DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII

AN APPROACH TOWARDS RURBANISATION

Vankaner Village

Surat District

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
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R. N. G. Patel Institute of Technology, Bardoli(Surat), Isroli-Tajpor, Gujarat.

NODAL OFFICER
Prof. Ajay B. Patel

YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad – 382424 Gujarat

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CERTIFICATE

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

Detail Project Report for,

Village Vankaner

District Surat

Under

Vishwakarma Yojana: Phase-VIII

in partial fulfillment of the project offered by

GUJARAT TECHNOLOGICAL UNIVERSITY, CHANDKHEDA

during the academic year 2020-21. This project work has been carried out by them under our supervision and guidance.

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ABSTRACT

Vishwakarma Yojana is established with the vision of reducing rate of migration from rural area to urban area, helping to reduce haphazard growth in urban and sub-urban area and to make development of rural area without much affecting village culture.

Projects under Vishwakarma Yojana are made ready to be implemented, from finding lack of services to create Ideas and making finished design along with cost of contraction Vishwakarma Yojana projects covers whole structure.

Vishwakarma Yojana is very helpful for students to understand actual field work and linking academic theories. And the village gets design and estimation at no cost. Not only to students and village but it is also helpful for Authorities to understand importance and requirement of different facilities.

Village is fairly developed, its having around 7.5k population with total area of 1148.52 km. Its nearest parent town in Bardoli at 10.8 km travel. Villagers are mainly associated with agriculture and farming sector.

The village has many basic facilities provided and in good condition, by our gap analysis we have found that village's library is not in good condition and village entrance is undeveloped, village don't have any waste water treatment system, public garden, gym and multiple ATMs. We have covered all these facilities in our project. Aside from these we have also purposed designs of pukka house and shopping complex.

This all facilities are designed while keeping village's condition and requirements in consideration. Some facilities are designed for long term services with population forecasting by census data and proper method of population forecasting.

Key Words: Vishwakarma yojna, migration, urban area, rural area, recreational activities, social activities.

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

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.

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ABBRIVIATION

Short Name / Symbol	Full Name
PURA	Provision of Urban Amenities in Rural
PHC	Public Health Centre
TDO	Taluka Developer Officer
DDO	District Developer Officer
NGO	Non-Government Organization
ATM	Automated Teller Machine
RO	Reverse Osmosis
RCC	Reinforce Cement Concrete
ISCED	International Standard Classification of Education
RCC	Reinforced Cement Concrete

Unit conversion

Prime Unit	Equivalent unit
1 meter (m)	3.28 foots (ft)
1 foot	30.48 centimeter (cm)
1 inch (“)	2.54 cm
1 m	39.4”

1 Ideal village visit from District of Gujarat State

1.1 Background

An ideal Indian village will be so constructed as to lend itself to perfect sanitation. It will have cottages with sufficient light and ventilation built of a material obtainable within a radius of five miles of it. The cottages will have courtyards enabling householders to plant vegetables for domestic use and to house their cattle. The village lanes and streets will be free of all avoidable dust. It will have wells according to its needs and accessible to all. It will have houses of worship for all, also a common meeting place, a village common for grazing its cattle, a co-operative dairy, primary and secondary schools in which industrial education will be the central fact, and it will have Panchayats for settling disputes. It will produce its own grains, vegetables and fruit, and its own Khadi.

This is roughly my idea of a model village. In the present circumstances its cottages will remain what they are with slight improvements. Given a good zamindar, where there is one, or co-operation among the people, almost the whole of the programme other than model cottages can be worked out at expenditure within means of the villagers including the zamindar or zamindars, without Government assistance. With that assistance there is no limit to the possibility of village reconstruction. But my task just now is to discover what the villagers can do to help themselves if they have mutual co-operation and contribute voluntary labour for the common good.

I am convinced that they can, under intelligent guidance, double the village income as distinguished from individual income. There are in our village's inexhaustible resources not for commercial purposes in every case but certainly for local purposes in almost every case. The greatest tragedy is the hopeless unwillingness of the villagers to better their lot.

The very first problem the village worker will solve is its sanitation. It is the most neglected of all the problems that baffle workers and that undermine physical well-being and breed disease. If the worker became a voluntary Bhangi, he would begin by collecting night-soil and turning it into manure and sweeping village streets. He will tell people how and where they should perform daily functions and speak to them on the value of sanitation and the great injury caused by its neglect. The worker will continue to do the work whether the villagers listen to him or no.

The nearest and well-developed village is Baben, we have taken Baben as our Ideal village. Baben in situated in bardoli taluka. Baben is 3 km away from bardoli or at 8 mins of travel in motor-car. Baben Pin code is 394601 and postal head office is Bardoli.

Baben village, which is located 36 km from Surat city. Here the villagers have all the facilities that one living in the city does. This village is also attached by having bardoli nagar palika nearer to its boundary. It is around 2.1 km away from bardoli. Distance between sub districts (Bardoli) to Baben is 2.1km. Here we the 8 students who visited ideal village selected in our district as Baben village, Near Bardoli on 12th September. We reached at morning 9 am to village baben & went to gram panchayat. There we met Deputy Sarpanch Bhaveshbhai Naginbhai Patel because sarpanch was on a meeting. Then we also visited Talati Shri A.V. Vishwabharan Sir. They give us information about their basic Amenities that are available in this Baben village.

Baben is a village panchayat located in the Surat district of Gujarat state, India. The latitude 21.1378786 and longitude 73.0966019 are the geocoordinate of the Baben. Total land area of baben have approx. 465 hectares. The surrounding nearby villages and its distance from Baben are Umrakh 1.7 KM, Ten 1.8 KM, Astana 2.1 KM, and Bardoli 3.1 KM. The nearest railway station to Baben is Bardoli which is located in and around 1.0 kilometer distance. Gandhinagar is the state capital for Baben village. It is located around 245.2 kilometer away from Baben. Baben village, which is located some 35 km from Surat city, typifies development. Here villagers enjoy all the facilities that one living in the city does. The 2-km road from Bardoli to Baben gives a commuter the feeling of passing through a highway. This is because the village road is 12-meter-wide and is well lit with street lights.

Nearby villages of Baben are,

1. Ten (2 km)
2. Kharvasa (2 km)
3. Astan (2 km)
4. Barasadi (3 km)
5. Dhamdod lumbha (4 km)

Baben is surrounded by Palsana Taluka towards west, Kamrej Taluka towards North, Valod Taluka towards East, Mahuva Taluka towards South. And nearby cities are Bardoli, Surat, Vyara and Navsari. Gujarati language is local language of Baben, except that people in Baben also speaks marvadi, hindi, English and Marathi. Bhartiya janta party and indian national congress are major political parties are there.

