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Development of Rural as an Ideal and a Smart Rurban Village

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ABSTRACT

This project report deals with study and development of village as a rurban village. We define rurban village as a village with all urban amenities without compromising the rural culture. "Smart Village" is an integration of ICT to manage & regulate cities assets, infrastructure such as schools, hospitals, power plants, transportation systems, water supply networks, waste, development in education, health, security, productive enterprise, environment that in turns support further improvement in energy. In this report we focus on use of improved technology, use efficiency, local self-governance, access to assure basic amenities and responsible individual and community behavior to build happy society. We making smart village by taking smart decisions using smart technologies and services. We did a study on Sansrod Village situated in Karjan Taluka of Vadodara district in Gujarat, India. According to Census 2011 information the location code or village code of Sansrod village is 521178.

Keywords : Infrastructure development, Rural development, Smart villages

I. INTRODUCTION

Over 40 % of population of Gujarat and 70% of India live in rural areas. Everyone everywhere is migrating from the rural areas to urban in search of better life, better job opportunities thus overpopulating the urban areas resulting in various problems. So, for solving the why not create those opportunities in rural areas itself. It would also preserve the ancient cultures and traditions of the village and passed on to another generations for which our nation's well-known. Thus, to understand and assess the problems and needs of the rural areas and stop haphazard development in urban areas it is necessary to conduct study in the rural areas. People living in rural areas deserve the same facilities and infrastructure as the people living in the urban areas.

I. LITERATURE REVIEW

Rural Issues and Concerns

The concerns in relation to rural credit – other than those relating to structural issues - are generally expressed in terms of –

Inadequacy of credit

Constraints on timely availability of credit

High interest rates

Neglect of small and marginal farmers,

Low credit-deposit ratios in several states and

Continued presence of informal markets.

The financial, manpower and managerial resources applied to the implementation of rural development programs are very less.

Rural development programs better implementation can be ensured only if those involved are paid reasonably well, properly trained, and sufficiently motivated.

- The political parties play a vital role in rural development. But the political parties today are more focused on party interests rather than national interests.
-

Rural Agricultural Health and Safety

According to the National Institute for Occupational Safety and Health (NIOSH), of the 1,854,000 full-time workers employed in production agriculture in 2012, 374 farmers and farmworkers died from a work-related injury for, a fatality rate of 20.2 deaths per100,000 workers. During that same year, agricultural workers experienced 167 non-fatal injuries daily, with 5% of these injuries causing a permanent disability.

Various Measures for Rural Development

Jawaharlal Rozgar Yojana:

The Government of India has made provisions to improve the quality of rural life in five-year plans and many other schemes known as Yojana's. Rozgar Yojana is an yojana for wage employment. Jawahar Rozgar Yojana was developed by the Indian government with a motive of making villages independent and to provide employment to the rural population to eradicate poverty to the extent possible.

Bharat Nirman through Pradhan Mantri Gram Sadak Yojana

Rural connectivity is one of the major goals of Bharat Nirman. In India, there are more than 6 lakh villages located in different terrains e.g. plain, hilly, deserts, swamps, coastal region, mountainous region, back water areas, tribal pockets, etc. The climatic condition also varies from place to place to a great extent. Due to improper planning, some villages are having multi road connection while others are deprived of even single road connection.

- PMGSY achievements can be summarized as follows:
- Construction of 53,000 Km. of new rural roads.
- 27,000 Km. of rural roads upgraded and modernized.
- 37,000 habitations provided all weather connectivity opening access for agricultural produce.
- Rs. 15,117 crores invested up to January 2006.
- Monitoring the quality of road works through independent technical experts at the state and national level.

Some Other Development Schemes:

Pradhan Mantri Adarsh Gram Sadak Yojana (PMAGSY):

It focuses on integrated development of 100 villages with a 50 per cent population of SCs.

Bharat Nirman Yojana:

It was launched in 2005 for building infrastructure and basic amenities in rural areas. It focuses on rural housing, irrigation, drinking water, rural roads, electrification and rural telephony.

Indira Awas Yojana:

It is the part of Bharat Nirman Yojana. It was introduced in 1985-86. It aims to help built or upgrade the households of people living under BPL.

- **Mahatma Gandhi National Rural Employment Guarantee Act**
- **Smart Village Mission**
- **Antyodaya Anna Yojana, etc.**

Review of Literature on Smart Village

David Freshwater (2000):

Sustainable development is generally discussed in terms of environmental considerations, but from a rural community perspective, sustainable development must address how the people of the community generate the income to maintain their rural lifestyle. In those instances where employments considered as part of sustainability discussions, it is too often thought of in static terms jobs that will last. But the reality of both modern rural and urban life is

that economic conditions rapidly change, and so a discussion of sustainable employment has to be conducted in a dynamic context where different types of employment evolve as economic conditions change. While market signals alone can, in principle, provide the information and the conditions for this type of dynamic process, the argument of the paper is that the nature of rural areas makes it unlikely for markets alone to allow sustainable employment.

