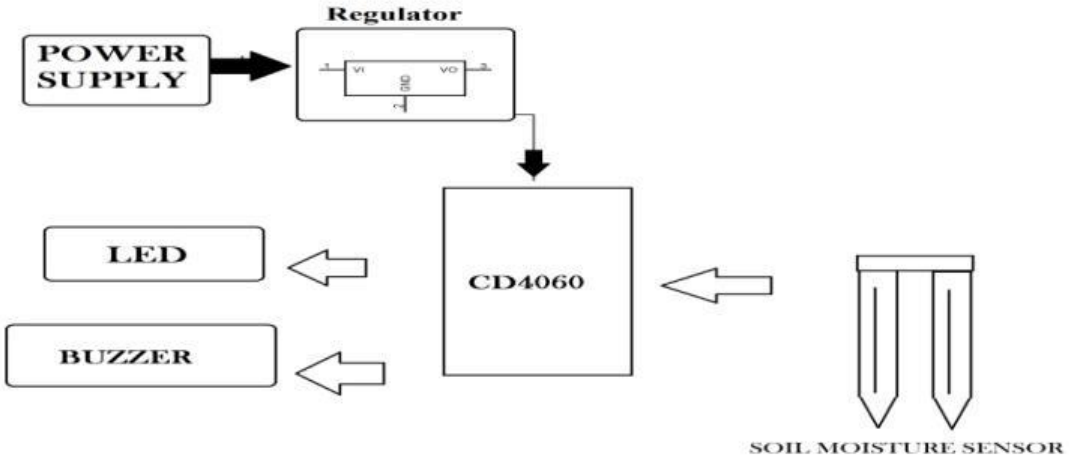
Planting a tree in an environment where the seed or the plant would not get water adequately through natural sources like rain or ground water in its initial phases has been always a matter of concern for tree planters. This is where an autonomous moisture monitor for plants system can help.The system timely monitors the moisture level of the soil. If at the time of monitoring it comes to know that the moisture level of the soil is lower than recommended then it will raise an audio visual alert. This alert is then received by the care taker of the plant. When the care taker waters the plant the alarm goes off and the monitoring cycle continues.

In this system we use a timer IC to time the monitoring process. A moisture level sensor is used to detect the moisture level of the soil. An LED is used to give visual alarm and a Buzzer is used to give audio alarm to the care taker of the plant. Thus in this project with the help of a simple combinational circuit and a sensor we can help save a plant by maintaining the moisture level of the soil of the plant, thus keeping the plant healthy.

Hardware Specifications

Water Sensor
Buzzer
Resistors
Capacitors
Transistors
Cables and Connectors
Diodes
PCB and Breadboards
LED
Transformer/Adapter
Push Buttons
Switch

Block diagram



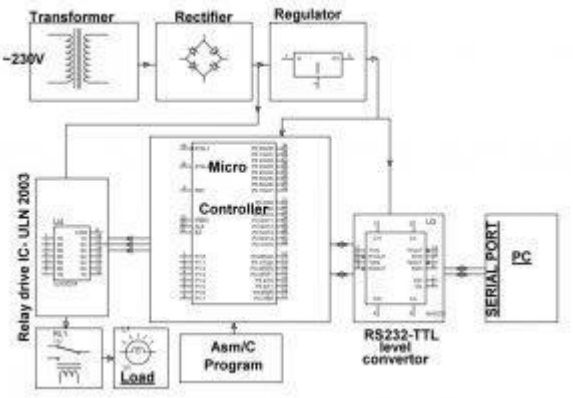
5.3.5 PC Based Electrical Load Control System

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

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

PC Based Electrical Load Control System

The PC based electrical load control system can be built with 8051 series Microcontroller, Level Shifter IC, DB Connector, Relays, Relay Driver, Transformer, Diodes, Capacitors, Resistors, LED, Crystal, Lamps, Keil compiler and Language: Embedded C or Assembly.



PC Based Electrical Load Control System Block Diagram

Keil an ARM Company makes C compilers, macro assemblers, real-time kernels, debuggers, simulators, integrated environments, evaluation boards, and emulators for ARM7/ARM9/Cortex-M3, XC16x/C16x/ST10, 251, and 8051 MCU families.

Compilers are programs used to convert a High Level Language to object code. Desktop compilers produce an output object code for the underlying microprocessor, but not for other microprocessors. i.e the programs written in one of the HLL like 'C' will compile the code to run on the system for a particular processor like x86 (underlying microprocessor in the computer).

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

Power Supply

The 230V AC supply is first stepped down to 12V AC using a step down transformer.

This is then converted to DC using bridge rectifier.

The AC ripples is filtered out by using a capacitor and given to the input pin of voltage regulator 7805.

At output pin of this regulator we get a constant 5V DC which is used for MC and other ICs in this project.

Microcontroller

It is a smaller computer; it has on-chip RAM, ROM, I/O ports. The features of this microcontroller include the following.

8K Bytes of In-System Programmable (ISP) Flash Memory
4.0V to 5.5V Operating Range
Fully Static Operation: 0 Hz to 33 MHz
256 x 8-bit Internal RAM
32 Programmable I/O Lines
Three 16-bit Timer/Counters
Eight Interrupt Sources
Full Duplex UART Serial Channel

MAX232

The MAX232 is an integrated circuit that converts signals from an RS-232serial port to signals suitable for use in TTL compatible digital logic circuits.
he MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals.
When a MAX232 IC receives a TTL level to convert, it changes a TTL Logic 0 to between +3 and +15V, and changes TTL Logic 1 to between -3 to -15V, and vice versa for converting from RS232 to TTl

Db9 Connector

The DB9 (originally DE-9) connector is an analog 9-pin plug of the D-Sub miniature connector family.

Relay

A relay is an electrically operated switch.
Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts.
The coil current can be on or off so relays have two switch positions and have double throw (changeover) switch contacts as shown in the diagram.
Relays allow one circuit to switch a second circuit which can be completely separate from the first.
For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit.
There is no electrical connection inside the relay between the two circuits, the link is magnetic and mechanical.
To drive relay through MC ULN2003 relay driver IC is used.
Relay Driver ULN2003

ULN is Relay Driver Application

The ULN2003 is a monolithic high voltage and high current Darlington transistor arrays.
It consists of seven NPN Darlington pairs that feature high-voltage outputs with common-cathode clamp diode for switching inductive loads.
The collector-current rating of a single Darlington pair is 500mA.
The Darlington pairs may be paralleled for higher current capability.
The ULN functions as an inverter.
If the logic at input 1B is high then the output at its corresponding pin 1C will be low

Project Working

The main goal of this project is to control the electrical load through a PC (personal computer). For example, lighting in the theatre can be controlled form the PC for superior stage management.At present, they are physically controlled which makes it complex to organize the lighting with the particular scene. By employing this system, one can manage the electrical load On/OFF by just being seated at one place using a PC.

5.4 Technical Case "Study On Burj-Al-Arab"

LOCATION

United Arab Emirates – Dubai
Private Island (280 m Offshore)
Building Name: Burj-Al-Arab Hotel.
Other/Former Names: Arab Sail.
Chief Architect: The primary architect who designed
the building Tom Wright of Atkins.
Chief Contractor: WS Atkins Partners Overseas.

Construction Contractor: Murray & Roberts.
Construction : 1993 – 1999.
Floors : 60. Floor Area : 111,500 m2(1200000 sqft)

Fig.5.4.1 Location of Burj-Al-Arab

Architect's Background

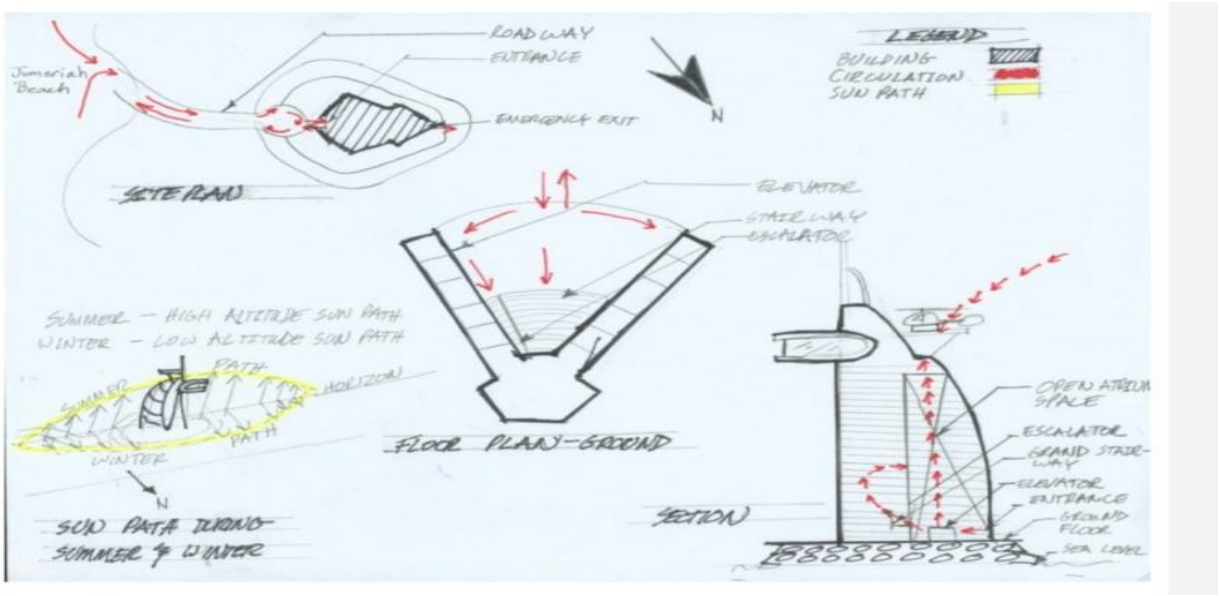
- Tom Wright (formerly Tom Wills-Wright) – The architect And designer of the Burj al Arab in Dubai, UAE.
- Tom Wright lived in Dubai during the design and Construction of the project, working as the project Design Director for Atkins , one of the world′s leading Multi discipline design consultancies.
- Tom Wright is British, born in Croydon a suburb of London on 18th September 1957.
- Educated at the Royal Russell School and then Kingston Polytechnic school of Architecture.
- Wright became a member of the Royal institute of British Architects in 1983 and has been in practice ever Since.

Introduction

- The Burj Al Arab – Tower of the Arabs , also known as "Arab Sail".
- A luxury hotel located in Dubai, United Arab Emirates.
- At 321 m (1,050 ft), it is the third tallest building in the world Used exclusively as a hotel.
- Stands on an artificial island 280 m (920 ft) .
- Connected to the mainland by a private curving bridge.
- It is an iconic structure, designed to symbolize Dubai's urban Transformation and to mimic the sail of a boat.

Concept

- The instruction from the client (the Crown Prince ofDubai) was to design, not just a hotel, but also aSignature building; one that would announce,"Welcome to Dubai".
- The client wanted a dramatic statement with imagery That would immediately conjure up images of the city.
- The building is built on sand, which is unusual as mostTall building are founded on rock. The Burj al Arab isSupported on 250, 1.5M diameter columns that go 45Meters under the sea. As there is only sand to holdThe building up the columns rely on friction.

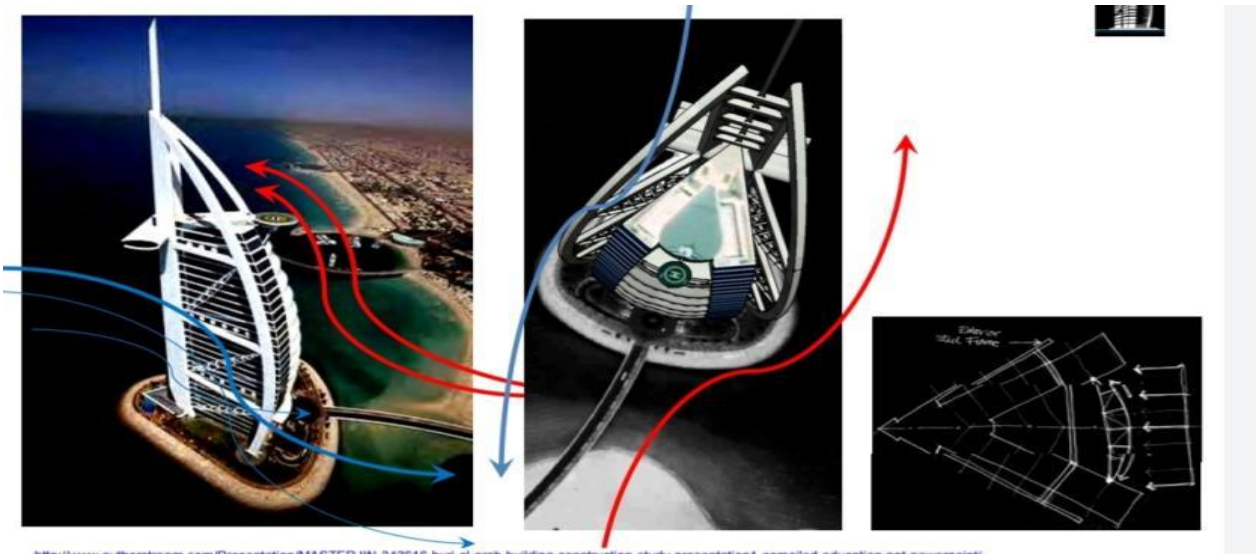


Concept –Orientation and Circulation

Fig.5.4.2 concept of Burj-Al-Arab

- The orientation of the building minimizes the Heat gain during the summer seasons.
- The south elevation has the most exposed Surface area. As a result, it has the maximum Capacity for heat absorption.
- The building is built on sand, which is unusual as mostTall building are founded on rock. The Burj al Arab isSupported on 250, 1.5M diameter columns that go 45Meters under the sea. As there is only sand to holdThe building up the columns rely on friction.
- The instruction from the client (the Crown Prince ofDubai) was to design, not just a hotel, but also aSignature building; one that would announce,"Welcome to Dubai".

- For people, there is access to the hotel through The roof via a helicopter. At the main entrance There is a grand stairway, an escalator and Elevators.For air, the revolving door



located at the main Entrance acts as a locking mechanism to prevent A phenomenon known as the stack effect, which Occurs when the hot air rises and the cool airFalls in a tall building

Fig.5.4.3 Orientation of Burj-Al-Arab

Environmental Approach

Wind Effects Dubai's

- Geographic location subjects the hotel to severe weather conditions including strong winds and Occasional violent thunderstorms.
- Due to the structure's proximity to its adjacent hotel resort, wind tunnel testing was considered to Ensure a safe design.
- wind speed of 45 meters per second, under the recommendations of Dubai Municipality, was adoptedFor the design.

Seismic Impact Dubai

- Itself is not located in an earthquake intensive zone. However, southern Iran which is only 100 miles Away to the north is subjected to moderate earthquake risk and in turn which could create tremors in Dubai if a seismic event were to occur in Iran.
- To reinforce the structure from any potential swaying, two tuned mass dampers, weighing about 2 Tonnes each, limit vibrations in the tubular steel mast that projects 60 m above the building.

Vortex Shedding

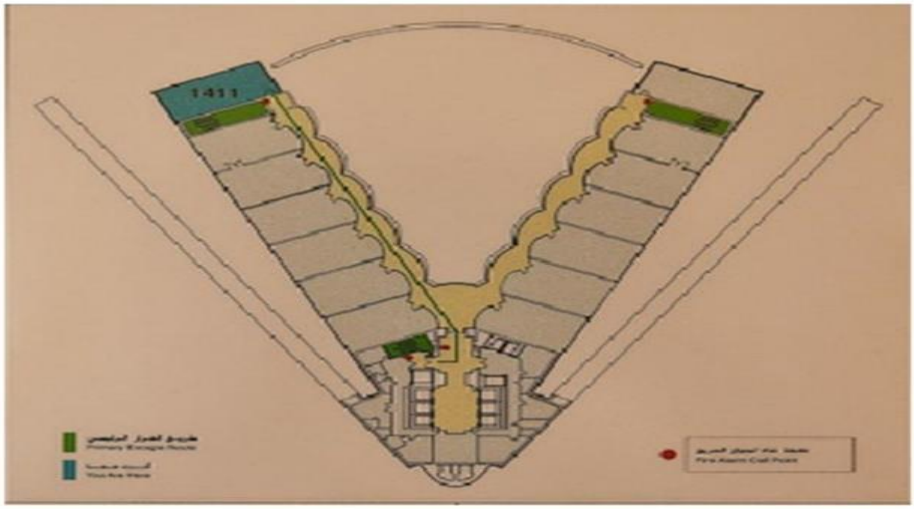
- Analysis were done with respect to Building Response under wind loads

- Wind tunnel could threaten the entire Skeleton. Wind blowing away sharp edges can Cause destruction.
- Vibration may cause due to vortex shedding

Response

- First option was to change the shape but Architect was against and forced the engineer To re-think.
- Ingenious hanging weight were installed at Variable places – when wind blows, 5 ton Weight will swing and damp down the Vibrations to safety limits (refer image for Locations highlighted in red)

Fig.5.4.4 Floor Plan of Burj Al Arab



Typical Floor Plan

- Building is a hybrid "V" shape structure constructed in Concrete and blended with structural steel.
- The "V" shape steel frame wraps around the Reinforced concrete tower inhabiting hotel rooms and Lobbies.
- The two wings enclose space in center to form largest Atrium in the world standing about 180m height.
- Burj al Arab is made up of 28 storeys of split levels (56 Storeys) with 10,000 Sqmt floor area, 60,000 Sqmt of Concrete and 9,000 ton of reinforced steel.
- The roofs and walls of the building are made of Prefabricated concrete
- There is a concrete core at the back of the building Which forms the base of the V-shape and the trusses Are connected to it.

Foundation

The Challenge

- It was very challenging to design foundations To Support the mega structure-270 miles off Coast, 320 mtr in height on man-made island (6mts from Arabian Sea) resistant to Earthquake (falling under range of major fault Line) and wind that blows 90 miles per hour.
- Structure was designed to amaze-one never Built before. Location on a reclaimed land was Added challenge.

Tests And Results

- Initial core test-Drilling done 180mts down and no solid rock was formed but architect was defiant about the design and construction.
- Then, reinforced concrete foundation piles deep into sand with concept of skin –friction were designed.
- Skin friction: resistance that stops the slipping between sand and surface of piles. When friction between them is equal to impact, situation is handled.

Load Analysis

- ✓ Total dead load : 2850,000,000 lbs
- ✓ Total live load : 86,160,000 lbs
- ✓ Total load on foundation : 150,000 lbs/SF
- ✓ Maximum horizontal wind load : 2,366,000 lbs

Lateral Loads

- The Burj Al Arab has three tubular steel trusses on the outside of the two sides of the V (in green).
- The trusses act as cross bracing to wind and earthquake forces.
- The translucent fabric wall of the atrium helps transfer lateral load (in red).
- Due to the rigidity, lateral loads are transferred to the fabric wall which acts similar to a diaphragm.
- The shape of Burj Al Arab lowers wind forces more effectively than a square building because of the streamlined V and curved fabric atrium wall (in blue).

Vertical Loads

- The structure transfers vertical loads from the top to the bottom of the structure using several different aspects.
- The structure transfers the vertical loading is through the large spine. This is the most direct way for the vertical loads to reach the ground.
- Secondly, the vertical loads transfer through the curved edge.

- The steel trusses running alongside the structure also helps in deflecting the horizontal loads.

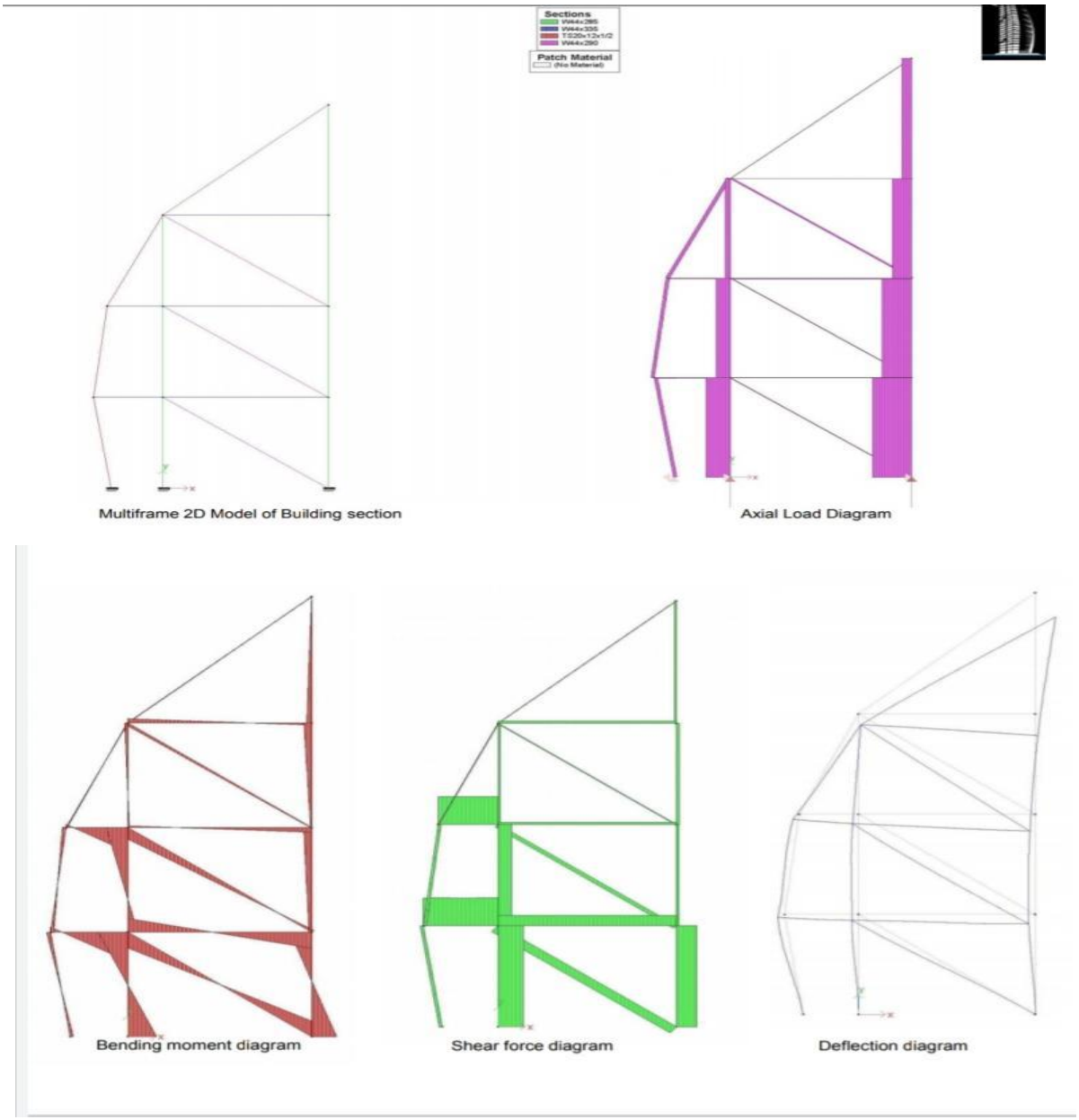


Fig.5.4.5 Load Analysis of Burj-Al-Arab

Chapter 6. Swachhbharatabhiyan (clean India mission): SWOT analysis

6.1 Swatchhta needed in allocated village -Existing Situation with photograph

Civilization is the distance that man has placed between himself and his own excreta.Sanitation is a basic necessity that affects everyone's life.Sanitation and hygiene is critical to health, survival, and development. Throughout the world, an estimated 2.5 billion people lack basic sanitation (more than 35% of the world's population).Many countries are challenged in providing adequate sanitation for their entire populations, leaving people at risk for water, sanitation, and hygiene (WASH)-related diseases.1,2 The pathetic state of sanitation index in India has put the country behind Pakistan, China, Bangladesh, and Nigeria. According to Water, Sanitation, and Hygiene (WASH) Performance Index 2015 developed by the Water Institute at the University of North Carolina, India was a bottom performer and was ranked 93. Despite the assumption that countries with higher GDP will perform better in improving access to water and sanitation, GDP was not significantly correlated with performance.3,4 India has been putting efforts for improving sanitation for a long time

Swachh Bharat Abhiyan (SBA)

To accelerate the efforts to achieve universal sanitation coverage and to put focus on sanitation,the Prime Minister of India launched the Swachh Bharat Abhiyan on 2nd October, 2014. SBA aims to achieve Swachh Bharat by 2019, as a fitting tribute to the 150th Birth Anniversary of Mahatma Gandhi.

SITUATIONAL ANALYSIS

SBA is one of the most highlighted programme run by the present Government of India. SWOT is a basic, analytical framework that assesses what an organization can and cannot do, as well as its potential opportunities and threats, determines what assists the firm in accomplishing its objectives, and what obstacles must be overcome or minimized to achieve desired results. So, the situational analysis was done by reviewing the available literature on subject. Strong points as well as weaknesses were identified regarding SBA, then some suggestions were given, which may work like an opportunity regarding improvement of sanitation in India.

6.2 Guidelines – Implementation in allocated village with Photograph

Funding provisions

In the new SBM Programme, funding has been delinked from the livelihood Programme, Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), since that was leading to inefficiencies and delays in implementation. Fund is also provided for SLWM (solid and liquid waste management), subject to a ceiling of Rs. 7/12/15/20 lakh to be applicable for Gram Panchayats having upto 150/300/500/ more than 500 households. A fund of Rs. 2 lakh is available for community toilets. 0.5% Swachh Cess on services has been imposed w.e.f. 15.11.2015 to supplement the budgetary source for Swachh Bharat Mission. Besides this, Swachh Bharat Kosh has been established in November, 2014 under Ministry of Finance to attract CSR funds for sanitation. Funding from Overseas Indians is also being tapped. Donations to the "Swachh Bharat Kosh" , other than the sums spent for "Corporate Social Responsibility" under sub-section of Section 135 of the Companies Act, 2013 are eligible

for 100% deduction under section 80G of the Income-tax Act, 1961.Other sources of fund such as 14th finance commission grants, states own sources, CSR etc. are also available.

Flexibility to states in implementation of program

There is immense socio-economic-geographic cultural-language diversity in India. The States are best placed to decide what kind of strategy, approach and technology suits them the most, in order to reach the desirable outcomes. Closer coordination with the States than before is being brought about by measures such as holding workshops in the States, exposing the key state/district officials to the approach of community processes for reinforcing the message, cross sharing of best practices across states by holding regional/ national workshops, visits to states, reviews and video conferencing.

State level workshops

The concept of workshops at the State level, involving the State officials/District Collectors/CEOs, Zilla Panchayats, Zilla Panchayat Presidents and other key stakeholders was rolled out in 2015-16. The workshops proved very effective in providing a platform from National to District level, to deliberate upon key issues pertaining to sanitation. Champion Collectors from other States/Districts, where these approaches had been successfully practiced were called as resource persons to share their experiences.

Technological innovations

With the launch of SBA, there is a spurt of research and development (R&D) activities in technology of both toilets and SLWM. The Ministry of drinking water and sanitation promotes such R & D activities by financing various projects. An Expert Committee has been constituted to examine the Innovative Technologies. This committee meets regularly and has enlisted various innovative technologies and a compendium consisting of such technologies has been published and uploaded in the website of the Ministry for benefits of various stakeholders. Locally relevant, safe and sustainable technology is promoted. Local innovations are encouraged.

6.3 Activities Done by Students for allocated village with Photograph

Behavioral change is the critical component required to improve sanitation. It is when people use a latrine, rather than when one is constructed, that the wider benefits are realized. Similarly, it applies for practicing other aspects of cleanliness like hand washing, drinking water and eating food. A systematic review estimated that the safe disposal of excreta alone can reduce diarrheal disease by 36% and a separate review of hand washing with soap on diarrhea found a 45% reduction.

Toilet construction without demand generation

One of the most critical components of any public health program is to generate the demand among the community.Demand of toilets cannot be conceptualized in the exact same structure as other goods and services, which typically display diminishing marginal productivity: the first units generally have a significantly greater impact than the last few units. In contrast, in a community where the vast majority of individuals defecate publicly, an individual who constructs and uses a toilet will not experience a drastic increase in his/her health. Because public defecation impacts health via water, the individual that constructs and uses a toilet in the high-density public defecation community will still experience poor health through contaminated water, or by flies that transmit fecal matter to food and drinking water practices. Theoretically, there must be some threshold level at which the percentage of community members

using toilets has a substantial effect on health. Once this threshold is reached and bypassed, all individualswhether or not one owns and uses a toilet will experience health improvements, with improvements continuously increasing in the number of adopters.

Latrines are socially unacceptable

In certain subpopulations of India due to religious reasons: latrines close to the home are considered ritually polluting. Individuals are reluctant to empty the pit(and its contents), and thus require unreasonably large (and expensive) pit sizes.

Caste system

The SBA, must address the working conditions of those at the lowest class of society□the ones who have occupations as manual scavengers□as well as the individuals permanently to certain social classes and stigmas. Caste and gender discrimination are linked to cleaning jobs. No takers for cleaning jobs as cleaning linked to caste based occupation taken by the lowest on the caste system ladder and women of all castes in the household. Consequently, this deep-seeded stereotype prevents a sense of ownership among those historically not responsible for cleaning the country.

Maintenance

The focus on short-term solutions also disregards efforts formaintenance. Even in municipal schools that have toilets, lack of funding from public institutions for maintenance leaves toilets broken and unusable. If the toilet stops working they just lock the door and no one does anything, so basically things fail because of lack of municipal support.

Campaign is voluntary not compulsory

Swachh Bharat Abhiyan is voluntary one but not the compulsory, so everyone need not understand and implement recommendations. It should be compulsory to use toilet and open defecation should be made a punishable act.

OPPORTUNITIES

Waste management through biogas/gobar gas plant/Domestic biogas plants

While the present government is planning to build concrete plan or allocation for laying down sewerage networks or treatment plants. One golden opportunity is waste management through domestic biogas plants. Biogas typically refers to a mixture of different gases produced by the breakdown of organic matter in the absence of oxygen. Biogas can be produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage, green waste or food waste. Biogas is a renewable energy source and in many cases exerts a very small carbon footprint. In developing nations .Domestic biogas plants convert livestock manure and night soil into biogas and slurry, the fermented manure. This manure has to be collectable to mix it with water and feed it into the plant. Toilets can be connected .

Options for alternative types of sewerage and treatment systems

New sanitation concepts are now built in several countries as pilot projects. One example is a vacuum-biogas system for around 400 inhabitants that have been built in Lübeck, Germany. It does perform recovery of resources and energy in an urban area. This type of sanitation can serve around up to 10,000 people and can be arranged in independent modules for larger settlements. Another pilot project based on urine-sorting flush toilets (no-mix-toilets) has been built in the rural water-mill museum, Germany. Urine or yellow water is collected with low dilution and can be used as fertilizer.

Sustainability of interest and priority

There is scope for expansion and increasing the coverage of the campaign. Sustaining the interest and priority accorded to the program at all levels of administration and in the community will be a challenge in the future.

Changes in administration and leadership

It is important to sustain the momentum and continue with the campaign irrespective of routine transfers of officers and staff and change in local leadership.The SBA, must address the working conditions of those at the lowest class of society□the ones who have occupations as manual scavengers□as well as the individuals permanently to certain social classes and stigmas. Caste and gender discrimination are linked to cleaning jobs. No takers for cleaning jobs as cleaning linked to caste based occupation taken by the lowest on the caste system ladder and women of all castes in the household. Consequently, this deep-seeded stereotype prevents a sense of ownership among those historically not responsible for cleaning the country.

Recycling solid waste is a big problem

According to Central Pollution Control Board (CPCB), Urban India generates about 100000 metric tonnes (MT) of solid waste every year. It is also reported that more than 75 percent of sewage or wastewater disposal is not treated in India. These issues need to be addressed now, so that a major crisis can be prevented in the future.much waste and how it will be disposed of is a big concern.

Change the mindsets of the people

When will our countrymen learn not to spit or throw garbage on the roads? Or when will our people learn to keep themselves and their localities clean? The value of SWOT analysis cannot be overemphasized. It is rightly said "winners recognize their limitations but focus on their strengths; losers recognize their strength but focus on their limitations." Positive thinking is strength whereas negative thinking is a weakness. Although clean India is very tough job, still nothing is impossible with efforts on this future swachh planet.

The focus on short-term solutions also disregards efforts formaintenance. Even in municipal schools that have toilets, lack of funding from public institutions for maintenance leaves toilets broken and unusable. If the toilet stops working they just lock the door and no one does anything, so basically things fail because of lack of municipal support. Campaign is voluntary not compulsory Swachh Bharat Abhiyan is voluntary one but not the compulsory, so everyone need not understand and implement recommendations. It should be compulsory to use toilet and open defecation should be made a punishable act.

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Chapter:-7 Village conditions due to Covid-19

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

In visit we interaction with villagers and sarpanch of the village,They told us all the villagers are follow government guidelines for covid 19 and they follow three basic steps to protect against corona virus and they follow a lockdown guidelines also and they pretend to be a safety against covid 19 situation.

- regular handwashing
- always wearing a mask
- make a social distancing

7.2 Activities done by students for pindharada village with Photograph

We spread awareness about corona virus and understand the village issue due to Covid-19 and we tell the villagers about corona virus spreading.we distribute the mask and hand sanitizer in village and teach to use them and aware about Covid-19.we tell them wear mask whenever you can going crowdy area and maintain social distancing that area and do not go anywhere without any work.we tell them to self quarantine when they feels any symptoms of Corona virus.

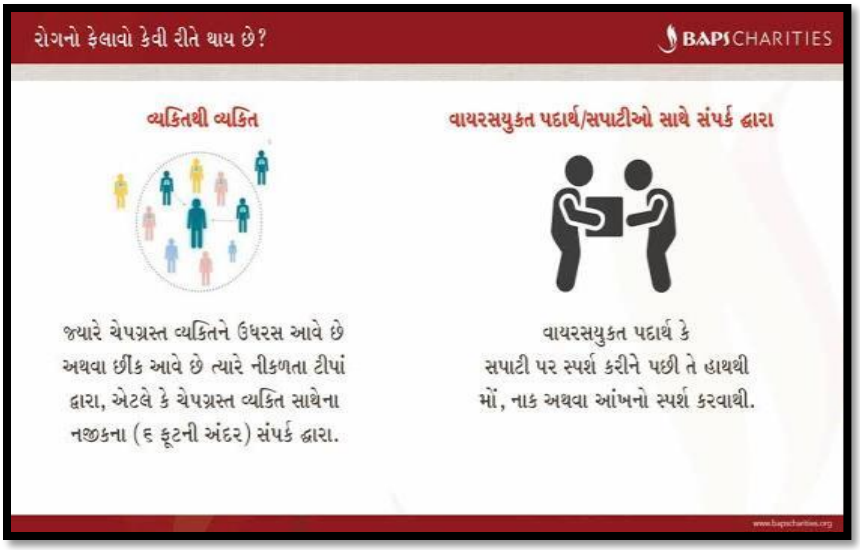


Fig.7.2.1 Activities done by students

7.3 Any other steps taken by students/villagers

We spread awareness about corona virus.we distribute mask and hand sanitizer .Villages in have made several arrangements spraying disinfectant with water in colonies, making locals aware about coronavirus through loudspeakers, including dos and don'ts and ensuring all homes have enough ration in the entire village tackle the Covid-19 outbreak.

Avoid touching surfaces, especially in public settings or health facilities, in case people infected with COVID-19 have touched them. Clean surfaces regularly with standard disinfectants. Frequently clean your hands with soap and water, or an alcohol-based hand rub.

Like any vaccine, COVID-19 vaccines can cause mild, short term side effects, such as a low-grade fever or pain or redness at the injection site. Most reactions to vaccines are mild and go away within a few days on their own. More serious or long-lasting side effects to vaccines are possible but extremely rare We spread awareness about corona virus and understand the village issue due to Covid-19 and we tell the villagers about corona virus spreading.we distribute the mask and hand sanitizer in village and teach to use them and aware about Covid-19 Safe and effective vaccines are a game-changing tool: but for the foreseeable future we must continue wearing masks, cleaning our hands, ensuring good ventilation indoors, physically distancing and avoiding crowds.

Being vaccinated does not mean that we can throw caution to the wind and put ourselves and others at risk, particularly because research is still ongoing into how much vaccines protect not only against disease but also against infection and transmission.

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 Sustainable planning proposal

OBSERVATION:

- As there is no any renewable / sustainable infrastructure facility, it is very important to provide Sustainable Infrastructure in the village. It will be economical, eco-friendly and efficient also. We can provide Sustainable Infrastructure like Solar street lights, Biogas plant, Rain Water Harvesting System etc.
- We can provide Solar Street Lights which uses solar energy to generate electricity. It is the most efficient system for the street lights. Street lights gets sun heat through-out the day and can store solar energy which can be used at night.
- The other design we can provide is Biogas plant. It can be used for cooking purposes and can be used as natural gas. This method is also very efficient and eco-friendly and economic also.
- Rain Water Harvesting can be provided for any particular Public Building to store the rain water.

RECOMMENDATION:

- The Solid Waste Management system of the village has to be improved for the sake of the cleanliness and health of the people of village because there is no provision for disposal of solid waste generated. People through it out in open land areas.
- Recreational facilities can be provided like public garden, playground etc. for the recreational purpose because there are no such provisions made in the village.
- Renewable energy sources can be used for the purpose of energy conservation and to reduce load on conventional energy sources.
- Rain Water Harvesting system can be implemented for individual as well as public buildings such as hospitals or schools.
- Solar Energy Sources can be used for electricity purposes in schools and hospitals.
- Biogas Plant can be provided.