How to reach Baben,

1. By rail
    a. Bardoli railways station
    b. Timbarva railways station
2. By GSRTC buses (Gujarat State Road Transport Corporation)

Colleges near Baben,

1. Faculty of Engineering Technology & Research Address: Bardoli Navsari Road, at. isroli, po. afwa, ta. Bardoli, Dist. Surat, Gujarat-395620
2. Vidyabharti Trust, Insti. Of Techn. And Research Centre, Umarakh. Address: Bardoli-- Mota Rd; Umarakh.

Schools in Baben,

Baben Primary School Address: Baben, bardoli, Surat, Gujarat. PIN- 394601, Post - Bardoli Govt.

1.1.1 Study area

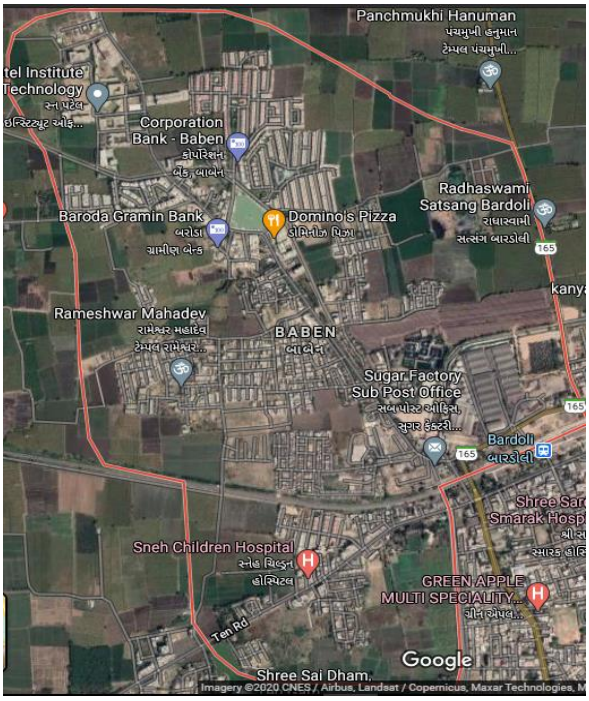


Figure 1 Baben satellite view (source google maps)

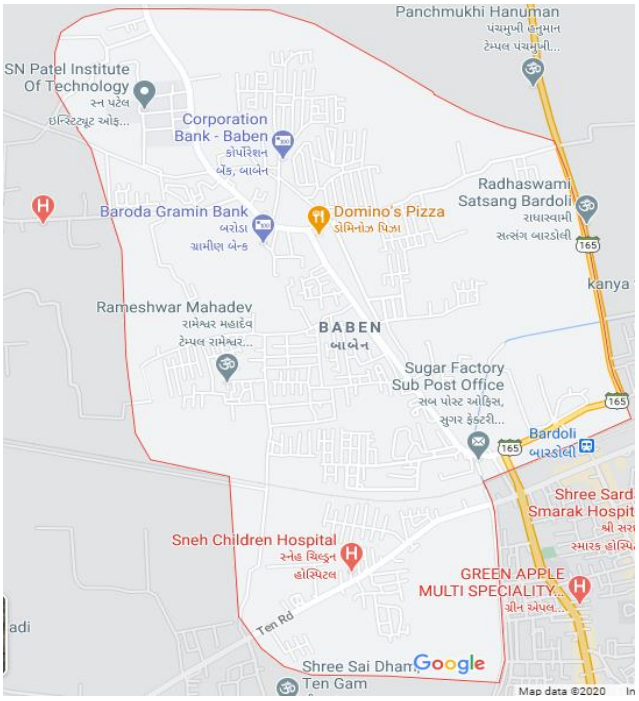


Figure 2 Baben traffic view (source google maps)

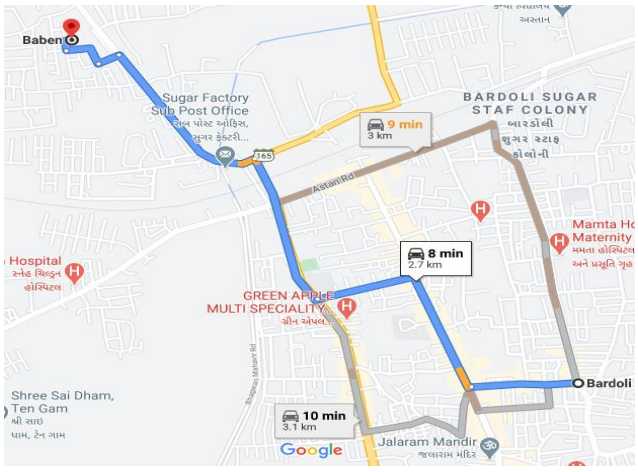


Figure 3 A route from bardoli to Baben (source google map)

Baben has population of 15,610 out of which 8,642 are males, while 6,968 are females (Census data-2011). There are around 806 Females against average of 919 males. Literacy rate in Baben town is 65%, which 10211 out of 15,610.

1.2 Concept: Ideal Village, Normal Village

The word Swaraj is a sacred word, a Vedic word, meaning self-rule and self-restraint, and not freedom from all restraint, which 'independence' often means. Real Swaraj will come not by the acquisition of authority by a few but by the acquisition of the capacity by all to resist authority when it is abused. In other words, Swaraj is to be obtained by empowering the masses to a sense of their capacity to regulate and control authority. The Gandhian vision of an ideal village or village Swaraj is that it is a complete republic, independent of its neighbors for its own wants and yet interdependent for many others in which dependence is necessary.

According to Gandhiji, the making of an ideal village is very simple.

He says: "An ideal Indian village will be so constructed as to lend itself to perfect sanitation. It will have cottages with sufficient light and ventilation built of a material obtainable within a radius of five miles of it. The cottages will have courtyards enabling householders to plant vegetables for domestic use and to house their cattle. The village lanes and streets will be free of all avoidable dust. It will have wells according to its needs and accessible to all. It will have houses of worship for all, also a common meeting place, a village common for grazing its cattle, a co-operative dairy, primary and secondary schools in which industrial education will be the central fact, and it will have Panchayats for settling disputes. It will produce its own grains, vegetables and fruit, and its own Khadi. This is roughly my idea of a model village... I am convinced that the villagers can, under intelligent guidance, double the village income as distinguished from individual income. There are in our villages' inexhaustible resources not for commercial purposes in every case but certainly for local purposes in almost every case. The greatest tragedy is the hopeless unwillingness of the villagers to better their lot. My ideal village will contain intelligent human beings. They will not live in dirt and darkness as animals. Men and women will be free and able to hold their own against anyone in the world."

1.2.1 Objectives

- To make the model village a "hub" that could attract resources for the development of other villages in its vicinity.
- To 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.
- To contribute towards social empowerment by engaging all sections of the community in the task of village development.
- To create and sustain a culture of cooperative living for inclusive and rapid development.
- To creating models of local development which can be replicated in other villages.
- To provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such villages.