Dr. Milind Kulkarni (2010):

In India majority of the population still lives in villages. A lot of work needs to be done in making the villages clean. There are different aspects of clean village such as: water supply, sanitation, indoor air quality, solid waste management and renewable energy etc. All these aspects have different alternatives with the associated merits and demerits. In some aspects such as water supply, considerable work is done whereas in some areas like sanitation lot of work is required to be done. We can learn lot of lessons based on success and failure in adopting different alternatives. Keeping in touch with technology clean village projects should integrate technology and digital design, which will make the village not only clean but also smart. The paper discusses all these aspects with reference to Maharashtra and India. This discussion plans to give important inputs and alternatives to policy makers so that they can redirect and reformulate the policy. Engineering students can design and implement projects of clean and smart village which will help in their skill development. At the end paper gives recommendations for effective making of Clean and Smart Village.

N. Viswanadham, Sowmya Vedula (2010):

This paper describes the ecosystem for a village and then map an integrated design procedure for building a smart village. It defines Smart Village as a bundle of services which are delivered to its residents and businesses in an effective and efficient manner. Dozens of services including construction, farming, electricity, heath care, water, retail, manufacturing and logistics are needed in building a smart village. Computing, communication and information technologies play a major role in design, delivery and monitoring of the services. All the techniques and technologies needed to build a smart village are available now and some of them are being used in villages in India but these are disparate, fragmented and piecemeal efforts. We recognize that the need of the hour is strategy, integrated planning and above all monitoring and execution of the activities using appropriate governance models. Our integrated design is a way forward to deal with the demographic deficit and also achieve the goals of inclusive growth. It is replicable and can be used to design and build smart villages other parts of the world.

Townships for Sustainable Cities (2012):

Cities of emerging economies are their engines of growth, because if villages cater to agriculture and allied activities, then cities to the industry and service sector. The influx of FDI, expansion of markets, international assistance and aid, globalization, etc. all contribute to the rapid urbanization and simultaneously to the problems associated therewith. With the premature expansion of cities, in the absence of proper planning and preparedness, the challenges and repercussions of this haphazard growth become more evident and serious. The paper deal with the analysis of the problems associated with rapid urbanization, and seeks a possible and practical solution in the form of townships, for such ballooning cities. These townships with “walk to work” concept, built up with public-private-partnership, integrated in nature can be the future of these cities. They will be self- sufficient, self-managed and self-governed units, with well-defined and well-designed residential, commercial, retail and recreational areas;

self-owned and created infrastructure, integrated waste management systems, water resource management systems, and other amenities in place thus reducing the pressure on the local governing bodies and the city resources. Understanding and acknowledging the role and importance of these Townships in development of sustainable cities, the emerging economies have Special Township Policies in order. India is one such country where four states, Maharashtra, Gujarat, Karnataka and Rajasthan, have their own Township Policies. The objective is to create intelligent cities, with smarter plans, better built- environment and happier.

Integrated biomass and solar town concept for a smart eco- village in Iskandar Malaysia (2014):

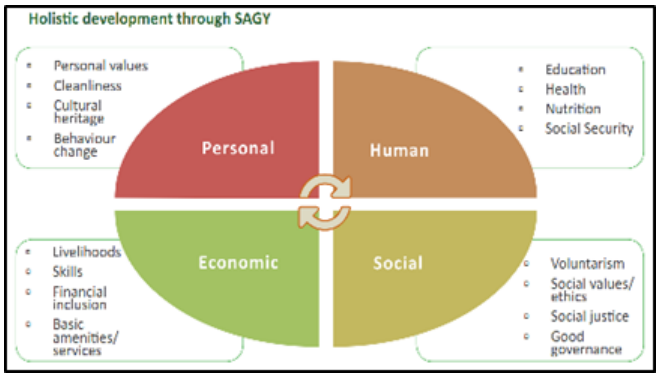
This paper presents a new integrated biomass and solar town concept that can serve as a global model for smart eco-villages in tropical countries. In this research, a renewable energy (RE)-based distributed energy generation (DEG) system for an eco-village driven by the "integrated biomass and solar town" concept was considered in order to optimize RE resource utilization. To design a cost-effective integrated biomass and solar town, a mixed integer linear programming (MILP) model was developed. The proposed model considers actual operation constraints due to biomass availability, weather variation, and restriction of the thermal plant. The application of this new concept on the Iskandar Malaysia (IM) case study with an average daily demand load of 16,900 kWh/d revealed that a 417-kW direct-fired biomass power generator, 412 kW biogas thermal power plant, 136 kW solar photovoltaic (PV) modules, and sodium Sulphur battery with an energy capacity of 3046 kWh and power of 1530 kW were required. The annual cost of the integrated biomass and solar town was estimated to be approximately RM 3 million at an electricity cost of RM 0.48/kWh.