8.1.1 Suitable Design-Bank Building

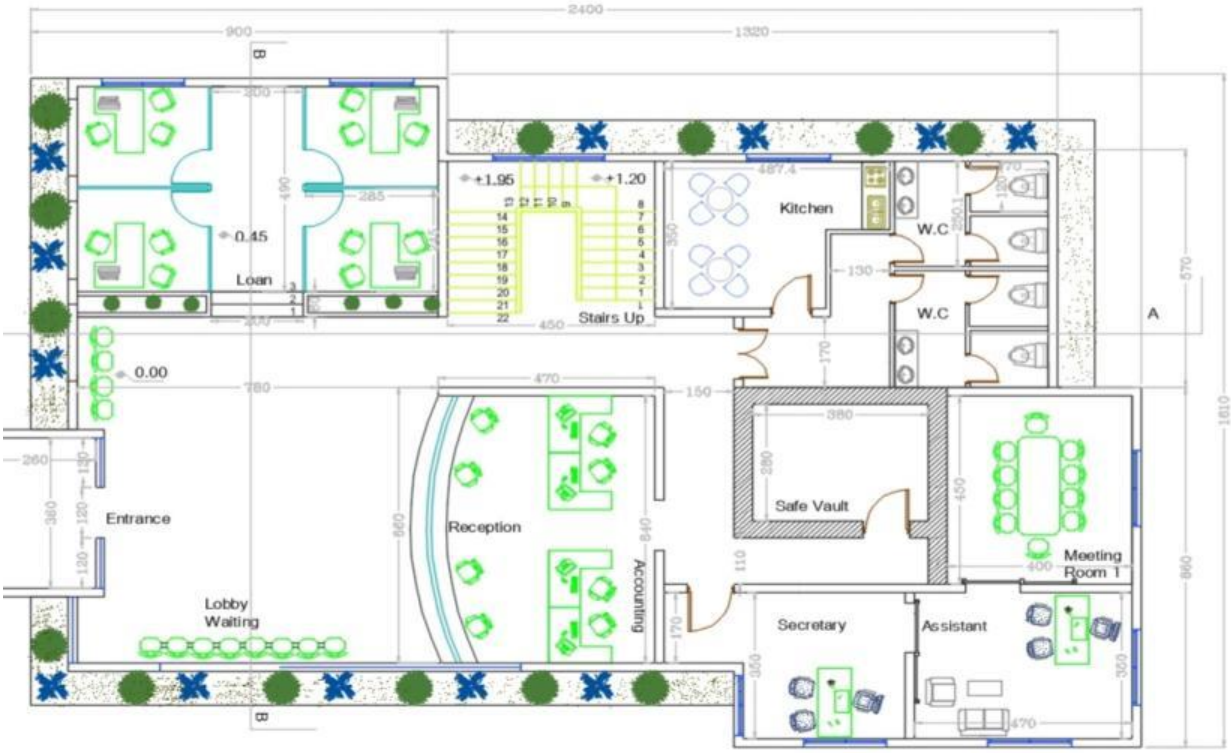
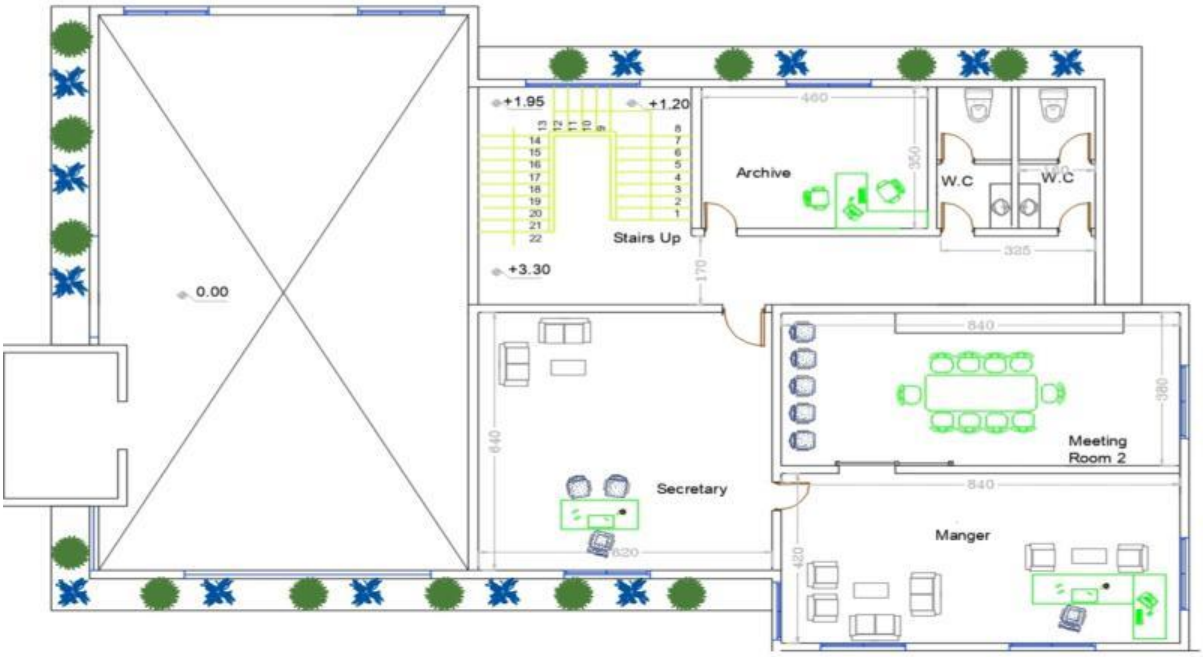


Fig.8.1.1.1 Plan of Bank



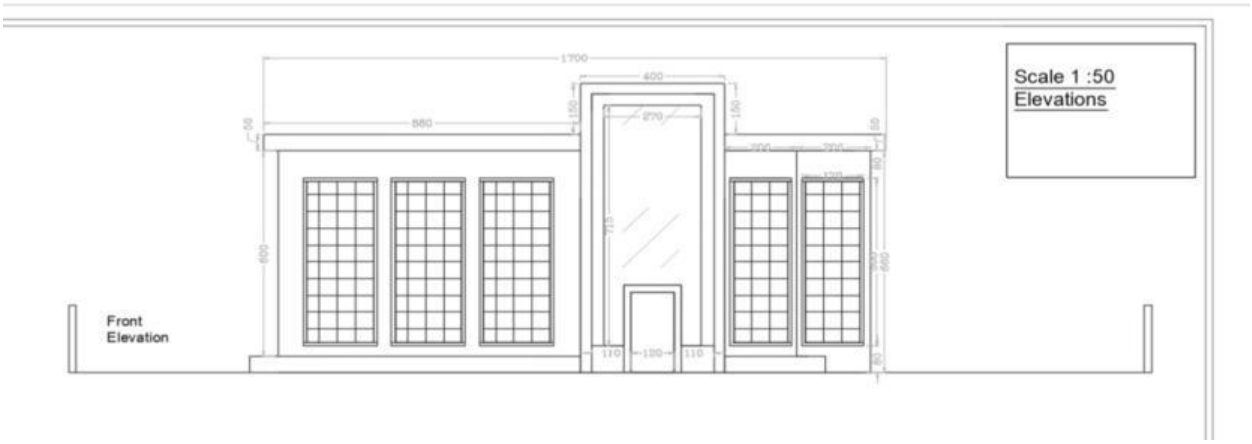


Fig8.1.1.2 Elevation of Bank

Measurement sheet

SR No	Item description	No	L (m)	B (m)	H (m)	Oty	Total Qty.
1	Excavation of foundation in soil	3	24	0.3	0.9	19.44	
		3	16	0.3	0.9	12.96	32.4 cu.m
2	Laying PCC on foundation (1:3:6)	3	24	0.3	0.15	3.24	
		3	16	0.3	0.15	2.16	5.4 cu.m
3	Laying of footing M20 Concrete (1:2:4)	3	24	0.3	0.45	9.72	
		3	16	0.3	0.45	6.48	16.2 cu.m
4	Filling the foundation with soil	1	16	24	0.9		345.6 cu.m
5	Brickwork up to superstructure in ground floor	3	24	0.3	2.1	45.36	
		3	16	0.3	2.1	30.24	
6	Brickwork in superstructure in first floor	3	14.6	0.3	2.1	27.60	
		3	13.2	0.3	2.1	24.94	128.14 cu.m

7	R C C lintel on the wall						
	Ground floor	3	24	0.3	0.15	3.24	
		3	16	0.3	0.15	2.16	
	First floor	3	14.6	0.3	0.15	1.97	
		3	13.2	0.3	0.15	1.78	9.152 cu.m
8	R C C slab with centering and shuttering						
	Ground floor	1	24	16	0.15	57.6	
	First floor	1	14.6	13.2	0.15	28.90	86.50 cu.m
9	Steel required for R C C work		L.S				200 kg
10	Plastering on the wall	6	24	-	2.1	302.4	
		6	16		2.1	201.6	
		6	14.6		2.1	184	
		6	13.2		2.1	166.32	855 sq.m

Abstract sheet

Sr No	**Item description**	**Qty.**	**Rate (RS)**	**Unit**	**Amount (RS)**
1	Excavation of foundation in soil	32.4	100	Cu.m	3240
2	Laying PCC on foundation (1:3:6)	5.4	3000	Cu.m	16200
3	Laying of footing M20 Concrete (1:2:4)	16.2	8500	Cu.m	137700
4	Filling the foundation with soil	345.6	50	Cu.m	17280
5	Brickwork up to superstructure in ground floor	128.14	3500	Cu.m	448490
6	R C C lintel on the wall	9.152	13000	Cu.m	118976
7	R C C slab with centering and shuttering	86.50	8800	Cu.m	761200
8	Steel required for R C C work	200	45	Kg	9000
9	Plastering on the wall	855	150	Sq.m	128250

10	Wood work for door and window lump sum				125000
	Total cost				**1765336**
	Contractor profit+ contingency				**212000**
	Total amount Rs				**1977336**

8.1.2 Physical design-Shelter Bus stand

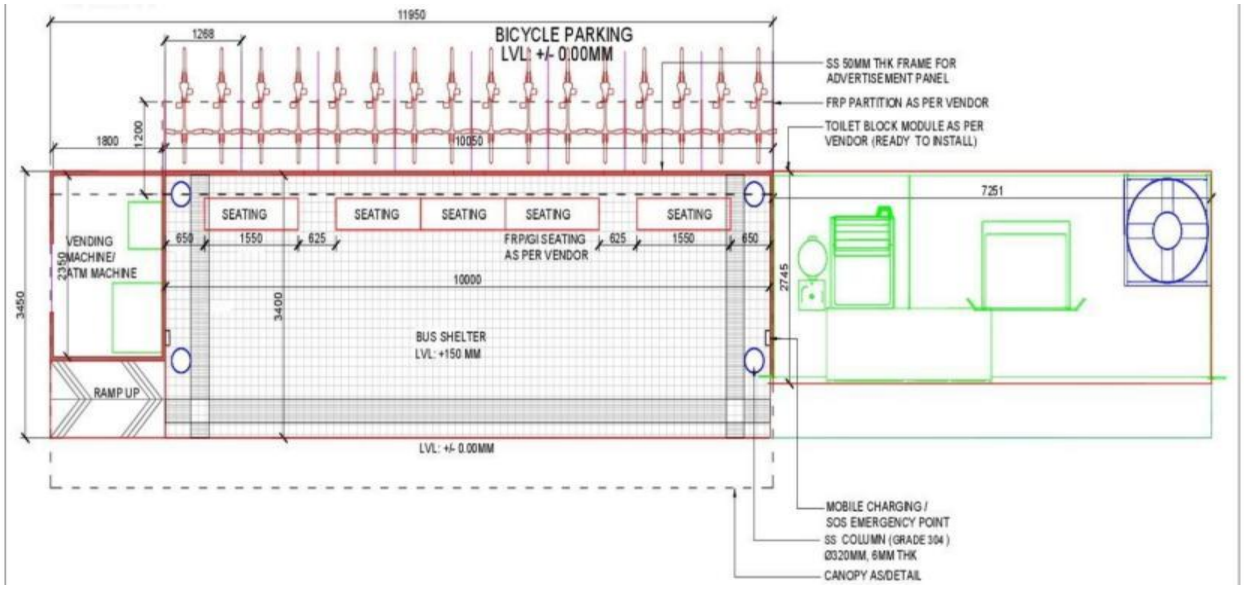


Fig.8.1.2.1 plan of shelter bus stand

S No.	**Item Description**	**Qty.**	**Unit price (RS.)**	**Unit**	**Amount (RS.)**
Bus shelter & cycle stand					
1.	SS Grade 304 Column, SS Grade 304 Rafter, SS Grade 304 Purlin, Roof sheet -Polycarbonate Sheet, SS Grade 304 Frame for Advertisement Board, SS Sheet for Advertisement Board, Acrylic Sheet for Route Board, SS Grade 304 Connectors for Advertisement Board	1	1,232,000	No.	1,232,000

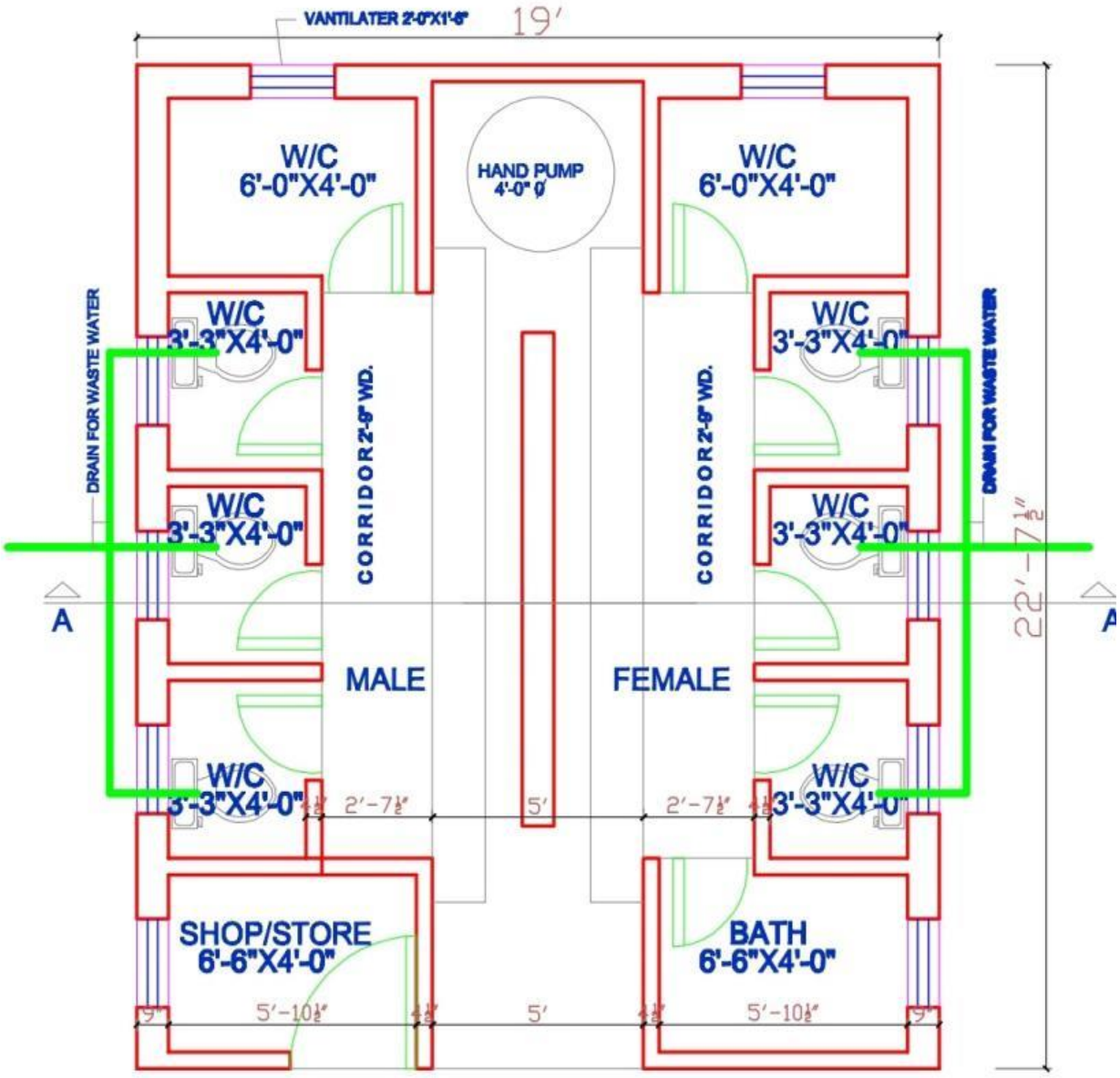
sub-total(A)					**1,232,000**
Toilet Blocks					
2.	Ss Urinal structure for two user	1	80,000	No	80,000
3.	Women Modular Toilet stalls (with all accessories) single	1	83,728	No	83,728
4.	Supply of LED lights (3 watt LED light Cree xpe chip based), PIR based motion sensing system with custom logic board	2	5000	No	5000
5.	Supply of Partition in front of regular Toilet with 1 Advertisement Panels with composite Roof and Stickers	1	75,000	No	75,000
6.	Supply of Wash Basin With Stand Arrangement for Soap Dispensor and Push Cock (Tap)	2	5000	No	5000
7.	Supply of MS Stand For Water Tank With FRP Sheet Covered All the sides for OHT-Structure and 1000 Ltrs. Water Tank	1	90,000	No	90,000
8.	Supply of MS STEEL Partition Frame with rectangular pipe frame –Painted	3	10,000	No	10,000
9.	Supply of Direction and Display Boreds	2	30,000	No	30,000
	Sub-Tatal(B)				384,728
Grid-Connected Solar PV System					
10.	5KW, Single phase, Rooftop On grid Solar System	1	285,000	No	285,000
11.	Power cables, DC combiner & DC distribution box, Earthing of Solar system	1	45,000	No	45,000

12.	Bi-directional, Import/ Export KWh Metering system	1	20,000	No	20,000
13.	AC Distribution Box	1	40,000	No	40,000
	Total(D)			**Sub-**	**390,000**
Vendor kiosk					
14.	Modular Prefabricated Kiosks	1	250,000	No	250,000
	Total(D)			**Sub-**	**250,000**
Civil Works					
15.	Earthwork for Cutting, Filling and Disposal of Surplus Earth				
15.1	Earth work in excavation in foundation, trenches etc. including dressing of sides and ramming of bottoms, including getting out the excavated material, refilling after laying pipe/ foundation and disposal of surplus excavated material at a lead upto 50m suitable site as per direction of Engineer for following depths, below natural ground / Road top level				
a	In ordinary rock.				
b	Depth upto 1.5 m	38	324	Cum	12,312
16.	Plain cement concrete 1:3:6 nominal mix in foundation with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibrator including curing complete as per clause 2100 of MoRT&Hspecification	9	3,550	Cum	31,950

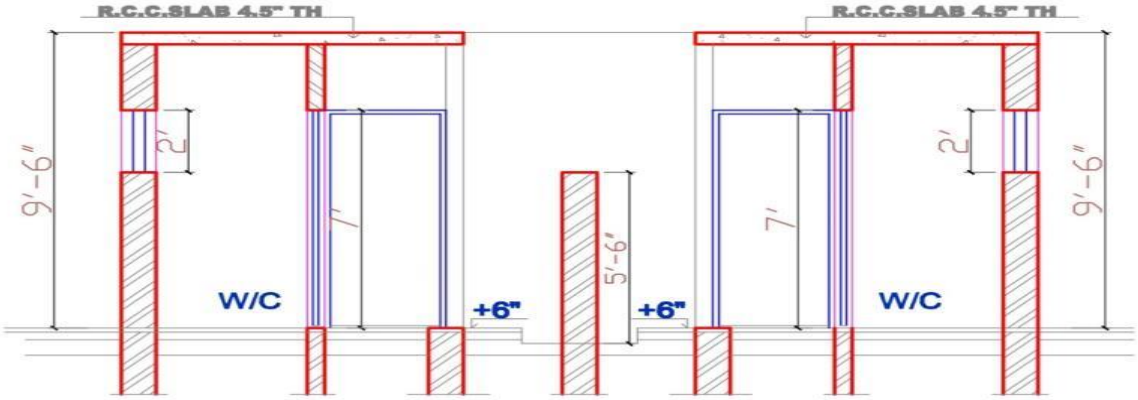
	including all scaffolding, material, labour, machinery.				
17.	Providing, laying and compacting plain/ reinforced cement concrete of specified grade in foundation/ leveling course/ pile cap using concrete mixer and vibrater complete including cost of form work, as per drawing and technical specifications and as per clause 1100, 1500, 1700, 2100 of MoRT&H specification including all scaffolding material, labour, machinery				
a	RCC - M25	24	4,940	Cum	118,560
18	Supplying, fitting and placing TMT bar reinforcement in sub structure/ superstructure at all level complete as per drawing and clause 1600 & 2200 of MoRT&H Specification including all material, labour, machinary etc.	0.2	52,800	Tonne	10,560
19	Brick work with FPS bricks of class designation 75 in foundation and plinth in:				
a	Cement mortar 1:4 (1 cement : 4 coarse sand)	6	3,950	Cum	23,700
20.	Kota stone slab flooring 25mm thick over 20 mm (average) thick base laid over and jointed with grey cement slurry mixed with pigment to match the shade of the slab including rubbing and polishing complete with base of cement mortar 1 : 4 (1 cement : 4 coarse sand)	80	1,020	Sqm	81,600
	Total(E)			**Sub-**	**278,682**

Miscellaneous					
21	Miscellaneous work (Electrical	1		LS	150,000
	TOTAL (A+B+C+D+E+F)				**2685,410**

8.1.3 Social Design-Public Toilet



8.1.3.1 plan of public Toilet



8.1.3.2 Elevation of public Toilet

Sr no	Item description		Unit	Qty	Rate (rs)	Amount (Rs)	
1	Earthwork in excavation depth up to 1.5 m	Cu.m	10.81			104	**1118**
2	Cement concrete up to plinth (1:4:8)with centering and shuttering	Cu.m	4.87			2449	**11927**
3	Brickwork in foundation	Cu.m	7.27			2121	**15425**
4	Half brickwork in foundation	Sq.m	14.93			270	**4036**
5	Brickwork in superstructure	Cu.m	13.08			2311	**30238**
6	Half brickwork up to superstructure	Sq.m	21.05			287	**6046**
7	Providing DPC (1:2:4)	Cu.m	18.90			144	**2724**
8	15 mm thick cement plaster	Sq.m	67.80			73	**4929**
9	Cement concrete in flooring	Cu.m	33.16			193	**6398**
10	Providing and fittings water closet	Nos	8			1010	**8080**
11	Providing and fixing trap of self cleaning	Nos	11			442	**4863**
12	Layingandjointingofstonewarepipe	Ru.m	16			263	**4213**
13	RCC work for slab	Cu.m	3.46			3359	**11624**
14	Rinforcement in rcc work	Kg	272			42	**11288**
15	Cost of drainage work						**4000**
	Total cost						**126916**
	Contingency cost						**19037**
	Contractor profit						**12691**

	Total cost				**158645 RS**

8.1.4 Socio-cultural Design-Community hall

Introduction

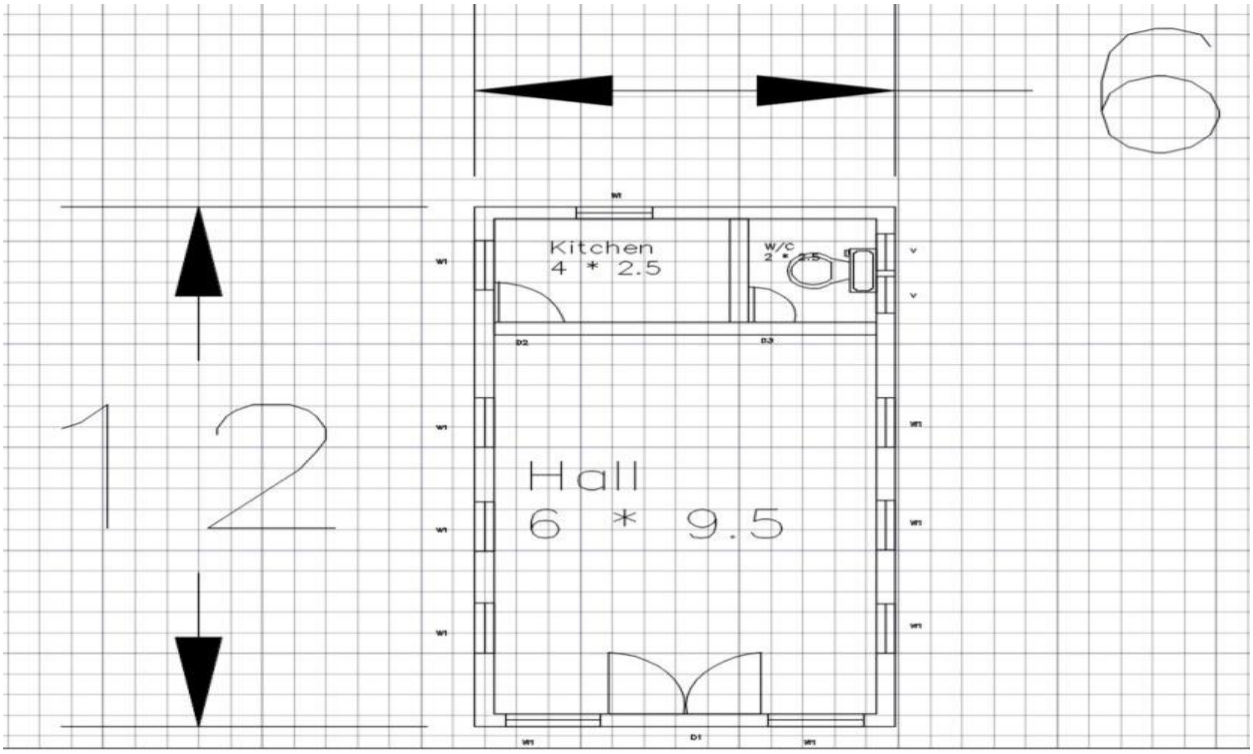
Village and community halls are the smallest buildings that can accommodate a sports programme alongside the customary social and arts pursuits. There are a wide variety of types and sizes, all with the following in common – a main activity and assembly space together with ancillary accommodation that might include additional small halls. Whatever the content,design must ensure that a full range of activities can be carried out without detriment to each other. It is vital to allow sufficient time to get the building brief right and to select an appropriate and accessible site at the heart of the community.The resultant building should be aesthetically pleasing and reflect the care taken to produce a quality facility capable of meeting the evolving needs of the community and the services it needs. A new stand-alone building is often the preferred solution but there are other optionsthat may be more economical:

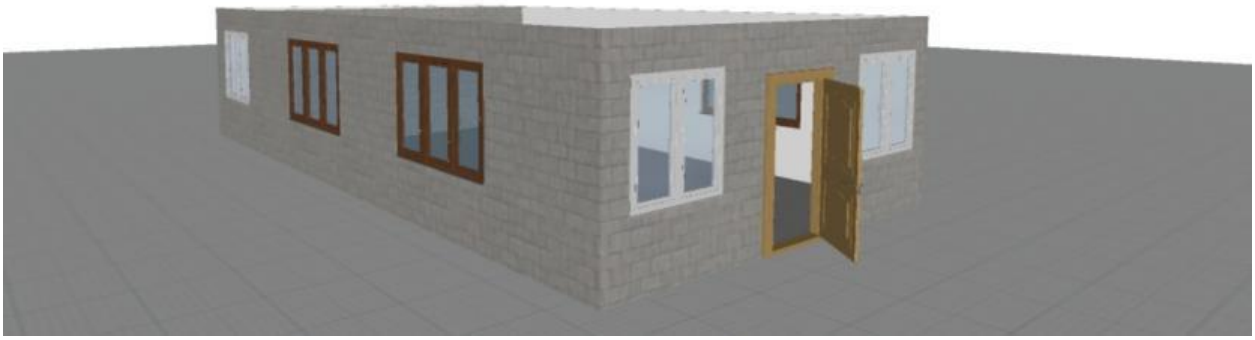
Community centres are important hubs across the country that give people an opportunity to socialise, learn and access key services.

Some argue that these centres aren't seen as desirable places to spend time – but they serve a vital function in communities across the country. De-stigmatising community centres and promoting the incredible work they do to bring people together will help invigorate and refresh the sector. The more people who use, contribute to and donate money towards community centres, the more people can be helped.

Now more than ever, we're living in challenging times that require us all to pull together and offer help. Here are just 10 reasons why community centres are vital hubs, providing a much-needed service for individuals across the country

- Extension and upgrade of an existing community hall to improve environmental standards and permit more activities
- Addition of a hall, store and revised circulation to a refurbished sports pavilion
- Inclusion of a community hall in a sports and leisure centre.Planning for community use of new schools (primary or secondary) by upgrading some of the accommodation.
- There are a wide variety of types and sizes, all with the following in common – a main activity and assembly space together with ancillary accommodation that might include additional small halls. Whatever the content,design must ensure that a full range of activities can be carried out without detriment to each other. It is vital to allow sufficient time to get the building brief right and to select an appropriate and accessible site at the heart of the community.The resultant building should be aesthetically pleasing and reflect the care taken to produce a quality facility capable of meeting the evolving needs of the community and the services it needs. A new stand-alone building is often the preferred solution but there are other optionsthat may be more economical





7.4.1 plan of community hall

7.4.2 elevation of community hall

Measurement sheet

Sr. No	Item description	No	L (m)	B (m)	H (m)	Oty.	Total Qty.

1	Excavation for foundation	1	35.10	0.9	1.0	31.59 m3	**31.59 m3**
2	P C C (1:4:8)	1	35.10	0.9	0.3	9.477 m3	**9.477 m3**
3	Brickwork in foundation	1	35.10	0.9	1.0	31.59m3	**31.59 m3**
4	Brickwork up to slab	2	12	0.3	3	21.6 m3	
		2	6	0.3	3	10.8 m3	
	Brickwork in toilet	1	1	0.2	3	0.6 m3	**33 m3**
5	R C C work in slab	1	6	12	0.15	10.8 m3	**10.8 m3**

Sr no	**Item description**	**Oty.**	**Rate (Rs)**	**Unit**	**Amount (Rs)**
1	Excavation for foundations	31.59	85	Cu.m	**2686**
2	P C C	9.477	3000	Cu.m	**28431**
3	Brickwork in foundation	31.59	3200	Cu.m	**101088**
4	Brickwork in superstructure	33	3500	Cu.m	**115500**
5	R C C work in slab with formwork and reinforcement	10.8	8800	Cu.m	**95040**
	Total cost (RS)				**3,42,745**
	Contractor profit + contingency cost				**35000**
	Total amount				**377745**

8.1.5 Smart village Design- Biogas plant

Biogas is the mixture of gases produced by the breakdown of organic matter in the absence of oxygen (anaerobically), primarily consisting of methane and carbon dioxide. Biogas can be produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage, green waste or food waste. Biogas is a renewable energy sourc Pipes carrying biogas (foreground) and condensate Biogas is produced by anaerobic digestion with methanogen or anaerobic organisms, which digest material inside a closed system, or fermentation of biodegradable materials.This closed system is called an anaerobic digester, biodigester or a bioreactor.

Biogas is primarily methane (CH4) and carbon dioxide (CO2) and may have small amounts of hydrogen sulfide (H2S), moisture and siloxanes. The gases methane, hydrogen, and carbon monoxide (CO) can be combusted or oxidized with oxygen. This energy release allows biogas to be used as a fuel; it can be used for any heating purpose, such as cooking. It can also be used in a gas engine to convert the energy in the gas into electricity and heat.Biogas can be compressed after removal of Carbon dioxide, the same way as natural gas is compressed to CNG, and used to power motor vehicles. In the United Kingdom, for example, biogas is estimated to have the potential to replace around 17% of vehicle fuel.It qualifies for renewable energy subsidies in some parts of the world. Biogas can be cleaned and upgraded to natural gas standards, when it becomes bio-methane. Biogas is considered to be a renewable resource because its production-and-use cycle is continuous, and it generates no net carbon dioxide. As the organic material grows, it is converted and used. It then regrows in a continually repeating cycle. From a carbon perspective, as much carbon dioxide is absorbed from the atmosphere in the growth of the primary bio-resource as is released, when the material is ultimately converted to energy.

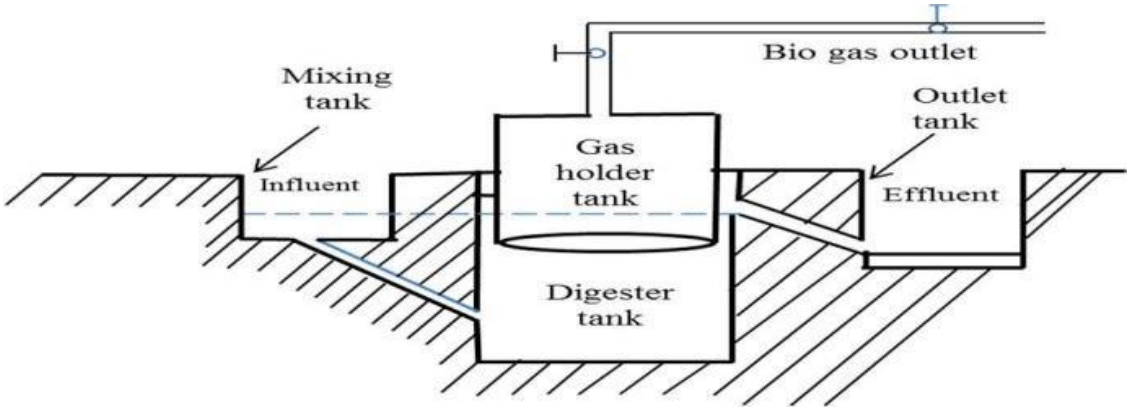


Fig 8.1.5.1 Diagram of biogas plant

Fig 

8.1.5.2. photo of biogas plant

Design:-

Total no. Of animals in village=230

As per standard data assume per day dung of animal=10.5 kg

Total dung per day =230*10.5= 2415 kg

Design of Digester

Assume retention period (R) = 70 day

Now,total amount of slury per day (S) =total dung per day + water amount = 2415+2(2415) = 7245 kg/day = 7.245 m3\day

Digester volume = (S) (R) = 7.245 * 70 = 507.15 m3

Assume cylinder shape biogas plant

Provide total 1 no of unit

So Digester volume

Assume h = 10 m

(Vd) = πr2h

507.15 = π r2 (10)

r = 4.2 m

Design of Gas holder

Assume Digester temperature : 26-28 °C

Now specific gas production = Gd = 37 lit /day

Daily gas production = 37 * 7245 = 268065 lit = 268 m3

Now,

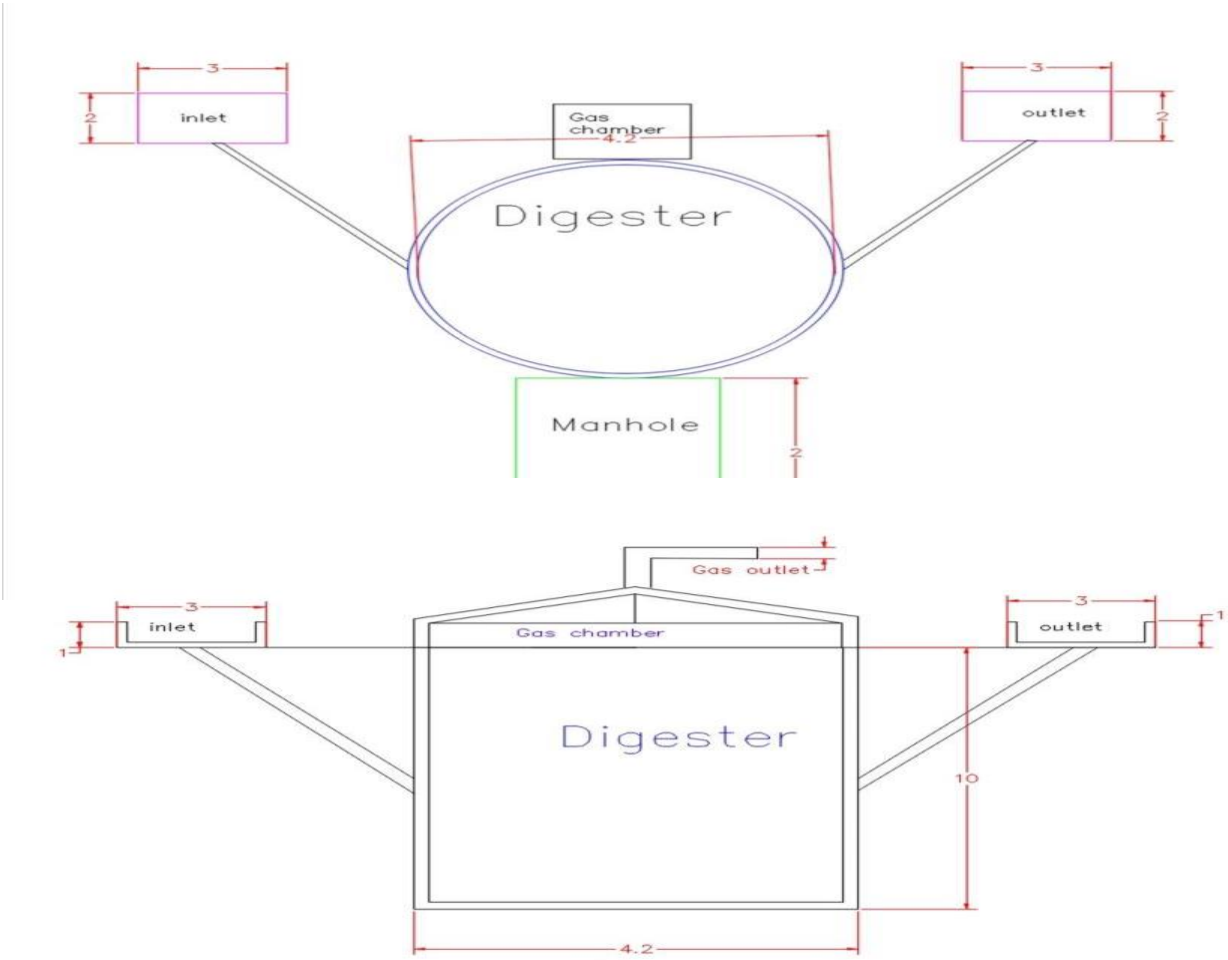
Assume Gas holder capacity : 60%

Gas holder volume = daily gas production * capacity of holder = 268 *0.60 = 160.8 m3
So take gas holder volume = 165 m3
Now, provide 6 unit volume
Provide cylinder shape
Vol. = π r2 h
165 = πr2 (1)
r = 7.3 m

Design of inlet and outlet

Total vol of slurry mix deposit = 7.245 m3 / day
Assume two time filling operation per day = 7.245 / 2= 3.5 m3 / day
Provide rectangular tank ,
Total vol of slurry = L * B * H = 3.5= L*B*1
Here, dimension of inlet = L= 3 m,B = 1.5m,H=1m
Here 3.5 m3/ day required < 4.5 m3 provided,hence ok
Provide same size of outlet also.