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

Punsari, located in Gujarat, puts most metros to shame. Funded by the Indian government and the village own funding model. The village also boasts of a mini-bus commute system and various other facilities. The village has 23 communities with a population of 6000, including only 350 people living below the poverty line. Most of the people in the village are dependent on agriculture and milk production for livelihood. The major crops cultivated in the village are cotton, wheat, and potato. The trajectory of development can be broadly divided into five headings. The most important concern in rural development is to provide basic amenities to each person living in the rural area. Punsari stands out in this regard as it has constructed a reverse osmosis plant and since then provided house-to-house piped connections to supply chlorinated water. It also has its own 66 KVA substation for electricity generation and 100 per cent coverage of all streets with LED streetlights. A public address system with 120 waterproof speakers for announcing information and spreading messages has been another striking feature of this village. Punsari has five primary schools and four secondary schools. The class rooms in these schools are fully equipped with CCTV cameras, LED screens used for teaching, mineral water plants, separate toilets for girls and boys, computer labs, and well-stocked libraries. Mid-Day Meals program of the central government has been successfully implemented. Availability of these basic amenities within the premises of schools has also helped to reduce the dropout rate to zero. Punsari has a 24/7 primary health centre equipped with a pharmacy and a library. It also has a 24/7 maternity ward to encourage institutional deliveries in the village.

1.2.3 The Idea of a model/Smart Village

A large percentage of our population lives in cities. Hence, the researchers as well as the governments concentrate their efforts towards the development of smart cities which are self-sustainable and technologically advanced. These cities can use their resources in a smart and restrained manner. The same idea can be extended to the villages. Rural population comprises a good portion of the total population of a farming-based economy like India. The life of people in villages is also tougher compared to their city counter-parts. There is a dire need to work towards the progress of the villages along with improving the life in cities. There are certain ideas in smart cities that can be directly implemented in villages. For example, the use of cameras and sensors in streets for surveillance, sensors for healthcare etc. On the other hand, there are certain sectors like agriculture, cattle/livestock rearing etc. which need some improvised ideas for smart working.

The various aspects of villages have been considered and how the quality of life in villages can be made better using the IoT and Smart village model. The first step in designing a Smart village will be the identification of all the objects which will communicate with each other. Then a large number of sensors, surveillance cameras, buttons and switches for emergency and other fixed devices will be installed. These sensors and devices will be connected to the Internet and produce huge amounts of data which can then be stored and processed on Cloud servers. This data can further be analyzed for finest usage using Big Data analytics tools like Hadoop. The eventual goal is to achieve smart homes, weather systems, education, surveillance systems, and smart agriculture among others.

1.2.4 Ancient History Civil concept about Indian Village

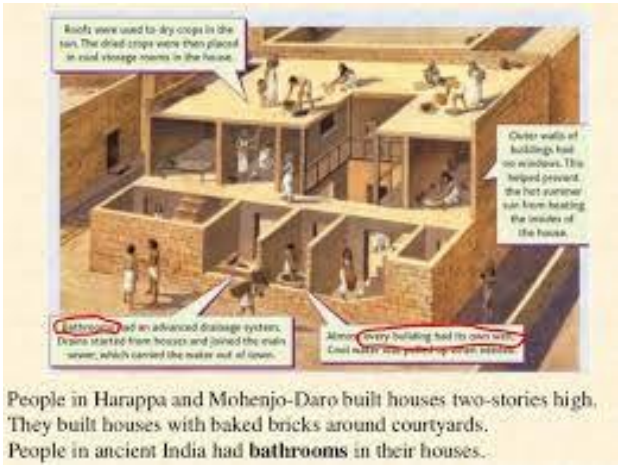


Figure 4 Illustration of Harappa and Mohenjo-Daro housing

Since earliest times, the village has been the pivot of administration in India. Its importance was naturally very great in an age when communication was slow and industrialization unknown. Town played a relatively unimportant part in ancient Indian life, the Vedic hymns frequently prey for the prosperity of village, but rarely for that of towns and cities. While describing the prosperity of a kingdom, Jatakas proudly give the large number of prosperous villages included in it, but are altogether oblivious to the existence of towns and cities that may flourished in it. In the Vedic age, states were small and this circumstance further enhanced the importance of the village. In later times, even when kingdoms became large, there was no change in the situation, because the village was the natural pivot of administration in a rural society. In modern times, governors often convene a conference of collectors to discuss important question of administrative policy; in ancient times kings like Bimbisara used to convene a meeting of village headmen for similar purpose. There is no doubt that village were the real centers of social life and important units in the country's economy. They sustained the edifice of national culture, prosperity and administration.

The history of Indian villages, in fact, goes back to the Vedic era when the kingdoms comprised a major city and several villages. The villages were a cluster of houses and the surrounding land was cultivated by the villagers. The concept of villages in India flourished during the late Vedic era or during the reign of the Mauryas. The Maurya Dynasty was founded by Chandragupta Maurya during 323 BC and the villages were a predominant part of the Indian social system at that time. The villages were administered in a structured way, through a Gram Sabha during the Maurya Dynasty. The religious and cultural scenario of the villages was primarily dominated by the Hindus, especially the Brahmans. The caste system of Hinduism was strictly maintained during that period.

Villages in Ancient India: There is sufficient evidence to suggest that the village was one of the important settlements in ancient India. The Rig Veda talks about the gram to which various families owed their allegiance. Valmiki’s Ramayana talks of two types of villages – the ghosh and the gram. The ghosh was smaller than the gram and was also known as vraja, or brij (signifying a cattle farm). Both types of villages had their officials, called the mahattar. There is also a reference to a senior official called gramani or gramik.

The Mahabharata talks of different types of settlements, for example, ghosh or brij (cattle farm), palli (small hutments), gram (villages around the forts or durgs), kharvata or pattan (towns), and pur, puri, nagar (cities of different types). The villages were linked with one another, culturally, socially and administratively.

The administrator of ten villages was called dashi; of 20 villages, vinshati; of 100 villages, shati, and of over 1,000 villages, sahasra gramadhipati. This is a clear indication of the interlink-ages between the villages. Kautilya ‘s Arthashastra suggests that river, hill, forests, ditches, tanks, bunds or trees demarcated village boundaries. He prescribed that villages should be situated at distances of one or two krosha (in Rajasthan, it is spelt as koss, which is the equivalent of two miles or 3.219 km) from each other so that in times of need, one village could go to the help of the other.

Villages Today:

There were 580,781 villages in India, according to the 1991 Census. Of these; the largest number (390,093) consisted of small-sized villages with a population of less than 1,000. In the category of 1,000-2,000 population are another 114,395 villages. Taken together, they represent 86 per cent of the villages of India. Villages with 2,000-5,000 population total 62,915, and those having a population of between 5,000-10,000 numbers 10,597. The highest concentration of very large villages, with more than 10,000 people, is to be found in the state of Kerala, which has 1,007 (of the 2,779) large villages.