Village-level solar power in Africa: Accelerating access to electricity services through a socio-technical design in Kenya 2014

Village-level solar power supply represents a promising potential for access to electricity services. Increased knowledge is needed for the development of solutions that work for the users and are viable in the long run. This article analyzes a solar power model developed and tested through action research in collaboration between a community in Kenya and a team of social scientists and technical experts. The analysis includes the reasons for its socio-technical design, and the actual functioning of the model. The research shows that an energy center model can cover basic electricity needs in areas with dispersed settlement patterns, where mini-grid based systems as well as conventional grid extension meet significant challenges. Close attention to the socio-cultural context and the challenges of users, operators and managers is required. Our research draws on theories of socio-technical change and users' innovation, and presents a five- step analytical framework for analysis of village-level power provision.

II. CONCEPT

The village that is self-sufficient and can fulfill its requirements without any help from outer sources and have all sustainable educational, health related infrastructure, social and socio-economic infrastructure and can earn by selling outputs of the infrastructure to nearby places.



A smart city is an integration of ICT to manage & regulate cities assets. Infrastructure such as schools, hospitals, power plants, transportation systems, water supply networks, waste management.

A city is defined as smart city when investments in human resource and social, traditional and modern communication infrastructures generates sustainable economic development with a high living standard and proper organization of non-renewable resources.

III. SERVICES REQUIRED FOR SMART VILLAGE

TECHNOLOGICAL OPTIONS FOR SMART VILLAGES

- Sustainable and energy efficient green residential and commercial buildings.
- Internet access and Wi-Fi at important places like subway stations, libraries, etc.
- Dynamic kiosks that display Real time information, traffic, weather and local news.
- Availability of GPS and GIS.
- Energy efficient and fast public transit.
- Solar powered charging stations, street lights, Wi-Fi hot-spots.
- Roof top solar panels or solar panels covered gardens.
- Parking facilities
- High tech waste management,
- Pure drinking water facilities,
- Recycling of waste and water.
- Smart Security
- Smart traffic control (traffic signal)/only one-way roads without crossings etc.
- Smart & effective emergency response systems.
- Zero tolerance on crime.
- Smart policing.
- Usage of technology like CCTV/speed monitors/smart surveillance systems.
- Speed cameras for detecting speeding vehicles.
- High resolution cameras for detecting stolen vehicles.
- Equal-distribution of facilities across all corners of cluster.
- Smart Sewage treatment facilities.
- Smart rain harvesting/rain water drainage system.
- Smart and efficient public transport system.
- Adequate & latest firefighting systems.
- Disaster management trained officials (only Disaster Management trained officials from paramilitary/NCC be deployed).
- Renewable energy/Solar Energy systems should be installed.
- Vehicle emissions should be controlled/private vehicle holding to be controlled by law.
- Make adequate green areas/parks/sanctuaries/water bodies mandatory for each cluster.
- No beggars (All beggars should be provided residential areas (boarding/ lodging) by Government and provided vocational training to sustain life independently).

IV. SMART CITIES: ISSUES AND CHALLENGES

FACED BY SMART CITY COUNCIL INDIA

- Retrofitting existing legacy city infrastructure to make it smart,
- Financing smart cities,
- Financial sustainability of municipal

corporations,

- Modern technology,
- Government collaborations and coordination,
- Reliability of services,
- Capacity building programs,
- Providing clearance in timely manner

V. FINANCING SMART VILLAGE DEVELOPMENT

- GoI funds: ~ Rs.500 cr
- Matching contribution by States/ ULBs: ~ Rs.500cr
- User Charges
- Public-Private Partnerships (PPPs)
- FFC recommendations (incl. land-based instruments)
- Municipal bonds
- Borrowings from bilateral and multilaterals
- National Investment and Infrastructure Fund (NIIF)
- Convergence with other Government schemes

VI. BENEFITS

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 greenhouse gases such as carbon dioxide .Energy consumption optimization 25-30% average energy saving.