Fig.8.1.5.3 Plan of Biogas plant Fig.8.1.5.4 Elevation of Biogas plant



8.1.6 Heritage Village Design-Crematoria

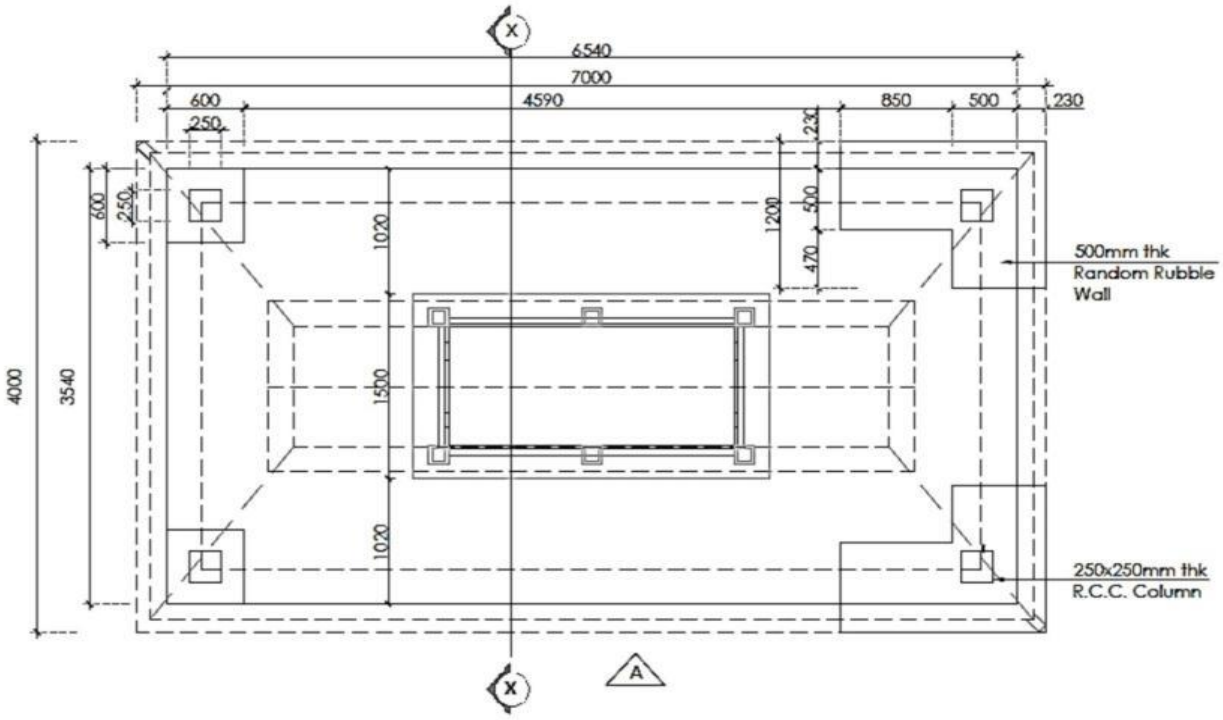
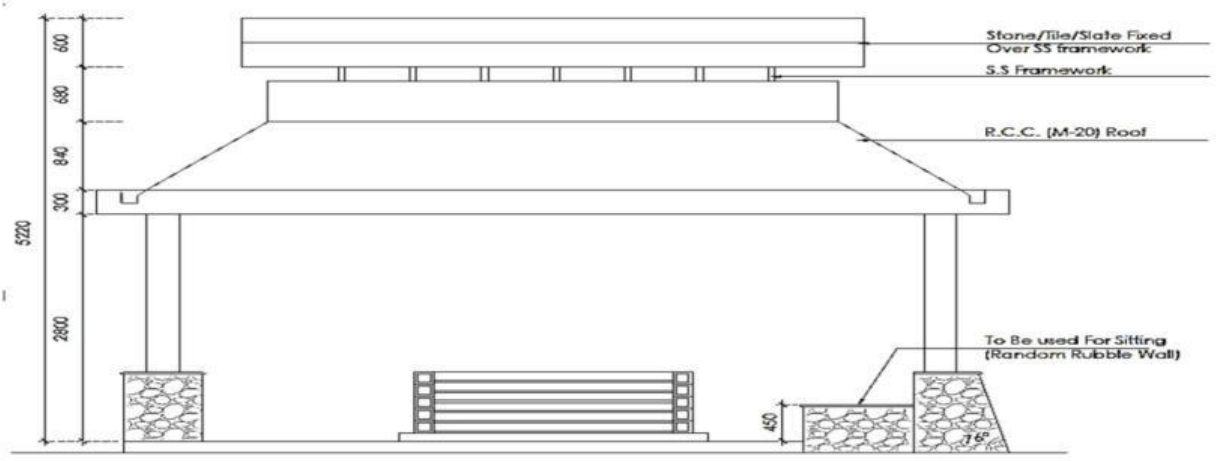


Fig.8.1.6.1 Plan of Crematoria

Fig.8.1.6.2 Elevation of Crematoria

Abstract sheet



Sr no	Item description	Oty.	Rate (rs)	Unit	Amount (RS)

1	Earthwork in excavation by mechanical Machinary up to 1.5 m	11.20	166	Cu.m	1860
2	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level :				
	1:5:10 (1 Cement : 4 coarse sand (zone-III) : 8 graded stone aggregate 40 mm nominal size) under footing/Floor	4.57	4209	Cu.m	19235
	1:3:6 (1 Cement : 4 coarse sand (zone-III) : 8 graded stone aggregate 40 mm nominal size) under footing/Floor	4.57	4927	Cu.m	22516
	1:1.5:3 (1 Cement : 4 coarse sand (zone-III) : 8 graded stone aggregate 40 mm nominal size) under footing/Floor	3.06	5924	Cu.m	18070
3	Providing and laying in position machine batched and machine mixed design mix M-25 grade cement concrete for reinforced cement concrete work	7.54	7250	Cu.m	54665
4	Centering and shuttering including strutting, propping	20.55	467.85	Sq.m	9614

	etc. and removal of form for all heights : Columns, Pillars, Piers, Abutments, Posts and Struts				
5	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete up to plinth level.	1138.5	57	Kg	64437
6	Random Brick work with common burnt clay F.P.S.	2.25	4751	Cu.m	10691
7	15 mm cement plaster on rough side of single or half brick wall of mix: 1:6 (1 cement: 6 coarse sand)	28	195	Sq.m	5448
8	SS Frame, 7700kg/Cum	61	130	Kg	7939
9	SS Hollow frame	212	350	Kg	74102
10	Structural steel work	275	67	Kg	18472
11	Roof pressed clay tiles of 20 mm nominal thickness	7.68	304	Sq.m	2386
12	Random rubble masonry with hard stone in superstructure above plinth level and up to floor five level, including leveling up with cement concrete 1:6:12	2.25	4795	Cu.m	10789
13	Finishing walls with water proofing cement paint	28	58.8	Sq.m	1646
	Total cost				321869

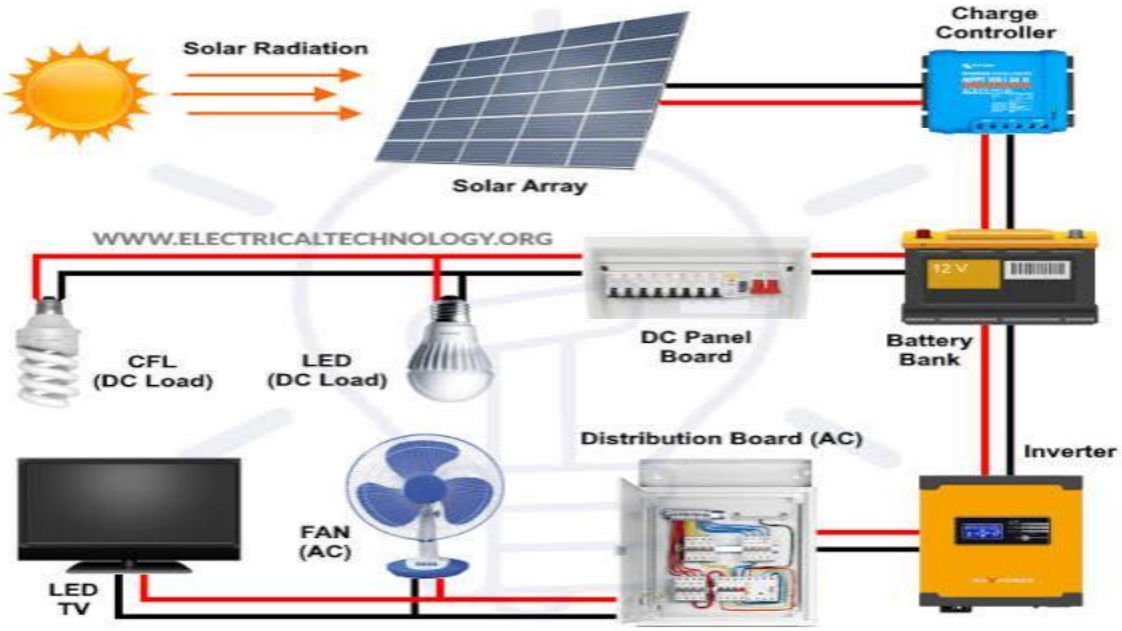
	Miscellaneous works				13130
	Total amount				**335000**

8.1.7 Design of solar power PV module

Solar photovoltaic modules are where the electricity gets generated, but are only one of the many parts in a complete photovoltaic (PV) system. In order for the generated electricity to be useful in a home or business, a number of other technologies must be in place.

Fig.8.1.7.1 diagram of solar PV module

Determine power consumption demands



The first step in designing a solar PV system is to find out the total power and energy consumption of all loads that need to be supplied by the solar PV system as

Components	**Nos**	**Rating**	**Working hours**
Celling Fan	4	60 W	7
T-12 flurocent tube light	4	55 W	7

Calculate total Watt - hours per day needed from the PV modules

Multiply the total appliances Watt - hours per day times 1.3 (the energy lost in the system) to get the total Watt - hours per day which must be provided by the panels.

Total power = {(60 * 7 * 4) + (55 * 7 * 4) * 1.3 = 3.682 kWh

Size of PV modules Different size of PV modules will produce different amount of power.To find out the sizing of PV module, the total peak watt produced needs. The peak watt (Wp) produced depends on the size of the PV module and climate of site location We have to consider "panel generation factor which is different in each site location.

The panel generation factor is 4.2 To determine the sizing of PV modules, calculation is as follows:

= 3682 / 4.2 = 876.66 Watt

Calculate the number of PV panels for the system

Divide the answer obtained in item 2.1 by the rated output Watt – peak of the PV modules available to you. Increase any fractional part of result to the next highest full number and that will be the number of PV modules required.

= 876.66 / 110 = 8 modules

Inverter Calculation

An inverter is used in the system where AC power output is needed. The input rating of the inverter should never be lower than the total watt of appliances. The Inverter must have the same nominal voltage as your battery

For stand – alone systems, the inverter must be large enough to handle the total amount of Watts you will be using at one time.

Connected Load = 4 (55) + 4 (60) = 460 watts

The inverter size should be 25-30% bigger than total Watts of appliances.

Hence inverter size should be 575 watt or greater.

Battery Size

The battery type recommended for using in solar PV system is deep cycle battery Deep cycle battery is specifically designed to be discharged to low energy level and rapid recharged or cycle charged and discharged day after day for years. The battery should be large enough to store sufficient energy to operate the appliances at night and cloudy days. To find out the size of battery, calculate as follows:

Battery Capacity (Ah) = Watt – hours per day used by appliances x Days of autonomy / (0.85 x 0.6 x nominal battery voltage)

= 2415 X 3 0.85X0.6X12 = 1183.82 Ah

Hence Battery should be rated 12 V, 1200 Ah per 3 day autonomy

Solar charge controller sizing

The solar charge controller is typically rated against Amperage and Voltage capacities. Select the solar charge controller to match the voltage of PV array and batteries and then identify which type of solar charge controller is right for your application.

PV module specification

Vm = 12 V Dc,Pm = 110Wp

Im = 6.6 A

Voc = 20.7 A

Isc = 7.5A

Solar charge controller rating = (8 strings x 7.5A) x 1.3 = 78 A

So the solar charge controller should be rated 90 A at 12 V or greater

Abstract sheet

Sr no	**Equipment**	**No**	**Cost**	**Amount**
1	115 W pv panel	8	6000	48000
2	600 watt invertor	1	6500	6500
3	12 V battery	4	30000	120000
4	80 A charge controller	1	9000	9000
5	Cables		1000	1000
6	Installation		5000	5000
		Total cost		**1,89,000 Rs**

8.1.8 Primary Energy Audit

- **ESTIMATION FOR LIBRARY BUILDING:-**

ITEM	NUMBER	TOTAL WATT
LAMP	15	135 W
FAN	4	320 W
5A SOCKET	12	1200 W
15 A SOCKET	4	6000 W
AC 1.5 TON	1	1500 W
	TOTAL	9155 ± 9500

TOAL PEAK CURRENT WILL BE 41.30 AMP ± 10%
NUMBER OF POWER CIRUIT WILL BE USED 1
NUMBER OF SUB CIRCUIT WILL BE USED 3
RATING OF MAIN MCB WILL BE 63 A
RATING OF SUB CIRCUIT MCB WILL BE 15 AMP, 10 AMP, 4 AMP RESPECTIVELY
PVC COATED COPPER WIRE WILL BE USE 1.0MM^2 , 1.5 MM^2 AND 4.0MM^2
LENGTH OF PVC CONDUIT WILL BE USE 180 M
LENGTH OF PVC COPPER WIRE WILL BE 220 M
LENGTH OF 1.5MM^2 OF WIRE 100M
LENGTH OF 1.0MM^2 OF WIRE 80M
LENGTH OF 4.0MM^2 OF WIRE 40M

Overall calculation of wire size, pvc conduit and mcb rating, current

SR.NO	ITEM WITH SPECIFICATION	QUANTITY REQUIRED	COST/UNIT	TOTAL COST
1	MCB 63AMP 4 POLE	1	2400	2400
2	MCB 15 AMP DOUBLE POLE	1	400	400
3	MCB 10 AMP 2 POLE	1	300	300
4	MCB 6AMP SINGLE POLE	1	100	100
5	ANGULAR HOLDER	5	40	200
6	BATTEN HOLDER	10	40	400
7	3 PIN SOCKET 5A	12	40	480
8	3 PIN SOCKET 15A	4	80	320
9	SINGLE POLE MODULAR SWITCH 5A	25	20	500
10	SINGLE PLOLE MODULAR SWITCH 15A	5	70	350
11	¾ PVC CONDUIT	180 M	15	2700
12	1MM^2 PVC COATED COPPER WIRE	80 M	12	960
13	1.5MM^2 PVC COATED COPPER WIRE	100 M	18	1800
14	4.0MM^2 PVC COATED COPPER WIRE	40 M	25	1000
15	5 MODULAR SWITCH PLATE	5	70	350
16	LAMP 9W	15	90	1350
17	FAN	4	2000	8000
18	FAN REGULATOR	4	80	320
19	AC 1.5 TON (4-5 STAR)	1	60,000	60,000
20	CCTV	3	3000	9000
21	CHARGE	MISCELLANEOUS		13,639

22	LABOUR CHARGE	12,000
23	OVERHEAD CHARGE	5000
24	COST OF EARTHING	2500
25	NET COST OF ELECTRIFICATION	1,24,069 ± 15%

- **ESTIMATION FOR ATM MACHINE:-**

ITEM	NUMBER	WATTS
LAMP 9W	3	27W
SOCKET 5A	1	100 W
SOCKET 15A	3	3000 W
AC 1.5 TON	1	1500 W
	TOTAL	4627=4700W
TOTAL PEAK LOAD CURRENT= 25 AMP		
PVC COATED COPPER WIRE PF 1.0mm2, 1.5 mm2		
NUMBER OF POWER CIRCUIT WILL BE 1		
TOTAL LENGTH OF PVC REQUIRED 60 M		
TOTAL LENGTH OF COPPER WIRE WILL BE REQUIRED 90 M		
MCB RATING 30 AMP		
NO SUB CIRCUIT OR MCB NEED		

Overall calculation of wire, length of conduit, and size

SR NO.	ITEM WITH SPECIFICATION	QUANTITY REQUIRED	COST/UNIT	TOTAL COST
1	MCB 30 AMP DOUBLE POLE	1	1500	1500
2	BATTEN HOLDER	2	40	80
3	ANGULAR HOLDER	1	40	40
4	3 PIN 5A SOCKET	1	40	40
5	3 PIN 15A SOCKET	3	80	240
6	SINGLE POLE MODULAR SWITCH 5A	1	20	20
7	SINGLE POLE MODULAR SWITCH 16A	3	70	210
8	¾ PVC CONDUIT	60 M	15	900
9	1mm^2 PVC COATED SINGLE CORE WIRE COPPER	20 M	12	240

10	1.5 mm^2 PVC COATED SINGLE CORE COPPER WIRE	15 M	18	270
11	3 MODULAR SWITCH PLATE	1	70	70
12	LAMP 9W	3	90	270
13	AC 1.5 TON (4-5 STAR)	1	60,000	60,000
14	CCTV (DAY-NIGHT)	2	3000	6000
15	MISCELLANEOUS CHARGES			1500
16	LABOUR CHARGE			4000
17	OVERHEAD CHARGES			1000
18	NET COST OF ELECTRIFICATION			76,380 ± 10%

8.1.9 Solar Street light

A standalone solar photovoltaic street lighting system is an outdoor lighting unit used for illuminating a Street or an open area. Recent advances in LED lighting have brought very promising opportunities For application in street lighting. Combining LED's low power, high illumination characteristics With current photovoltaic (PV) technology, PV powered street light utilizing LED has become a Norm in many places. In today's application, most of the common High Intensity Discharge (HID) lamps, often High Pressure Sodium (HPS) lamps are being replaced by more low powered Light Emitting Diode (LED) lamps.

Solar panel

A Solar Panel is basically a module that converts light energy (photons) from the sun to generate in direct current (DC) form. There are two types of solar panels, mainly crystalline and thin-film types.

There are two types of crystalline solar panels (see Figure a & b):

- Poly-crystalline Solar Panel
- Mono-crystalline Solar Panel

As for Thin-film types, there are (see Figure c):

- Amorphous Silicon (a-Si)
- Cadmium Teluride (Cd-Te)
- Copper Indium Gallium Selenide (CIGS)
- Dye-Sensitized Solar Cell (DSC)

Battery

Batteries are used to store the electricity generated by the solar panel. During the day, electricity Generated by the solar panels is supplied to the battery and/or the load. When the load demand is Higher than the energy received from the solar panels, these batteries will provide stable energy

To the load. Solar power applications typically use deep-cycle batteries because they can persist Repeated and deep discharges. There are a few types of rechargeable batteries

LED lamp

A LED lamp is a light-emitting diode (LED) product that is assembled into a lamp (or light bulb) for use in lighting fixtures. LED lamps have a lifespan and electrical efficiency that is several times better than incandescent lamps, and significantly better than most fluorescent lamps, with LED able to emit more than 100 lumens per watt.LED are the perfect combinations with solar power as it operates under low voltage, low heat and low power requirement. Like incandescent lamps and unlike most fluorescent lamps (e.g. tubes and CFL), LED lights come to full brightness without need for a warm-up time; the life of fluorescent lighting is also reduced by frequent switching on and off. Initial cost of LED is usually higher. LED chips need controlled direct current (DC) electrical power; an appropriate power supply is needed. LEDs are adversely affected by high temperature, so LED lamps typically include heat dissipation elements such as heat sinks and cooling fins.

Fig8.1.9.1 Led lamps

Charge controller

Charge controllers are used to control the charging of the batteries. Since the output from solar Panels are variable and needs adjustments, charge controllers fetches the variable voltage/current From solar panels, condition it to suit the safety of the batteries. The main functions of charge Controllers are to prevent over-charging of batteries from solar panels, over-discharging of Batteries to the load and to control the functionalities of the load.Charge controllers are basically DC-DC converters, where PWM or MPPT technique is used to Regulate the switches of the controller. There are three general types of charge controller, mainly:

- Simple ON/OFF Controller
- Pulse Width Modulated (PWM) Controller
- Maximum Power Point Tracking (MPPT) Controller

A LED lamp is a light-emitting diode (LED) product that is assembled into a lamp (or light bulb) for use in lighting fixtures. LED lamps have a lifespan and electrical efficiency that is several times better than incandescent lamps, and significantly better than most fluorescent lamps, with LED able to emit more than 100 lumens per watt.LED are the perfect combinations with solar power as it operates under low voltage, low heat a The configuration of solar street light system must be designed to be robust and must be good enough to withstand the harsh environmental condition as the system are installed in road where it is continuously exposed to sun, rain, fog, pollution etc. The solar street lighting installation shall

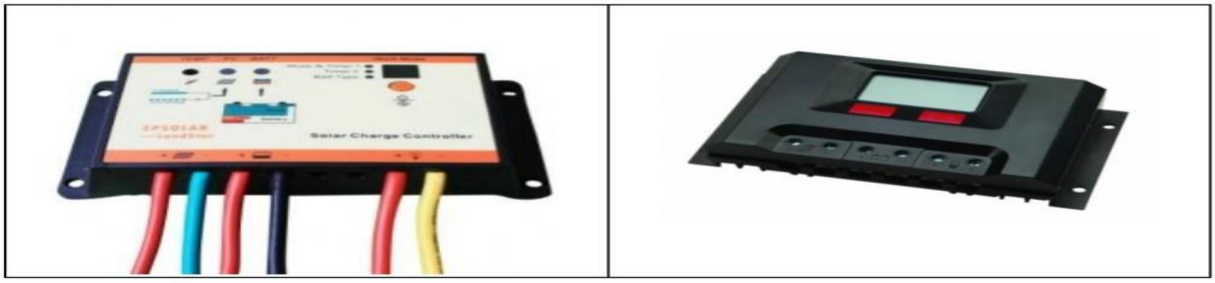
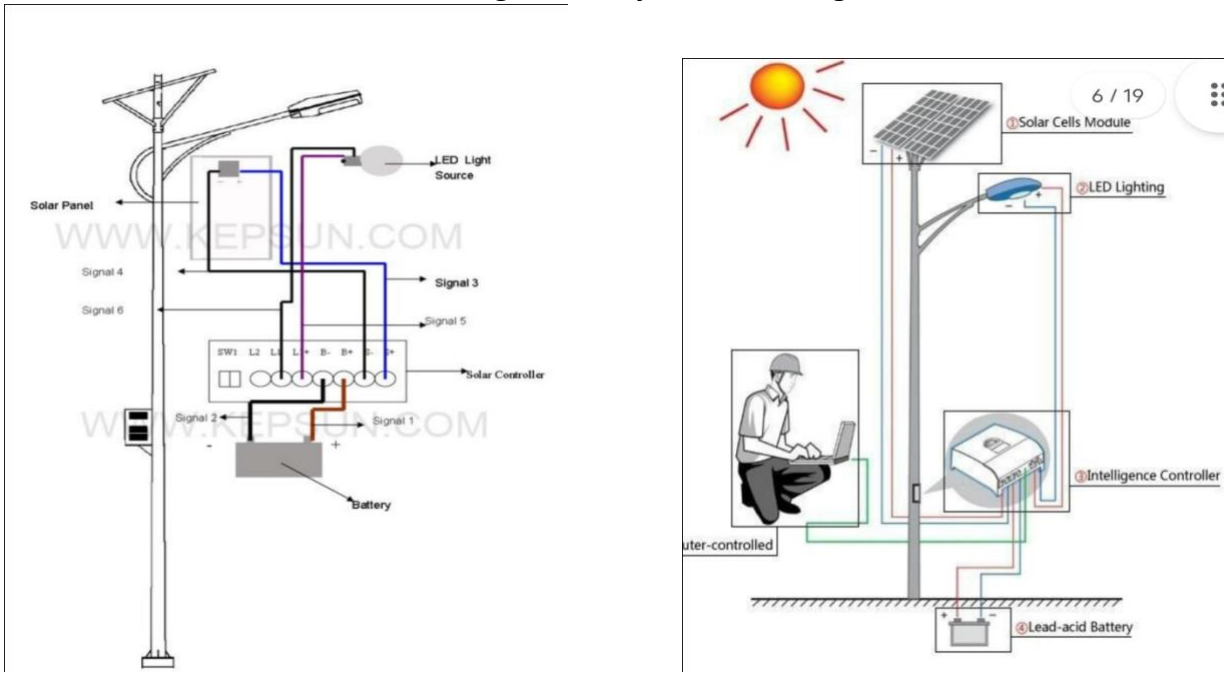


Fig.8.1.9.2 charge controller

not damage .The configuration ght system must be designed to be robust and must be good enough to withstand the harsh environmental condition as the system are installed in road where it is.

Fig.8.1.9.3 layout of street light



Abstract sheet

Sr no	Name of components	Specifications	Qty	Cost (Rs)
1	Solar PV Panel	140 wp	1	14000
2	Battery (12v)	100 ah tubular Gel @C10	1	28000
3	Charge controller with dusk Through down function	Size as required by panel	1	3500
4	LED lamp	40 watt	1	12000
5	Single arm galvanized pole	9m	1	27120
6	Interconnecting Wires & Other Accessories (Nut-Bolt, Earthing)			1700
7	Installation/ transportation charge			10000
8	After sales service			5000
	Total cost			**101320 Rs**

This solar street light provide every 4 to 6 m of the road

8.2 Reason for Students Recommending this Design

Bank :- to easy distribution of money and easy available of money.
Bus stand:- to easy Connectivity for around village and towns.
Public Toilet:- care of hygiene and to promote swacch Bharat abhiyan
Community hall:-to organise and programs in village
Biogas plant :- to use waste bio to convert gas.
Crematoria:- to use peace for humanity.

8.3 About designs Suggestions / Benefit of the villagers :

1.Bank :-Bank accounts offer convenience. For example, if you have a checking account, you can easily pay by check or through online bill pay. Bank accounts are safe. Your money will be protected from theft and fires.It’s an easy way to save money.

2.Bus stand:-Travelling by bus is cheaper than owning and operating a car. Reduces pollution and road congestion – the more people who travel by bus, the fewer cars on the road.

3.Public Toilet:-Purposes. As an “away-from-home” toilet room, a public toilet can provide far more than access to the toilet for urination and defecation. People also wash their hands, use the mirrors for grooming, get drinking water (e.g. refilling water bottles), attend to menstrual hygiene needs, and use the waste bins.

4.Communityhall:-Promotes Exercise is one of the most obvious benefits ofa community center. Boosts the Local Economy. Keeps Adolescents Safe. Provides a Meeting.

5.Bioiogas plant :- Biogas plant is Eco-Friendly. Biogas Generation Reduces Soil and Water Pollution. Biogas Generation Produces Organic Fertilizer. It’s A Simple and Low-Cost Technology That Encourages A Circular Economy. Healthy Cooking Alternative For Developing Are Healthy Cooking Alternative For Developing Areas.

6.Crematoria :- Ashes are stored in an urn, and they can be taken home, stored, or scattered where the deceased has requested. Being cremated wastes fewer resources than a burial. Funeral services or memorials can be held later, allowing friends and family to arrive from far away

CHAPTER:-9.Proposing design for future development of village

For the future development of pindharada village we are proposing the design for the future semester.

1. Physical design
   We wil design Solid waste management for the village.The waste collection arenot working properly so Waste management system should be provide in village.
2. Social Design
   We will design ATM and Bank for the village to provide easy cash distribution in village.
3. Smart village design
   We will design solar street lights and solar system for public buildings for the village.
4. Sustainable design
   We will design Pharmacy Store for village to provide basic medicine and basic medical requirement.

5. Public Garden:- Increase access to fresh foods.improve food security ncrease physical activity through garden maintenance activities.Improve dietary habits through education.Increase fruit and vegetable intake.Reduce risk of obesity and obesity-related diseases.
6. PHC :- We design PhC for availability of primary treatment of health and any situation use phccenter.

Following are the future plan for the next semester:

- In next semester we will provide Social Infrastructure design for the village. It will include the
- design of CHC (Community Health Centre) and it is required to provide Child Welfare &
- Maternity Homes.
- Then we will also design Social-Cultural Infrastructure for the village. It will include recreational facilities like Public Library and Public Garden.
- We will also design Physical Infrastructure in the village. It will include the design of overhead water tank.

Chapter 10 :- Conclusion

Firstly we discuss and understand about viswakarma yojnaproject.what can us do in viswakarma project and what knowledge gain by this project. After we understand that project .first we visited our smart village punsari and we make techno economic survey and gap analysis about village.And understand difference between normal village and ideal Village. We show the different facilities in the smart village like solar street lights, biogas plant,etc.and study about it.

We visited our allocated village Pindharada. And we study about village and study many survey in village. We discuss about village problems and basic requirements of village also we study about difficulty in village face from village people. We study that, IN villages no renewable energy sources was used till now and the people are not that much Aware from electric energy conservation and advantages of renewable sources. Need to Aware people from both and also aware from the other government's schemes and subsidy Related to it so, villagers are start using renewable energy sources and save electricity. After that we planning the different facilities require in the village. We are design community hall, public toilet ,rain water harvesting, and biogas plant. Also we try to implement of all the design require in village.

The designed under Vishwakarma yojna project phase viii-an approach towards Rurbanisation will be helpful for better physical development of the village. This project develop lifestyle of Villagers.

These amenities designed under this project will be helpful for better development of village As physically as well as socially, which improves the overall lifestyle of people along with nation With preserving nature bit by bit.

CHAPTER:-11.REFERENCES

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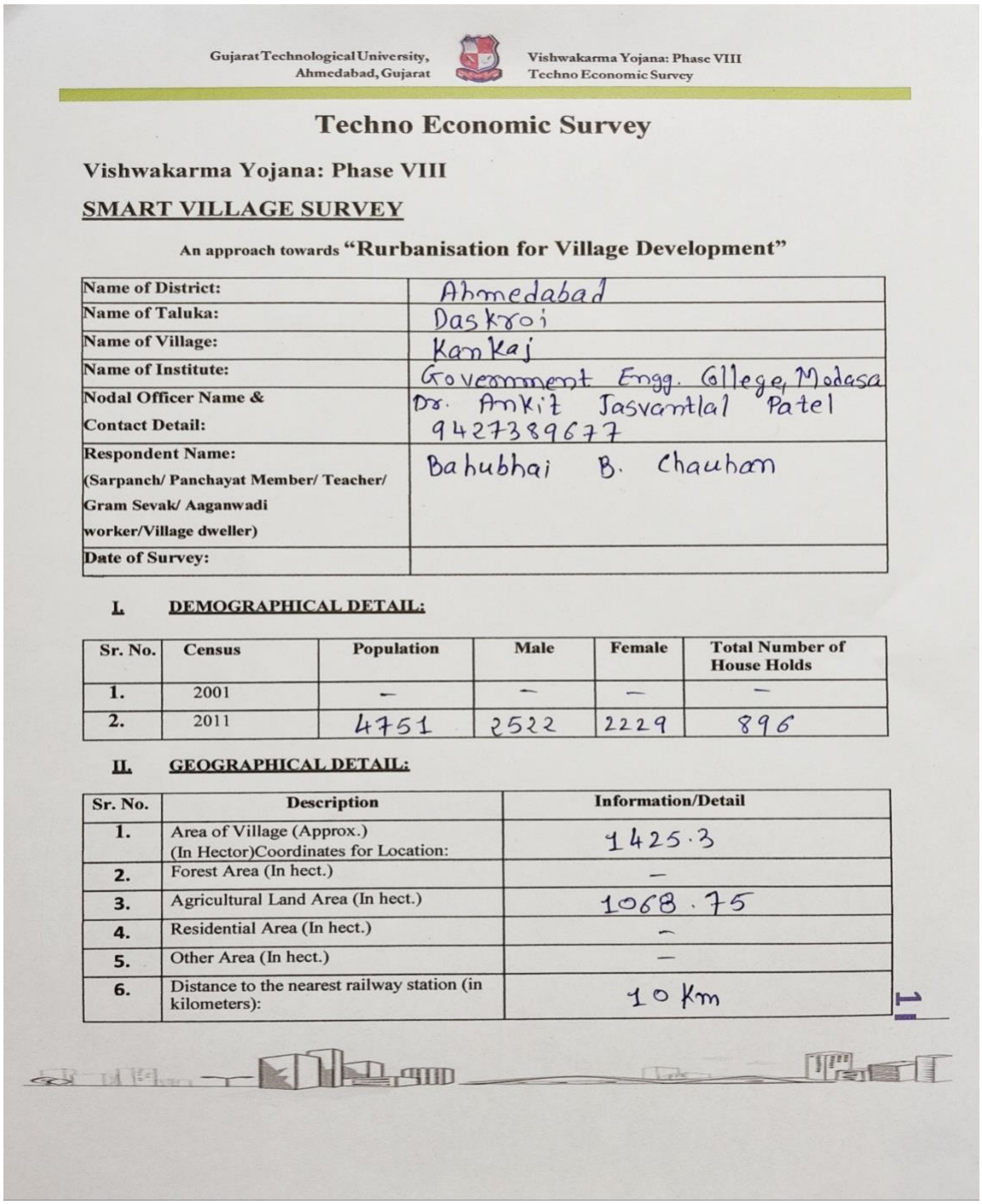
Chapter 12 :- ANNEXURE

12.1 Survey form of Ideal Village Scanned copy attachment in the report for Part-I :



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

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

Name of District:	Ahmedabad
Name of Taluka:	Daskroi
Name of Village:	Kankaj
Name of Institute:	Government Engg. College, Modasa
Nodal Officer Name & Contact Detail:	Dr. Ankit Jasvantlal Patel 9427389677
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Bahubhai B. Chauhan
Date of Survey:	

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	–	–	–	–
2.	2011	4751	2522	2229	896

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1425.3
2.	Forest Area (In hect.)	–
3.	Agricultural Land Area (In hect.)	1068.75
4.	Residential Area (In hect.)	–
5.	Other Area (In hect.)	–
6.	Distance to the nearest railway station (in kilometers):	10 Km

7.	Name of Nearest Town with Distance:	Ahmedabad (14 km)
8.	Distance to the nearest bus station (in kilometers):	11 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. Agricultural 2. Small Scale Industry 3. Milk production.
Major crops grown in the village:	1. Wheat 2. Tomatos. 3. —

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

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

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	–	–	–
	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	Under-Ground Drainage	✓	–	Good & Clean Facility
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	R.C.C.	✓	–	–
	Main road	R.C.C.	✓	–	–
	Internal streets	Pucca R.C.C.	✓	–	–
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH-142	✓	–	–
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	17.1 Km	✓	–	–
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes	✓	–	–
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto	✓	–	–
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Govt. Yes More than 6 hrs	✓	–	–

3

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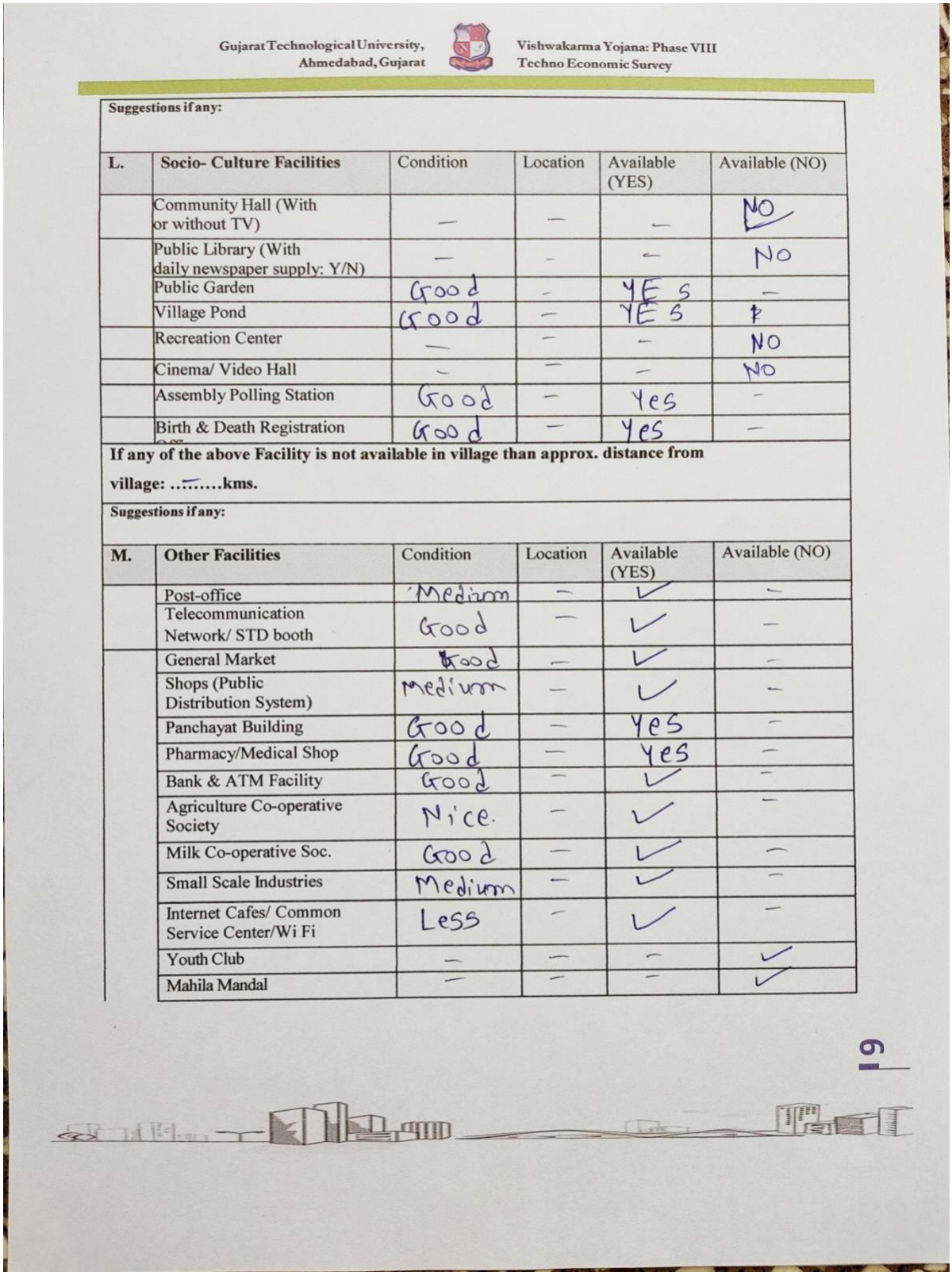
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Power supply for Domestic Use	Govt.	✓	–	–
	Power supply for Agricultural Use	Gov.	✓	–	–
	Power supply for Commercial Use	Gov.	✓	–	–
	Road/ Street Lights	Gov.	✓	–	–
	Electrification in Government Buildings/ Schools/ Hospitals	Gov. good	✓	–	–
	Renewable Energy Source Facilities (Y/ N)	Yes	✓	–	–
	LED Facilities	Yes	✓	–	–
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	–	–	–	–
	Location Condition	–	–	–	–
	Community Toilet (With bath/ without bath facilities)	Yes without bath	✓	–	–
	Solid & liquid waste Disposal system available	Yes	✓	–	–
	Any facility for Waste collection from road	Door to Door	✓	–	–
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL. OTHER (SPECIFY)	Well River	✓	–	–
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	80% Pucca 20% Kutchha	✓	–	–

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi) Sub-Centre PHC BLOCK PHC CHC/RH District/ Govt. Hospital Govt. Dispensary Private Clinic Private Hospital/ Nursing Home AYUSH Health Facility sonography /ultrasound facility	PHC	✓	–	–
	If any of the above Facility is not available in village than approx. distance from village: ……kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	Yes	✓	–	–
	Primary School	Yes	✓	–	–
	Secondary school	Yes	✓	–	–
	Higher sec. School	Yes	✓	–	–
	ITI college/ vocational Training Center	No	–	✓	–
	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: ……kms.				