At the time of the 2001 Census, the number of villages had gone up to 638,691. Like the 1991 Census, Uttar Pradesh (UP) continues to have the largest number of villages, although the state has become somewhat smaller with the state of Uttaranchal carved out of it. UP has 107,452 villages and Uttaranchal, 16,823, making a combined total of 124,275. While data exist for the average size of the village in each state in 2001, the, distribution of villages in different sizes is not yet available. On that basis, however, it can be said that the average size of villages in different states of India range between 17,281 (in Kerala) and 214 (in Arunachal Pradesh). In Uttar Pradesh, the average size of the village is 1,224 people, while in Uttaranchal, it is 375. It is interesting that most of the villages in the state of Kerala are in the category of large villages. The state has 1,384 villages, of which 1,007 are big villages with more than 10,000 people each. It has only seven villages that are below the size of 1,000 people.

1.3 Detailed study

Socio-economic

Social economics is a branch of economics—and a social science—that focuses on the relationship between social behavior and economics. Social economics consists of two broad perspectives that, though opposite in their approach, can be thought of as complementary. The first, pioneered by Noblest Gary Becker, applies the basic theoretical and applied tools of neoclassical microeconomics to areas of human behavior not traditionally considered as part of economics proper, such as crime and punishment, drug abuse, marriage, and family decisions.

The second, applies the ideas of other social sciences, such as sociology, psychology, and identity group studies to subjects of an economic nature like consumer behavior or labor markets. These practitioners of social economics use history, current events, politics, and other social sciences to predict social trends that could potentially impact the economy.

Figure 5 Baben sugar Factory

The main source of income for the village people is agriculture, jobs, self-employed. Around 300 hector is agriculture land and around 60percent of people are engaged in agricultural while 25 percent are engaged in jobs & others are self-employed. The village also has a degree and diploma engineering college, a school and a restaurant. The village has its own ambulance. A big sugar factory & Higher Educational facility is available for better employment, due to self-reliance new development of residential area is taking place. Many types of crops are to be farmed in the village like Wheat, Banana, Ladies-Finger, Bringer, Cucumber, Chili etc.

Physical & Demographical Growth

Demographic increase (or total change) is the variation of a population during the year, whether this be an increase or a decrease. It is the sum of natural increase, migration balances and sometimes an adjustment intended to restore consistency among various statistical sources.

Baben has population of 7472 people, out of which 3748 males and 3724 females. The village has 0.9936 sex ratio. With 1658 numbers house-holds.

As water is a basic need for all, Panchayat itself manage the water supply for each household. For storage purpose Panchayat having 7 overhead water tanks with the capacity varying from 20,000 to 1.5 lac liter within the area. They provide 160 LPCD water. They are using ground water as a source of water. They have provided water 6 hours daily and for the purification of water chlorination process is conducted. The charge each household only 10 rupees per year for water supply.

Geographical Detail

The village is spreaded over 1148.52 Ha land with 969.78 Ha of agricultural land.

Drinking Water / Water Management Facilities

Figure 6 Water tanks at baben

Village has good sources of water like treated tap water, reverse osmosed water, bore water, well water, tube wells, hand pumps, 5 numbers of overhead tanks and pond.

Drainage Network / Sanitation Facilities

Drainage is the natural or artificial removal of a surface's water and sub-surface water from an area with excess of water. The internal drainage of most agricultural soils is good enough to prevent severe waterlogging (anaerobic conditions that harm root growth), but many soils need artificial drainage to improve production or to manage water supplies.

The village is equipped with adequate drainage facility for removal of sanitary water. These drains are closed drains made of soil pipes network. But these drains are directly discharged into river without any kind of treatment.

Sanitation refers to public health conditions related to clean drinking water and adequate treatment and disposal of human excreta and sewage. Preventing human contact with feces is part of sanitation, as is hand washing with soap. Sanitation systems aim to protect human health by providing a clean environment that will stop the transmission of disease, especially through the fecal–oral route. For example, diarrhea, a main cause of malnutrition and stunted growth in children, can be reduced through adequate sanitation. There are many other diseases which are easily transmitted in communities that have low levels of sanitation, such as ascariasis (a type of intestinal worm infection or helminthiasis), cholera, hepatitis, polio, schistosomiasis, and trachoma, to name just a few.

Village has many public latrines-blocks and community-toilets with good condition but they don’t have bathing facilities. Solid waste from such latrines and road have no proper disposal systems.

Transportation & Road Network

Village road network in well developed, it has metal roads as village approach roads, village streets and main road. Village is closest to the GJ SH 187.

To connect village with its parent town and other locations villagers has to take local transportation auto-rickshaw, after auto-rickshaw villagers can reach to the bus station Shekhpur Bus stop from where they can take state transportation bus to travel further, or they have to go to railway station or bus station situated in parent town Bardoli.

Other Facilities

Village is provided with electricity by Gujarat Energy Transmission Corporation Limited (GETCO). Villagers can use this power supply for domestic uses, industrial uses, agriculture uses, commercial uses and public uses. Village's streets are provided with street-lightings. However, village lacks the facility of renewable energy like solar energy or wind energy.

1.4 SWOT analysis of Ideal village / Smart Village:

SWOT Analysis is a useful technique for understanding your Strengths and Weaknesses, and for identifying both the Opportunities open to you and the Threats you face.

- Strength:

Lake site

Local businesses

Schools and colleges

Religious places (temples/masjid)

Excellent water quality

Easy access to highway

Parking facilities

- Weakness:

No facility of clubs for adults and seniors

Need to upgrade village parks and playgrounds

Opportunities:

Construction of public library

Construction of movie theatre

Opportunities for local business

Redevelopment of vacant land

Entertainment parks

- Threats:

Algae in ponds

Accidents due to rough driving by college students

High commercial rents

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

By seeing the kind of the village and the infrastructure we get to know about the new concept which we can try something new which is a problem or can say issue coming in the ideal Village. According to our view public things about the village is a big prospect in the upcoming future if the thinking changes the automatically the development gets its way.

Baben village can be developed as an educational and recreational hub due to development of Avadh lake city and other upcoming infrastructure projects near the village and due to Vidyabharti college campus in the premises of Baben village. Local business and employment opportunities can also be improved with regards to increase in the physical and social development of the village.

- Connecting the village with the Wi-Fi facility.
- Segregation of waste i.e. Plastic and other garbage is going to be planned for the effective waste management.
- A mechanism to use sewage water for plantation.
- Pond development and redesigning of public garden.
- Reduce the Illiteracy rate.
- Opening Skill Development Centers.
- Increase Source for high wages.
- To provide infrastructure facilities like, water harvesting system, Different types of renewable energy source, Water conservation system.
- In this village also maintains for the bus stand, public toilet should be providing and drainage facilities etc. in existing public facilities are need in this village.

1.6 Benefits of the visits of Ideal village / Smart Village:

The visit to the Ideal village gives a wide idea about the place its geography, socio economic, infrastructure details. It explains us or gives an idea regarding the new things and futuristic things that could be a necessity for the village in next few year, thus this visit to the ideal Village is a good idea for starting the work regarding the Vishwakarma Yojana.