4. For farmer e-learning etc. facility that will be able to ask there quarries online.

5. New technologies in education, e-learning, desktop publishing, horoscope generation of interested person of the village. Transportation of village into comfortable & safe space that enhance quality

	Recommendation	% ↑ over last FC
Tenth Finance Commission	Rs. 1,000 crore grants	
Eleventh Finance Commission	Rs. 2,000 crore grants	100%
Twelfth Finance Commission	Rs. 5,000 crore grants	150%
Thirteenth Finance Commission	Rs. 23,111 crore grants	362%
Fourteenth Finance Commission (2015-20	Rs. 87,144 crore grants	277%

VII. AWARENESS PROGRAMS FOR PEOPLE

9.1 GOVERNMENT CONTRIBUTION:

(a) Reorienting education towards sustainable development –

- Education is critical for promoting sustainable development and improving the capacity of the people to address the

environment and development issue.

- Basic education provides underpinning for any environment and development education, the latter needs to be incorporated as essential part of learning.
- It is critical for achieving ethical awareness, values and attitudes, skills and behavior consistent with sustainable development and for effective public participations in decision making.
- To achieve the accessibility of environment education, linked to social education from the primary school age through adulthood to all groups of people.

(b) Increasing public awareness –

- Public awareness should be recognized as a process by which human beings and societies can teach their fullest potential.
- Small scale enterprise promotion through social media.
- Education empowerment and access to information through smartphones.
- By making Motivational Videos.

(c) Promoting training programs –

- Government with the help of non-government authorities can arrange various trainings to aware the people.
- Implement various schemes and projects in accordance with policies.
- Training for all age group people.
- With the help of social media, motivational speeches and videos we can give training to the people.
-

9.2 NGO's Role

- NGOs play important role in rural development of India. NGOs acts as Planner & Implementers of Developmental Plans and perform a variety's of services & Humanitarian.
- NGOs services focus on assessing individual strength and settling personal goals& encourage overall growth and development.
- NGOs play role in co-ordination, collaboration and bridge he communication between the govt., private sectors.
- NGOs creating awareness among the public active to promote education.Ex.Education of girls .NGOs have important role in bringing about social change and development.
- The projects like construction of Dams, Roads, Highways', railways& important role in religious discrimination.
- The role of NGOs has a very important to protection of environment through social services. NGOs are taking up this job sportingly and successfully.

9.3 PEOPLES ROLE

- Inculcating hygienic behavior and practices.
- Inculcating respect for the cultural heritage.
- Volunteerism: activities for promotion of voluntarism like Bharat Nirman.
- Reducing risk behavior - alcoholism, smoking, substance abuse.
- Behavioral changes.various programs implemented by grampanchayat,
- Drinking water pipeline is under construction with the help of Rastriya peyjal yojna,

VIII. INFORMATION / DATA AND PHOTOGRAPHS OF SANSROD VILLAGE

PHOTOGRAPS

Fig. 8.1 Internal Roads

Fig. 8.2 Water Tank

Fig 8.3 Gram Panchayat

Fig. 8.4 Water Purification Plant

IX. INFRASTRUCTURE REQUIREMENT FOR SMART VILLAGE

In this selected village, we see so many problems. To develop this village as a SMART VILLAGE by providing various services we prepare a report are as follows,