51



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Suggestions if any:

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

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

Suggestions if any:

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

9

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	—	—	—	Need plant
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	Soft Copy	✓	—	—
2.	Recent Projects going on for Development of Village	NO	—	-	—
3.	Any NGO working for village development	NO	—	-	-
4.	Any natural calamity in the village during the last one year: EARTHQUAKES FLOODS CYCLONE DROUGHT LANDSLIDES AVALANCHE OTHER (SPECIFY)	—	—	—	—

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks

18

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

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

IX. Smart Village / Heritage Details

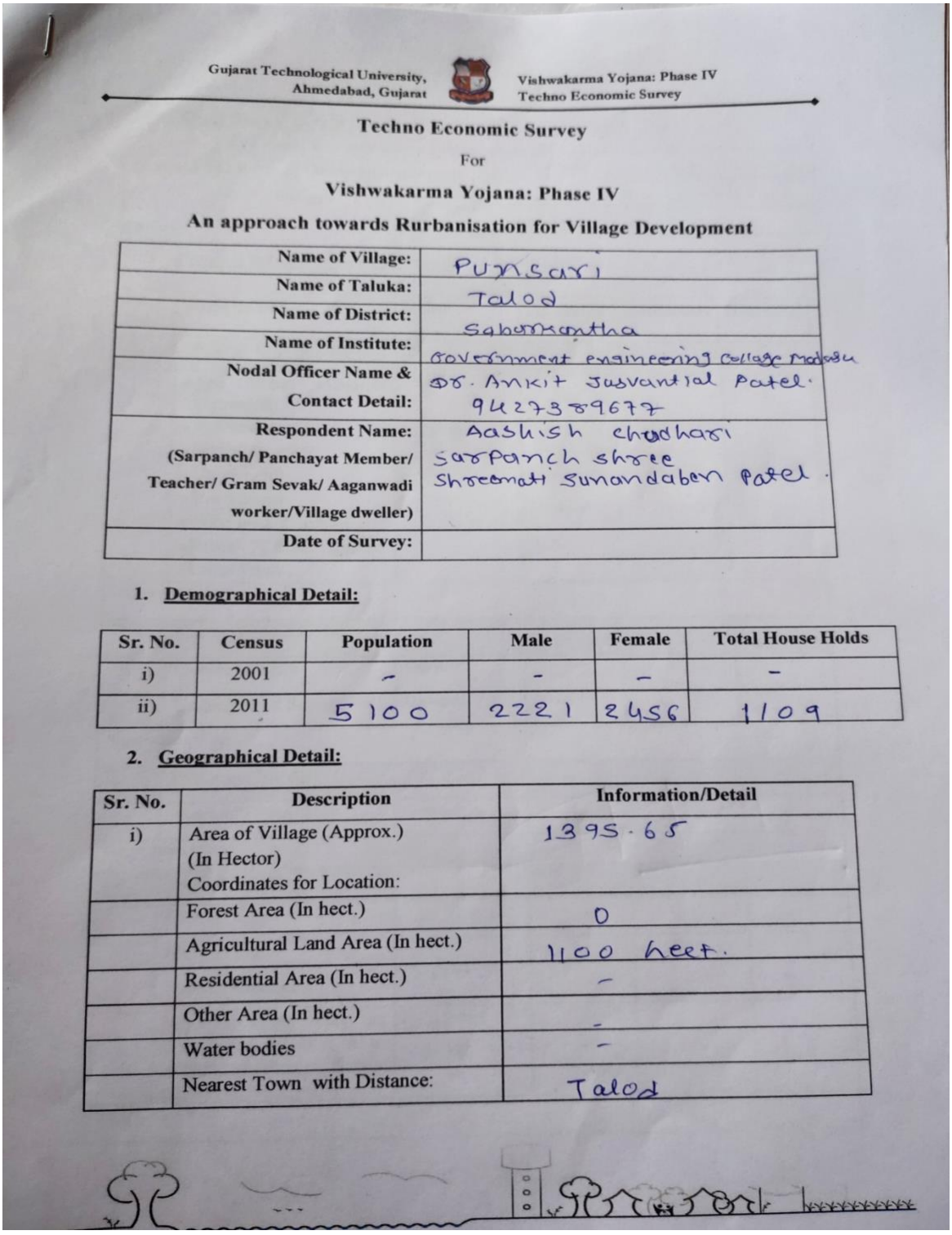
Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	—	—

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

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

સરપંચ
પાલડી-કાંકજ ગ્રામ પંચાયત
તા.દસક્રોઈ, જી.અમદાવાદ.

12.2 Survey form of Smart Village Scanned copy attachment in the report for Part-I :



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For

Vishwakarma Yojana: Phase IV

An approach towards Rurbanisation for Village Development

Name of Village:	Punsari
Name of Taluka:	Talod
Name of District:	Sabarkantha
Name of Institute:	Government engineering college Modasa
Nodal Officer Name & Contact Detail:	Dr. Ankit Jasvantlal Patel. 9427389677
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Aashish chodhari sarpanch shree Shreemati Sunandaben Patel
Date of Survey:	

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	-	-	-	-
ii)	2011	5100	2221	2456	1109

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	1395.65
	Forest Area (In hect.)	0
	Agricultural Land Area (In hect.)	1100 hect.
	Residential Area (In hect.)	-
	Other Area (In hect.)	-
	Water bodies	-
	Nearest Town with Distance:	Talod

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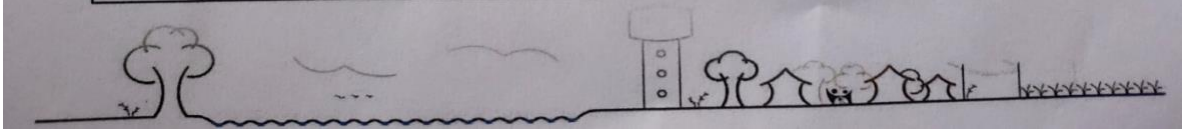
Vishwakarma Yojana: Phase IV
Techno Economic Survey

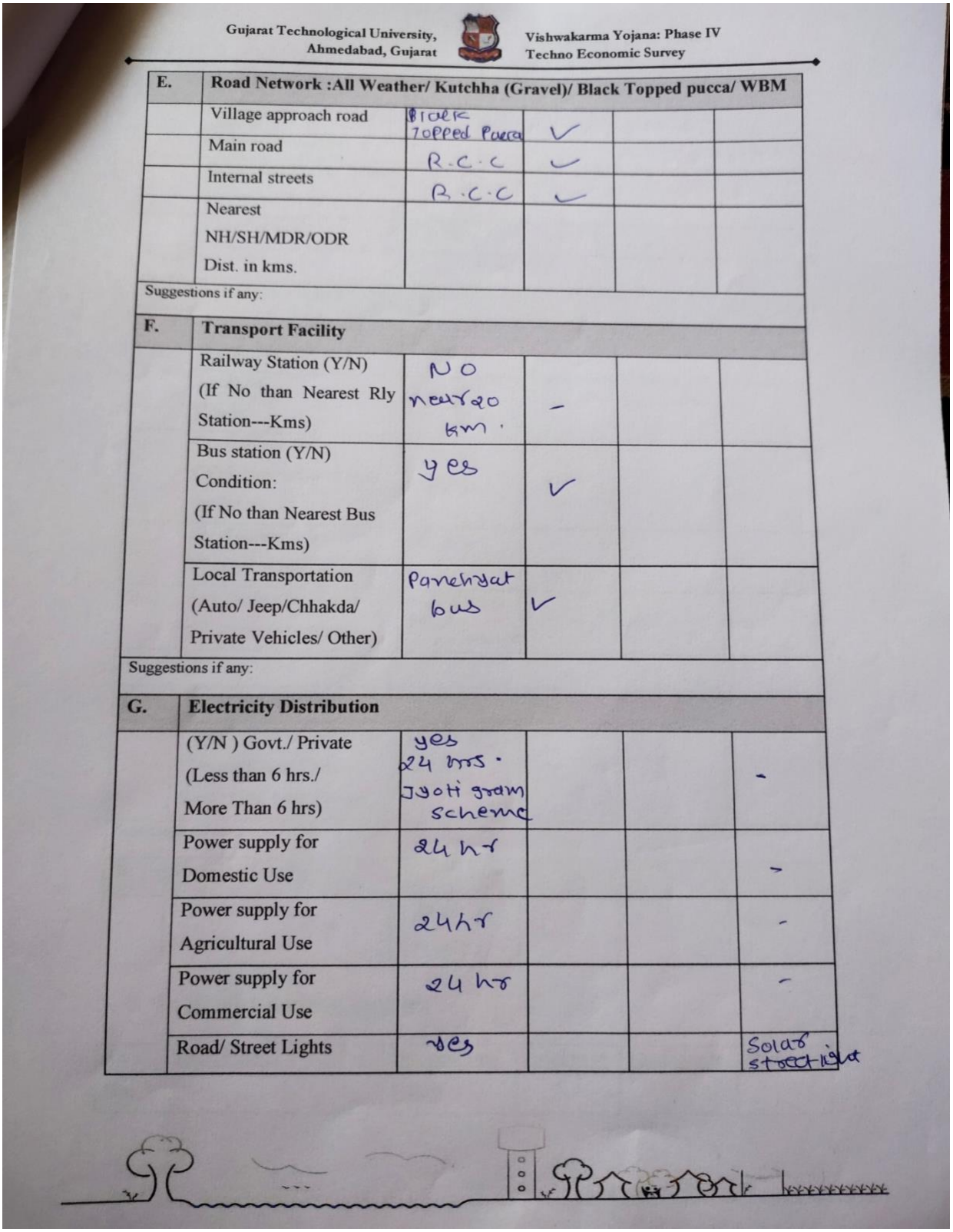
3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1. Agriculture 2. Milk production 3. small industries

4. **Physical Infrastructure Facilities:**

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





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Vishwakarma Yojana: Phase IV
Techno Economic Survey

E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Black Topped Pucca	✓		
	Main road	R.C.C	✓		
	Internal streets	R.C.C	✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.				
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO near 20 km.	-		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	yes	✓		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Panchyat bus	✓		
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	yes 24 hrs. Jyoti gram scheme			-
	Power supply for Domestic Use	24 hr			-
	Power supply for Agricultural Use	24hr			-
	Power supply for Commercial Use	24 hr			-
	Road/ Street Lights	yes			Solar street light

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Vishwakarma Yojana: Phase IV
Techno Economic Survey

	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.	-			
	Location Condition	-			
	Community Toilet (With bath/ without bath facilities)	yes	✓		
	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)	River well	✓		
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	70 % 30 %	✓		

5. Social Infrastructural Facilities:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks

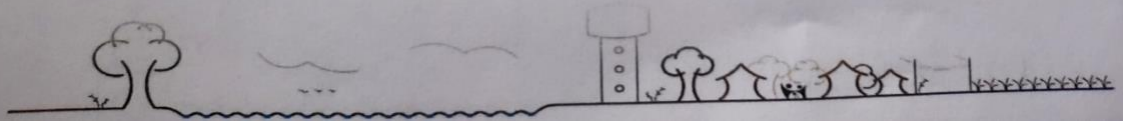
	General Market	yes	✓		
	Shops (Public Distribution System)	yes	✓		
	Panchayat Building	yes	✓		
	Pharmacy/Medical Shop				
	Bank & ATM Facility	yes 2,2	✓		
	Agriculture Co-operative Society				
	Milk Co-operative Soc.	yes	✓		
	Small Scale Industries	yes	✓		
	Internet Cafes/ Common Service Center/Wi Fi	yes	✓		Wi-Fi cafe
	Other Facility				
Suggestions if any:					

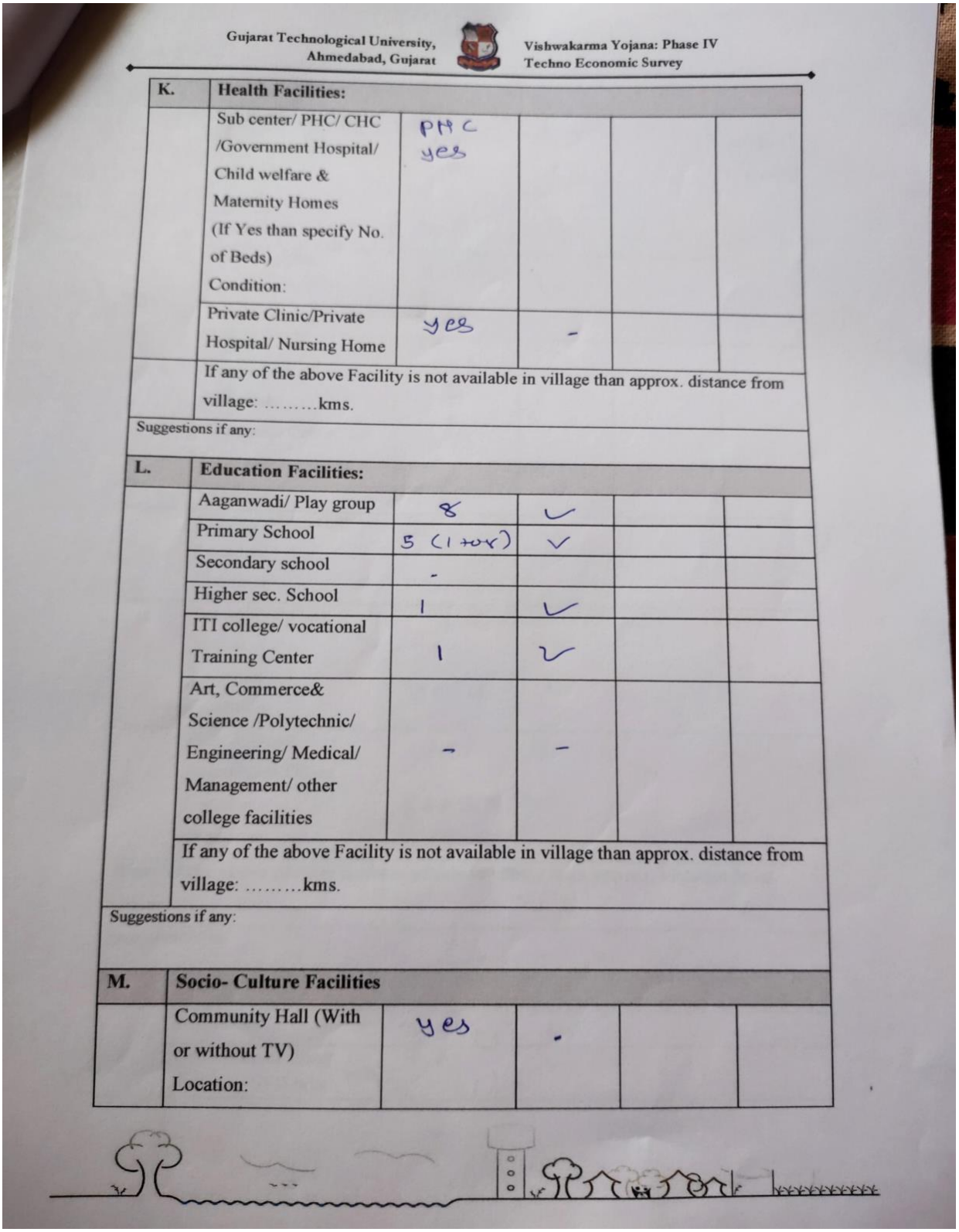
6. **Sustainable /Green Infrastructure Facilities:**

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
O.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	Renewble energy sources	✓		
P.	Bio-Gas Plant	yes	✓		
	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	





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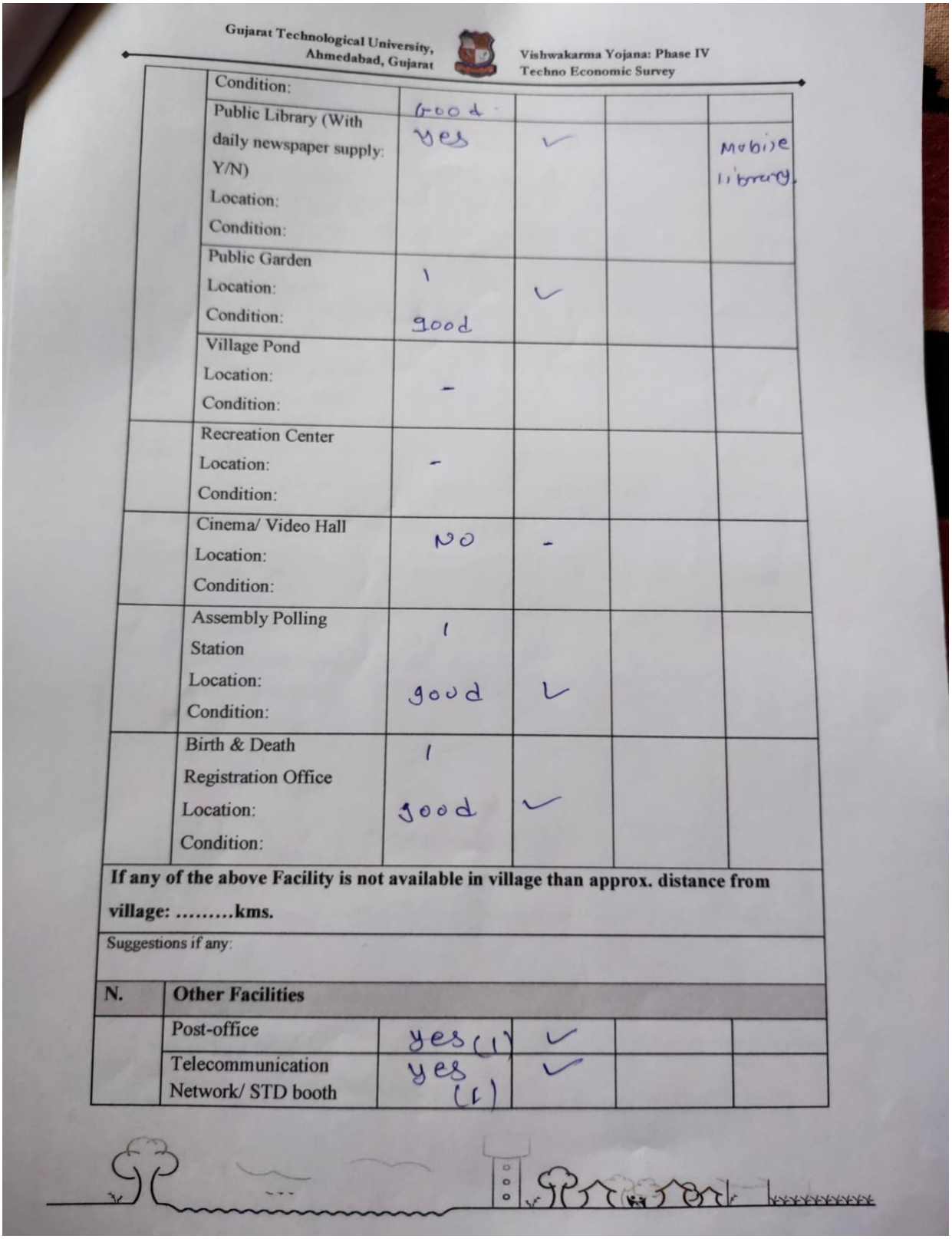
K.	Health Facilities:					
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	PHC yes				
	Private Clinic/Private Hospital/ Nursing Home	yes	-			
	If any of the above Facility is not available in village than approx. distance from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

L.	Education Facilities:				
	Aaganwadi/ Play group	8	✓		
	Primary School	5 (1 to 4)	✓		
	Secondary school	-			
	Higher sec. School	1	✓		
	ITI college/ vocational Training Center	1	✓		
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	-	-		
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					

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



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	Condition:	Good			
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	yes	✓		Mobile library.
	Public Garden Location: Condition:	1 good	✓		
	Village Pond Location: Condition:	-			
	Recreation Center Location: Condition:	-			
	Cinema/ Video Hall Location: Condition:	NO	-		
	Assembly Polling Station Location: Condition:	1 good	✓		
	Birth & Death Registration Office Location: Condition:	1 good	✓		

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

Suggestions if any:

N.	Other Facilities				
	Post-office	yes (1)	✓		
	Telecommunication Network/ STD booth	yes (1)	✓		

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Vishwakarma Yojana: Phase IV
Techno Economic Survey

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

8. **Additional Information/ Requirement:**

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities(School Building, Health Center, Panchayat Building, Public Toilets & any other)	Not required	-
2.	Additional Information/ Requirement	66 KVA substation CCTV, wifi	-
		RO system E-gram Panchayat	-
		Public Address system.	-

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

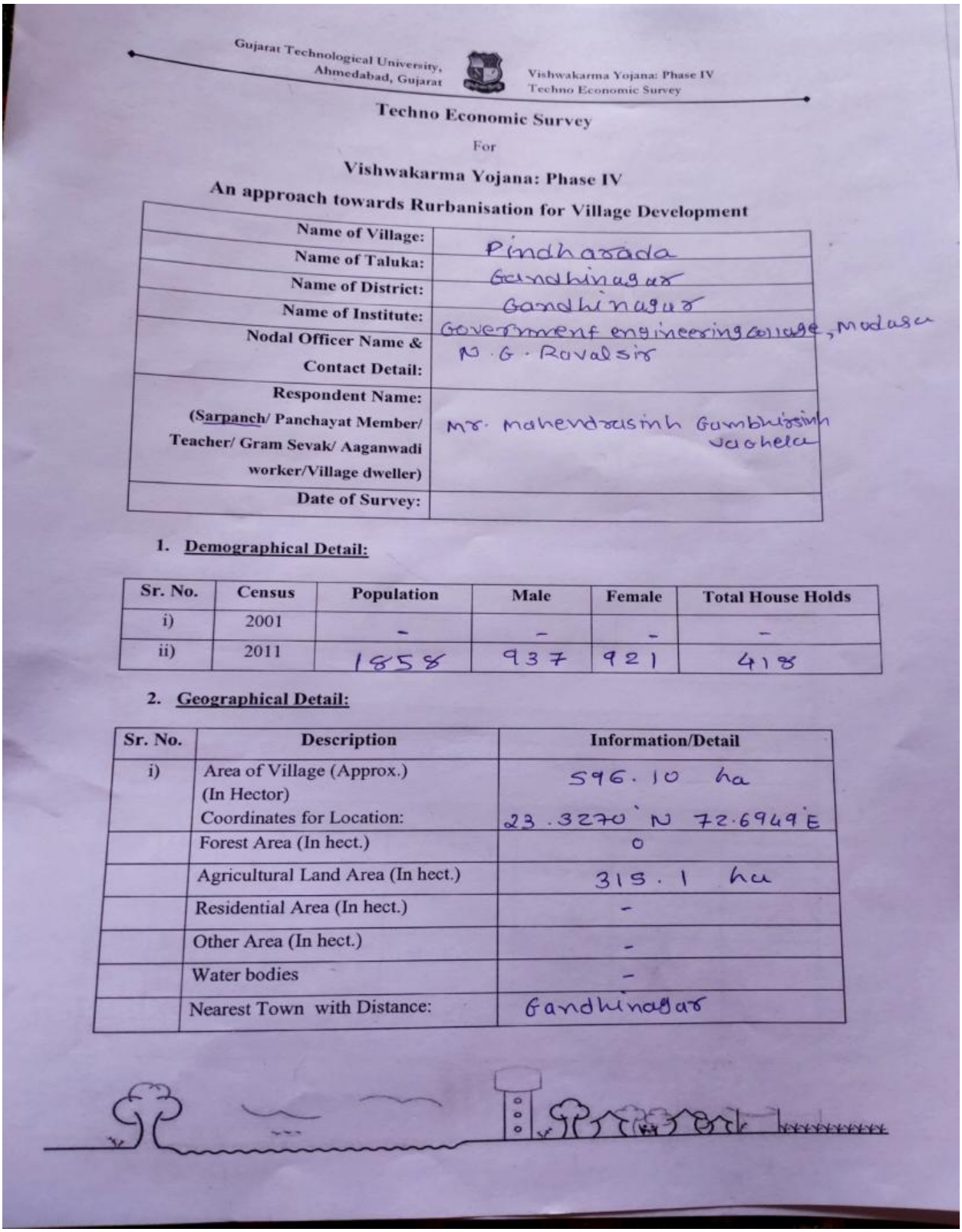
For Any Technical queries/ Difficulties:
Ms Jagruti Shah, OSD
Contact no. 9978980170

For Any Administration queries/ Difficulties:
Ms. Darshana Chauhan, OSD
Contact No. 9909944891

Email ID: rurban@gtu.edu.in

સરપંચ શ્રીમતી
પુનાજી ગ્રામ પંચાયત
તા.વડોદ, જિ.સાબરકાંઠા.

12.3 Techano economic survey of pindharada Village



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Vishwakarma Yojana: Phase IV
Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase IV

An approach towards Rurbanisation for Village Development

Name of Village:	Pindharada
Name of Taluka:	Gandhinagar
Name of District:	Gandhinagar
Name of Institute:	Government engineering College, Modasa
Nodal Officer Name & Contact Detail:	N. G. Raval sir
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Mr. Mahendrasinh Gambhirsinh Vaghela
Date of Survey:	

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	-	-	-	-
ii)	2011	1858	937	921	418

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector)	596.10 ha
	Coordinates for Location:	23.3270° N 72.6949° E
	Forest Area (In hect.)	0
	Agricultural Land Area (In hect.)	315.1 ha
	Residential Area (In hect.)	-
	Other Area (In hect.)	-
	Water bodies	-
	Nearest Town with Distance:	Gandhinagar

Gujarat Technological University, Ahmedabad, Gujarat

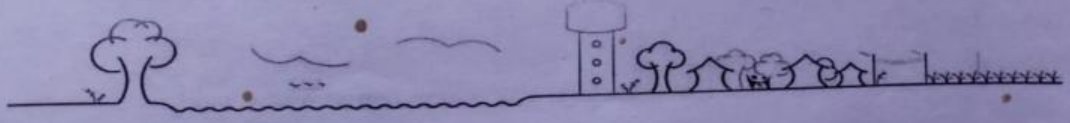
Vishwakarma Yojana: Phase IV
Techno Economic Survey

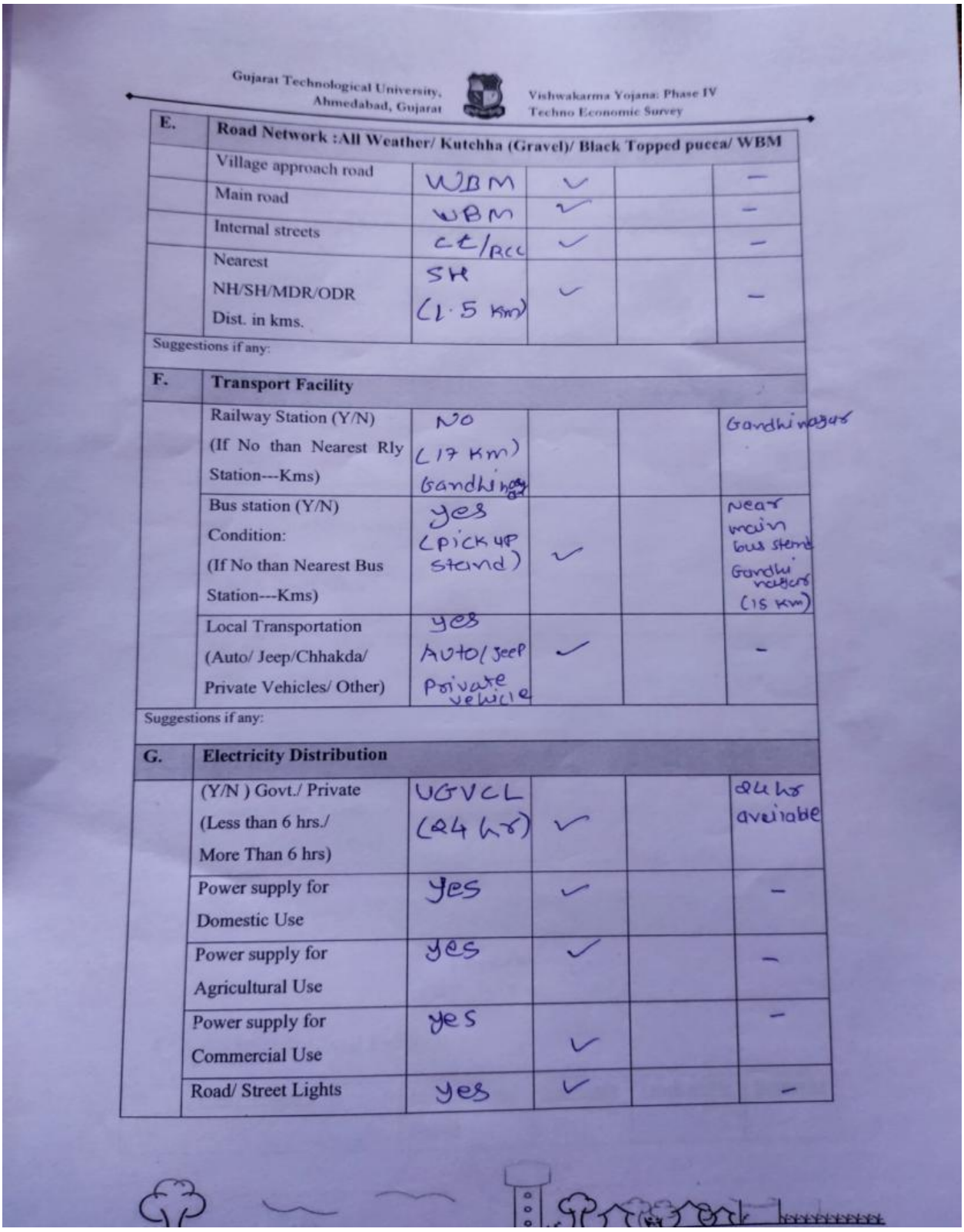
3. Occupational Details:

Name of Three Major Occupation groups in Village	1. Agriculture 2. Dairy Product 3. Labour / Giga worker

4. Physical Infrastructure Facilities:

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





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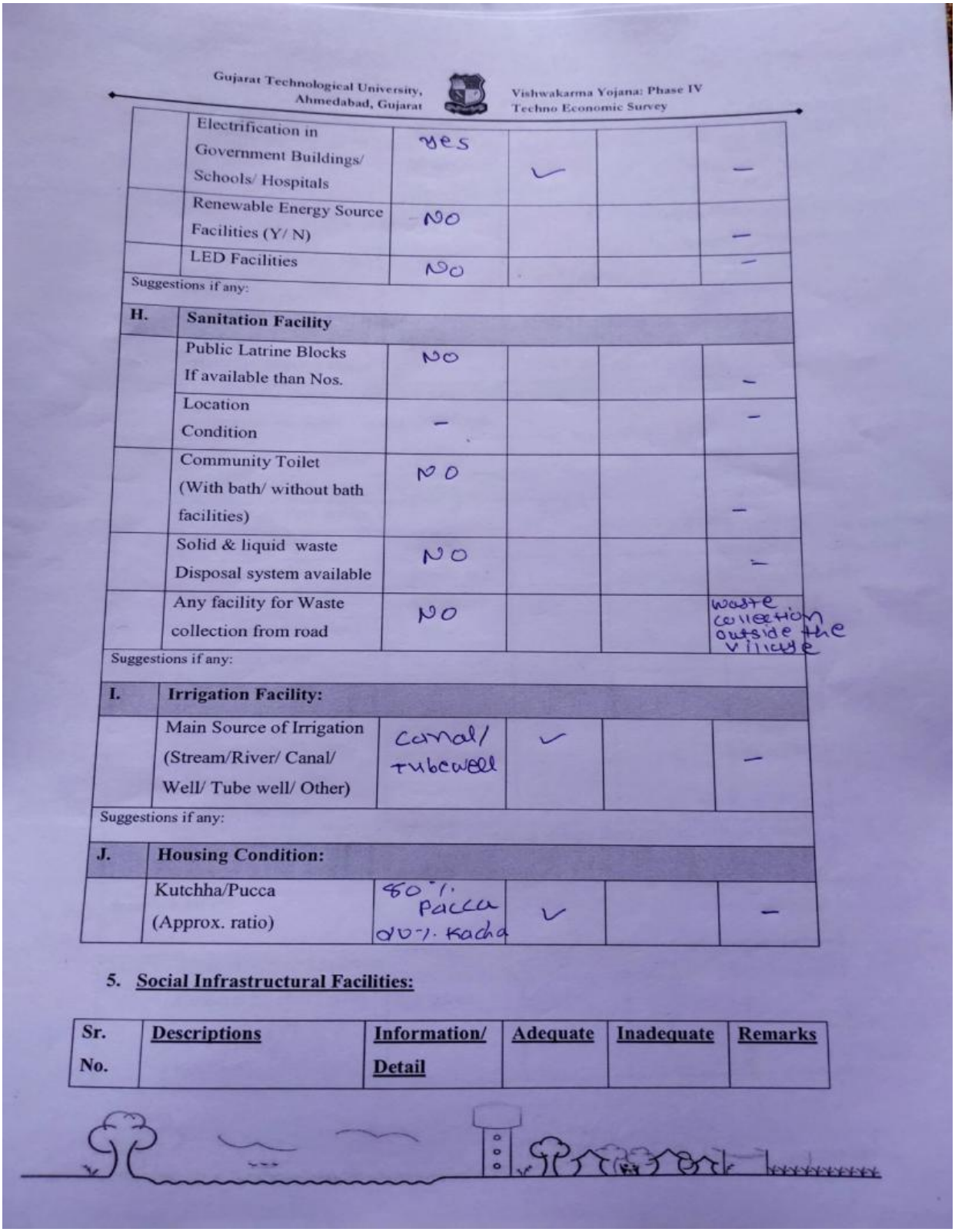
Techno Economic Survey

E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	WBM	✓		–
	Main road	WBM	✓		–
	Internal streets	CC/RCC	✓		–
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH (1.5 km)	✓		–
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No (17 km) Gandhinagar			Gandhinagar
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	yes (pick up stand)	✓		Near main bus stand Gandhinagar (15 km)
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	yes Auto/Jeep Private vehicle	✓		–
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	UGVCL (24 hr)	✓		24 hr avelable
	Power supply for Domestic Use	yes	✓		–
	Power supply for Agricultural Use	yes	✓		–
	Power supply for Commercial Use	yes	✓		–
	Road/ Street Lights	yes	✓		–



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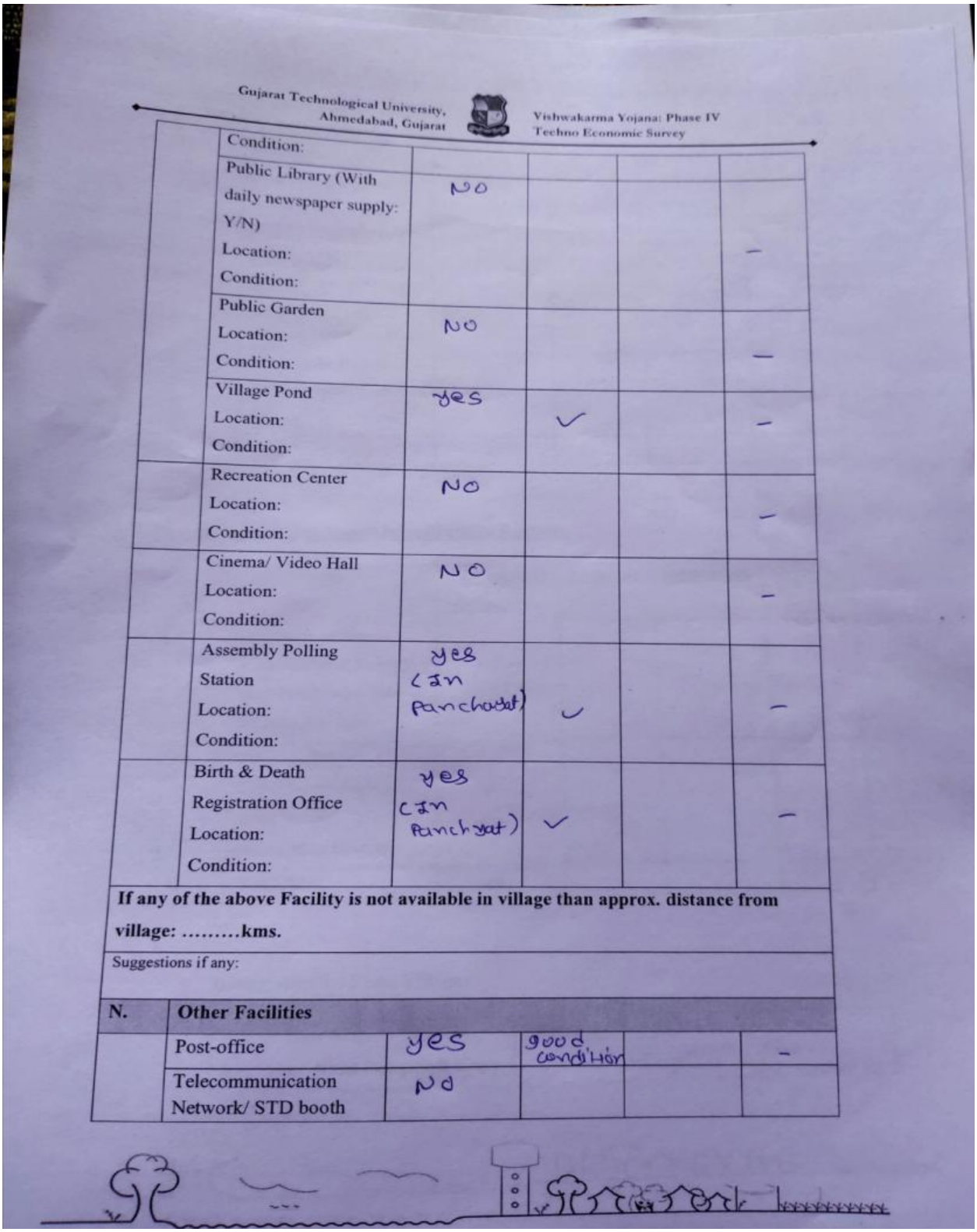
Vishwakarma Yojana: Phase IV
Techno Economic Survey

	Electrification in Government Buildings/ Schools/ Hospitals	yes	✓		–
	Renewable Energy Source Facilities (Y/ N)	NO			–
	LED Facilities	NO			–
Suggestions if any:					
H.	**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			waste collection outside the village
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	canal/ tubewell	✓		–
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	60% Pacca 40% Kacha	✓		–

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks

K.	**Health Facilities:**				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	NO			—
	Private Clinic/Private Hospital/ Nursing Home	yes			—
	If any of the above Facility is not available in village than approx. distance from village: ...5...kms. Unava				
Suggestions if any:					
L.	**Education Facilities:**				
	Aaganwadi/ Play group	yes	(2) ✓		—
	Primary School	yes 1 to 8			Need of / leveling of playing equipment school
	Secondary school	NO (3km)			Unava Mubarakpura (3km)
	Higher sec. School	NO			—
	ITI college/ vocational Training Center	NO			—
	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: ...5...kms. Unava				
Suggestions if any:					
M.	**Socio- Culture Facilities**				
	Community Hall (With or without TV) Location:	NO			



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase IV
Techno Economic Survey

	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	NO			–
	Public Garden Location: Condition:	NO			–
	Village Pond Location: Condition:	yes	✓		–
	Recreation Center Location: Condition:	NO			–
	Cinema/ Video Hall Location: Condition:	NO			–
	Assembly Polling Station Location: Condition:	yes (In Panchayat)	✓		–
	Birth & Death Registration Office Location: Condition:	yes (In Panchyat)	✓		–
If any of the above Facility is not available in village than approx. distance from village: .....kms.					
Suggestions if any:					

N.	Other Facilities				
	Post-office	yes	good condition		–
	Telecommunication Network/ STD booth	No			

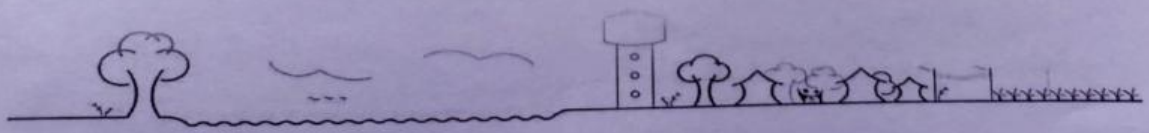
	General Market	NO	-		
	Shops (Public Distribution System)	YES	✓		
	Panchayat Building	YES			
	Pharmacy/Medical Shop	NO			
	Bank & ATM Facility	NO			
	Agriculture Co-operative Society	NO			
	Milk Co-operative Soc.	YES			
	Small Scale Industries	NO			
	Internet Cafes/ Common Service Center/Wi Fi	NO			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

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	Not available only location chart available.