Smart Village is a concept adopted by national, state and local governments of India, as an initiative focused on holistic rural development, derived from Mahatma Gandhi's vision of Adarsh Gram (Ideal Village) and Swaraj (Self Reliance). Prime Minister Narendra Modi launched Sansad Adarsh Gram Yojana (SAGY) or SAANJHI) on 2 October 2014, Gandhi's

birthday, in addition to Smart Cities and Digital India, as a development program for India. The Parliamentarian's Model Village Scheme main goal is for each Member of Parliament and Minister to adopt a rural village and develop it into a model by 2019 under the SAGY guidelines. The vision of SAGY is an integrated village development plan, encompassing Personal, Human, Social, and Economic dimensions.

To study about the development as well as the infrastructure facilities of the villages which is an ideal village and can be considered as Benchmark for the development and growth of other villages which are developing or which needs development. By visiting such villages, we students of civil engineering can understand about the actual development that a rural area needs to satisfy its basic infrastructure facilities and to compete with urban area and can implement these techniques and facilities for the development of other villages which actually needs development and can implement the same for the development of the villages which are allotted to us in Vishwakarma Yojana Phase-VIII as our final year project. After visiting the village, we came to know about the various facilities that can be provided in a village for Reurbanization of village and to reduce the migration of people from villages to city areas. We also came to know about the various methodologies and techniques that can be used for the development of the villages. The sarpanch of Baben gram panchayat gave us a brief idea about the methods, techniques, strategies that muse be used for the development of any village and what plays an important role for the development of any village. As Baben has developed a lot during the year 2007 to 2020 we got a good knowledge related to rural development and general infrastructure facilities to be provided in a village. Baben can also be considered as bench mark for the development of other villages.

- We discussed the good and bad thing about village from village people.
- We saw all type of basic and primary amenities available.
- To know the strength and weakness of village.
- Know about Behavior of different village people.
- Get a surveyor experience in illiterate people.
- We see some different type of little requirements of village

2 Literature review

2.1 Introduction urban and rural village concept

Figure 7 Picture of Urban village

Urban villages are villages with medium population density housing with urban facilities like high-rise buildings, good public transit, infrastructures, sewage and water supply facilities, basic industries, etc. making it possible to provide sustainable living with high/medium living standards.

Urban is that area where the population density is more and new facilities are provided to the people. Urban area is the region surrounding a city. Most of inhabitants of urban areas have nonagricultural jobs. Urban areas have municipality, corporation, cantonment board or notified town area committee etc. According to census 2011, there are 7,935 towns, 4,041 statutory town and 3,894 census towns. All places with a municipality, corporation, cantonment board or notified town area committee, etc. A minimum population of 5,000; At least 75% of the male main working population engaged in non-agricultural pursuits

Figure 8 Picture of Rural village

Rural villages are villages with haphazard settlements and usually population ranges between 500 to 2500 which is more than hamlet but less than a town. These villages do not have any infrastructural facilities or least; most cases people live in kaccha houses.

All the areas which are not characterized as urban area is called rural area. In which the population is very low compared to urban areas. Mainly they depend on agricultural activities. According to census 2011, there are 6, 40,867

villages in India. The area where more than 75% of male population is associated with agricultural activity is known as rural area. Rural areas are also known as the 'countryside' or a 'village' in India. It has a very low population density. In rural areas, agriculture is the chief source of livelihood along with fishing, cottage industries, pottery etc. According to the Planning Commission, a town with a maximum population of 15,000 is considered rural in nature. In these areas the panchayat makes all the decisions.

2.2 Importance of rural development

Figure 9 Rural marketing

In 2019 it was reported than 65% of Indian population lives in rural areas and more than 70% of this population is associated with agricultural activities, which is major food source of country. With the development of rural areas, we'll not only provide better life style to poor rural people but economic condition of villages will rise and eventually it'll help in economic growth of nation.

With the development of rural areas, we can reduce unemployment, improve life style of people, reduce rate of migration, provide clean and hygienic environment, improve health condition, provide necessary education, better place to live and metal roads for easy communication with parent-town.

The national rurban mission (NRUM) follows the vision of ―development of a cluster of villages that preserve nature the essence of rural community life with focus on equity and inclusiveness without compromising with the facilities perceived to be essentially urban in nature, thus creating a cluster of Rurban villages. The objective of the national rurban mission is to stimulate local economic development, enhance basic services and create well planned rurban clusters. Bridging the rural-urban divide-via: economic technology and those related to facilities and services. Aims at finding ways to improve rural lives with participation of rural people themselves, so as to meet the required needs of rural communities.

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. Stimulating local economic development with emphasis on reduction of poverty and unemployment in rural areas.

Rural development has always been a matter of concern for government of any nation. Though there is a marked difference between the severity of development issues of developed and developing nations of the world, still the common agenda of rural development tops the hit list of national developmental concerns of any country. In India, there are 6,40,867 villages. The Father of the Nation, Mahatma Gandhi said that, “India lives in its villages”. It is true because 68.84 per cent of our country’s population of whom about 75 percent of them are dependent on agriculture, lives in villages (Census of India, 2011). Hence we can well imagine that a majority of the development agendas in India cater to rural issues and have the motto of rural development. In order to meet different challenges in rural areas, rural development interventions are made by development agencies concerned. Thus, this project will aim to discuss the concept of rural development, its priority in India and agriculture being an integral part of it, importance of rural development indicators and the global inventory of indicators, the concept of Model Villages in India, how they are the micro embodiments of the global inventory and lastly, the recent national initiative of Sansad Adarsh Gram Yojana which is in tandem with the concept of Model Villages. The article also provides suggestions and explores future scope for improvisation of the existing rural development programmers in order to make them more effective.

2.3 Ancient Villages / Different Definition of: Rural Urban Villages

Figure 10 Modern village

Rural areas have low population density and large amount of undeveloped land. Agricultural activities are more in rural areas. Census rural refers to individuals living in the countryside outside centers of 1000 or more population. Rural and small town refers to individuals in towns or municipalities outside the commuting zone of larger urban centers. A rural area is an open swath of land that has few homes or other buildings and not many peoples. A village is an area in which 70% male population is join with farming and in Indian region all the area which has no basic amenities provided.

In India, the "rural sector" means any place as per the "latest census" which meets the Following criteria:

- A population of less than 5,000
- Density of population less than 400 per sq. km and more than "25 per cent of the male.
- A Village is a clustered human settlement or community, larger than a hamlet but smaller than a town, with a population ranging from a few hundred to a few thousand.

In general, a rural area is a geographic area that is located outside towns and cities. Whatever is not urban is considered rural." Typical rural areas have a low population density and small settlements. The Census Bureau defines rural as "any population, housing, or territory NOT in an urban area". Its definition of rural is closely tied to its urban definition

2.4 Rural development issues

Rural areas have low population density and large amount of undeveloped land. Agricultural activities are more in rural areas. Census rural refers to individuals living in the countryside outside centers of 1000 or more population. Rural and small town refers to individuals in towns or municipalities outside the commuting zone of larger urban centers. A rural area is an open swath of land that has few homes or other buildings and not many peoples. A village is an area in which 70% male population is join with farming and in Indian region all the area which has no basic amenities provided.