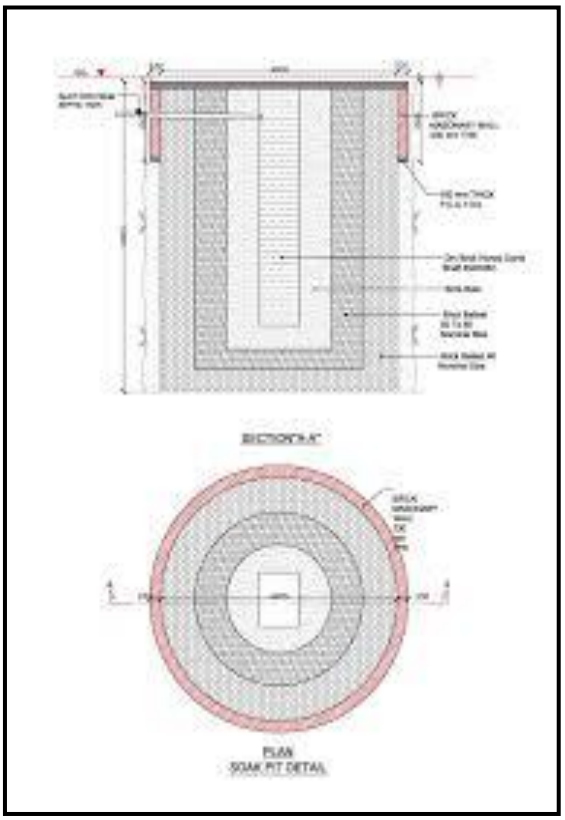


Fig 9.1 Soak pit

12.1 MAGIC PIT OR SOAKPIT:

- Magic pit is covered porous walled chamber that allows water slowly soak into the ground.
- Magic pit can offer a cost-efficient opportunity for partial treatment of waste-grey or storm water and relatively safe way of discharging it into the environment and therewith recharging groundwater bodies.
- As waste water percolates through the soil from a magic pit, small particles are filtered out by the soil matrix and organics are digested by micro-organisms. Sub-soil layers are water permeable in order to avoid fast saturation.
- Magic pit is best suited for soil having good absorptive properties; clay, hard packed or rocky soil is not appropriate.
- It should be located at safe distance from drinking water source (30m at least). It odorless and not visible because of that it does not cause any problem regarding with health.
- A magic pit should be last between 3-5 years without maintenance but after that it needs to clean.
- When the performance of the magic pit deteriorates, the material inside the magic pit can be excavated and refilled.
- For future access, a removable lid should be used to seal the pit until it needs to be maintained.
- For magic pit Govt. give a fund of 2111/-Rs.

Benefits:

- Can be built and repaired with locally available materials.
- Technique simple to apply for all users.
- Small land area is required.
- Low capital cost; low operating cost.
- Recharging ground water bodies.

For Sansrod village,

No of houses = 1129,

Required no. of magic pit = 1129,

Amount required for magic pit = 2,111 X 1129 = Rs.23, 11,545

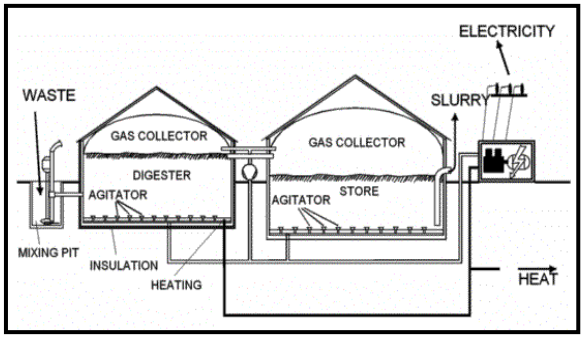
12.2 SOLID WASTE MANAGEMENT:

- Establish a waste collection, transport and treatment within the panchayat.
- The collected waste should be segregate into bio- degradable and non-biodegradable at each house itself by making two dustbins,

Green dustbin = bio-degradable waste

Red dustbin = non-biodegradable waste.

- From bio-degradable waste we can prepare bio-compost and vermin-compost and non-biodegradable is sold to recyclers or sent to the landfills.
- To collect this waste, under Mahatma Gandhi National Rural Employment Guarantee Scheme gram panchayat appoint a team of trained youth called as Friends of nature w
- So, do entire operation starting from collection to composting and land fill.
- The no. of friends of nature, 1 for 150 households.
- Sansrod already has trucks for collection of solid waste
- For this management, various tools and equipment's are required for daily collection and treatment of waste and the



land required to construct treatment plant and capital cost required to construct vermin-compost bed and shed which are obtained under Solid Waste Management Scheme Fund and Mahatma Gandhi National Rural Employment Guarantee Scheme.

- A vermicompost is prepared from segregated organic biodegradable waste which can be used as manure for plants.

12.3 ROPLAN

- Reverse osmosis (RO) is a water purification technology that uses semipermeable membrane to remove ions, molecules and larger particles from drinking water.
- About 60% of diseases afflicting the rural population are waterborne.
- So, instead of spending money on medical facilities use clean drinking water. Total population of the Sansrod village is near to 5649.
- In Sansrod , there are 1129 families and which carry 20-liter water daily.
- Therefore provide 1 RO plant of capacity 2000 lph having cost of 10 Lakh each and which is implemented under the various scheme of Department of Rural Development and Panchayat Raj.
- With RO plant provision of tankers is done to solve the problems such as delivery of water using manpower and payment related issue.
- The cost of one liter of water is 50 paise.

The total cost required for Ro plant is 20 lakhs

12.4 BIOGAS PLANT:

- Biogas is a byproduct of the decomposition of organic matter by anaerobic bacteria.
- Biogas is typically composed of 60% methane and 40% CO2. It is similar to natural gas which is composed of 99% methane.
- Biogas is a clean and renewable energy that may be substituted to natural gas to cook, to produce vapor, hot water or to generate electricity.
- At room pressure and temperature biogas is in gaseous form, not liquid like LPG (propane). Bottling biogas is a very expensive process.
- Organic waste is put into a sealed tank called a digester (or bioreactor) where it is heated and agitated. In the absence of oxygen anaerobic

bacteria consume the organic matter to multiply and produce biogas.