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Vishwakarma Yojana: Phase IV
Techno Economic Survey

Recent Projects going on for Development of Village	Painting in Primary school.
Any NGO working for village development	Yes, Adani group. Yuva unstopable.

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)	yes yes NO	
2.	Additional Information/ Requirement	NO	
3.	Is theis any thing for the village enhancement possible?	Rain water harvesting, community hall biogas plant etc.	

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 Technical queries/ Difficulties:
Ms Jagruti Shah, OSD
Contact no. 9978980170

For Any Administration queries/ Difficulties:
Ms. Darshana Chauhan, OSD
Contact No. 9909944891

Email ID: rurban@gtu.edu.in

12.4 Village GAP Analysis

VILLAGE GAPAnalysis					
Village Facilities	**Planning Commission/UDPFI Norms**	**Village Name :**	**Pindharada**		
		Population:1858			
		Existing	**Required as per Norms**	**Smart Village / Cities / Heritage Future Projection Design**	**Gap**
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 population	2	1	-	+1
Primary School	Each Per 2500 population	1	1	-	0
Secondary School	Per 7,500 population	0	0	-	0
Higher Secondary School	Per 15,000 Population	0	0	-	0
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/Panchayat Dispensary or Sub PHC or Health Centre	Each Village	0	1	-	-1

			village		
Drinking Water (Minimum 70 lpcd)		**Adequate**	-	-	-
Over Head Tank	1/3 of Total Demand	**Adequate**	1	1	0
U/G Sump	2/3 of Total Demand	**Adequate**	1	1	0
Drainage Network - Open		**Adequate**	20% open	-	-
Drainage Network - Cover		**Adequate**	80%covered	-	-
Waste Management System		**Inadequate**	-	-	-
Socio- Cultural astructureFacilities					
Community Hall	Per 10000 Population	0	1	-	-1
Public Library	Per 15000 Population	0	0	-	+1
Cremation Ground	Per 20,000 population	0	1	-	-1
Post Office	Per 10,000 population	1	1	-	0
Gram Panchayat Building	Each individual/group 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**	-1 lac		

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

In this semester, we completed our Literature Review and our Ideal Village Visit. From there we got an Idea about how the smart village should be. Then we visited our allotted village Pindharada of Gandhinagar district. There we completed our Techno-Economic Survey and Smart Village Survey. After surveying we came To conclusion that there was lack of Biogas plant. Hence, we designed Biogas and also designed rain water Harvesting for school to store the rain water.

Sr no	Village Name	Discipline	Part 1	Part 2
1	Pindharada	Civil	Bank	Solid waste management
			Public Toilet	ATM
			Bio gas plant	Solar street lights
			Community hall	Pharmacy store
			Pick up bus stand	Public Garden
			Crematoria	PHC
		Electrical	Design of solar power PV module	Primary energy audit
			Primary energy audit	Solar water purifier
			Solar street light	Solar PV Sizing Of Water Pumping System For Irrigation
2	Handiya	Civil	Primary School	Drinking water facilities
			Primary health centre	Burial ground
			Community hall	Animal center
			Skill development unit	Bank with ATM service
			Agro storage unit	Public Toilet
			Anganwadi	Citizen services center
		Electrical	Automatic Light system	Street light system
			Solar water purifier	Agricultural monitoring
			System for load rotation	Automated irrigation system

12.6 Drawings

All the drawing and images are attached with their respected chapters along with listing and respective page numbers.

12.7 Summary of Good Photographs in Table Format (village visits, Ideal, Smart Village or Any other) : (T-12.7- Summary of all village photographs)
Summary photographs of Pindharada village


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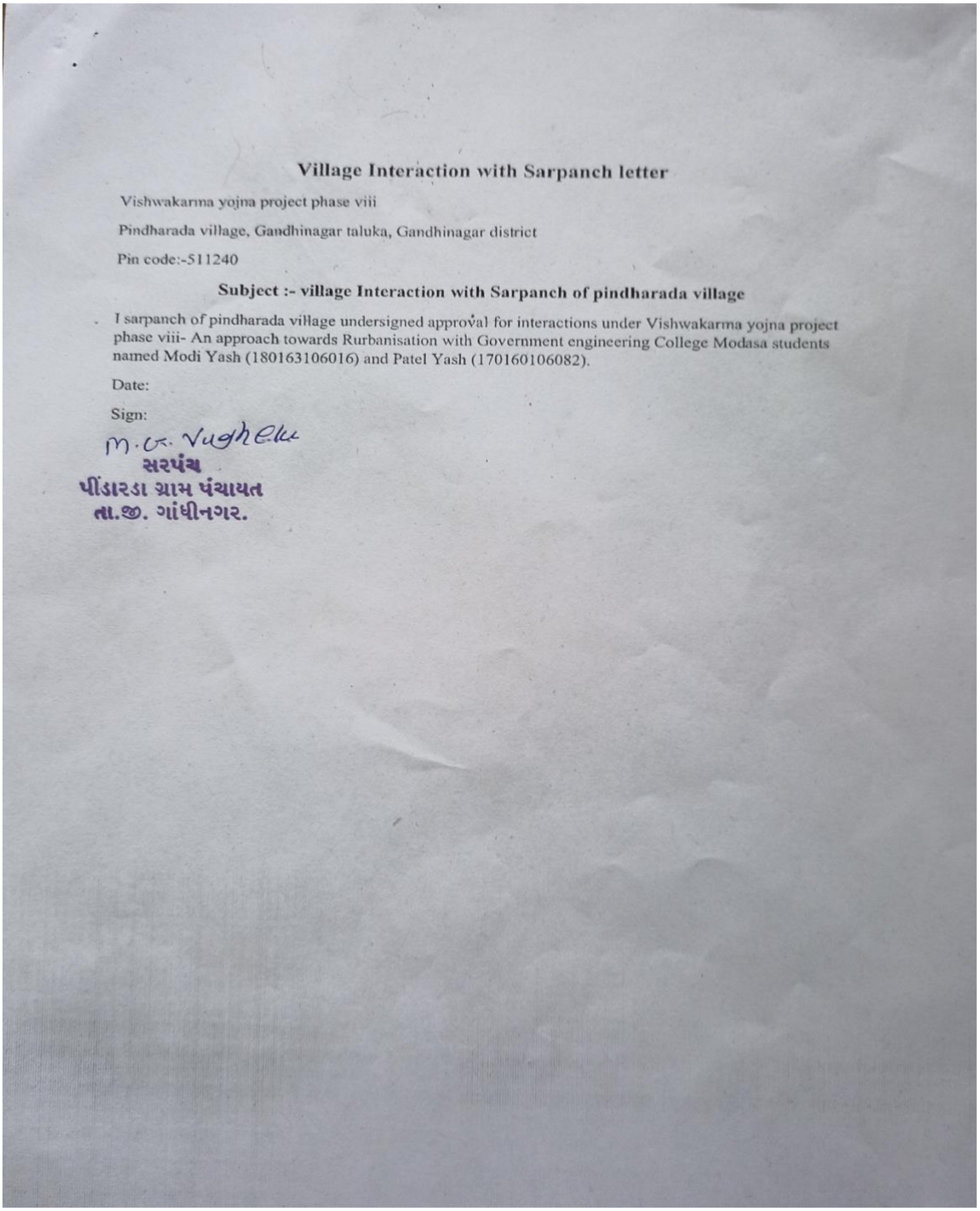
CHITRA(B) 9879 6

12.8 Village Interaction with sarpanch/talati Report with the photograph :



Village Interaction with Sarpanch letter

Vishwakarma yojna project phase viii

Pindharada village, Gandhinagar taluka, Gandhinagar district

Pin code:-511240

Subject :- village Interaction with Sarpanch of pindharada village

I sarpanch of pindharada village undersigned approval for interactions under Vishwakarma yojna project phase viii- An approach towards Rurbanisation with Government engineering College Modasa students named Modi Yash (180163106016) and Patel Yash (170160106082).

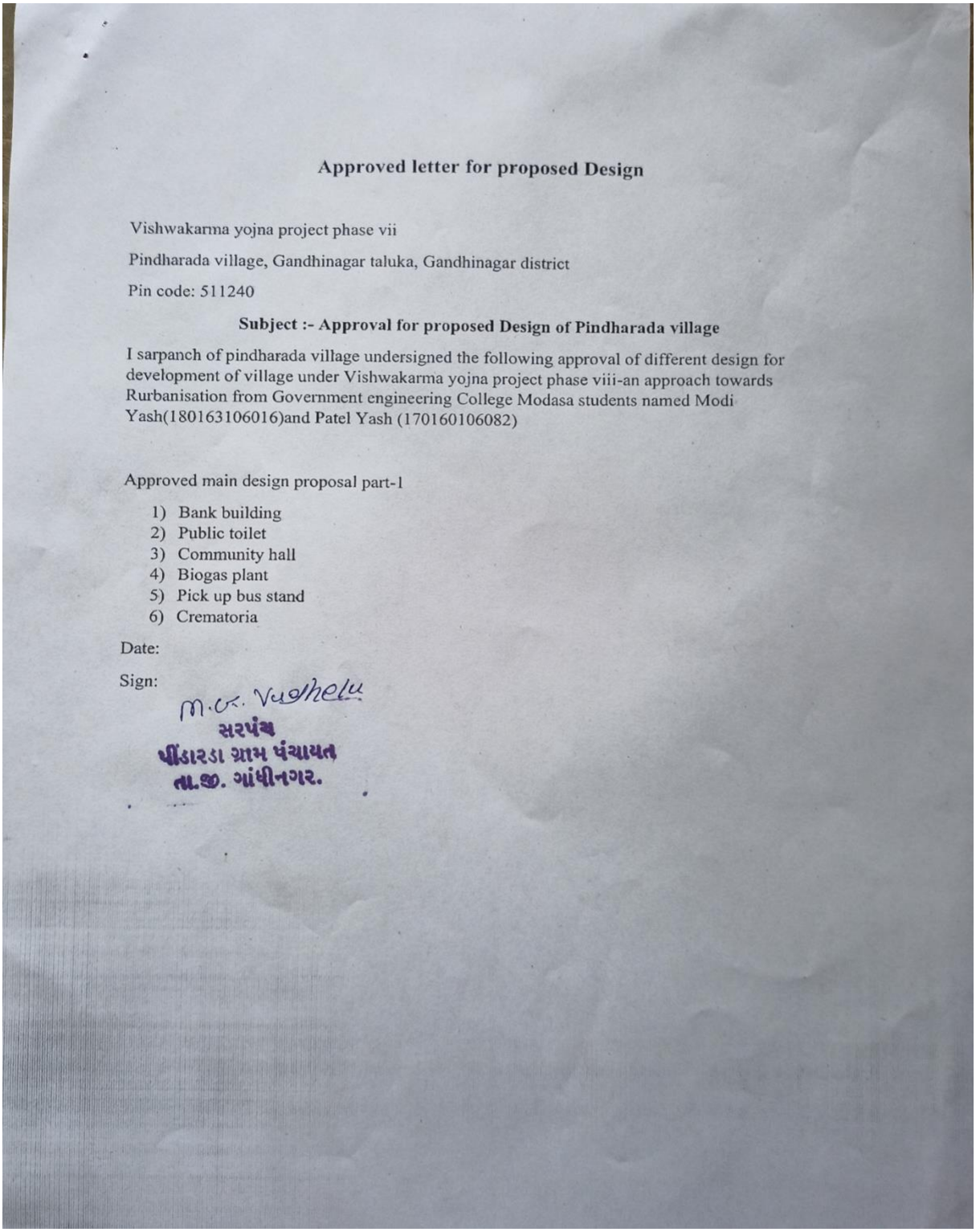
Date:

Sign:

M.G. Vaghela

સરપંચ
પીંડારડા ગ્રામ પંચાયત
તા.જી. ગાંધીનગર.

12.9 Sarpanch Letter giving information about the village development :



Approved letter for proposed Design

Vishwakarma yojna project phase vii

Pindharada village, Gandhinagar taluka, Gandhinagar district

Pin code: 511240

Subject :- Approval for proposed Design of Pindharada village

I sarpanch of pindharada village undersigned the following approval of different design for development of village under Vishwakarma yojna project phase viii-an approach towards Rurbanisation from Government engineering College Modasa students named Modi Yash(180163106016)and Patel Yash (170160106082)

Approved main design proposal part-1

1) Bank building
2) Public toilet
3) Community hall
4) Biogas plant
5) Pick up bus stand
6) Crematoria

Date:

Sign:

M.C. Vadhelu

સરપંચ
પીંડારડા ગ્રામ પંચાયત
તા.જી. ગાંધીનગર.

12.10 Comprehensive report preparation as per formate:

Introduction

The main aim of this project is studying the present status and techno – economic survey of village In different terms of basic and public amenities, other infrastructural facility for the need of the People of respective village. This task or work done with consultation of the local revenue Authorities, like TDO and DDO, the leaders like the sarpanch and talati of respective village and Prepare detailed report on survey of the available data with reference to population of the village And growth area.. the main aim of this project to reduce migration from rural to urban areas this is Achieved by the concept of urbanization which means provide better amenities in rural area without Changing structure of rural area.The second task is to give the most required and suitable economical sustainable design or Prototype for village and sustainable development.

Objectives

A model village project has the following important objectives:

- Prevent distress 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.
- Make the model village a "hub" that could attract resources for the development of other villages in its vicinity.
- Provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such villages
- Contribute towards social empowerment by engaging all sections of the community in the task of village development.
- Create and sustain a culture of cooperative living for inclusive and rapid development.

Study Area

Pindharada village is located in Gandhinagar taluka in Gandhinagar district of Gujarat state. It is a small village consisting population of 1858 only.. Total area of the village is 596.13 hectares. It includes 315.10 hectares land for agricultural purpose and 285.93 hectares land for Residential area. The nearest town to the pindharada is Gandhinagar which is 13 km away from village. The other nearest town is the unava that is 6 km away from the village. The village has bus station, Gram Panchayat, Community Hall, Primary School and Secondary and Higher Secondary School, Primary Health Centre (PHC) etc. The nearest river is Sabarmati River and it is the main source of irrigation for village. Pindharada is about 50 km from Modasa. It is the small town. Nearest villages from pindharada are unava , mansa.. It is 141 m above sea level. The total land area of village pindharada is 596.10 hectares.

Scope of study

Scope and Importance of Rural Development Rural development is a dynamic process, which is mainly concerned with the rural areas. These include agricultural growth, putting up of economic

and social infrastructure, fair wages as also housing and house sites for the landless village planning, public health, education and functional literacy, communication etc. Rural development is a national necessity and has considerable importance in India because of the following reasons. 1. About three – fourth of India's population live in rural areas, thus rural development is needed to develop nation as whole 2. Nearly half of the country's national income is derived from agriculture, which is major occupation of rural India. 3. Around seventy per cent of Indian population gets employment through agriculture.

Available Methodology for development of related to Civil :

Designing a Rural Areas Development Project is a condition of finding rational solutions for The rural areas involved. The process of building a rural development project must address:

1. The main nature-related criteria which include:
- Classification potential of arable land soils,
- Environmental protection with elements of landscape shaping and cultural heritage Protection
2. Design and technical criteria which include studies in the localization of nature objects.
3. Economic analysis of the implementation of a rural areas development project which Comprise:
- A balance of property resources belonging to the State Treasury and municipalities, Possibilities to increase the State Treasury's property resources under the structural Pension programme and the Farmers' Social Insurance Act,
- Potential income source of people living in rural areas.
4. related criteria include:
- Defining the legal status of a designed Rural Areas Development Project,
- Defining entities competent to design a Project,

Data Collection pindharada village.

1 Describe Methods for data collection :

The method of data collection is :-

Techno economic survey :- We go to the village and make a survey about village and villagers facilities and available infrastructure.

Personal interview :- we interaction direct to the villagers and collect the available data and instructions about village.

Field survey:- we go to the village and Survey the village to go one by one all the main sites or field available in village. Good source for providing extra information about a certain group , can use videography.

Questionery survey :- we go to village and make certain types of questions and after analyzing the answer from different people we find the problem available in village.This type of survey is easy to analyze problem.

2 Primary details of survey :

Pindharada village is located in Gandhinagar taluka in Gandhinagar district of Gujarat state. It is a small village consisting population of 1858 only.. Total area of the village is 596.13 hectares. It includes 315.10 hectares land for agricultural purpose and 285.93 hectares land for Residential

area. The nearest town to the pindharada is Gandhinagar which is 13 km away from village. The other nearest town is the unava that is 6 km away from the village. The village has bus station, Gram Panchayat, Community Hall, Primary School and Secondary and Higher Secondary

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

In pindharada village average size of house is 700 to 1000 sq ft.

Geo Tagging:-The key objective of geo-tagging is to track progress of construction of individual houses through geo-tagged photographs, under the Beneficiary led Individual.

4 No of Human being in One House :

In pindharada village total population of village is 1858. And average no of human being in one house is 5 .

5 Material available locally in the village and Material Out Sourced by the villagers:

In village main business of village is agriculture and dairy products. So available material like milk, Other grocery, agricultural material, ash ,milk products ,sand , gravel etc.

6 Geographical Detail:

Total area of the village is 596.13 hectares. It includes 315.10 hectares land for agricultural purpose and 285.93 hectares land for Residential area.

Net area sown :- 540 ha.

Total irrigated land :- 496 ha.

Total non irrigated land :- 47 ha.

Well tubes :- 496 ha.

7 Demographical Detail – Cast Wise Population Details / Which ID proof using by villagers

No of population :- 1858

No of house :- 418

SC caste :- 55

ST caste :- 0

Literacy :- 80.60 %

Total worker :- 588

8 Occupational Detail – Occupation wise Details / Majority business :

In Pindharada village out of total population, 588 were engaged in work activities. 97.96 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 2.04 % were involved in Marginal activity providing livelihood for less than 6 months. Of 588 workers engaged in Main Work, 117 were cultivators (owner or co-owner) while 217 were Agricultural laborers.

9 Agricultural Details / Organic Farming / Fishery :

Major occupation of village is agriculture. The main crop of village is seasonally like cotton , rice , tobacco ,corn , sugar ,Wheat etc.

10 Physical Infrastructure Facilities – Manufacturing HUB / Ware Houses :

a) Drinking Water:

There is tap water system in the village. There is 100% treated water is distributed in the village. There are 2 wells and tank in the village. There are 2 wells in the village out of which one well is covered and other well is uncovered. There is underground sump having the capacity of 1 lakh litre.

Available amenities:-

Anganwadi	Yes
Primary school	Yes
Secondary school	No (near 10km)
CHC	No (near 10 km)
PHC	No (near 5 km)
PHS	Yes
Tap water	Yes
Hand pump	No
Community toilet	No
Bio gas or recycling waste management	No
Sub post office	Yes
Pacca road	Yes
Kaccha road	Yes
WBM road	Yes

Design Proposal

Sr no	Design name	Period	Amount (RS)	Benefits
8.1.1	Bank Building	Long term (1-2 year)	1977336	Provides customer services, provide banking services
8.1.2	Bus stand	Long term (1 year)	2685410	It is provide easy transportation facility
8.1.3	Public Toilet	Immediately	158645	It is improve sanitation facility ,it is improve cleanliness in village
8.1.4	Community hall	Long term (1 year)	377745	Group activities, social support, public information and other purpose
8.1.5	Crematoria	Immediately	335000	It create pleasant environment in village

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

1. Solid Waste Management:-Solid waste streams can be appropriately characterized by their sources, by the types of waste produced

2. PHC Centre:-Provision of medical care. Education about health. It provides whole person care for health needs throughout the lifespan , not just for a set of specific design.

3. Pharmacy store:-Easy avaibility of medicine and primary heath requirement. Promotion of healthy lifestyles. Support for self care. Despencing services.

4.ATM Machine:- An ATM is aan electronic banking outlet that allows customer to complete basic transaction without the aid of branch teller. Anyone with a credit card or debit card can access cash at most ATMs.

5. Library room:-The prime purpose of library is to provide access to knowledge and information. Libraries help the student to develop good reading and study habits.

6. Government Groceries Store:- Groceries store provide Groceries to normal people by the government in any situation like corona situation etc

13.1.1 Cyber Café Design

Alternatively referred to as an Internet café, PC bangs, or Net café. 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.

One of the salient features of cybercafes is the fact that they are far less expensive than personal ownership of computer hardware or software as they make use of the shared access model. Most cybercafes have printers, scanners and other similar peripherals for customer use. They usually have high performance computers and are frequently suited for PC gamers. Another feature is that the average internet speed is faster than home internet, and this helps in reducing the timeouts or any lag due to interrupted internet connections.

There are many advantages associated with cybercafes. In countries where internet or computer access is not affordable or available, a cybercafe can provide the benefits of both computers and internet to the local population. For short durations of time, usage of an internet café is cheaper than renting a computer for computer-related tasks. In most countries, the internet cost at cybercafes is much cheaper than other alternatives. In many cases, cybercafes have all the necessary accessories and software for any visitor, making their experience worthwhile.

Fig.13.1.1.1 plan of cyber cafe

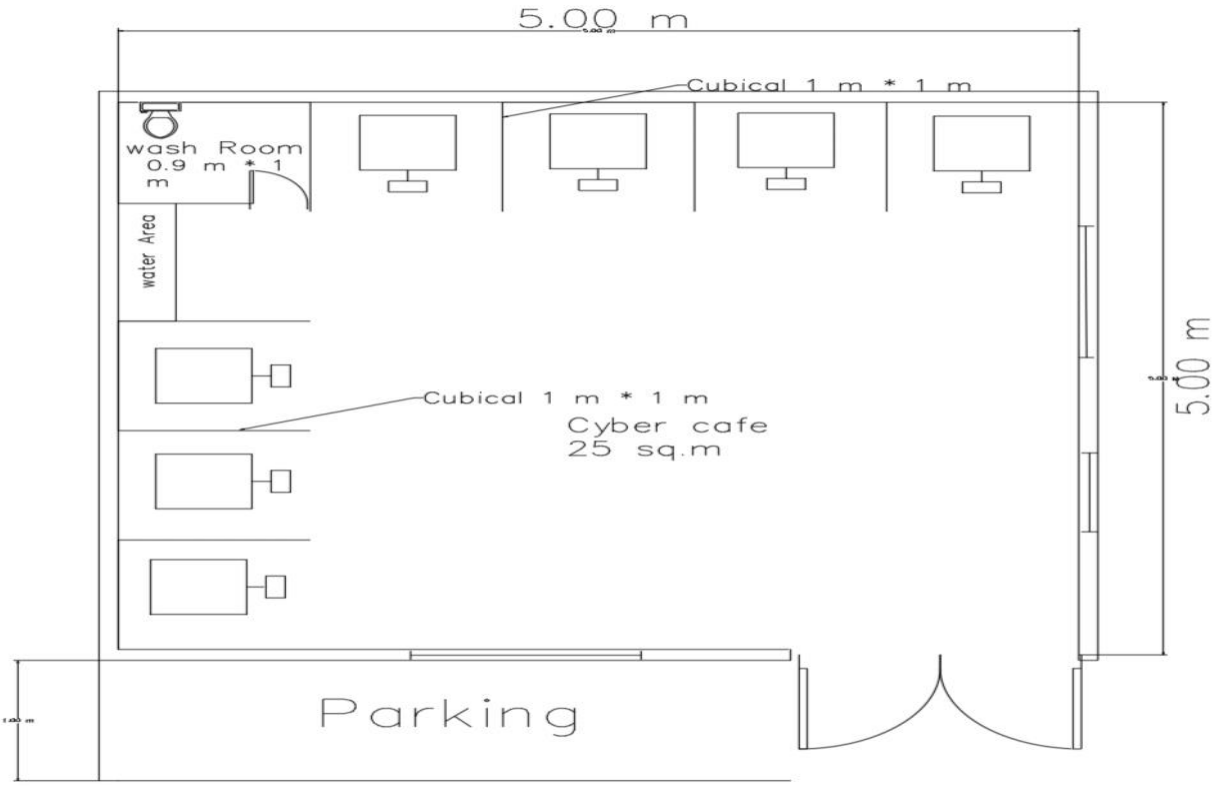
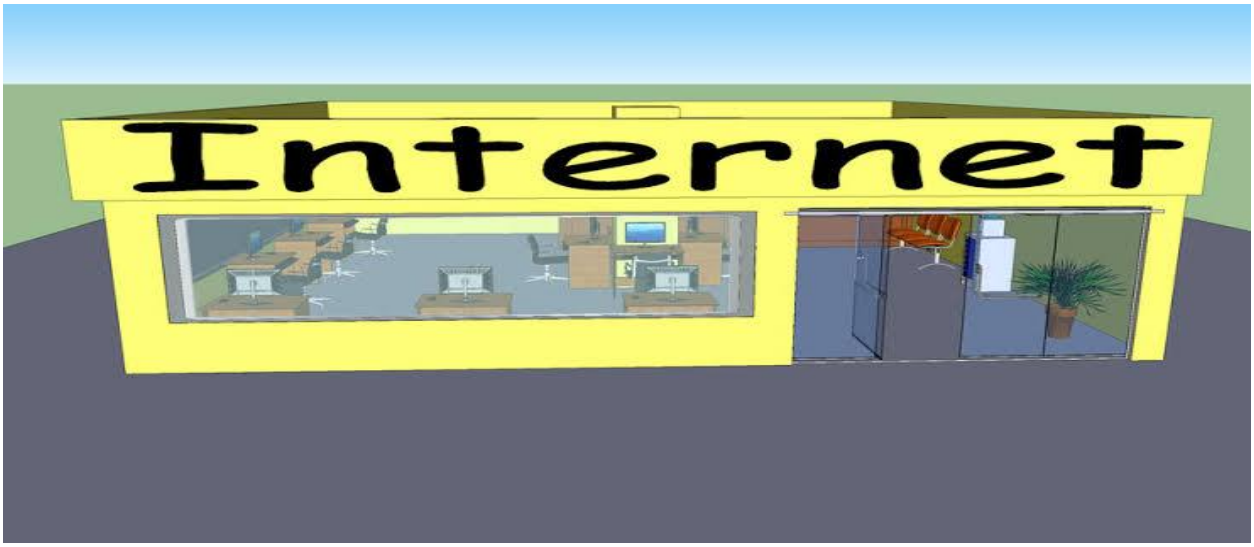


Fig.13.1.1.2 elevation of cyber cafe



Measurement sheet

Sr no	Description	No	L(m)	B(m)	H(m)	Total qty
1	Excavation in foundation	1	20	1.2	1.5	36 cu.m
2	PCC in foundation	1	20	0.9	0.4	7.2 cu.m
3	Masonary in foundation					
	First step	1	20	0.4	0.4	
	Second step	1	20	0.3	0.4	
	Third step	1	20	0.2	0.4	7.2 cu.m
4	Flooring	1	5	5	0.15	3.15 cu.m
5	Masonary in superstructure	4	5	0.20	3	12 cu.m
6	Rcc in lintel	1	20	0.20	0.15	0.6 cu.m
7	RCC slab	1	5	5	0.15	3.75 cu.m
8	Smooth plaster	4	5		3	60 sq.m
9	Glass partition	7				7
10	Computer	7				7
11	Printer, xerox machine	1				1

Abstract sheet

Sr no	Description	Qty	Per	Rate(rs)	Amount(rs)
1	Excavation in foundation	36	Cu.m	85	3060
2	PCC in foundation	7.2	Cu.m	3000	21600
3	Masonary in foundation	7.2	Cu.m	3200	23040
4	Flooring	3.15	Cu.m	2000	6300
5	Masonary in superstructure	12	Cu.m	3500	42000
6	RCC in lintel	0.6	Cu.m	8800	5280
7	RCC slab	3.75	Cu.m	8800	33000
8	Smooth plaster	60	Sq.m	150	9000
9	Glass partition	7	Nos	3000	21000
10	Computer	7	Nos	50000	350000
11	Printer xerox machine	1	Nos	50000	50000
	Amount				5,64,280 Rs
	Add 3% contingency				16930
	Total amount				**5,81,210 rs**

13.1.2 PHC Centre

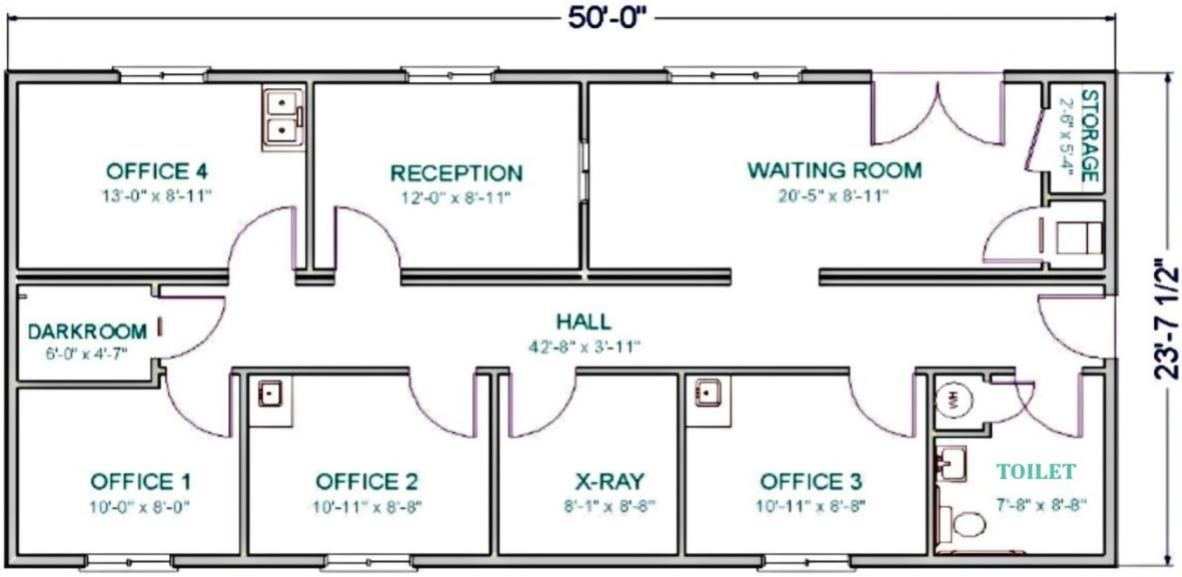


Fig.13.2.1 Plan of PHC centre

Fig.13.2.2 Elevation of PHCcentre

Sr no	Description	NO	L (m)	B(m)	H(m)	QTY.
1	Excavtion in foundation	1	75.6	0.9	1.2	81.64 cu.m
2	PCC in foundation	1	75.6	0.9	0.3	20.412 cu.m
3	Brickwork in foundation	3	15.25	0.3	1.3	
		2	7.3	0.3	1.3	23.53 cu.m
4	Brickwork in superstructure	1	80	0.22	2.65	46.64 cu.m
5	RCC Work	1	15.25	7.3	0.15	16.69 cu.m
6	2 cm thick flooring	1	15.25	7.3		111.325 sq.m
7	Smooth plaster	1	15.25		3	
		1	7.3		3	
	Ceiling	1	15.25	7.3		178.975 sq.m
8	Earth filling in excavation					37.74

Abstract sheet;

Sr no	Description	Qty.	UNIT	Rate	Per	Amount
1	Excavation in foundation	81.64	Cu.m	85	Cu.m	6939
2	PCC in foundation	20.412	Cu.m	3000	Cu.m	61236
3	Brickwork in foundation	23.53	Cu.m	3200	Cu.m	75296
4	Brickwork in superstructure	46.64	Cu.m	3500	Cu.m	163240
5	RCC Work	16.69	Cu.m	8800	Cu.m	146872
6	2 cm thick flooring	111.325	Sq.m	500	Sq.m	55663
7	Smooth plaster	178.975	Sq.m	150	Sq.m	26847
8	Earth filling in excavation	37.75		50		1888
						537981
	Total amount					**5,54,181**

13.1.3 Pharmacy Store Design

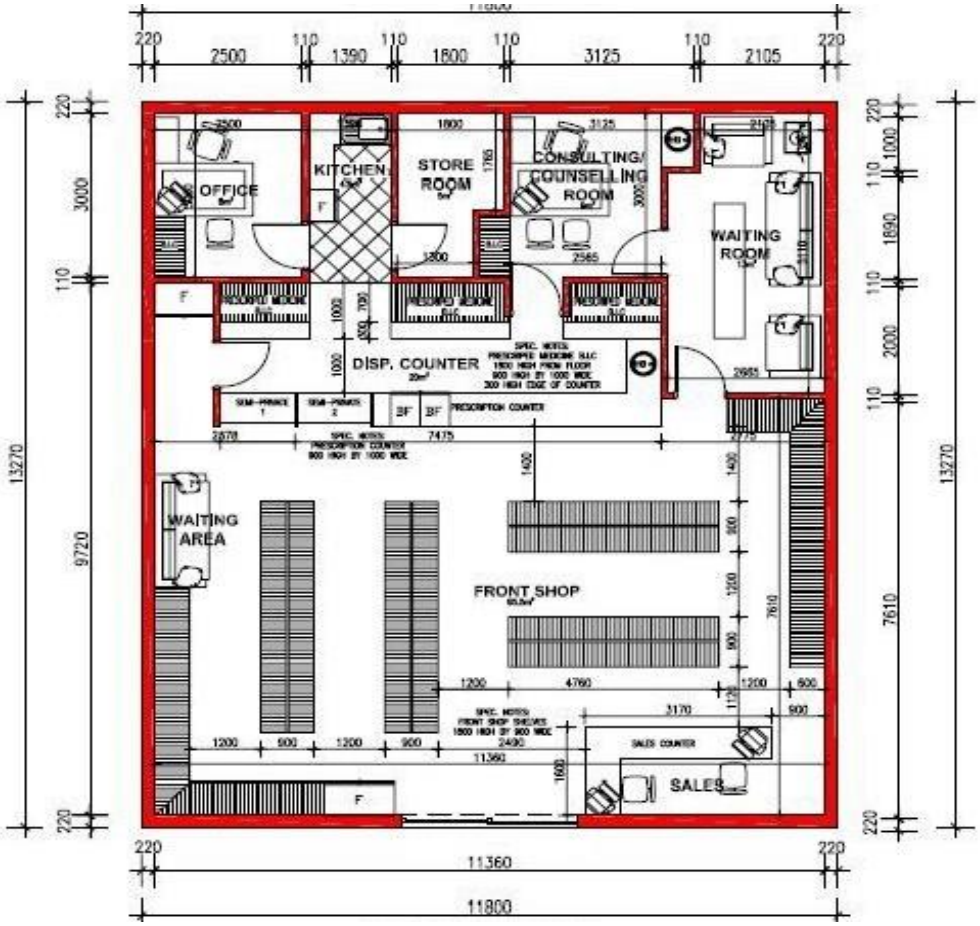


Fig.13.1.3.1Plan of Pharmacy store

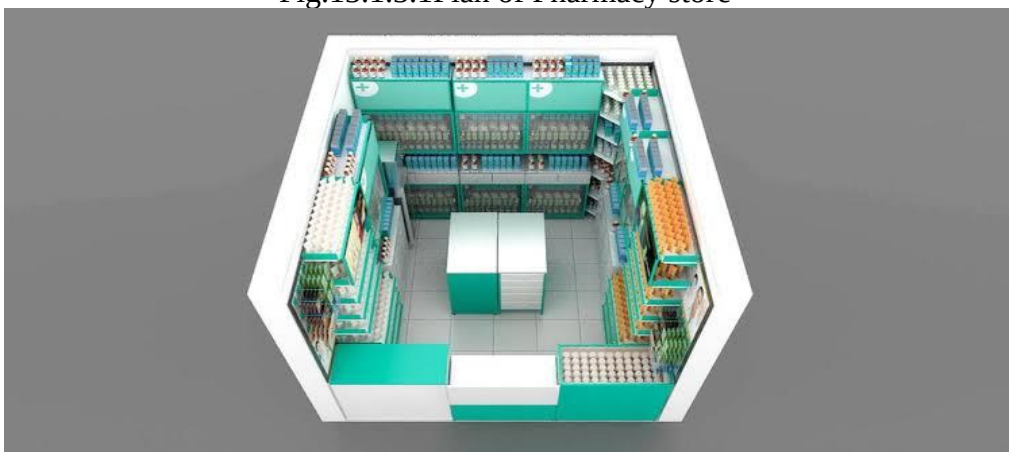


Fig.13.1.3.2 Elevation of Pharmacy store

Sr no	Description	NO	L (m)	B(m)	H(m)	QTY.
1	Excavtion in foundation	1	25	0.9	1.2	27 cu.m
2	PCC in foundation	1	25	0.9	0.3	6.75 cu.m
3	Brickwork in foundation	2	11.8	0.3	1.3	
		2	13.2	0.3	1.3	19.344 cu.m
4	Brickwork in superstructure	1	25	0.22	2.65	14.575 cu.m
5	RCC Work	1	11.8	13.2	0.15	23.35 cu.m
6	2 cm thick flooring	1	11.8	13.2		155.75 sq.m
7	Smooth plaster	1	11.8		3	
		1	13.2		3	
	Ceiling	1	11.8	13.2		230.75 sq.m
8	Earth filling in excavation					0.609