In process of rural development numbers of issues and problems could obstruct the development, Major problems are poverty, illiteracy, unemployment, homelessness, criminal activities and violence.

Figure 11 Poverty in rural area

Poverty can occur due to lack of resources, when individual does not possess enough financial resources, they cannot afford their needs and requirements. And individual faces problems in their survival, the major part of this population is associated with agricultural sector, farming sector, etc.

Causes of poverty,

- Unemployment
- Working in minor jobs
- Illiteracy and unawareness
- Natural calamities and disaster
- No/Inadequate financial management
- Borrowing loans
- Overpopulation
- Migration

Unemployment is a condition of a person who is not engaged in any occupation and does not generates any income. Such people majorly fails in fulfilling needs and requirement, and experiences poverty.

Working is minor jobs such as farming, fishing, agriculture, etc., such jobs doesn't generate much of income causes an individual to experience poverty. Sometimes these people have to wait for season to come for demand and selling of their manufactures.

Illiteracy and unawareness, when individual does not possess skills reading, writing and arithmetic or when a person is unaware of basic schemes and method of surviving in live hood are tensed to experience poverty.

Natural calamities and disaster the unexpected natural phenomenon like earthquake, tsunami, cyclone, flood, drought, etc. disturbs the system of living and destroy individual at greater extend the person or whole community is likely to face poverty.

Figure 12 Drought in Maharashtra

No/Inadequate financial management illiterate and unaware people of rural area, they do not acquire knowledge of financial management, they don't save money or make any investment, they spend their income on unnecessary things and experience big losses.

Borrowing loans, when people borrows loans from moneylenders and later unable to pay the loan, becomes bounded labours and fall into less payment jobs.

Overpopulation, in many rural houses people usually live in large families, which means a couple having more than two children, sometimes they have six or more children. These families are nuclear families. Their incomes may not enough to fulfil needs and requirement of every-member of house.

Figure 13 Migration from villages to cities

Migration, people are likely to think that in urban cities they will be able to get better life style opportunity, but when incapable people migrates, they are unable to possess expensive housing accommodation and become homeless or creates slums. Such people faces problem in income generation and experiences poverty.

People move from villages and towns to cities for numerous kinds of reasons. However, one common reason they all have is in my opinion, a chance of better life. Subsequently, when they grow up in villages and small towns they get the idea from their parents and also from the world wide global network, of what kind of opportunities they can have living in cities contrary to where they are living. Theoretically, they can earn a lot of money in cities than with that labour and talent in a small town. But in order to earn adequate amount of money they have to be well educated which many villagers are not in countries like India.

2.5 Various infrastructure guidelines with the norms for village for the provisions of different infrastructure

1. Physical Facilities:
    a. Road facilities:

Rural roads have gradually extended to farmland and rural logistics centers, providing guarantees for increasing farmers' income and agricultural development. The unobstructed rural roads in all directions have enabled agricultural and side-line products to be transported in a timely manner, which has solved the problem of increasing output, increasing income and transporting agricultural products. With the improvement of rural roads, farmers can enjoy the same convenient transportation facilities as urban residents and promote the integration of urban and rural areas. Due to the convenience of transportation, more and more urban residents began to travel to rural areas to make tourism such as farmhouse music and rural tourism very popular. This has become a new bright spot for rural farmers to increase their

income. In recent years, due to the relatively low cost of rural economic development, the road bottlenecks in urban and rural economic development have been resolved and more and more manufacturers have begun to build their factories in rural areas so that the rural surplus labour can find a job nearby, which not only solves the surplus rural labour force employment issue, but also increased the income of farmers.

Figure 14 Village Road

An ideal village must have good road facilities that the people can easily move from one place to other. The roads linking with the other nearby village or town or city must be provided.

Dwelling Houses: The dwelling-house in an ideal village are very neat and clean. The dwellers of these houses look to the house sanitation and house-drainage. The houses have sufficient windows to let in light and air. All the houses are roofed by good tiles at least. Electricity: The electricity should be supplied 24 hours. The village should have good facilities of electricity because most of the work nowadays depends on electricity.

2. Social Facilities:

    a. Sanitation and Drainage:

An ideal village has good system of sanitation and drainage. Because filth and rubbish of the village should be regularly removed away into the compost pits. An ideal village has very good drains so that the dirty water of the village is properly drained away.

    b. Drinking Water:

An ideal village should have good supply of drinking water. There are enough tube-wells in an ideal village. There are separate ponds for men and cattle.

    c. Agriculture and Industry:

People of an ideal village are good farmers and good artisans. They grow food crops, commercial crops and oil-seeds. They take up improved method of farming. They do all kinds of home industry including spinning and weaving.

    d. Educational Facilities:

There are Primary schools, High schools and craft schools in an ideal village. Primary education is free and compulsory.

Sr. no.	Description	Population served per unit	remarks
1.	Pre-primary, nursery	2500	-
2.	Primary school (I to V)	5000	Strength of 500
3.	Senior secondary school (VI to XII)	7500	Strength of 1000

Table 1 Education Facilities

e. Clinical Facilities:

Figure 15 Veterinary hospital in village

Along the assurance of veterinary care being accessible at all times, the animal welfare awareness of the people needs to be increased to improve animal welfare long-term. The people must be able to see whether their animals are healthy and if not, know how to proceed and what to do. Therefore, for any treatment administered by our partners, the animals' owners are taught some basic knowledge in primary care and animal health.

They learn about nutrition, animal care, housing and the necessity of vaccinations and rest periods for cattle and donkeys. In additional separate training sessions, the people are taught about animal welfare and animal health in general, to accomplish the foundation of knowledge that is required to be a responsible animal owner.

3. Distribution facilities

There should be at least one milk distribution facility on every 5000 population of size 150 sqm.

Figure 16 Distribution facility for milk distribution

Sr. no.	Description	Population served per unit	remarks
1.	Anganwadi	2500	200-300 sqm
2.	Community room	5000	750 sqm
3.	Community hall	15000	2000 sqm
4.	Religious facilities	5000	400 sqm
5.	Organised green	5000	0.5 Ha
6.	Sports facilities	5000	5000 sqm

Table 2 Socio-Cultural Facilities

4. safety facilities

There should be at least one sub-fire station facility within 3-4 km radius with 0.6 Ham area.

5. commercial facilities

There should be at least one convenience shopping centre facility on every 5000 population of size 1500 m^2.

Figure 17 Convenience store

A convenience store, convenience shop, or corner store is a small retail business that stocks a range of everyday items such as coffee, groceries, snack foods, confectionery, soft drinks, tobacco products, over-the-counter drugs, toiletries, newspapers, and magazines. In some jurisdictions, convenience stores are licensed to sell alcohol, although many such jurisdictions limit such beverages to those with relatively low alcoholic content such as beer and wine. Such stores may also offer money order and wire transfer services, along with the use of a fax machine or photocopier for a small per-copy cost. Some also offer to sell tickets or recharge a smart card, like the OPUS card in Montreal. They differ from general stores and village shops in that they are not in a rural location and are used as a convenient supplement to larger stores.