- Each cubic meter (m3) of biogas contains the equivalent of 6 kWh of calorific energy.
- However, when we convert biogas to electricity, in a biogas powered electric generator, we get about 2 kWh of useable electricity, the rest turns into heat which can also be used for heating applications.
- Approximate cost of biogas plant would be Rs. 3200000 for a community biogas plant of size 88 cubic meter.
- Operation and Maintenance cost would be around RS 500000 including lubrication, wages for workers, dung, mixer and blower running cost and worms for vermicompost

12.5 BIOGAS LINKED TOILETS

Biogas from public toilet has multiple benefits- improve sanitation, community health and hygiene environment, make available liquid manure in addition to uses of biogas of different purposes. Under this system only human excreta with flush water is allowed to flow into the biogas plant for anaerobic digestion. Bathing and clothing water is allowed to collected separately that is reused after sand filtration or discharged in drain after settlements. For biogas generation no manual handling of excreta at any stage is required. Hydraulic Retention Time (HRT) of feed material is maintained for 30 days. One cft of biogas is produced from the human excreta of one person per day. Human excreta-based biogas contains 65-66% methane, 32-34% carbon oxide about 1% hydrogen sulphide and trace amounts of nitrogen and ammonia. Biogas is stored inside plant through liquid displacement chamber. Biogas plant is made up of Reinforcement Concrete Cement (R.C.C.); therefore, no recurring expenditure is required for its maintenance. Methane is the only combustible constituent which is utilized in different forms of energy. A thousand cft (30m3) of biogas is equivalent to 600 cft of natural gas, 6.4 gallons of butane, 5.2 gallons of gasoline or 4.6 gallons of diesel oil.

Basic parameters and operational criteria:

Human excreta fed biogas plant system, especially those linked with community toilet complexes, have a number of limitations:

- These are used by people from different socio-economic and cultural backgrounds whose food habits and toilet habits are different.
- Human excreta are malodorous and associated with psychological and religious taboos.
- It contains full spectrum of pathogens causing health hazards if not carefully handled.
- Variation in the number of users leads to variation in loading rate of the digester.
- Wide variation in the frequency and quantity of water used for cleaning the pans and toilet floor, although the amount of water used for personal cleaning does not vary much.
- With direct gravity feeding arrangement, the feeding of the digester can at best be termed as intermittent or semi-continuous depending upon the frequency of use.
- The public conveniences are generally constructed in congested and busy areas where space is often limited.
- Energy input in the form of heating, mixing, pumping etc. has to be kept to the minimum.

Keeping in view of the above limitations, some additional basic criteria needs to the considered for the night solid based biogas plant:

- There should not be any direct handling of excreta.
- Aesthetically it should be free from odour. It should not be visible at any stage.
- Cleaning water should not be more than two litres per use.
- Use of disinfectants for cleaning latrines should not be permitted.
- Arrangements for the drying of slurry before using it as manure should be made.

- There is no direct control over the concentration of the feed material, loading rate, hydraulic retention time (HRT), temperature etc. The design criteria have to take all these into account, and the design parameters have to be flexible to accommodate the variations.

12.6 RAINWATER HARVESTING: -

Rainwater Harvesting is a technique of collection and storage of rainwater into natural reservoirs and tanks, or the infiltration of surface water into subsurface aquifers. The rainwater harvesting is of different types such as,

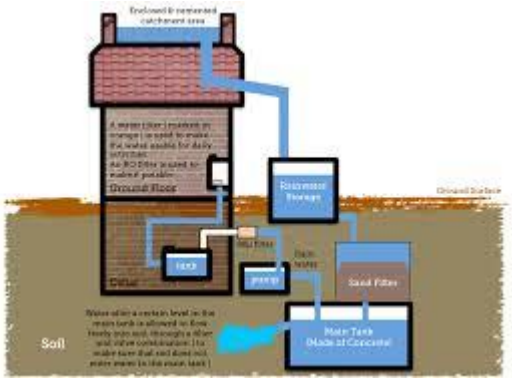
- Directly from roof tops and stored in tanks,
- Monsoon runoff and water in swollen streams during the monsoon and storing it in underground tanks,
- Water from flooded rivers can be stored in small ponds,
- Collection and transfer of rainwater into percolation tanks. So as to facilitate discharge into ground.
- With rooftop harvesting, most any surface – tiles, metal sheets, plastic but not grass or palm leaf can be used to intercepts the flow of rainwater and provide a clean water and year-round storage. Other uses include water for gardens, irrigation of annual crops pastures and trees, domestic and livestock consumption, ground water recharge.
- The rainwater harvesting is mandatory to all in village.
- The reasons for using rainwater harvesting systems answer three questions:
- What: rainwater harvesting will improve water supply, food production, and ultimately food security.
- Who: Water insecure household or individuals in rural areas ill benefit the most from rainwater harvesting system.
- How: Since rainwater harvesting leads to water supply which food security, this will greatly contribute to income generation.