Abstract Sheet:

Sr no	Description	Qty.	UNIT	Rate	Per	Amount
1	Excavation in foundation	27	Cu.m	85	Cu.m	2295
2	PCC in foundation	6.75	Cu.m	3000	Cu.m	20250
3	Brickwork in foundation	19.344	Cu.m	3200	Cu.m	61900
4	Brickwork in superstructure	14.575	Cu.m	3500	Cu.m	51012
5	RCC Work	23.35	Cu.m	8800	Cu.m	205480
6	2 cm thick flooring	155.75	Sq.m	500	Sq.m	77875
7	Smooth plaster	230.75	Sq.m	150	Sq.m	34612
8	Earth filling in excavation	0.609		50		30
						453454
	Total amount					**4,67,054**

13.1.4 ATM Machine Design

fig.13.1.4.1 Plan of ATM machine

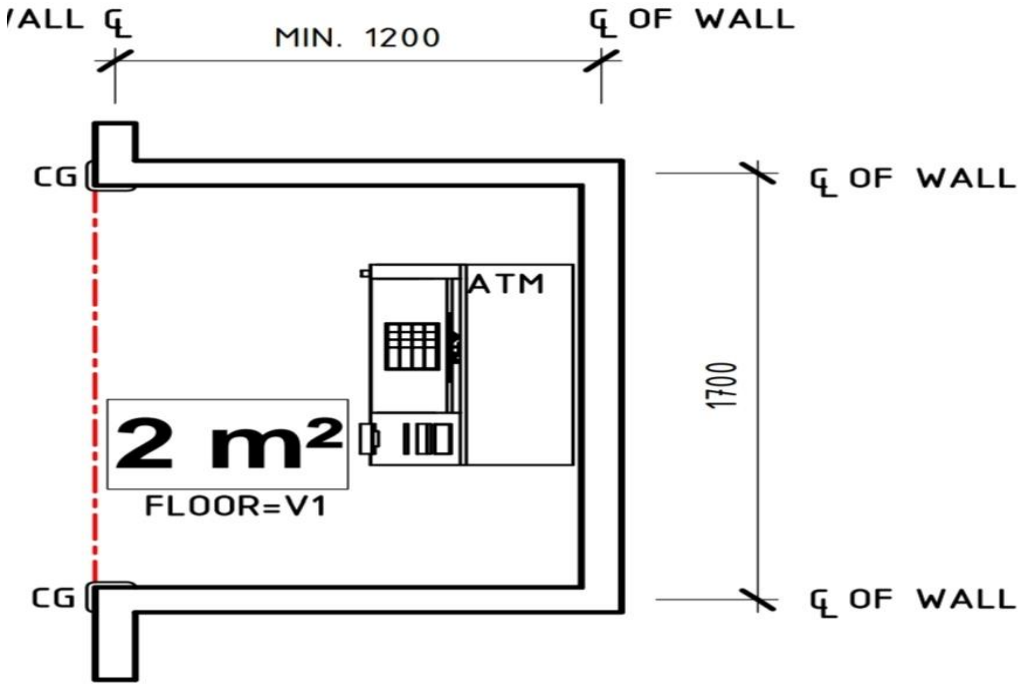
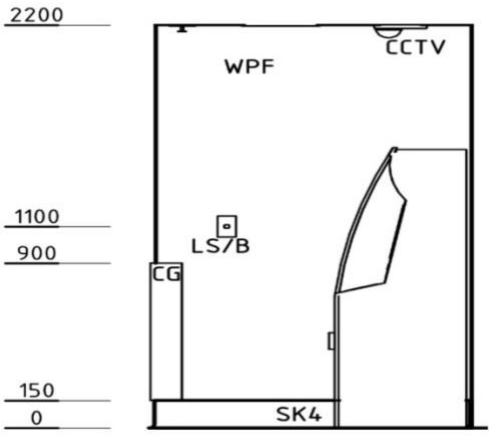
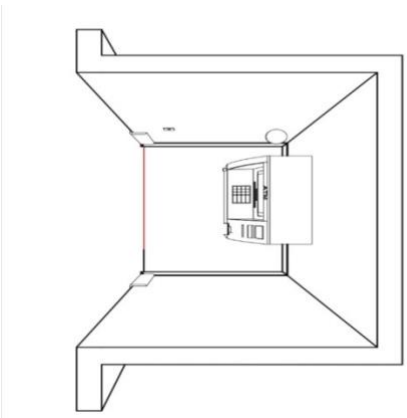


fig.13.1.4.2 Elevation of ATM machine





Measurement sheet :

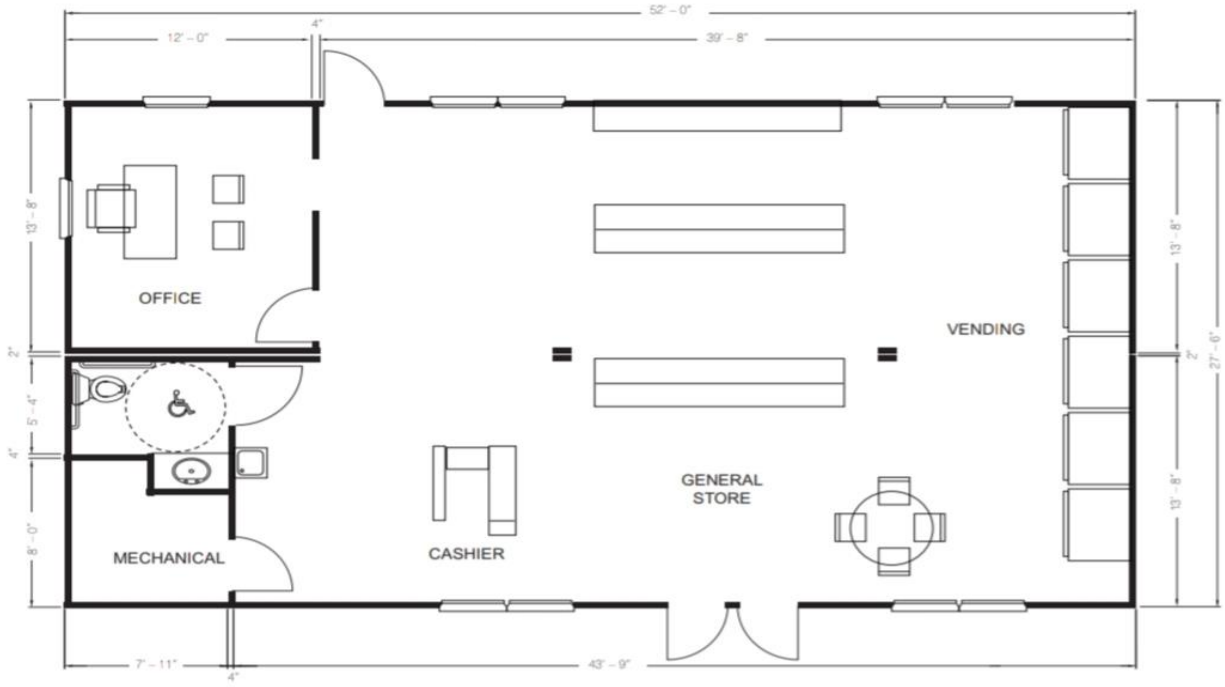
Sr no	Description	No	L (m)	B (m)	H (m)	Oty.
1	Glass door with aluminum frame	1	1.7	0.02	2.05	1
2	Basic roof	1	1.7	1.2	0.15	0.310
3	Floor	1	1.7	1.2	0.15	0.310
4	Masonary wall	2	1.2	0.9	2.7	
		1	1.7	0.9	2.7	9.963
5	P C C in footing	1	5.8	0.9	0.2	1.044
6	Wall in footing	1	5.8	0.9	0.4	2.088
7	Excavation	1	5.8	1.2	1.5	10.44

Abstract sheet:-

Sr no	Description	Qty.	Rate	Per	Amount
1	Excavation in foundation	10.44	105	Cu.m	**1096**
2	PCC in foundation	1.044	3000	Cu.m	**3132**
3	Brick masonary Wall in footing	2.088	3200	Cu m	**6682**
4	Floor	0.310	2000	Cu.m	**620**
5	Brick masonary wall	9.936	3500	Cu.m	**34776**
6	Roof covering with glass material	0.310	8800	Cu.m	**2728**
7	Glass door	1	3000	No	**3000**
	Total cost				**52034**
	Add 1.5 % contingency				**780**
	Add 10 % profit				**5200**
	Total amount				**58,014 RS**

13.1.5 Government Groceries Store

fig.14.1.5.1 plan of groceries store



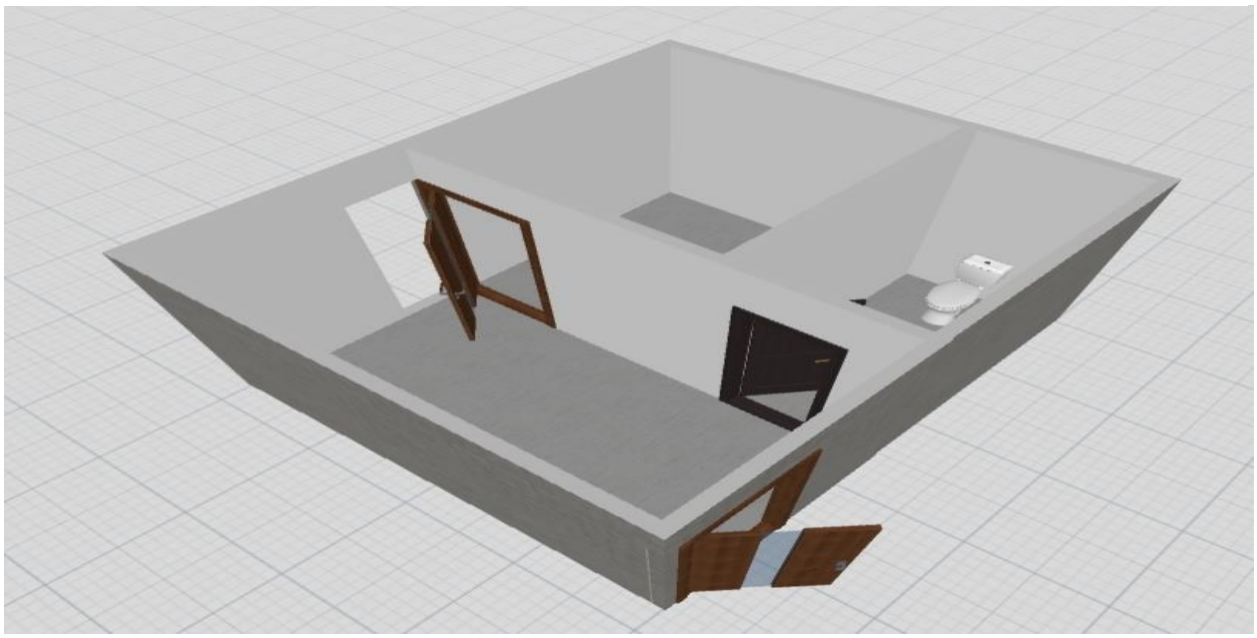


Fig.14.1.5.2 elevation of groceries store

Measurement sheet

Sr no	Description	NO	L (m)	B(m)	H(m)	QTY.
1	Excavtion in foundation	1	20.25	0.9	1.2	21.87 cu.m
2	PCC in foundation	1	20.25	0.9	0.3	5.4675 cu.m
3	Brickwork in foundation	3	3.75	0.3	1.3	
		2	4.5	0.3	1.3	7.9 cu.m
4	Brickwork in superstructure	1	22.75	0.22	2.65	13.26 cu.m
5	RCC Work	1	3.75	4.5	0.15	2.53 cu.m
6	2 cm thick flooring	1	3.75	4.5		16.87 sq.m
7	Smooth plaster	1	3.75		3	
		1	4.5		3	
	ceiling	1	3.75	4.5		41.62 sq.m
8	Earth filling in excavation					8.51

Abstract Sheet

Sr no	Description	Qty.	UNIT	Rate	Per	Amount
1	Excavation in foundation	21.87	Cu.m	85	Cu.m	1859
2	PCC in foundation	5.4675	Cu.m	3000	Cu.m	16372
3	Brickwork in foundation	7.9	Cu.m	3200	Cu.m	25280
4	Brickwork in superstructure	13.26	Cu.m	3500	Cu.m	46410
5	RCC Work	2.53	Cu.m	8800	Cu.m	22264
6	2 cm thick flooring	16.87	Sq.m	500	Sq.m	8435
7	Smooth plaster	41.62	Sq.m	150	Sq.m	6243
8	Earth filling in excavation	8.51		50		426
	Add 3% contingency					3820
	Total Amount					**1,31,109 RS**

13.1.6 Library Building

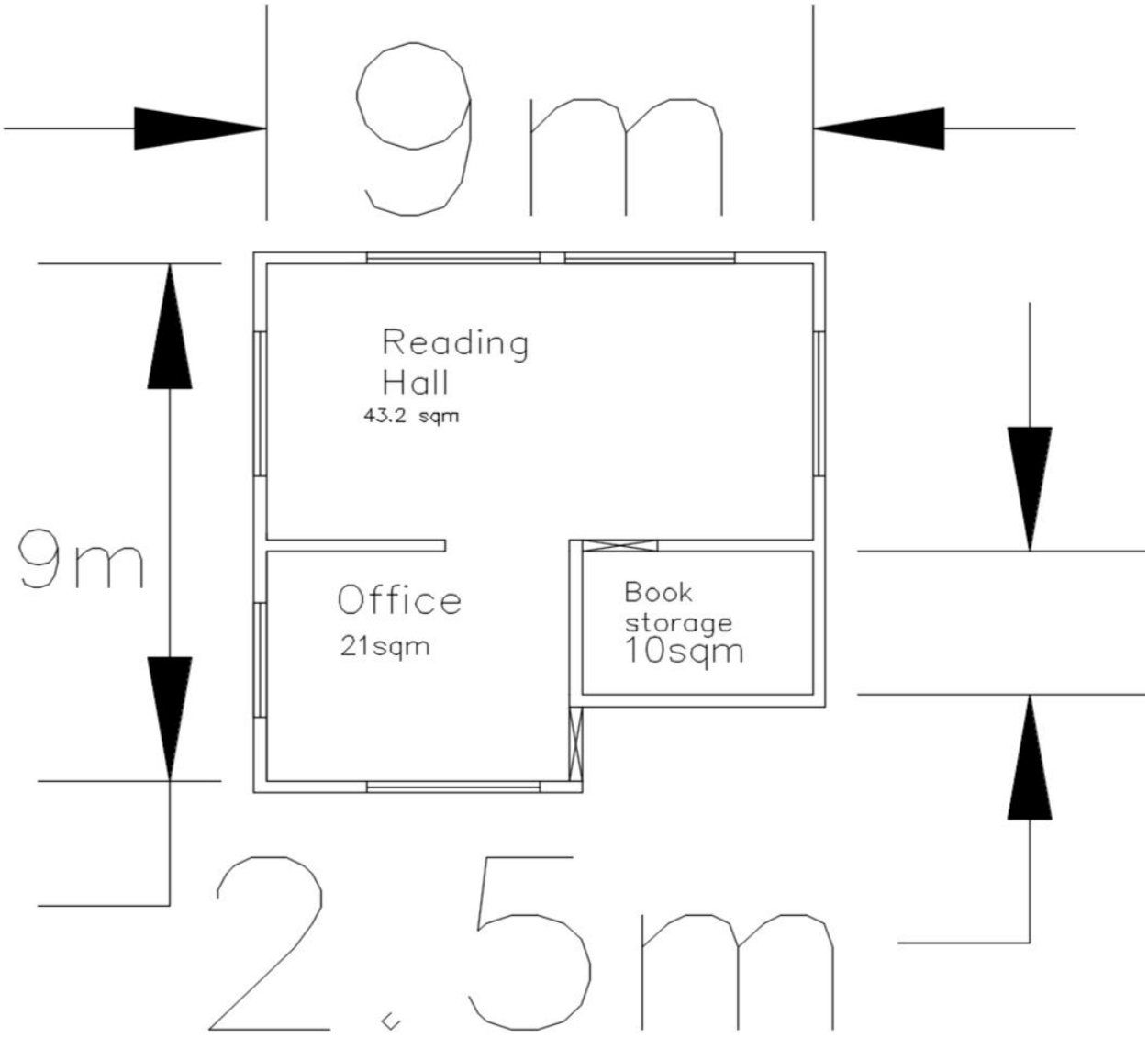


Fig.13.1.6.1 Library building plan

Fig.13.1.6.2 Elevation of library building

Measurement sheet

Sr no	Description	NO	L (m)	B(m)	H(m)	QTY.
1	Excavtion in foundation	1	47.5	0.9	1.2	51.3 cu.m
2	PCC in foundation	1	47.5	0.9	0.3	12.825 cu.m
3	Brickwork in foundation	3	9	0.3	1.3	
		1	9	0.3	1.3	18.725 cu.m
		1	4.5	0.3	1.3	
		1	7.5	0.3	1.3	
4	Brickwork in superstructure	1	47.5	0.22	2.65	27.69 cu.m
5	RCC Work	1	9	9	0.15	12.15 cu.m
6	2 cm thick flooring	1	9	9		81 sq.m
7	Smooth plaster	3	9		3	
		3	9		3	
	Ceiling	1	9	9		243 sq.m
8	Earth filling					19.75

Abstract Sheet

Sr no	Description	Qty.	UNIT	Rate	Per	Amount

1	Excavation in foundation	51.3	Cu.m	85	Cu.m	4360
2	PCC in foundation	12.825	Cu.m	3000	Cu.m	38475
3	Brickwork in foundation	18.725	Cu.m	3200	Cu.m	59920
4	Brickwork in superstructure	27.69	Cu.m	3500	Cu.m	96915
5	RCC Work	12.15	Cu.m	8800	Cu.m	106920
6	2 cm thick flooring	81	Sq.m	500	Sq.m	40500
7	Smooth plaster	243	Sq.m	150	Sq.m	36450
8	Earth filling in excavation	19.75		50		990
						384530
	Add 3% contingency					11550
	Total Amount					**3,96,080 RS**

13.1.7 Primary Energy Audit

- **ESTIMATION FOR PHC CENTRE:-**

ITEM	NUMBER	TOTAL WATTS
LAMP 9W	75	675 W
FAN	18	1440 W
5A SOCKET	55	5500 W
15A SOCKET	12	18,000 W
AC 1.5 TON	1	1500 W
	TOTAL LOAD	27,115 = 30,000 W
TOTAL PEAK LOAD CURRENT WILL BE 130 AMP ± 15%		
NUMBER OF POWER CIRCUIT WILL BE 3		
NUMBER OF SUB CIRCUIT WILL BE 8		
TOTAL LENGTH OF COPPER WIRE (1.O+1.5+4.0 MM^2) WILL BE 1455 M		
TOTAL LENGTH OF 1.0MM^2 WILL BE 1055 M		
TOTAL LENGTH OF 1.5MM^2 WILL BE 300 M		
TOTAL LENGTH OF 4.0MM^2 WILL BE 100 M		
TOTAL LENGTH OF PVC CONDUIT WILL BE 650 M		
TOTAL RATING OF MAIN MCB WILL BE 50AMP * 3= 150 AMP		

RATING OF SUB CIRCUIT MCB MAXIMUM 20 AMP, 15AMP

Over all calculation of wire size, length, pvc conduit, rating of mcb

SR. NO	ITEM WITH SPECIFICATION	QUANTITY REQUIRED	COST/UNIT	TOTAL COST
1	FOUR POLE 50A MCB	3	2350	7050
2	MCB 20 AMP	4	500	2000
3	MCB 15 AMP DOUBLE POLE	4	400	1600
4	ANGULAR HOLDER	10	40	400
5	BATTEN HOLDER	61	40	2440
6	3 PIN SOCKET 5A	52	40	2080
7	3 PIN SOCKET 15A	12	80	960
8	SINGLE POLE MODULAR SWITCH 5A	150	20	3000
9	SINGLE PLOLE MODULAR SWITCH 15A	12	70	840
10	¾ PVC CONDUIT	650	15	9750
11	$1MM^2$ PVC COATED COPPER WIRE	1055	12	12,660
12	$1.5MM^2$ PVC COATED COPPER WIRE	300	18	5400
13	$4.0MM^2$ PVC COATED COPPER WIRE	100	35	3500
14	5 MODULAR SWITCH PLATE	12	70	840
15	8MODULAR WITCH PLATE	14	100	1400
16	LAMP 9W	75	90	9750
17	FAN	18	2000	36,000
18	FAN REGULATOR	18	80	1440
19	AC 1.5 TON	1	60,000	60,000
20	CCTV	6	3000	18,000
21	MISCELLANEOUS CHARGE			35,882
22	LABOUR CHARGE			6,80,000
23	OVERHEAD CHARGE			20,000
24	NET COST OF ELECTRIFICATION			9,14,992 ± 15%

- **ESTIMATION FOR GOVERNMENT GROCERY STORE:-**

ITEM	NUMBER	TOTAL WATTS
LAMP	7	63 W
FAN	2	160 W
EXHAUST FAN	1	80 W
TUBE LIGHT	2	40 W
3 PIN SOCKET 5A	6	600 W
3 PIN SOCKET 15A	1	1500 W
	TOTAL	2443 W ± (2500 W)
TOTAL PEAK LOAD CURRENT = 10.86 AMP ± 15 AMP		
PVC COATED COPPER WIRE DIAMETER 1.0MM^2		
NUMBER OF POWER CIRCUIT WILL BE 1		
NUMBER OF SUB CIRCUIT WILL BE 2		
MCB RATING 15 AMP FOR POWER CIRCUIT		
MCB RATING FOR SUB CIRCUIT NEAR 6-7 AMP		
TOTAL LENGTH OF COPPER WIRE WILL BE 90 M		
TOTAL LENGTH OF PVC CONDUIT WILL BE 70 M		

Overall estimation for copper wire, pvc conduit and mcb rating

SR. NO	ITEM WITH SPECIFICATION	QUANTITY REQUIRED	COST/UNIT	TOTAL PRICE
1	MCB 15AMP DOUBLE POLE	1	300	300
2	MCB 6-10 AMP	2	250	500
3	ANGULAR HOLDER	7	40	280
4	3 PIN 5A SOCKET	6	40	240
5	3 PIN 15A SOCKET	1	80	80

6	SINGLE POLE MODULAR SWITCH 5A	19	20	380
7	SINGLE POLE MODULAR SWITCH 15A	1	70	70
8	¾ PVC CONDUIT	70 M	15	1050
9	1.5MM^2 PVC COATED SINGLE CORE COPPER WIRE	90 M	18	1620
10	5 MODULAR SWITCH PLATE	3	200	600
11	2 MODULAR SWITCH PLATE	1	50	50
12	LAMP 9W	7	90	630
13	TUBE LIGHT	2	80	160
14	FAN	2	2000	4000
15	FAN REGULATOR	2	80	160
16	CCTV	1	3000	3000
17	EXHAUST FAN	1	1900	1900
18	MISCELLANEOUS CHARGES			1500
19	LABOUR CHARGES			6000
20	OVERHEAD CHARGE			1500
21	TOTAL COST OF ELECTRIFICATION			24,000 ± 15%

13.1.8 Solar Water purifier

Open non-evacuated parabolic trough with evacuated receiver (pipe) is the main Design for our project with the fMain parts of the design

1. Receivers (inner pipe of stainless steel and outer evacuated pipe of borosilicate)

2. Two metallic parts to hold the pipes

3. Reflecting Parabolic trough

4. Wooden support structure

5. Two ends for the sides

6. Highly sensitive tracking systems

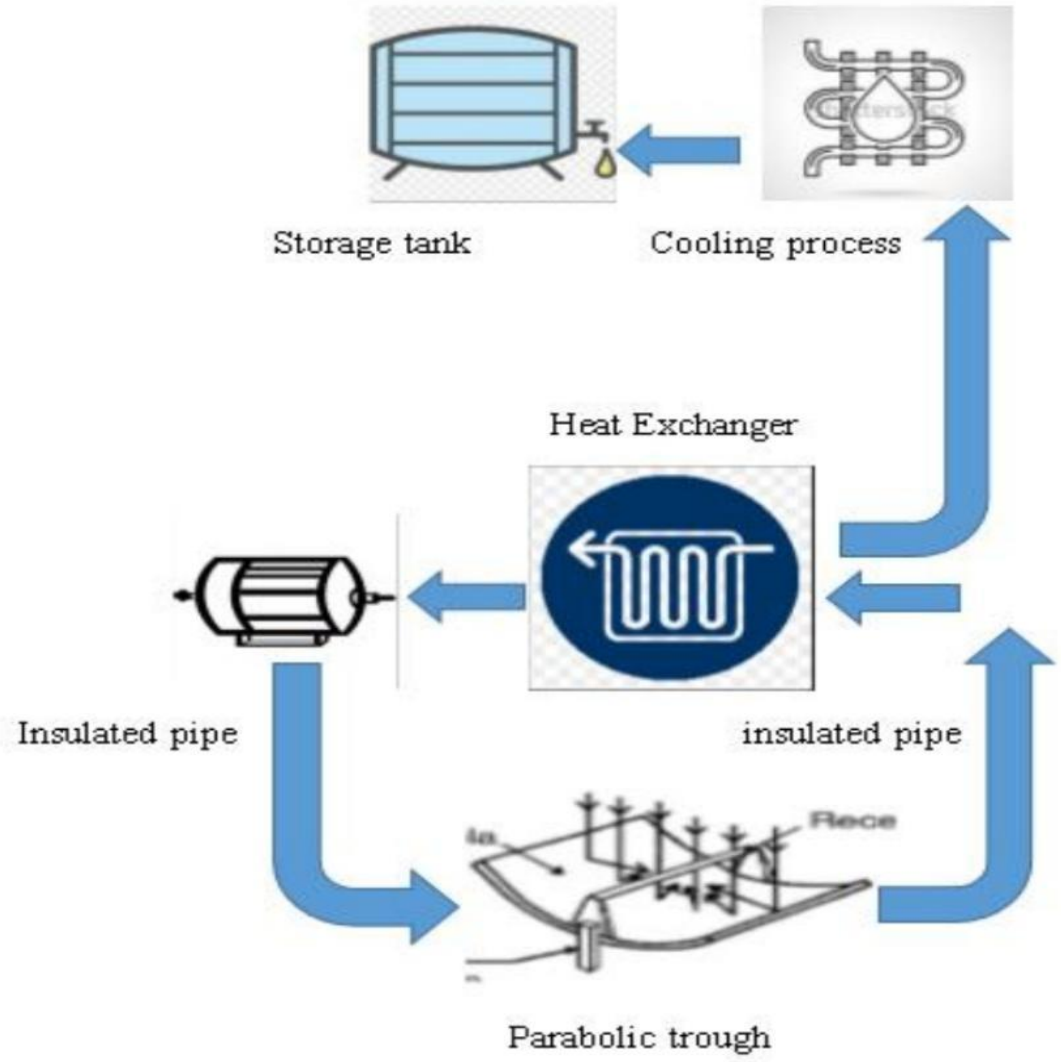


Fig.13.1.8.1 diagram of solar water purifier

Volume of pipe

In order to generate 5.4 liters per hour that will be used for heating purpose to provide 5 liters of drinkable water for people in rural areas we will be using a pipe of Diameter of 5.868 cm and length of 2 m.

V = πR2∗ L $V = \pi(2.934)2(200)$, V = 5408.78 $cm3$ V = 5.4 $liters$

Heat Transfer Fluid

Density $\boldsymbol{\rho}$ 1000 $kg/m3$ Cp 4.011 $J/g.C$ Viscosity μ at 18.9 °C 1.002 ∗ 10−3 kg/m.s

Energy

$Q = mcp\Delta T$ = 5.4(4.011)(120 – 18.9) = 2190 KJ ,kwh =13600(KJ) =13600(2190) = 0.608 kwh

$\dot{Q} = Q\Delta t$ =0.6081 = 0.608 K = 608 kw

Mass Flow rate The mass flowing in the system through a period of time which is one hour in our Case. It is calculated as below:

$\dot{Q} = \dot{m}cp\ \Delta T$,$\dot{m} = \dot{Q}cp\Delta T$ =6084.011(120 – 18.9) = 1.36438 g/s = 1.36 ∗ 10−3kg/s

Velocity

It depends on mass flow rate of fluid, density of fluid and cross sectional area of the inner pipe. As the following

$\dot{m} = \rho VA$, $V = \dot{m}\rho A$ =1.36 ∗ 10−31000(0.0027) = 5.03 ∗ 10−4m/s

Time per cycle

Time the system will take to raise the temperature of 5.4 liters of water from 18.9 °C to 120 °C.

$t = L/V$ =2/ 5.03 ∗ 10−4 = 3970 s = 66 $minpercycle$

Area of the Parabola

Area of the parabola is calculated by using heat flux or DNI of Ouarzazate and the gained power from the parabolic trough to the receivers.

$A = \dot{Q}/\ \dot{q}$ =608 / 300.917 = 2 $m2$

$\dot{Q}$ = 608 W + 72.2 W = 680.2 W

Recalculating the area with taken the thermal losses into consideration

$A = \dot{Q}\ /\ \dot{q}$ =680.2 / 300.917 = 2. 3 $m2$

Since we know the area of the parabolic trough, which is equal to the area of the plate that is used to make the reflecting surface. As long as we know the area and length of the parabola, then width can be calculated:

$w = A\ /\ L$ =2.3 $m2$ / 2 m = 1.15 m

Two metallic parts

After specifying the trough area and pipes we will need two parts to hold the receivers (pipes). These pipes will be placed at each end of the parabola with the height of 8.27 cm in order to keep the pipes on the focal line. Keeping the pipes on the focal line means the maximum absorbance of the sunlight since most of the sunrays directed on the parabola will be reflected by the surface of the parabola on the focal line Wooden Support Structure Supporting structure is essential in any design for better performance and longer lifetime. For our design, a wooden structure will surround the parabolic trough from both sides in order to support it from any shattering . The structure will be made of wood since its very light material that is appropriate for our portable design. Wood is very strong material that can hold the weight of the parabolic reflector. Also, it has a low thermal expansion in about $3 * 10{-}6$ which is preferable in such kinds of designs. Also, wood is very durable material which will be appropriate in a region like Ouarzazate.

Two ends for the sides

Two ends are extremely important for this design since it reduces the energy lost From the system by convection and improve efficiency of the system. Also, they can be Used as protection parts to protect the surface from dust and dirt in which it will reduce The maintenance cost. The dimensions of the ends will be the same as the ones of the Parabolic trough. Meaning, the width of the ends will be 1.15 m with a height of 1 m.

Tracking system

Usually, parabolic trough are designed with high sensitivity tracking system in Order to follow the sunrays during daylight. In fact, there are two types of tracking Systems varying from to complex that can be categorized into two groups which are Mechanical and electronic. In fact, electronic is preferred in general due to its high Accuracy comparing the mechanical type. Also, electronic systems can be subdivided According to their mechanism:

- Motors controlled by sensors in order to detect the magnitude of solar Illumination.
- Motors controlled by computers with a feedback unit and sensors in order to Measure the solar flux on the receivers.

Power of Pump

The required power to operate a pump In order to push the pure water from inlet to outlet of the pipe. Also, it's a quantity that is dependent on the volume flow rate and the pressure difference between inlet and outlet. It can be calculated as the following:

$W = V * \Delta P = (1.5 * 10{-}6)(9.2 * 10{-}3) = 1.4 * 10{-}8$ W

This results shows that the need to pump pure water through the pipe is almost neglected. Therefore, we will be using a tank on a higher elevation so the pressure in the inlet will increase casing the heat transfer fluid to flow through the pipe.

PV panel

In order to supply the pump, we need a source of generating electricity which is PV panel. Of course, we can use direct electricity source but since our project mainly Depends on solar energy, we prefer using a small PV panel to generate our electricity. Since pump won't be used for the whole day but for short periods of time, then, the need To electricity also reduced. Therefore, we

need a PV panel that is able to produce about 10 W and 12 V to supply the small pump. Also it's preferable to have TiO2 coating because it works as self-cleaning mechanism that improves the PV panel performance and efficiency. The other advantage is reducing the need to clean the panel by hand that may scratches its surface and reducing its efficiency

Abstract sheet

Material	**Quantity**	**Rate**	**Total amount**
Silvered glass mirror	2.3 sq.m	1000	2300
Wooden structure and wheel	1	5000	5000
Stainless steel pipe	2 m	1500	3000
Evacuated pipe	2 m	1000	2000
Low consumption pump	1	6000	6000
PV panel	1	3500	3500
Insulated pipe	2 m	400	800
Normal pipe	2 m	400	800
Storage tank	1	12000	12000
Heat exchanger	1	20000	20000
Condenser	1	4000	4000
			59400 Rs

13.1.9 Solar PV Sizing Of Water Pumping System For Irrigation

Water Requirement of the Plant

The water requirement of the plants varies with time and Depends on the season and growth of the plants. It is Essential to irrigate optimally during the stage of flowering to Fruits maturity. The type of soil and the climatic parameters Are other factors that need to be considered. Calculation of Solar PV System for Water Pumping

PV Sizing: Different size of PV modules will produce different amount of power. To find out the sizing of PV module, the total peak watt produced needs. The peak watt (WP) produced depends on the size of the PV module and climate of site location. To determine the sizing of the PV modules, calculate as follows:

Fig.13.1.9.1 layout of solar PV

First Step:

Load requirements = 25000 liters of water everyday from a depth of 5m

Amount of water to be pumped/day = 25000 liter/day= $25m^3$

To determine Total Dynamic Head (TDH)

Possible max elevation of piping unit inlet = 3m

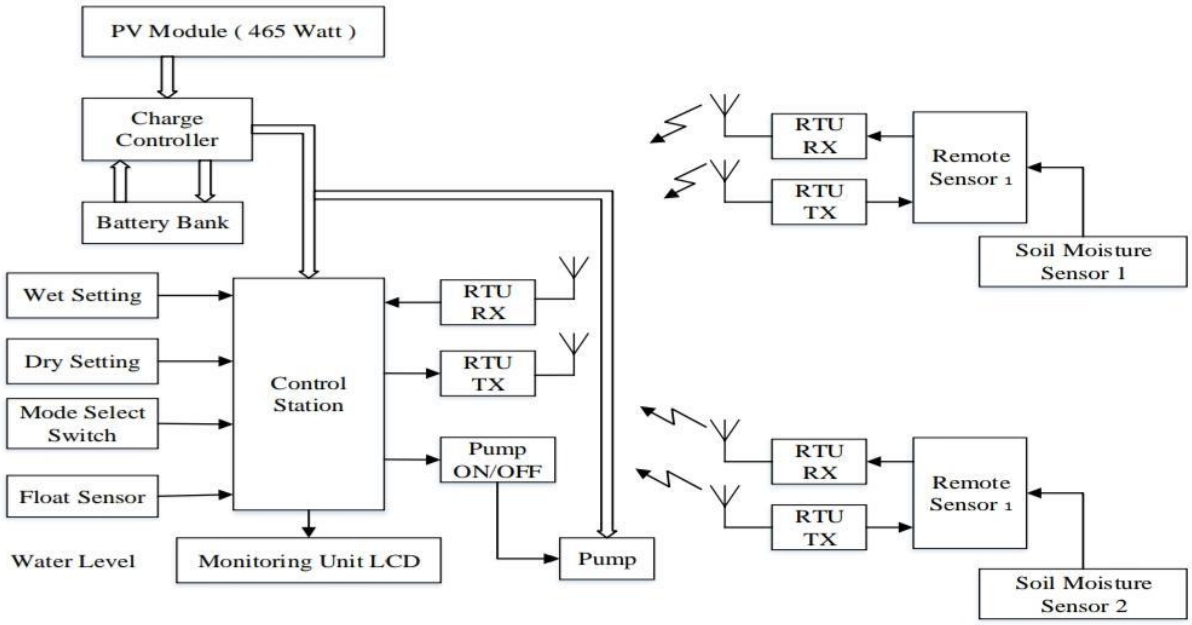
Possible max head of running stream fluctuates = 2m , Total vertical lift = 3m + 2m = 5m

Possible frictional losses = 5% of total vertical lift = 5 0.05 = 0.25 TDH= 5m + 0.25m =5.25m

To determine estimate load requirement with selected DC pump[Experimental]

Selected DC pump max head = 7m

Selected DC pump max flow = 5m³/hour



Supplied voltage = 12V

No load current = 3A

Loading current = 14A

Power consumption, P = VI = 12 *14 = 168 Watt

Required running hour/day = amount of running hours per day / DC pump max flow 25/5 = 5 hour / day

Required electrical energy/day = Power consumption × Running hour/day = 168Watt × 5hour/day = 840 Watt hour/day

To determine Ampere hour requirement of DC load

System voltage = 12V

Load Current = 14A

Required running hour/day = 5 hour/day

Required Ampere hour/day = Load current × Running hour/day = 14A × 5 hour/day = 70A-hour/day

Second Step:

Battery Sizing: 12V, 14A load for 5hour day time

Typical battery terminal voltage = 12V

Number of days of Autonomy = 0 [day to run no sunlight]

DOD for Lead Acid Battery = 20%

Required capacity of battery bank = (required total ah/d) / DOD = 70/20% = 70*50 = 350 ah

Selected battery capacity = 100 Ah

Numbers of parallel batteries in the bank =Required capacity of battery bank/ provide capacity of battery bank = 350ah/100ah = 3.5 approx 4 nos

Third Step:

PV module sizing: charging for battery bank 100Ah, 4 Nos, 12V, 400Ah/day

Possible min Solar radiation [August] = 3.96 kWh/m²/day

Possible min Sunshine hour [August] = 5.4193545 h/day

Possible max load = 70Ah/day

Battery efficiency for charging and discharging = 90%

PV module efficiency due to temperature = 30%

Possible total loss factor =1/ (90%*30%) = 3

Estimated Ah requirements from PV module = Possible max

Load × Loss factor = 70 Ah/day × 3 = 210 Ah/day

Solar Isolation[August] = solar radiation / sunshine hour = 3.96 / 5.41 = 38.75 A

PV module system voltage = 12V

PV module system current = 38.75A

Required PV module Power capacity, P = VI = 12V × 38.75A= 465 Watt

Selected PV module unit = 55 Watt

Required numbers of PV modules= required pv module power / selective pv module unit

465 watt / 55 watt = 8.45 = 9 nos

13.2 Reason for Students Recommending this Design

- **Solid Waste Management:-** Solid waste streams can be appropriately characterized by their sources, by the types of waste produced
- **PHC Centre:-**There is availability of sub center for the health of the people of village. There is no availability of PHC. For major issue of health people are going to 8 km from the village. If the population is increase in the village there is more problems arise in health issue, so we provide design of PHC for future scope of village
- **Pharmacy store:-**Easy avaibility of medicine and primary heath requirement. Promotion of healthy lifestyles. Support for self care. Despencing services.
- **ATM Machine:-** An ATM is aan electronic banking outlet that allows customer to complete basic transaction without the aid of branch teller. Anyone with a credit card or debit card can access cash at most ATMs.
- **Library room:-**There is a small structure of library available in the village for the students of village but after some years if there is required the more area of library if population of student is increase ,We gave design of library as social design.
- **Government Groceries Store:-** Groceries store provide Groceries to normal people by the government in any situation like corona situation etc.