Various Measures for Rural Development

Rural development can be defined as an integrated development of the area and the people through optimum development and utilization of local resources-physical, biological and human and by bringing about necessary institutional, structural, and attitudinal changes of rural public.

Policy for developing uplifting the lifestyle of the farmers. Policy of rural industrial development - integration of farming and industries, farmer's Industrial co-operatives and industrial enterprises. Modernization of rural society and cultural policies and planning for transfer of loyalty and values from traditional technology to modem technology.

Many Programs / Plans such as IRDP (Integrated Rural Development Program), DDP (Desert Development Program), DPAP, ITDP, NREP, SFDA, MFAL and TRYSEM etc. Scenario: Rural / Urban village of Gujarat as per Census 2011 and latest

Sr. no.	Detail	2011	2020
1.	Total population	60,439,692	70,444,935
2.	Total male population	31,491,260	36704353
3.	Total female population	28,948,432	33740582
4.	Total growth of population	19%	16.55%

Table 3 Gujarat population as per Census 2011

2.6 Scenario: Rural / Urban village of India population Growth

The current population of India is 1,390,308,750 as of Tuesday, April 6, 2021, based on Worldometer elaboration of the latest United Nations data.

- India 2020 population is estimated at 1,380,004,385 people at mid-year according to UN data.
- India population is equivalent to 17.7% of the total world population.
- India ranks number 2 in the list of countries (and dependencies) by population.
- The population density in India is 464 per Km2 (1,202 people per mi2).
- The total land area is 2,973,190 Km2 (1,147,955 sq. miles)
- The median age in India is 28.4 years.

Sr. no.	Detail	2011
1.	Total population	1,210,854,977
2.	Total male population	623,724,568
3.	Total female population	586,469,294
4.	Total Literacy	74%
5.	Male	82.10%
6.	Female	65.46%
7.	Sex ratio(Per thousand male)	940

Table 4 Indian Population as per census 2011

2.7 Vishwakarma Yojana: An Approach Towards Rurbanisation for Pali Village, Kheda District.

Akshay Ardeshasna & Rachit Sitapara Batchelor of Civil Engineering, Prof. H. J. Chauhan, Birla Vishwakarma Mahavidhyalaya.

This paper contains development aspects of PALI VILLAGE, KHEDA DISTRICT. They've explained how population of India is distributed in urban and rural areas. They've mentioned that how villages contribute in GDP of a nation and how it is beneficial to develop villages to increase national income. They've also mentioned the government schemes implemented for development of villages namely JYOTIGRAM YOJANA, SARDAR PATEL AAVAS YOJANA and E-GRAM.

After complete investigation of facilities available in village and lacking facilities they've came to the conclusion,

a. Drainage system

b. Dry compost toilet

c. Community hall

d. Biogas plant

This four out of many design aspects had been selected and adequate designs are given for many advantages for village and its people. They have mentioned,

Advantages of drainage system 1. Prevents water accumulation, 2. Reduces soil Erosion, 3. Removes toxic materials and disease organisms.

Advantages of Dry compost toilet 1. considerable amount of fresh water will be saved, 2. Separate treatment for faeces and urine is possible which is more advantageous, 3. Direct disposal of sewage is eliminated, 4. Compost obtained from treatment is good soil conditioner and increase soil fertility, 5. Urine can directly be applied to corps which is rich in nitrogen, phosphorous and potassium.

Advantages of Community Hall 1. It provides the place of celebration at various occasion and tradition, public meeting and citizen on various issues, politicians can do election campaigning, 2. It provides cheapest place for rent for party and functions.

According to them providing lacking facilities helps in improvement of life-style of village people. And creates hygienic and peaceful environment to live.

2.8 Vishwakarma Yojana an Approach Toward Rurbnisation, Lilakha Village, Rajkot District.

Pratik Tripathi, Mayursinh Chudasama & Shilpa Bagda Bachelor of Civil Engineering, Atmiya Institute of Technology and Science. Prof. Akshay B. Ardeshna AITS, Rajkot.

This paper contains development aspects in Lilakha village, Rajkot district, Gujarat. In this paper authors have shown importance of rural development for improving lives of village people and keep people away from migration. They have also mentioned that developing villages increases income potential of the village and contributes in GDP of country.

For development of villages many government schemes are implemented some of which authors have mentioned which are,

- Mahatma Gandhi National Rural Development Guarantee Act (MGNREGA)
- Pradhan Manti Gram Sadak Yojana (PMGSY)
- Indira Awas Yojana (IAY)

Authors have also mentioned visiting ideal village and understanding requirement of village, practical possibilities and ideas of execution. After visiting ideal village and considering norms gap analysis has been done and some of design concepts has been taken in consideration which are,

- Biogas plant
- Roof top Rainwater harvesting for school building

Design of biogas plant has been given following features,

- Digester of capacity 640 m^3
- Gas holder of capacity 300 m^3
- Daily inlet and outlet tank of 6 m^3 capacity

Authors have explained importance of rainwater harvesting,

- Harvesting rain water reduces supply stresses on storage dams.
- Collecting rain water can reduce water bills.
- By collecting rain water and storing considerably reduces stresses on storm-water drainage.

Rain water harvesting system was designed for school building having following features

- Catchment area of 273.21 m^2
- Storage capacity of 1025 m^3
- Overall cost of project 709614 Rupees (year 2017)

From this paper we can get better idea of data collection, data analysis, planning and designing of different facilities for development of village.

2.9 Vishwakarma Yojana an Approach Towards Rurbanisation Pansar

Chavda Nihalsinh, Patel Utsav, Vaghela Reghuvirsinh & Patel Dhavalkumar – Department of Civil engineering SVBIT, Gandhinagar.

This paper explains how an approach of government of Gujarat Vishwakarma Yojana in helpful for development of rural area by preparing 'Ready to Deliver' design from under graduation student for different lacking facilities in rural areas to make healthy environment of village and improving life style of village people.

This study was done in Pansar Village, Gandhinagar, Gujarat, India. They have mentioned basic steps of study for development of village

After all necessary studies of village, they decided to provide design for,

Repair and maintenance of existing public building (State transport bus stop).

To development of village compare to the city area in the basic facility to needed for people and their amenities and to study whole village. How can development the basic needed and their requirement. Find out of the village data and survey of the whole village and improving the growth of village.

There are a number of schemes of the Government which are being operated and run for rural development in the rural areas of the country. Evaluation taken up so far for these schemes has been more or less in a piecemeal form, i.e. generally for each scheme separately. It thus becomes difficult to get an overall picture of the development in totality in the rural areas and is difficult to assess the impact of any one particular scheme, since most of the schemes are

complementary and supplementary and most of the time they all are contributing to the impact. Hence, a view has been formed to take up studies on trial basis to assess the impact of the important schemes as a whole in rural development in selected villages.