12.7 Solar Farms

Electricity is becoming expensive with each passing day and more people are getting interested in using solar energy to meet their electricity needs. Power cuts and dependence on DG sets is making people look for more and better sources. Solar PV panels provide a very good alternative. Ministry of New and Renewable Energy (MNRE), Government of India is also promoting solar PV systems under the Jawaharlal Nehru National Solar Mission in the country. They also provide a subsidy to people buying solar panels under this scheme. The scheme that was last modified on 15th March 2012 provides 40% subsidy on capital costs of Solar PV Systems for units located in both urban and rural areas in India.

cost of a PV module (just the panel) costs anywhere between Rs 30 to Rs 50 per watt of power generated (depending on the quantity you are buying).

- The modules having higher Watt power capacity are cheaper per Wp as compared to modules with lower Watt power capacity. The efficiency of solar panels is also better for modules of higher Watt power as compared to modules of lower Watt power.
- If you are living in an area where power cuts are less frequent and you want to implement solar PV system to reduce your electricity bills then the best solution would be to go for a Grid Connected Solar PV System. It will cost you anywhere between 50,000-70,000 per kWp (cost varies based on the type of inverter and panels you choose).
- A typical Off Grid Solar PV System of 1Kwp would cost about Rs **1 lakh**.



For, Sansrod for all farms around 10 Kwp solar system would be needed which will cost

Rs.1000000 for panels and other around **50000** for inverter batteries and cable. With 40% subsidy from govt it would cost around **Rs 700000.**

12.8 Solar street Lights

Solar street lights consist of 5 main parts:

Solar Panel

The solar panel is one of the most important parts of solar street lights, as the solar panel will convert solar energy into electricity. There are 2 types of solar panel: mono-crystalline and poly-crystalline. Conversion rate of mono-crystalline solar panel is much higher than poly-crystalline. Solar panel are varying from wattage systems.

Lighting Fixture

LED is usually used as lighting source of modern solar street light, as the LED will provide much higher Lumens with lower energy consumption. The energy consumption of LED fixture is at least 50% lower than HPS fixture which is widely used as lighting source in Traditional street lights. LEDs lack of warm up time also allows for use of motion detectors for additional efficiency gains.

Rechargeable Battery

Battery will store the electricity from solar panel during the day and provide energy to the fixture during night. The life cycle of the battery is very important to the lifetime of the light and the capacity of the battery will affect the backup days of the lights. There are usually 2 types of batteries: Gel Cell Deep Cycle Battery and Lead Acid Battery and many more.

Pole

Strong Poles are necessary to all street lights, especially to solar street lights as there are often components mounted on the top of the pole: fixtures, panels and sometimes batteries. However, in some newer designs, the PV panels and all electronics are integrated in the pole itself. Wind resistance is also a factor.

Also, there are some accessories, like foudation cage and battery box.

The cost of 1 solar street would be around 6600 and the requirement in Sansrod will be around 30

So, 30*6600=Rs. 198000

The govt provides subsidy of 30 %.

12.9 SMART HEALTHCARE FACILITIES:

- Remote health monitoring at home that reduces hospital bed occupancy by converting a home into a health care ward using technology.

- Scientific, statistical evaluation of health care outcomes, incidence prevalence, follow up etc. will for the first time be feasible
- Health' is an inherent and major component, which must always be taken into account while planning a smart city or smart village. Whether it be pollution, the metro or even water or transportation management, inputs of a clinician who is familiar with technology and its implications and most importantly the behavioral response to use / imposition of technology needs to be considered.
- In the past, health has always been an afterthought, retrofitting being the order of the day we have never ever been future ready – with the imminent construction of smart communities, this is once in a life time opportunity.

- Most importantly 24/7 availability of EMR will considerably reduce duplication of investigations. Immediate access to entire past and present medical history to authorized personnel will produce incremental changes in quality of health care delivery.
- With the help of latest modern technologies like e-healthcare, laser technique we can diagnosis the person anywhere

12.10 WI-FI CONNECTION:

Free Wi-Fi is provided for the village. After consuming some amount of data, the connection will be discontinued and user can re-login after some time

The amount required for installation of Wi-Fi is approximately 4 Lakh

12.11 ROAD:

In Sansrod village we can provide two types of roads, Cement concrete road or Paver block road Construction of around 7 km length of road and 5 m wide.