13.3About designs Suggestions / Benefit of the villagers

There are following structures need to build up to Progress of village and their people

- Physical Infrastructure Facilities should need such as: Higher secondary school, closed drainage system, panchayat building, sanitation facilities, Child Welfare center etc.
- Social Infrastructure Facilities should need such as: Police station, hospitals, community Housing, General market, etc.
- Socio-Cultural Infrastructure Facilities should need such as: Govt. grocery shop, Community hall. Library, Auditorium, Recreational activities, pick up stand etc.
- Sustainable Infrastructure Facilities should need such as: Green building, organic waste controller, Natural Resources (petrol, diesel), Solar system, Biogas plant, Rain Water Harvesting, etc.

If these structures available in the village. Villager can easily get the advantages of the system and they not need to depend on other town, good drainage system and sanitation facility in village ensure the good health and well-being of people

CHAPTER :- 14. Technical Options with Case Studies

(EXPLAIN ALL TOPIC AND FOR MINIMUM ONE TOPIC EXPLAIN NEW CONCEPT, DESIGN, PROTOTYPE MODEL WITH ACTUAL COST ESTIMATION)

14.1 Civil Engineering

14.1.1 Advanced Earthquake Resistant

14.1.1.1 INTRODUCTION

Disasters are sudden occurrences which have unfavorably affected humans as the advent of our survival. In response to such occurrences, there have been challenges to mitigate destructive effects of these disasters. Many people have lost their lives owing to the collapse of houses during earthquakes in the past few decades, millions of moneys of financial losses have also been prolonged. Building liability usually results from a shortage of awareness of engineering science and inadequate implementation of building codes. The challenge is most difficult in emerging countries where peoples are increasing, cities and towns are enlarging, and buildings are more subjected to damage. An Earthquake is the cause of a unexpected discharge of energy in the earth's crust that generates seismic waves. Earthquakes are dignified by with seismometers. Earthquakes are so far away unpredictable and unpreventable; the only alternative is to construct and build the building structures which by earthquake resistant. There are so many techniques to withstand earthquake, but they are costly are not used by ordinary people. Here a variety of beneficial small cost techniques to resist earthquake effects. This is sustained by negligible damage devoid of loss of life when relative to severe earthquake attacks developed countries, whereas still a moderate earthquake cause wide-ranging spread destruction in emerging countries as has been observed in recent earthquakes. Earthquake, which is not kills the people, but it is the hazardous in buildings which is at fault for the widespread devastation the present paper sketches the building typologies confronted in the Indian subcontinent and their accomplishment during earlier earthquakes incidents. In addition to efficient and effective seismic design philosophies, it is essential to make sure strict code-compliant construction practices and structural design. The professionals elaborate in the Enterprise/construction of such structures are civil/ structural engineers, who are liable for building earthquake resistant structures and possess the buildings in a safe environment.

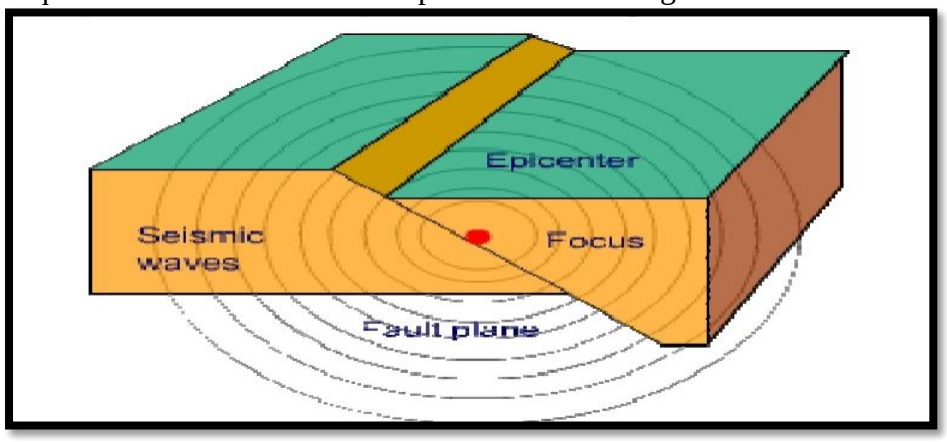


Fig.14.1.1 Terminology of Earthquake

Understanding Of Earthquake And Basic Terminology

Earthquake is well-defined as an unexpected ground shaking produced by the release of massive stored strain energy at the interface of the tectonic plates.

Focus:-It is the point in the earth from point at the seismic waves originate.

Focal Depth:-It is the vertical distance between Focus and epicenter.

Epicenter:-It is the point on surface of the earth from vertically above the origin of an earthquake.

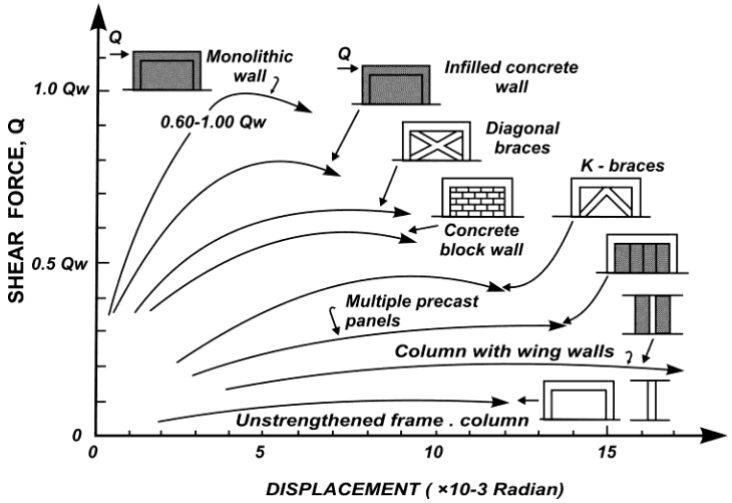
14.1.2 Seismic Retrofitting of Buildings Seismic Retrofitting Strategies of Reinforced Concrete Buildings

Introduction

The aftermath of an earthquake manifests great devastation due to unpredicted seismic motion striking extensive damage to innumerable buildings of varying degree i.e. either full or partial or slight. This damage to structures in its turn causes irreparable loss of life with a large number of casualties. As a result frightened occupants may refuse to enter the building unless assured of the safety of building from future earthquakes. It has been observed that majority of such earthquake damaged buildings may be safely reused if they are converted into seismically resistant structures by employing a few retrofitting measures. This proves to be a better option catering to the economic considerations and immediate shelter problems rather than replacement of buildings. Moreover it has often been seen that retrofitting of buildings is generally more economical as compared to demolition and reconstruction even in the case of severe structural damage. Therefore, seismic retrofitting of building structures is one of the most important aspects for mitigating seismic hazards especially in earthquake prone countries. Various terms are associated to retrofitting with a marginal difference like repair, strengthening, retrofitting, remoulding, rehabilitation, reconstruction etc. but there is no consensus on them. The most common definition of these terms may be summarized in Table

The need of seismic retrofitting of buildings arises under two circumstances (i) earthquake damaged buildings and (ii) earthquake vulnerable buildings that have not yet experienced severe earthquakes. The problems faced by a structural engineer in retrofitting earthquake damaged buildings are (a) lack of standards for methods of retrofitting (b) effectiveness of retrofitting

techniques since there is a considerable dearth of experience and data on retrofitted structures (c) absence of consensus on appropriate methods for the wide range of parameters like type of structures, condition of materials, type of damage, amount of damage, location of damage, significance of damage, condition under which a damaged element can be retrofitted etc. Therefore, a catalogue of available options regarding feasible and practical retrofitting methods is needed for the structural engineer due to great variability of retrofitting requirements differing from building to building. In addition experimental and analytical research is urgently needed to strengthen different techniques of retrofitting.



CONCLUSION

Seismic Invisibility Cloak – A series of the borehole is dug around the periphery of the structure that need strobe protected. These boreholes appear to work as a seismic cloak that possibly will hide a building or perhaps a whole city starting an earthquake's deadly waves. This makes the use of isolators, ,and other vibration response control devices obsolete.

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

Research

The structure of the course will consist of self-directed research based on literature, contact to the industry and research institutes as well as discussions and student presentations, field trips and workshops.

In order to fully understand the materials and systems one has to research on various comparative criteria. It is intended to create several groups, responsible for specific criteria across systems and construction methods, and specific individuals responsible for comprehensive documentation.

In discussions, individual research, and workshops students will have the opportunity to collaboratively develop suggestions for design opportunities, comparative studies of different construction methods.This course is a research based course and not a lecture course.

Construction Compendium

The product, each student is expected to deliver is communicational material in form of a compendium for architects, designers, engineers as well as for students. It is expected that students are motivated for team efforts and independent research with weekly deliverables. The goal of the course is not only to gain comprehensive knowledge of different construction methods, but to create documentation with a highly communicational value to practitioners and students alike. The materials, eventually published in a format of a printed "Advanced Construction Compendium"

and as web-based resource, requires the development of visual communication skills as well as an understanding of hierarchies and importance of specific information. The Compendium will require basic introductions to materials and products, construction methods and assemblies, as well as in depth information about data, detailed drawings, photo documentation, and sourcing. In a second step, suggestions on design opportunities, integration of systems and presentation of case studies add to the basic technical information in order to build a bridge between technical data and design. For graduate students it provides an intensive introduction to the translation of technical information into design relevant aspects as well as the translation of research into communication. At the broader level of professional education, the research will take you to a wide range of local and international cultures of building, their traditions and contemporary practices. On the other hand, through contact to the local and national industry and research institutions, this broad knowledge will then be able to be translated into relevant information for the North American market. The overarching goal is to present critical information on the advancement of construction, in relationship to its environmental impact, durability and quality assurance with a focus on developing more sustainable building practices. The "Compendium" will be a tool of communicating this information to a wider audience, in order to foster good practices and advancements in the built environment. As an effort to compile this valuable material over time and to make it available for a broad audience, a publication is planned.

GRADING

As the work in the seminar is both individual and collective, the criteria for evaluation include not only research excellence, but also the ability to make constructive contributions within the overall framework of the class, participating actively in group discussions and all collective undertakings. There will be one major research paper as the final deliverable. Grading is based on a comparison to other students currently in the course, with past students at the same level, with the instructor

14.1.4 Engineering Aspects Of Soil mechanics - Environmental Impact Assessment

INTRODUCTION

Origin of EIA

Before the First World War, rapid industrialization and urbanization in western countries was causing rapid loss of natural resources. This continued to the period after the Second World War giving rise to concerns for pollution, quality of life and environmental stress. In early 60s, investors and people realized that the projects they were under taking were affecting the environment, resources, raw materials and people. As a result of this, pressure groups formed with the aim of getting a tool that can be used to safeguard the environment in any development. The USA decided to respond to these issues and established a National Environmental Policy Act in 1970 to consider its goal in terms of environmental protection. The USA became the first country to enact legislation on EIA. This was the first time that EIA became the official tool to be used to protect the environment. The United Nations Conference on the Environment in Stockholm in 1972 and subsequent conventions formalized EIA. At present, all developed countries have environmental laws whereas most of the developing countries are still adopting it (Lee, 1995). Multilateral and bilateral lenders included EIA requirements in their project eligibility criteria (OECD, 1996).

EIA in developing countries

Until recently, EIA as a new concept was not readily understood and accepted as a tool in developing countries. Developers resisted and argued that it was anti development because laws and policies supporting it dictated that lands developments causing negative impacts should be discontinued. In a nutshell, EIA was considered just another bureaucratic stumbling block in the path of development. Secondly, it was conceived as a sinister means by which industrialized nations intend to keep Developing countries from breaking the vicious cycle of poverty. Thirdly, the experts in the developing countries were foreigners who were viewed as agents of colonization. The need for EIAs has become increasingly important and is now a statutory requirement in many developing countries.Historically, the choice of new projects was primarily based on one criterion: economic viability. Today, a second and a third choice criteria, environmental and social impact, have become a strong yardstick, hence the triple bottom-line approach (economic, environmental and social) to project viability (Modak& Biswas, 1999).

EIA LEGAL, POLICY & INSTITUTIONAL FRAMEWORK

EIA takes place within the legal and/or policy and institutional frameworks established by individual countries and international agencies. EIA provision and procedure can contribute to successful implementation of project if these frameworks are adhered to

EIA in international environmental law context

Key Multilateral Environmental Agreements (MEAs) have seen review and improvements in EIA legal, policy and institutional arrangements. The key agreements are discussed below.

a) Convention on Environmental Impact Assessment in a Trans-boundary Context (Espoo, 1991).

This is the first multi-lateral EIA treaty. It looks at EIA in a trans-boundary context and entered into force in 1997. The Espoo Convention sets out the obligations of Parties to assess the environmental impact of certain activities at an early stage of planning. It also lays down the general obligation of states to notify and consult each other on all major projects under consideration that are likely to have a significant adverse environmental impact across borders.

Apart from stipulating responsibility of signatory countries with regards to proposals that have trans- boundary impacts, it describes the principles, provisions, procedures to be followed and list of activities, contents of documentation and criteria of significance that apply.

b) Rio Declaration (1992).Principle 17 of Rio Declaration on Environment and Development calls for use of EIA as a national decision making instrument to be used in assessing whether proposed activities are likely to have significant adverse impact on the environment. It also emphasized the role of competent national authority in the decision making process. The other principle (15) of this declaration that is relevant to EIA practice is the application of the precautionary principle.

Agenda 21, which was also as a result of this convention, proposes that governments should:

“Promote the development of appropriate methodologies for making integrated energy, environment and economic policy decisions for sustainable development, inter alia, through environmental impact assessment (9.12(b))

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

INTRODUCTION

Water scarcity and water pollution are crucial issues in today's world. One of the ways to reduce the impact of water scarcity and pollution is to expand water an increasing scarcity of water in the world along with rapid population increase in urban areas gives rise to concern about appropriate water management practices. In the context of trends in urban development, wastewater treatment deserves greater emphasis. Currently, there is a growing awareness of the impact of sewage contamination on rivers and lakes. Accordingly, wastewater treatment is now receiving greater attention from the World Bank and government regulatory bodies.

Urban wastewater treatment has received less attention compared to 'water supply & treatment.' Water scarcity coupled with the bursting seams of our cities and towns have taken a toll on our health and environment. The sewage contamination of our lakes, rivers, and domestic water bodies has reached dangerous levels and is being recognized by leading organizations like the World Bank. The current urban wastewater management system is a linear treatment system that is based on disposal. The traditional system needs to be transformed into a sustainable, closed-loop urban wastewater management system that is based on the conservation of water and nutrient resources. A huge loss of life-supporting resources is the result of failed organic wastewater recovery. A wastewater management team is well equipped to create a wastewater management strategy that will result in the reduction of pathogens in surface and groundwater to improve public health.

In a developing urban society, the wastewater generation usually averages 30- 70 cubic meters per person per year. In a city of one million people, the wastewater generated would be sufficient to irrigate approximately 1500-3500 hectare. This urban epidemic needs to be tackled ecologically because of so many pressing issues that are afflicting our waste management process:

- New immigrants to cities have low incomes and cannot afford municipal amenities like waste disposal and sanitary functions;
- In developing countries, approximately 300 million urban residents have no access to sanitation;
- Approximately two-thirds of the population in the developing world has no hygienic means of disposing excreta and an even greater number lack adequate means of disposing of total waste water;
- It is often an acceptable practice to discharge untreated sewage directly into the bodies of water.

According to the World Bank, "The greatest challenge in the water and sanitation sector over the next two decades will be the implementation of low cost sewage treatment that will at the same time permit selective reuse of treated effluents for agricultural and industrial purposes" (Green Arth, 2012). It is crucial that sanitation systems have high levels of hygienic standards to prevent the spread of disease. Other treatment goals include:

- The recovery of nutrient and water resources for reuse in agricultural production;
- Reducing the overall user-demand for water resources.

In order to achieve ecological wastewater treatment, a "closed-loop treatment system" is recommended. Many present day systems use a "disposal-based linear system." The traditional linear treatment systems must be transformed into the cyclical treatment to promote the conservation of water and nutrient resources. Using organic waste nutrient cycles, from "point-of-generation" to "point-of- production," closes the resource loop and provides a better approach for the management of valuable wastewater resources. Failing to recover organic wastewater from urban areas means a huge loss of life-supporting resources that, instead of being used in agriculture

for food production, fill rivers with polluted water. The development of ecological wastewater management strategies will contribute to the reduction of pathogens in surface and groundwater to improve public health. The goal of ecological engineering, in this particular context, is to attain:

- High environmental quality,
- High yields in food and fiber,
- Good quality/high efficiency production, and.
- Full utilization of wastes.

14.2 Earthquake Analysis of Multi Storied Residential Building - A Case Study

ABSTRACT

Earthquake occurred in multistoried building shows that if the structures are not well designed and constructed with and adequate strength it leads to the complete collapse of the structures. To ensure safety against seismic forces of multi-storied building hence, there is need to study of seismic analysis to design earthquake resistance structures. In seismic analysis the response reduction was considered for two cases both Ordinary moment resisting frame and Special moment resisting frame. The main objective this paper is to study the seismic analysis of structure for static and dynamic analysis in ordinary moment resisting frame and special moment resisting frame. Equivalent static analysis and response spectrum analysis are the methods used in structural seismic analysis. We considered the residential building of G+ 15 storied structure for the seismic analysis and it is located in zone II. The total structure was analyzed by computer with using STAAD.PRO software. We observed the response reduction of cases ordinary moment resisting frame and special moment resisting frame values with deflection diagrams in static and dynamic analysis. The special moment of resisting frame structured is good in resisting the seismic loads.

Keywords – Equivalent static analysis, response spectrum analysis, ordinary moment resisting frame, special moment resisting frame, STAAD.PRO V8i

INTRODUCTION

At present people are facing problems of lad scarcity, cost of land. The population explosion and advent of industrial revolution led to the exodus of people from villages to urban areas i.e. construction of multi-storied buildings has become inevitable both for residential and as well as office purposes. The high raised structures are not properly designed for the resistance of lateral forces. It may cause to the complete failure of the structures. The earthquake resistance structures are designed based on the same factors. The factors are natural frequency of the structure, damping factor, type of foundation, importance of the building and ductility of the structure. The structures designed for ductility need to be designed for less lateral loads as it has better moment distribution qualities. This aspect is taken care of by response reduction factor R for different type of structure. For high performance, the building is designed as an SMRF. It needs to be designed only for lesser forces than it is designed as an OMRF.

14.2.1 RESISTING FRAME

The frame whose member and joints resist the forces primarily caused by flexure is Moment resisting frame.

14.2.2 Ordinary Moment Resisting Frame: The moment resisting frame which are designed without any special attention towards ductile nature of the frame are called ordinary moment resisting frames.

14.2.3 Special Moment Resisting Frame: The moment resisting frame which are designed to have ductile nature are called as special moment resisting frames. The design is doneaccording to the requirements specified in IS-13920.The earthquake resistant designs of structures are considering the following magnitudes of a earthquake.

14.2.4 Design Basis Earthquake (DBE): The earthquake whose probability of occurrence is at least one during the structure design life is called design basis earthquake.

14.2.4 Considered Earthquake (MCE): The earthquake whose expected intensity is maximum that can occur in a particular area or region is called maximum considered earthquake. The maximum values are considered as per code.

The design approach recommended by IS: 1893-2002 is based on the following principles (clause 6.1).

i. The structure should have the strength to withstand minor earthquakes less than DBE without any damage. The structure should be able to resist earthquakes equal to DBE without significant structural damage though some non-structural damage may occur.
ii. The structure should withstand an earthquake equal to MCE without collapse.

The revised IS 1893-2002 uses the dynamic analysis by response spectrum. In this method takes into account all the five important engineering properties of the structures.

i. The fundamental natural period of vibration of the building (T in seconds)
ii. The damping properties of the structure
iii. Type of foundation provided for the building
iv. Imp0ortance factor of the building
v. The ductility of the structure represented by response reduction factor.

ZONE FACTORS FORDIFFERENTZONES IN INDIA

Zone	Seismic coefficient of 1984	Seismic zone factor (z of 2002)
V	0.08	0.36
IV	0.05	0.24
III	0.04	0.16
II	0.02	0.1

Table.14.2.1 Seismic Zone factors

MODAL GENERATION AND ANALYSIS:

We considered a residential building of 3BHK plan with y-axis consisted of G+15 floors. The ground floor and rest of the 15 floor had a height of 3m each. The supports at the base of the structure were also specified as fixed. The structure was subjected to self-weight, dead load, live load values considering by the specifications of IS 875 part-1 and part-2. The wind load values were generated by STAAD.PRO considering the given wind intensities at different heights and strictly abiding by the specifications of IS 875 part-3. The Seismic load calculations of Static and Dynamic analysis were done following IS 1893-2002 part-1.

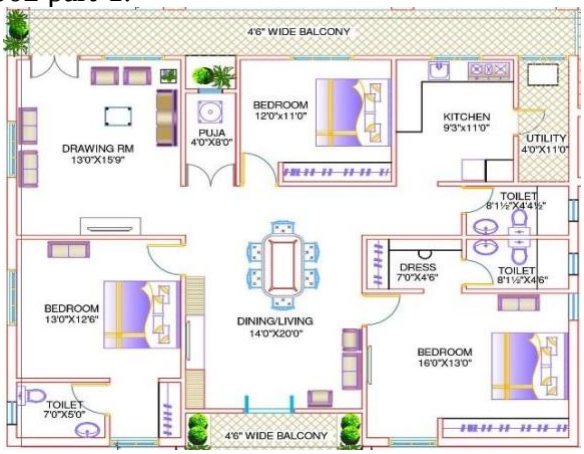


Fig.14.2.1 column positions
Fig.14.2 2. plan of residential building

14.3.Electrical Engineering

14.3.1 Design of Power Electronics converter

As the technology for the power semiconductor devices and integrated circuit develops, the potential for applications of power electronics become wider. There are already many power semiconductor devices that are commercially available, however, the development in this direction is continuing.

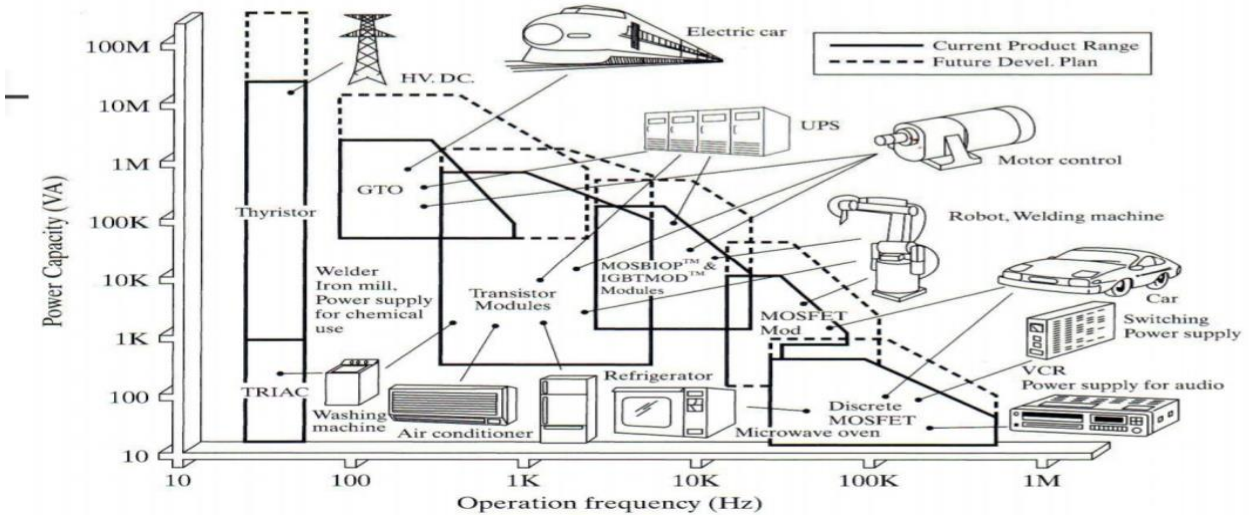
The power semiconductor devices or power electronic converter fall generally into six categories

- AC to DC Converter (Controlled Rectifier)
- DC to DC Converter (DC Chopper)
- AC to AC Converter (AC voltage regulator)
- DC to AC Converter (Inverter)
- Static Switches

The design of power electronics converter circuits requires design the power and control circuits. The voltage and current harmonics that are generated by the power converters can be reduced or minimized with a proper choice of the control strategy.

Power Electronics defined as the application of solid the application of solid state (devices) electronics for the control and state (devices) electronics for the control and conversion of electric

power. conversion of electric power. Power Electronics Application Power Electronics Application Power electronics have already found an important place in modern technology and



are now used in a great variety of high-power product, including heat controls, light controls, electric motor control, power supplies, vehicle propulsion system and high voltage direct current (HVDC) systems.

Fig 14.3.1.1 Figure of Power Electronic devices application

1. Uncontrolled turn on and off (Power Diode)
2. Controlled turn on uncontrolled turn off (Thyristors)
3. Controlled turn on and off characteristic (Power Transistor, BJT, MOSFET, GTO, IGBT)
4. Continuous gate signal requirement (BJT, MOSFET, IGBT)
5. Pulse gate requirement (SCR, GTO)
6. Bipolar voltage-withstanding capability (SCR, GTO)
7. Unipolar voltage-withstanding capability (BJT, MOSFET, GTO, IGBT)
8. Bidirectional current capability (TRIAC)
9. Unidirectional current capability (SCR, GTO, BJT, MOSFET, IGBT)

STATIC CONVERTERS STATIC CONVERTERS

Static converter is a power electronic converter that Static converter is a power electronic converter that can conversion of electric power from one to another. can conversion of electric power from one to another. The static power converters perform these function of The static power converters perform these function of power conversion. power conversion. The Power Electronic Converte The Power Electronic Converter can be classified into r can be classified into six types: six types:

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

INTRODUCTION

Soft starter is an electronic device that can be used to control the operation of AC motors in starting and stopping motors equipped with safety or protection. The soft starter consists of a thyristor component mounted anti-parallel with a three phase AC source, the soft starter works based on the angle setting of the thyristor or IGBT or MOSFET which can cause voltage changes to the motor (Suvra Gupta, 2014). Some of the induction motor starting methods that are mostly done before the use of soft starter are primary resistor, autu transformer, and star delta. In the primary resistor method, the resistor is installed directly from the voltage source before going into the motor coil. The current flowing to the coil will decrease and the motor voltage drops. When the motor is rotating and reaches full load speed, the resistor must be detached from the source of the motor circuit. Regardless of the resistor can be done mechanically or electronically. While in the method of auto transformer, basically the same concept with the primary resistor method and the difference is only on the use of the primary coil of the transformer to decrease the motor voltage. Motor voltage regulation of magnitude ranging from 50%, 60%, or 80% to the voltage source (M.A. Saqib, 2007). The method of starting primary resistor and autotransformer produces a lower starting current when compared to the DOL method, but the resulting torque is lower. In addition both methods produce power losses on resistors or coils. Another starting method that is still widely used is the star delta method. In this method at the start of the motor coil connected in star and when the motor reaches the nominal current with star connection, the motor coil connection turns into delta. The star delta method does not cause power loss. In the starting method using a soft starter decrease and voltage increase is performed using IGBT or thyristor components (Mohamed WasimAnsari.K, 2014). The use of soft starter in the industry has increased to reduce the initial flow by maintaining the torque according to load requirements. Soft starter based intelligent systems began to be developed to improve the performance of conventional starter. One of the development of soft starter using artificial neural network with back propagation algorithm. Ability to correct errors then back propagation algorithm is more suitable for artificial neural networks. The back propagation algorithm with momentum gradient parameters provides a sufficient and efficient response when compared to DOL and star delta starter. The main function of the soft starter is to limit the initial current which will protect the coils from heat distortion especially for squirrel cage motors. This efficiency increase is done with load changes. The conventional soft starter realization simply uses the six anti-parallel thyristors component. The stator voltage setting is done by adjusting the trigger angle of the thyristor. In many cases the systems and design systems focus on the often overlooked characteristics of steady state (Tuton Chandra Mallick, 2015).

FUZZY LOGIC CONTROLLER

Fuzzy logic theory according to (Lin, Chin-Teng, 1996) was first discovered by a professor from the University of California at Berkeley Prof. LotfiZadeh in 1965. Fuzzy logic is an appropriate way to map an input space into an output space. Fuzzy technology is able to solve very complex behavior problems and reliability is also high. There are several reasons why people use fuzzy logic. To simplify complex and complex system behavior, the system in fuzzylogic uses linguistic variables. The linguistic variables in its penjabarn are expressed in natural natural language that

can follow the logic or mindset of man. The use of the fuzzy set is a systematic basis for manipulating the concept of uncertainty or obscurity. With linguistic variables the plant control criteria can be made easier.control of soft starter.

14.3.3 Advanced Wireless Power Transfer System

1 INTRODUCTION

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

In modern technology the use of portable device has increased such as mobile robots and electric vehicle. Mobility is the main concern of these equipment i.e. they are not connected to the main source of power. All these problems are the main motivation for researchers. Nikola Tesla was the first who introduce the concept of wireless power transfer . But this technology from the time of Tesla is underdeveloped due to lack of funding and technology .But research from past few years has always going on and recent development has been observed in the field . Wireless power transfer can be achieved by several methods (discussed later). Here we discussed few methods such as induction coupling, resonating coupling, LASER technology for electrical power transfer.

2. LITERATURE REVIEW

- After the immense research in electromagnetic field By many pioneers and development of Electromagnetic induction law by Michael Faraday Which gives the basis of wireless power transfer.
- In 1891 Nikola Tesla was the first pioneer who Started working on wireless power transfer system In his “experimental station” at Colorado, by using Tesla coils .
- Tesla want to develop a wireless power system that Is capable of transmmitting power over long Distances. He proposed many such systems.
- Nikola Tesla successfully lighted a small Incandescent lamp by means of a resonant circuit Grounded on one end. The lamp is lighted by the Current induced in the coil.
- Wardenclyffe tower was also designed by Tesla for Trans-Atlantic wireless telephone and also for Demonstrating wireless electrical power Transmission .
- In 2008 the wireless power consortium was Established to connect all manufactures its Qi Inductive power standard enable wireless power Charging and powering of portable devices of Capacity up to 5W with separation distance 4cm .
- In recent years the research on microwave and LASER wireless power transmission system such as Solar power satellite has increased.
- Energy harvesting also called power harvesting Which is the conversion of ambient energy from Environment to electric power which mainly used to Power mini watts wireless

electronic devices .The Ambient energy is produce from stray electric or Magnetic field or radio waves.

14.3.4 Industrial Temperature Controller

1. INTRODUCTION

Temperature: This is the degree of hotness or coldness of a Body or an environment.

Control System: A control system is a device or set of Devices that manage, command, direct or regulate the Behavior of other devices or systems. Thus we can literally Say that a Temperature Control System is a device or set of Devices that manage, command, direct or regulate the Behavior of other devices or systems in order to influence The degree of hotness or coldness of a body or an Environment. A temperature control system consists of a small Programmable digital logic controller device, wired to a Heating and/or cooling system. About the size of a typical Wall-mounted thermostat, a temperature control system Contains a small circuit board and a memory chip(s). After Setting the temperature control system to a desired Temperature, known as a set point,the system will utilize the Heater and/or air conditioning unit(as needed) as effesctor, To maintain that setting for the duration programmed. Temperature is one of the main parameter to control in most Of the manufacturing industries like chemical, food Processing, pharmaceutical etc. In these kinds of industries,

2.METHODOLOGY

The circuit presents the design, construction, development And control of automatic switching electric heater. The idea Is based on the problem occurs in human's life nowadays by Improving the existing technology. The Peripheral Interface Controller (PIC) based automatic temperature control System is applied to upgrade the functionality to embed Automation feature. The electric heater will automatically Switch on according to the temperature falls below the Specified limit. The system monitors the temperature from The thermocouple temperature sensor, where it will control The electric heater according to the setting values in the Programming. The system indicates the temperature from The PIC 16F887A, and it will display it on the common Cathode LED display.

If the electric heater temperature goes beyond the preset Temperature, then the electric heater will switch off and if Temperature goes below to preset value then electric heater Will switch on. In this way, the electric heater's temperature Can be maintained preset temperature value.It also provides A security characteristic, where it detects on extremely high Temperature. Before you begin to format your paper, first write and Save the content as a separate text file. Keep your text and Graphic files separate until after the text has been formatted And styled.Do not use hard tabs, and limit use of hard returns To only one return at the end of a paragraph. Do not add any Kind of pagination anywhere inthepaper. text Heads-the template will do that for you.

3. CONCEPT OF TEMPERATURE CONTROL TECHNIQUE

To increase the production of an industry, smooth control of temperature is the key function.5 Different industry has its own individual temperature requirement for specific role. Conventionally, industrial temperature measurement instrument thermometer is used to measure the temperature. After observing temperature reading, operator controls temperature manually. Sometimes controlling is not appropriate because of time consuming human operated control of cooling device and heating device. As a result, efficiency of temperature control fails and production is hampered in industries. Besides that, thermostat is used to select temperature which is not efficient because of erosion of metal and losing to strength of metal for successive using. Consequently, analog system loses its own linearity function since it is mechanically designed temperature control device. The temperature can be controlled more efficiently using interface between temperature sensors LM35 which produce linear voltage signal with rising temperature and microcontroller which takes response fraction of millisecond to response. Microcontroller takes signal from temperature sensor and compare with pre-set value of temperature then take decision when heating device or cooling device would be turned on and the duration of maintained temperature in system.

4. MEASUREMENT PRECISION

The LM35 series of temperature sensors are manufactured By National Semiconductor Corporation and are rated to Activate over a -55 °C to 150°C temperature range. These Sensors do not need any peripheral calibration and the Output voltage is proportional to the temperature. The scale Factor for temperature to voltage conversion is 10 mVper °C. The LM35 series sensors come in different packages. The Measurement of negative temperatures (below 0°C) needs a Negative voltage source. However, this project does not use Negative voltage source, and therefore would validate the Use of sensor for determining temperatures above 0°C (up to 100°C). The output 0 to 1.0V, the ADC requires a lower reference Voltage (instead of the supply voltage Vdd = 5V) for A/D Conversion in order to get better accuracy. The lower Reference

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

Introduction

Existing System Currently there is no technology for accident detection. As it Is done manually there is loss of life in golden hours. The Accident victim is dependent on the mercy of others to rush Him to hospital. Many a times an accident goes unnoticed For hours before help comes in. Due to all these factors There is a high rate of mortality of the accident victims. In Addition to this

Intelligent accident-detection and Ambulance-rescue system

The system consists of three main units, which coordinate with each other and make sure that the ambulance reaches the hospital without any time lag. Thus our system is divided into following four units:

1. The vehicle unit.

2. The ambulance unit.

3. The traffic junction unit.

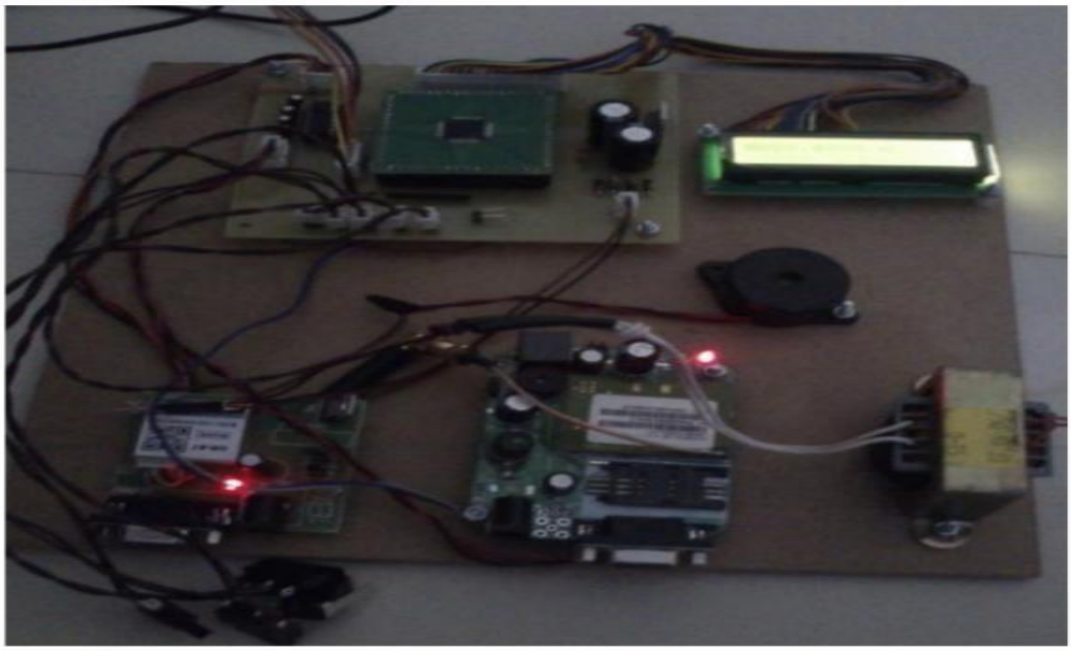
4. The control unit.

1) Vehicle unit

For implementation of this project, vehicle unit should be installed in every vehicle .It consists of microcontroller along with the accelerometer, GPS and GSM module and sensors to sense the accident. On impact on the vehicle, information about accident is send to the main server. This information consists of the location of accident detected by GPS module installed in vehicle. The GPS system finds out current position of vehicle (latitude and longitude) which is the location of accident spot and gives that data to GSM module. This information to the main server is conveyed by GSM module. There is also provision of avoidance of accident by using accelerometer (ADXL 335). Accelerometer alerts the driver by turning on the buzzer whenever the position deviates from the normal.

Ambulance unit:Control unit sends the ambulance to the accident location. Ambulance collects the victim from the accident location. While in the ambulance the vital parameters of the patient Temperature and pulse rate are continuously monitored and Conveyed to the concerned hospital. We are using LM35 Temperature sensor whose output voltage is linearly Proportional to the Celsius (centigrade).For measuring Pulse rate we are using IR based obstacle sensor. Normally there is delay in ambulance reaching the hospital Due to traffic congestion. To overcome this delay, the traffic Signals in the path of ambulance are controlled via RF Communication. The ambulance

14.3.5.1 Traffic junction unit.



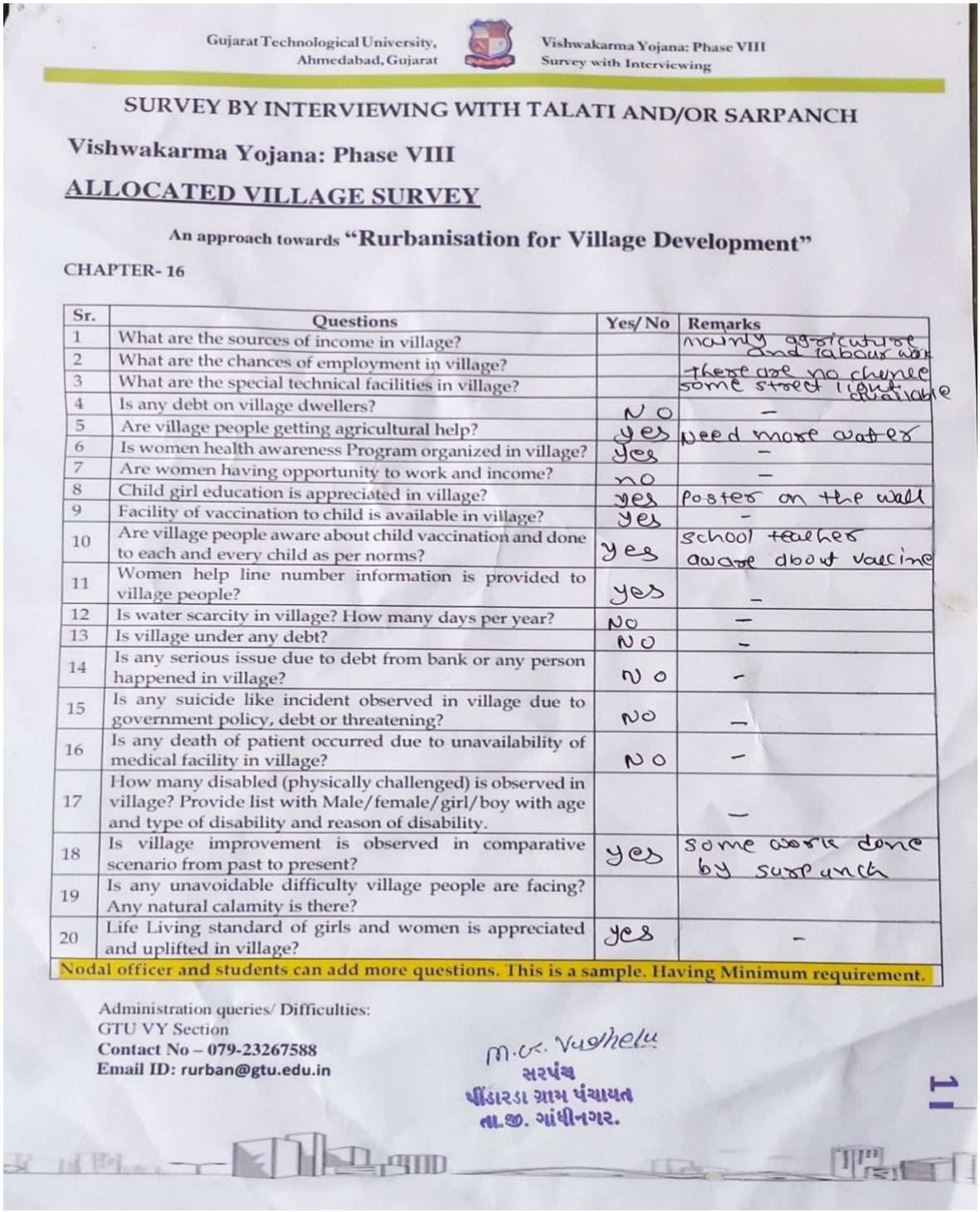
CHAPTER :- 15. Smart and/or Sustainable features of Chapter 8 & 13 designs, Impact on society. (For Allocated village development, villagers happiness, comfortable and for enhancement of the village)(With the Smart village development Concept As Per Your Idea And Village Visit, modern technology with innovation).with doing small changes, Period, Amount Expenditure and Benefit –

a) Immediately b) Within 1 year c) Long term (3-5 years) along with cost estimation. If possible, List the sources of the funding available with the Village gram panchayat

Sr no	Design name	Period	Amount (RS)	Benefits
8.1.1	Bank Building	Long term (1-2 year)	1977336	Provides customer services, provide banking services
8.1.2	Bus stand	Long term (1 year)	2685410	It is provide easy transportation facility
8.1.3	Public Toilet	Immediately	158645	It is improve sanitation facility ,it is improve cleanliness in village
8.1.4	Community hall	Long term (1 year)	377745	Group activities, social support, public information and other purpose
8.1.5	Crematoria	Immediately	335000	It create pleasant environment in village
13.1.1	Cyber cafe	Immediately	5,81,210	Reduce waste and reduce pollution of village
13.1.2	PHC Centre	Long term (1 Year)	554181	To improve the health facility in village , avoid long distance health facilities.

13.1.3	Pharmacy store	Immediately	467054	Provide medicines to the villagers
13.1.4	ATM Machine	Immediately	58014	Easy cash withdraw and easy payments.
13.1.5	Groceries store	Immediately	131109	Avaibility of groceries in village
13.1.6	Library	Immediately	396080	To increase literacy of village, too familiar with new technology, to increase growth of education.

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?		mainly agriculture and labour work
2	What are the chances of employment in village?		there are no chance
3	What are the special technical facilities in village?		some street light available
4	Is any debt on village dwellers?	NO	–
5	Are village people getting agricultural help?	yes	need more water
6	Is women health awareness Program organized in village?	yes	–
7	Are women having opportunity to work and income?	no	–
8	Child girl education is appreciated in village?	yes	poster on the wall
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	school teacher aware about vaccine
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.		–
18	Is village improvement is observed in comparative scenario from past to present?	yes	some work done by sarpanch
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?		
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

M.K. Vaghela
સરપંચ
પીંડારડા ગ્રામ પંચાયત
તા.જી. ગાંધીનગર.

CHAPTER :- 17. Irrigation / Agriculture Activities And Agro Industry, Alternate Technics And Solution

Abstract:
Water is most powerful natural resource it is mostly influences in health and wealth of the people and production of food. India economic backbone is agricultural. We are depending the water resources for development agriculture. Irrigation plays main role in the food production. The future expansion of food production will be increasing dependents upon sound irrigation and water management systems and now days theresourcesaremostchallengingbecauseofenvironmentchanges.Thesedays "peopleprefer postmodern irrigational techniques because they are extremely efficient and effective. Modern irrigational techniques are also pivotal in increasing the crop yield. Also since these days farming is done with the help of fertilizers, crops need a certain amount of water to grow properly. Modern irrigational techniques are also cost effective, if done on a large scale. Also modern irrigational methods are important because of scarcity of water and increasing demand for food crops. For example: drip irrigation, if done properly can save up to 95% of water. According to me, modern irrigational techniques should be used and promoted because they save a lot of water.

Key Words: Irrigation & Environment Changes

Introduction:
Water is most powerful natural resource it is mostly influences in health and wealth of the people and production of food. India economic backbone is agricultural. We are depending the water resources for development agriculture. Irrigation plays main role in the food production. The future expansion of food production will be increasing dependents upon sound irrigation and water management systems and now days the resources are most challenging because of environment changes.

The most important activity aimed at improving the productivity of land in arid areas is irrigation. The optimality of the irrigation method used and technical perfection of irrigation and drainage systems are evaluated by the minimum flow of irrigation water and maximum yield. This problem can be solved in a complex, creating technically perfect water-saving on-farm systems with the use of efficient equipment and advanced technologies.

Choice of rational irrigation technologies and equipment for these specific conditions should be carried out in stages. At first it is necessary to determine technical acceptability of a particular irrigation technology, and then choose the most economically sound method for this area (basin) taking into account dominant crops.

Economic evaluation of the appropriateness of particular equipment and modern irrigation technologies is set by comparing the number of technical and economic parameters, the most important of which are: the amount of capital investments and payback period. But the irrigation system is expensive the modern irrigation system have two types one is Sprinkler and drip irrigation system.

Sprinkler Irrigation Method:

In present times, when water crisis is developing very fast everywhere, we should adopt The whole land becomes available for cultivation of crops, whereas in traditional irrigation methods, 15to20percentlandremainsvacantindepressionsandboundaries.Modernequipment'scanalsobeusedi nit due to absence of depressions and boundaries. Rate of infiltration is higher in sandy soils where frequency of watering is more. Hence, sprinkler irrigation method is more suited to sandy soils. In sprinkler irrigation method, water is taken from source to the fields through pipes, whereas in surface irrigation methods only 30-45 per cent water reaches the crops. Such loss of water is avoided in sprinkler irrigation method. The problem of water logging or„ Kallar may because incase of excess water from surface irrigation, whereas no such problem is caused in sprinkler irrigation method. The balance of groundwater is also maintained.

Advantages:

- ✓ There is increase in production and compactness.
- ✓ It is helpful in soil conservation and stabilization of sand dunes in desert areas.
- ✓ Sprinkler system is considered more suitable in areas where slit is coagulated on surface of soil after rains, prevents growth of crop.
- ✓ This system saves the crop from extreme frost or temperature.
- ✓ Fertilizer application as well as insecticide spray can be done by sprinkler system.

Disadvantages/Defects:

- ✓ Sprinkler irrigation method inexpensive.
- ✓ It requires technical knowledge.
- ✓ Sprinkler irrigation method cannot be used in all crops.
- ✓ Crop is damaged by changing sprinkler system again andagain.
- ✓ Water to be used in sprinkler method should be clean.

17.1 Drip irrigation for tomato farming

Drip Irrigation:

A newly developed irrigation system known as drip irrigation or trickle irrigation, originally developed in Israel, is becoming popular in areas of water scarcity. In this irrigation system, a small amount of water is applied at frequent intervals in the form of water droplets through perforations in plastic pipes or through nozzles attached to tubes spread over the soil to irrigate a limited area around the plant.

A precise amount of water equal to the daily consumptive use or the depleted soil water needs to be applied. The soil water can be maintained at the field capacity during the crop growing period. Deep percolation losses can be completely prevented and the evaporation loss is also reduced.

Advantages:

- ✓ In this method, water directly reaches the roots of the plants, which take water to plants in balanced quantities.
- ✓ Drip irrigation method saves 30 to 70 per cent water and it is possible to irrigate three times more area with the same amount of water.
- ✓ In this method, weeds do not spread because water reaches only near plants and does not spread in the whole field.
- ✓ Fertilizers and insecticides can also reach the plant directly by solution in the water and it saves 30 to 60 per cent chemical fertilizers as well as 40 to 50 per cent pesticides along with saving of water.
- ✓ Even in case of uneven lands, drip irrigation method can do balanced irrigation.
- ✓ Crop production is higher by 20 to 40 per cent in drip irrigation method, because plants can get air and water in required quantities, resulting in regular growth ofcrops.

Disadvantages:

- ✓ Drip irrigation method inexpensive.
- ✓ It requires special technical knowledge for successful operation of this method.
- ✓ In heavy soils, it creates problems of flow and water blockages.
- ✓ Plants are able to get nutritive elements in a very limited area.
- ✓ It is not suitable for every crop

Objectives of the Study:

- ✓ To study functioning of farmers irrigation system.
- ✓ To analyses the factors influent for adapting modern irrigation system.
- ✓ To find the modern techniques help for the farmer in the cultivation.

Methodology:
Research methodology is a study of using modern irrigation methods. The validity of any research is based on the systematic method of formulating the objectives, data collection, analysis and interpretation.

Research Design:
This study falls under descriptive research and hence descriptive research design was followed.

Methods of Data Collection:
The present study is based on primary data. Questionnaire was the main tool for collecting the primary data. The questionnaire was designed in a systematic way of covering adequate and relevant almost all aspects of the study. The data collected from the primary sources were arranged sequentially and tabulated in a systematic manner. Secondary data required for the study was collected from books, magazines, journals, newspapers, past research, reports and various websites.

Sampling Method:
Non probability convenience sampling techniques was used to select a sample of 150 farmers in Coimbatore city.

Tools for Analysis:
The following tools were employed to analyze the data with reference to the selected objectives of the
study.

- ✓ Simple Percentage
- ✓ Chi- square analysis
- ✓ Henry Garrett Ranking
- ✓ Correlation

Review of Literature:
Senthilkumar (2011) in his report discuss Labour Absorption in agriculture; employment generation is one of the major objective of the developed and developing countries. The studies conducted in the past have broadly concluded that technological progress based on seed, fertilizer and irrigation is generally labour-using in nature whereas mechanization via tractors, pump sets, harvesters and threshers is usually labour –saving in nature. However, usually these two aspects of the technological progress are complementary in nature and as such
Salimonu, Falusi, (2009) in their study identified the sources of risk and the management strategies employed by the food crop farmers. Data from 165 respondents were used for the analysis. Sources of risk in the last three years were market failure, 54.5%; price fluctuation, 46.1%; drought, 32.7%; pest and diseases attack, 33.9% and erratic rainfall, 39.4%. Majority of the food crop farmers in the study area (Nigeria) were in the medium risk category. Finally they concluded that the investment in irrigation projects by the government would also save the farmers from drought and erratic rainfall while farmers are encouraged to benefit from the services of the agricultural insurance industry.
Senthilkumar (2011) in his report discuss Labour Absorption in agriculture; employment generation is one of the major objective of the developed and developing countries. The studies conducted in the past have broadly concluded that technological progress based on seed,

fertilizer and irrigation is generally labour-using in nature whereas mechanization via tractors, pump sets, harvesters and threshers is usually labour –saving in nature. However, usually these two aspects of the technological progress are complementary in nature and as such
Shashidhar (2004) in his study on drip irrigation farmers of Bijapur district in Karnataka revealed that all the drip irrigation adopters were influenced to adopt drip irrigation due to influencing factors like saving water (100%), better utilization of nutrients (79%), save in labour (75%), easy application of fertilizers (68%), to avail subsidy provision (54%), to reduce weed growth (33%) and to avoid land leveling (8%)

Data Analysis and Interpretation:

1. Simple Percentage Method:

1.1 Type of Modern Irrigation System:

Table 17.1: Type of Modern Irrigation System

Types	**Respondents**	**Percentage**
Drip Irrigation	125	83
Sprinkler Irrigation	25	17
Total	**150**	**100**

It is observed that most (83%) of the respondents are using Drip irrigation and 17% of the respondents are using sprinkler irrigation system. It reveals that most of the farmers used drip irrigation system.

1.2 Benefits of Using Modern Irrigation System:

Table 17.2: Benefits of Using Modern Irrigation System

Benefits	**Respondents**	**Percentage**
Low cost	11	7.33
Reduce irrigation time	16	10.67
Less manpower	25	16.67
High area of production	37	24.67

It is found that maximum (40.67%) of the respondents stated that they are benefit in less wastage of water, while 24.67% of the respondents are benefit by high area of production, 16.67% of the respondents are beneficiary by manpower using. It reveals that most of the 40.67 percent respondents are beneficiary threw time saving in modern irrigation system.

2. Chi-Square Test:

2.1 The Relationship between the Water Resources and Area of Farming:

Table 17.3: Water Resources and Area of Farming

Water Resources	Area of Farming			Total
	Less Than 5 Acres	5 to 10 Acres	More than 10 Acres	
Bore well	3	44	14	61
	8.9	37.82	14.2	61
Well	4	25	8	37
	5.4	22.9	8.6	37
Tank	9	10	6	25
	3.7	15.5	5.8	25
Rain fed	2	9	5	16
	2.3	9.9	3.7	16
Canal	4	5	2	11
	1.6	6.8	2.5	11
Total	22	93	35	150
	22	93	35	150.0

The chi-square test reveals that the calculated chi-square value (19.82) is more than the table chi- square value (15.507) at 5% level of significance (P<0.021) and therefore, the relationship between water resources and Area of Farming is significant. Thus, the hypothesis is that the relationship between the two factors holds good. Hence, the null hypothesis is rejected.

3. Correlation:

3.1Relationship between the Type of Modern Irrigation method and Satisfaction Level:

X Variable is Type of Modern Irrigationmethod Y Variable is Satisfaction Level

$$r = \Sigma xy / \sqrt{\Sigma X^2 + \Sigma Y^2}$$

$$r = 9125 / 10325\ X 7850$$

$$r = 0.99$$

From the correlation analysis, it was inferred that the r value is positively correlated as 0.99. Therefore it is cleared that there is a positive correlation between the Type of Modern Irrigation method and Satisfaction Level of the farmers.

Findings:

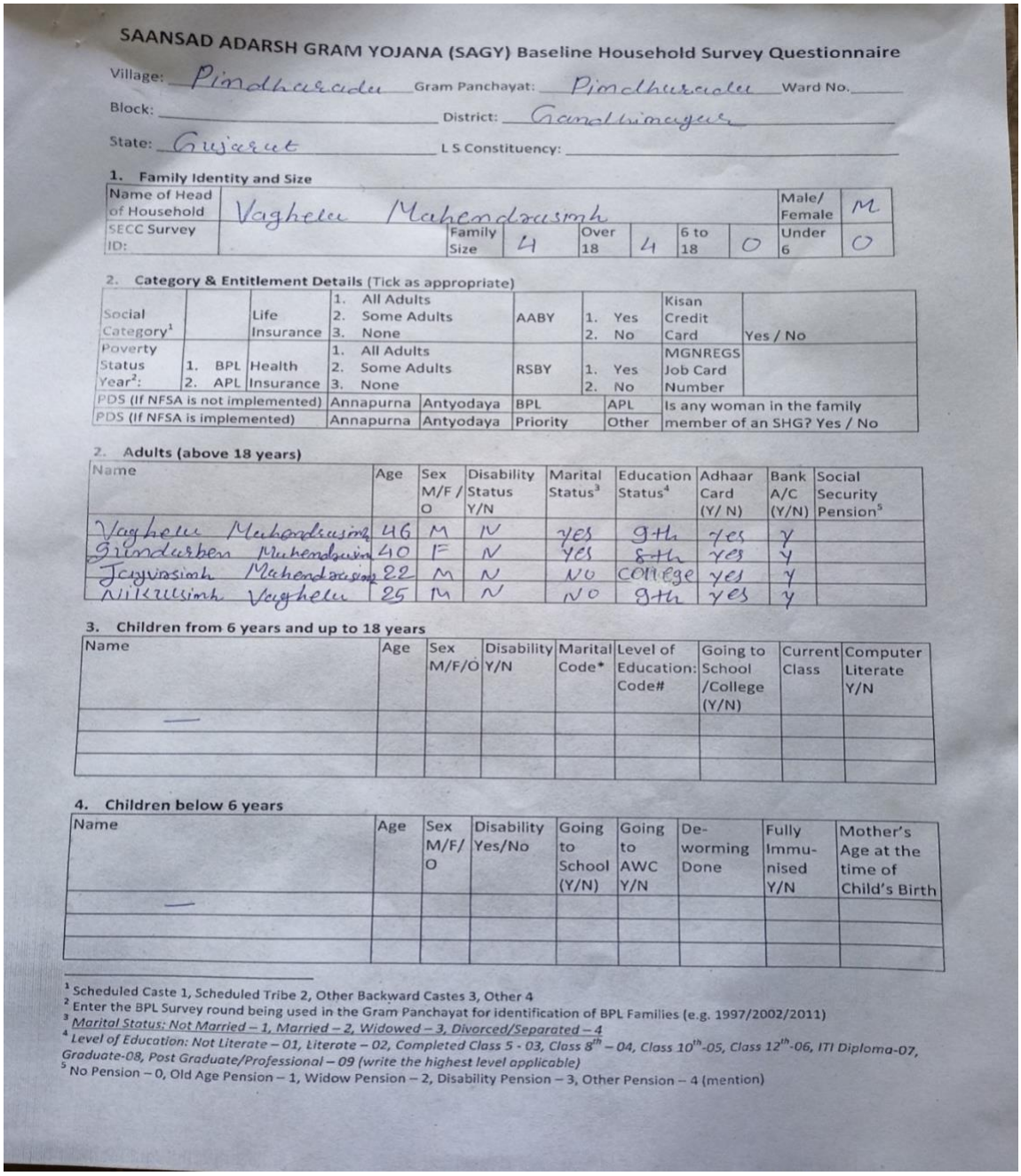
- ✓ Most (83%) of the respondents are using Drip irrigation.
- ✓ Maximum (40.67%) of the respondents stated that they are benefit in less wastage of water.
- ✓ There is significant relationship between type of irrigation and area of farming.

CHAPTER:-18. Social Activities – Any Activates Planned By Students

- We done activities in village during the corona situation
- We distribute Mask and sanitizer to the villagers
- We aware about corona to the people and tell about what to do in corona like regular hand wash with soap. Do not go to outside.
- We aware about cleaning the village and make healthy village.
- We have suggest them to do not disposal of waste anywhere.
- We have suggest to sarpanch to start waste collection door to door system
- We have suggest to villagers to make check up about there health.
- We have also done cleaning of village.
- After covid -19 more activities are not done by villagers/students.

fig 18.1 Activities done by student

CHAPTER :- 19 PINDHARADA SAGY Questionnaire Survey form with the Sarpanch Signature(Scanned copy attachment in the soft copy report and Original copy in hardbound report)



SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Pindharada Gram Panchayat: Pindharada Ward No. ____

Block: ____ District: Gandhinagar

State: Gujarat L S Constituency: ____

1. Family Identity and Size

Name of Head of Household	Vaghela Mahendrasinh							Male/ Female	M
SECC Survey ID:		Family Size	4	Over 18	4	6 to 18	0	Under 6	0

2. Category & Entitlement Details (Tick as appropriate)

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

2. Adults (above 18 years)

Name	Age	Sex M/F/O	Disability Status Y/N	Marital Status[3]	Education Status[4]	Adhaar Card (Y/N)	Bank A/C (Y/N)	Social Security Pension[5]
Vaghela Mahendrasinh	46	M	N	yes	9th	yes	Y	
Gunderben Mahendrasinh	40	F	N	yes	8th	yes	Y	
Jayvirsinh Mahendrasinh	22	M	N	No	College	yes	Y	
Nikulsinh Vaghela	25	M	N	NO	9th	yes	Y	

3. Children from 6 years and up to 18 years

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

4. Children below 6 years

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

[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	No	No
Children	No	No

9. House & Homestead Data

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

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

Source of Water		Distance
Piped Water at Home	Yes / ~~No~~	
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	596 ha	2. Cultivable Area	—
3. Irrigated Area	47ha	4. Uncultivable Area	

13. Principal Occupations in the Household

Livelihood	Tick if applicable
Farming on own Land	Yes
Sharecropping /Farming Leased Land	Yes
Animal Husbandry	NO
Pisciculture	NO
Fishing	NO
Skilled Wage Worker	Yes
Unskilled Wage Worker	NO
Salaried Employment in Government	Yes
Salaried Employment - Private Sector	Yes
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
Tomatoes		
bateka		
Cotton		

17. Livestock Numbers

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

18. What games do Children Play
hide & seek, Cricket, Volleyball

19. Do children play musical instrument (mention)
No

Schedule Filled By:
Principal Respondent:
Date of Survey:

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

I. Basic Information

a. Gram Panchayat: Pindharada

b. Block: _____

c. District: Gandhinagar

d. State: Gujarat

e. Lok Sabha Constituency: _____

f. Number of Wards in the Gram Panchayat: _____

g. Number of Villages in the Gram Panchayat: _____

h. Names of Villages: Pindharada

Demographic Information

Number of Households 478 Total Population 1858 Male 937 Female 921

SC HHs_____ ST HHs_____ OBC HHs_____ Other HHs_____

I. Access to Infrastructure / Facilities / Services

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

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

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 1 Public School ground Private_____

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 2

b. Number of villages without Angan Wadi Centres_____

Names of such villages: _____

_____

c. Schools (Number)

Primary Private: ____ Primary Govt.: 1

Middle Private:_____ Middle Govt.:_____

Secondary Private:_____ Secondary Govt.:_____

Higher Secondary Private: _____ Higher Secondary Govt: _____

VI. Public Distribution System

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

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		
b.	Hand Pump Coverage in Villages:	Covered / Not Covered		
c.	Coverage under Covered Drains:	Covered / Not Covered		
d.	Coverage under Open Drains:	Covered / Not Covered		
e.	Villages with Household Electricity Connection (Numbers)	Connected / Not Connected		

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land		d.	Pasture / Grazing Land		g.	Check Dam	
b.	Irrigated Land	4.96 hec	e.	Forests/ Plantations		h.	Wells/Bore Wells	2
c.	Un-irrigated Land	4.7 hec	f.	Other Common Land		i	Tanks /Ponds	1

[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)	
b)	Number of Households receiving pension (old age, widow, disability)	
c)	Number of eligible Households who are not receiving pension	
d)	Number of Households eligible for Ration Card	Mostly
e)	Number of eligible HHs having ration cards	
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	
h)	Number of active Job Card holders under MGNREGA	
i)	Number of Job Card holders who completed 100 days of work during 2013-14	
j)	Number of shops selling alcohol	No one
k)	Number of BPL families	Mostly
l)	Number of landless households	Mostly no one
m)	Number of IAY beneficiaries	
n)	Number of FRA[2] beneficiaries	
o)	Number of Community Sanitary Complexes	
p)	Number of Households headed by single women	
q)	Number of Households headed by physically handicapped persons	
r)	Total number of Persons with Disability in the village	
s)	Number of SHGs	
t)	Number of active SHGs	
u)	Number of SHG Federations	
v)	Number of Youth Clubs	
w)	Number of Bharat Nirmán Volunteers	

Name and Signature of Surveyor and Respondent'

Surveyor	PRI Respondent (Preferably Gram Panchayat Chairperson)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey

M.U.Vaghela
સરપંચ
પીંડારડા ગ્રામ પંચાયત
તા.જી. ગાંધીનગર.

[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: Pindhuruda

b. Ward Number: _____

c. Gram Panchayat: Pindhuruda

d. Block: _____

e. District: Gandhinagar

f. State: Gujarat

g. Lok Sabha Constituency: _____

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

i. Names of Habitations / Hamlets:

Demographic Information

Number of Households 418 Total Population 1858 Male 937 Female 921

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

II. Access to Infrastructure/Amenities etc.

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

[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	
m	Common Service Centre	NO	
n	Veterinary Care Centre	NO	

ii. Road Connectivity

a. Habitations connected by All-weather Roads *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations where not available: 1 All

iii. Drinking Water Facilities

a.Piped Water Supply Coverage to Habitations: 1-All *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:

b.Hand Pump Coverage in Habitations: 3 - Some *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:

iv. Coverage of Habitations under Waste Management System

a. Coverage under Covered Drains: 1 - All *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:

b. Coverage under Open Drains: 3-Some *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:

c. Coverage under Doorstep Waste Collection: *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: 2 - None

v. Coverage of Habitations under Electrification

a. Coverage under Household Connections: *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: 1 - All

b.Coverage under Street Lighting: All*(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: 3-Some

vi. Sports Facilities in the Village

a.Number of Play Grounds in the Village (minimum size 200 square meters): only School ground

b.Mini Stadium : No Yes(Y) /No (N)

vii. Education, ICDS

a. Number of Anganwadi Centres:

c. Schools (Number)

Primary Private: ____ Primary Govt.: 1

Middle Private:_____ Middle Govt.:_____

Secondary Private:_____ Secondary Govt.:_____

Higher Secondary Private: _____ Higher Secondary Govt: _____

2

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

viii. Land Category		Area in Acres		Land Category	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land		d.	Pasture / Grazing Land		g.	Check Dam	
b.	Irrigated Land	496 hec	e.	Forests/ Plnatations		h.	Wells/Bore Wells	
c.	Un-irrigated Land	47 hec	f.	Other Common Land		I	Tanks /Ponds	

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

Name and Signature of Surveyor and Respondent'

Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey

M.G. Vaghela
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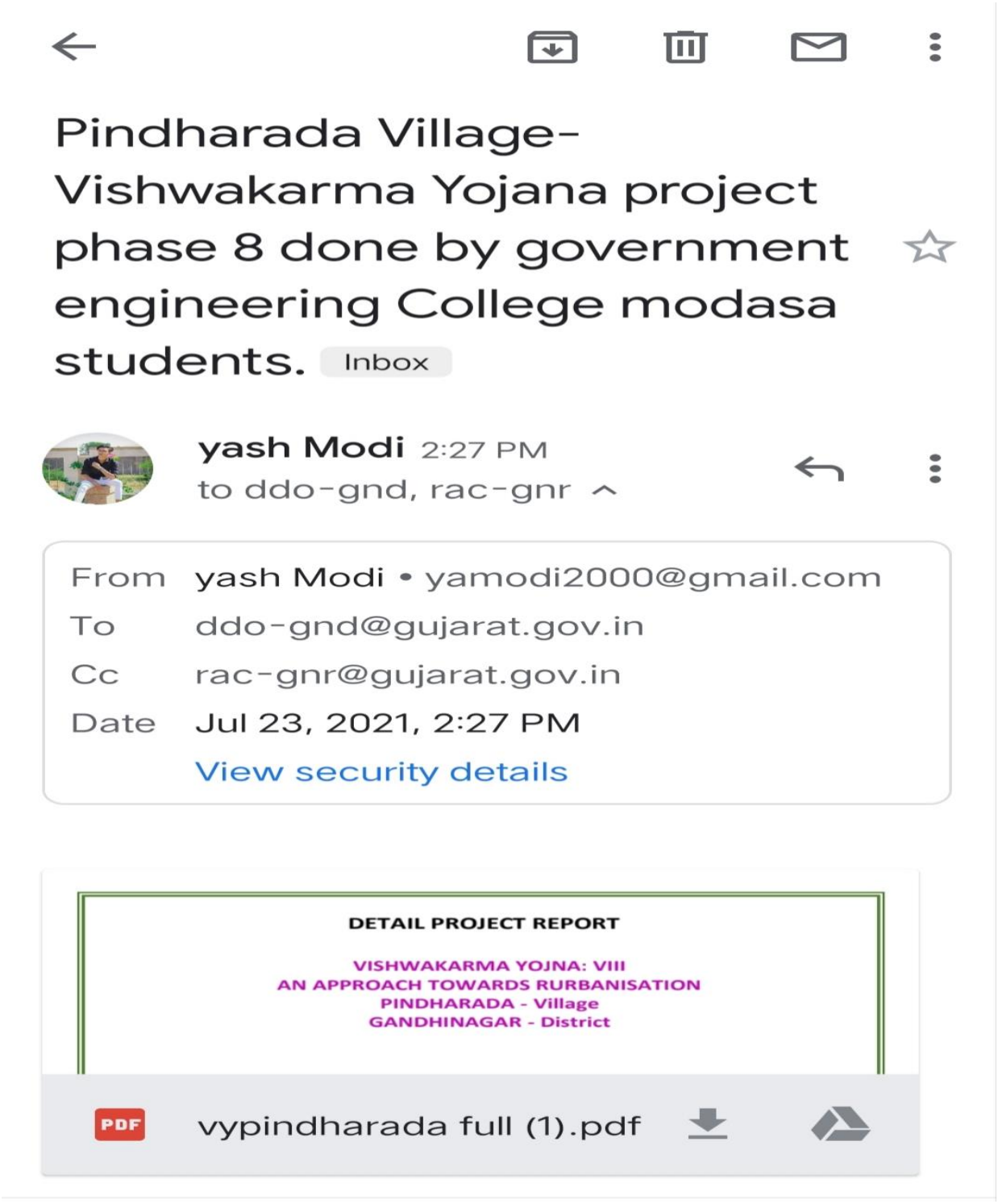
તા.જી. ગાંધીનગર.

3

Chapter:- 20 TDO-DDO-Collector email sending Soft copy attachment in the report



CHAPTER:- 21 Comprehensive report for the entire village

Introduction

The main aim of this project is studying the present status and techno – economic survey of village In different terms of basic and public amenities, other infrastructural facility for the need of the People of respective village. This task or work done with consultation of the local revenue Authorities, like TDO and DDO, the leaders like the sarpanch and talati of respective village and Prepare detailed report on survey of the available data with reference to population of the village And growth area.. the main aim of this project to reduce migration from rural to urban areas this is Achieved by the concept of urbanization which means provide better amenities in rural area without Changing structure of rural area.The second task is to give the most required and suitable economical sustainable design or Prototype for village and sustainable development.

Objectives

A model village project has the following important objectives:

- Prevent distress 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.
- Make the model village a "hub" that could attract resources for the development of other villages in its vicinity.
- Provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such villages
- Contribute towards social empowerment by engaging all sections of the community in the task of village development.
- Create and sustain a culture of cooperative living for inclusive and rapid development.

Study Area

Pindharada village is located in Gandhinagar taluka in Gandhinagar district of Gujarat state. It is a small village consisting population of 1858 only.. Total area of the village is 596.13 hectares. It includes 315.10 hectares land for agricultural purpose and 285.93 hectares land for Residential area. The nearest town to the pindharada is Gandhinagar which is 13 km away from village. The other nearest town is the unava that is 6 km away from the village. The village has bus station, Gram Panchayat, Community Hall, Primary School and Secondary and Higher Secondary School, Primary Health Centre (PHC) etc. The nearest river is Sabarmati River and it is the main source of irrigation for village. Pindharada is about 50 km from Modasa. It is the small town. Nearest villages from pindharada are unava , mansa.. It is 141 m above sea level. The total land area of village pindharada is 596.10 hectares. Out which 315.1 hectares land is Agricultural land and the rest of the land is used as Residential area. The Total Population of pindharada is 1858 as per census 2011. There are 937 male in the village and 921 females are there. Literacy rate for male in the village is 90.72% and that for female is 70.38%.

Infrastructure Details (With Exiting Village Photograph) :

1 Drinking Water / Water Management Facilities :

Is tap water system in the village. There is 100% treated water is distributed in the village. The main source of water for the village is Sabarmati River which is only 1 km away from the village. There are 2 wells and and tank in the village. There are 2 wells in the village out of which one well is covered and other well is uncovered. There is underground sump having the capacity of 1 lakh litre.

1 drinking water facilities

2 Drainage Network / Sanitation Facilities :

There is underground drainage facility in pindharada. It is closed type drainage system. The drain water is discharged directly in to its nearby water body. Sanitation is Done daily by villagers and there is no any solid waste collection system available in the village. No Government sweepers are coming daily for other waste collection and for cleaning of the village.

2 drainage facilities

3 Transportation & Road Network :

There is bus station in the village. All the roads in the village are of C.C roads. Internal road having width of 5.5 m. There is no railway station in the village. People use the nearest railway station of Gandhinagar town which is 13 km away from the village. People use their own vehicles for the local transportations.

3 Transportation facilities

4 Housing condition :

We visited village and make field survey and we survey that the major infrastructure like panchayat , school, anganwadi, assembly polling, are pucca construction. Major infrastructure made by brick , sand and RCC . And minority house are made by kuccha material like sand , gravel or clay.
We observed that , Pucca construction : 70% kutccha construction : 30 %

4 housing facilities

5 Social Infrastructure Facilities , Health , Education , Community Hall , Library :
In pindharada village there are some social infrastructure available. In village there are 2 anganwadi,1 primary school, 1 PHS center, 1 pick up stand, 1 sub post office, 1 panchayat building, 1 birth dead register office. There are no recreational infrastructure available and no community hall are available.

Design Proposal :-

Sr no	Design name	Period	Amount (RS)	Benefits
8.1.1	Bank Building	Long term (1-2 year)	1977336	Provides customer services, provide banking services
8.1.2	Bus stand	Long term (1 year)	2685410	It is provide easy transportation facility
8.1.3	Public Toilet	Immediately	158645	It is improve sanitation facility ,it is improve cleanliness in village
8.1.4	Community hall	Long term (1 year)	377745	Group activities, social support, public

				information and other purpose
8.1.5	Crematoria	Immediately	335000	It create pleasant environment in village
13.1.1	Cyber cafe	Immediately	5,81,210	Reduce waste and reduce pollution of village
13.1.2	PHC Centre	Long term (1 Year)	554181	To improve the health facility in village , avoid long distance health facilities.
13.1.3	Pharmacy store	Immediately	467054	Provide medicines to the villagers
13.1.4	ATM Machine	Immediately	58014	Easy cash withdraw and easy payments.
13.1.5	Groceries store	Immediately	131109	Avaibility of groceries in village
13.1.6	Library	Immediately	396080	To increase literacy of village, too familiar with new technology, to increase growth of education.