Cement concrete road:

Problems due to the dust and wet weather damage to the road using innovative technology at a low cost. For 1 KM and 5 m wide cement concrete road with 30 % fly ash the required cost is 35 lakhs.

Therefore, for **7 km it will cost around Rs. 3 crore**s

12.12 Greenhouse

Growing plants is both an art and a science. About 95% of plants, either food crops or cash crops are grown in open field. Since time immemorial, man has learnt how to grow plants under natural environmental conditions. In some of the temperate regions where the climatic conditions are extremely adverse and no crops can be grown, man has developed methods of growing some high value crop continuously by providing protection from the excessive cold, which is called as Greenhouse Technology. So, Greenhouse Technology is the technique of providing favorable environment condition to the plants. It is rather used to protect the plants from the adverse climatic conditions such as wind, cold, precipitation, excessive radiation, extreme temperature, insects and diseases. It is also of vital importance to create an ideal micro climate around the plants. This is possible by erecting a greenhouse / glass house, where the environmental conditions are so modified that one can grow any plant in any place at any time by providing suitable environmental conditions with minimum labor. Greenhouses are framed or inflated structures covered with transparent or translucent material large enough to grow crops under partial or fully controlled

environmental conditions to get optimum growth and productivity.

Advantages of greenhouses:

- The yield may be 10-12 times higher than that of outdoor cultivation depending upon the type of greenhouse, type of crop, environmental control facilities.
- Reliability of crop increases under greenhouse cultivation.
- Ideally suited for vegetables and flower crops.
- Year-round production of floricultural crops.
- Off-season production of vegetable and fruit crops.
- Disease-free and genetically superior transplants can be produced continuously.
- Efficient utilization of chemicals, pesticides to control pest and diseases.
- Water requirement of crops very limited and easy to control.
- Maintenance of stock plants, cultivating grafted plant-lets and micro propagated plant-lets.
- Hardening of tissue cultured plants
- Production of quality produce free of blemishes.
- Most useful in monitoring and controlling the instability of various ecological system.
- Modern techniques of Hydroponic (Soil less culture),
- Aeroponics and Nutrient film techniques are possible only under greenhouse cultivation

The cost of low cost greenhouse would be **Rs 17500 for 100sqm.**

X. Other Key elements of ideal village

- Cleanliness
- Proper sanitation
- Education
- Health and Nutrition
- Livelihoods
- Good governance
- Basic amenities and infrastructure facilities
- Social values / Ethics
- Proper utilization of human resource

XI. SWOT analysis of ideal village

STRENGTH	WEAKNESS
Cultivable Land High literacy rate Latest technology Social capital	Lack of proper irrigation equipment's Less wage payment Lack of understanding and new tech
Agricultural demand Availability of Market Good Road connectivity Collaboration with NGO Government Development Schemes	Natural hazards Seasonal unemployment Low repayment practice
OPPORTUNITIES	**THREAT**

XII. CONCLUSION

If we all these infrastructure facilities can be implementes in the rural areas then the countries economical as well as social growth can reach great heights. Also, use of sustainable energy sources can help in controlling environmental pollution whose implementation can be started in the developing rural areas as they have sufficient land required and help reduce the carbon footprints of the country

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Sr.No.	Information of village	Details
01	Area	9.3 sq.km
02	No. of houses	1129
03	Population • Men and women = 2846+2803=5649 • Literate = 2201+1936=4137	5649
04	Water supply system(bore wells) • Pipeline work construction under government scheme “Rashtriya Peyjal yojana” • Water supply with the help of bore	15
05	Schemes implemented by grampanchayat • MG NREG under Jalyukt-shivar yojana	
06	Reservoirs location • Sansrodn – Pus-Murambi • Sansrodn – Bardapur	02

Sr.No.	Information of village	Details
07	Power supply • From govt. of Gujarat	01
08	Water supply for agriculture • From –wells,borewells,Reservoirs	
09	Canals • Narmada Canal	01
10	Biogas plant	0
11	Education facility • 2 schools and 5 anganwadi	07
13	Health facilities • Private =2 • Subcentre =0	02
14	Community hall	0
15	Bachatgat • Private =10 • Govt. =5	10
16	Bank = Union Bank of India	01
17	Worth ship places • Temple 1 • Mosque=5	06
18	Income source • Agriculture • Poultry houses • Animal conservation • Business in dairy products • Shops	
19	Irrigation system • Sprinkler • Pipe irrigation • Canal Irrigation	
20	Main crops • Paddy • Ladies Finger • Maize • Sugarcane	
21	Major problems • Undeveloped roads • No solid waste treatment • No use of sustainable energy sources	