- Creation of Infrastructure

To provide connectivity, civic and social infrastructure along with provision of alternative Economy generation is the key pillars that the concept hinges on. Basic Physical Infrastructure

To provide Water Supply, Transport, Sewerage and Solid Waste Management should be the priority focus and be provided.

To provide internal roads within village settlement, Efficient Mass Transportation systems to improve connectivity between urban and rural areas,

Public transportation facilities that need to be developed like bus stops, transport depot etc.

- Basic Social Infrastructure

To provide Health and Education facilities should be provided and ensure proper delivery of facilities to village dwellers. Promote integrated development of rural areas with provision of quality housing, better connectivity, employment opportunities and supporting physical and social infrastructure. Reduce migration from rural to urban areas due to lack of basic services and sufficient economic activities in rural areas. Identification of Sanitation Facilities

Development of infrastructural facilities in vadi village

Moh. Abrar Shaikh, Krunal Khandelwal, Meet Desai & Nirav Mehta, Department of Civil Engineering, Sarvajanik College of Engineering and Technology, Surat, Gujarat, India.

Bhaskar bhatt – PG in-charge (ME, TCP), assistant professor, Sarvajanik College of Engineering and Technology, Surat, Gujarat, India.

This paper consists Ideas of development of rural area under new concept of Rurbanisation. For this study Vadi village area is selected, this village have population of 5648(Year 2011) people out of which 2542 people are involved in economic activities involving 253 farmers and 1470 agricultural labour.

After techno-economic survey and gap analysis different designs of required facilities were proposed which were,

- Solid waste management
- Sanitation system
- Recreation centre

Solid waste management is a term that is used to refer to the process of collecting and treating solid wastes. It also offers solutions for recycling items that do not belong to garbage or trash. As long as people have been living in settlements and residential areas, garbage or solid waste has been an issue.

For solid waste management authors suggested open window composting method, in this method 3300 kg/day solid waste is estimated and door-to-door scheme for collection of solid waste is said to be adopted with 1.2 tones capacity of garbage vehicle is required.

For open window composting method 1.6 m3 of pit is required for dumping of solid waste for single day and composting will required 40 days, so that 40 pits will be required.

After 40 days of open window composting waste should be recollected and shall be used as fertilizer.

The second proposed design is smart sanitation system, benefits of this system are stated as,

- By giving treatment to biological waste reduces spread of disease and return valuable fertilizer to be used in farming.
- It'll help in reducing pollution of open water sources like ponds and small streams.
- It will reduce use of clean water which can be used for other important purposes.

2.10 Study and development of village as smart village

Utkarsha Shindepatil, Deepali Tule, Archana Manjar, Namdev Ingle, Ruturaj Somwanshi, Dr. V. S. Rajamanya, Prof. A. Deshmukh. M.B.E.S. College of Engineering of Ambajogai, Faculty of Civil Engineering, Dr. Babasaheb Ambedkar Marathwada University Aurangabad, Maharashtra, India

This paper contains Ideas and concepts of development of village as smart village. They stated that smart village is bundle of services of which are delivered to its residence and business in an effective and efficient manner. They have mentioned that development of village area with the concept of smart village acts as a catalyst for development in education, health, security, environment, productive enterprise of nation.

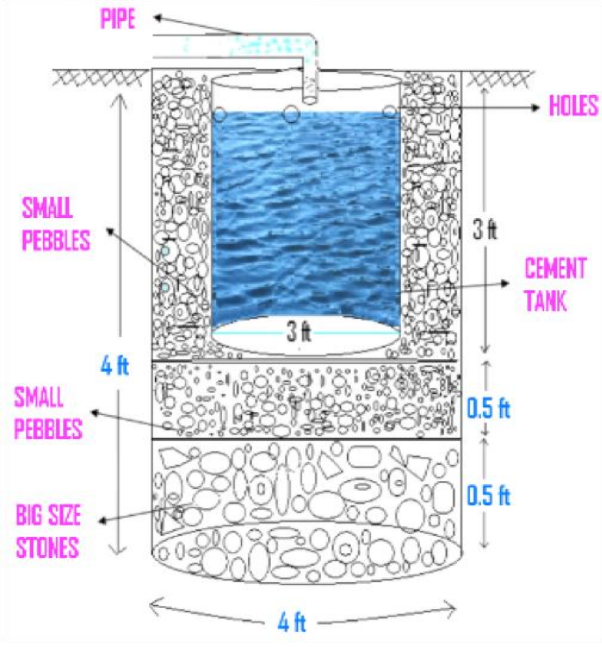


Figure 18 Schematic diagram of magic soak pit

People from backward villages seeks to get modernized, for which they migrate to urbanized areas for facilities of higher education, better employment opportunities and healthcare.

To make smart village a village needs to be self-dependent in providing services, employment and well connected to the world market. The smart village helps in correcting oversight by providing accommodation for continuous family relationships without affecting the culture of generations.

For development of pleasant and healthy environment for village different designs were proposed,

Magic pit or soak pit

It is shallow pit filled with porous material which allows water to pass through, which partially treat water waste water and comparatively better way to discharge freely in ground.

Benefits of this method of disposal are,

It can be built easily and with locally available material.

Not very large area is required.

Low initial and operational cost.

Recharge of ground water.

For Javalgao village total 1095 magic pits are required, which will cost approximately 2.3 million rupees.

Biogas production

Figure 19 A biogas plant

The biogas plant is made of FRP material which is resistant to water, sunlight and electricity, if it is well maintained, it can be used for up to 25 years. The mixture of animal excreta, kitchen waste and water is converted into slurry, this slurry is then treated under anaerobic condition to breakdown organic matters and producing methane and carbon-dioxide. This methane gas is collected and supplied to kitchens. The biogas plant is made of material which is resistant to water, sunlight and electricity, if it is well maintained, it can be used for up. The mixture of animal excreta, kitchen waste and water is converted into slurry, this slurry is then treated under anaerobic condition to breakdown organic matters and producing methane and carbon-dioxide. This methane gas is collected and supplied to kitchens.

For suppling biogas to each house of 1095 numbers, 80 plants are being provided to 80 individual houses and 500 plants were provided for rest (1 plant for at every 2 houses) out of which 15 houses already had plants at their own. In total 580 plants are required to construct, each plant costs 25000 rupees, total cost of constructing 580 plants will be 1,45,00,000 rupees. In this government provides subsidy, to general category 9,000 rupees and to backward category 11,000 rupees.

Providing these all facilities will help in reducing problems of Javalgao. With these facilities life-style of village people will get higher and cultural, social, economic, environmental difficulties will reduce. It will make village independent at some extend and contribute towards development of nation. It will make village independent at some extend and contribute towards development of nation.

The authors had provided many other facilities which are as follow,

Sr.no.	Description	Estimated cost (rupee)
1.	Solid waste management	5,50,000
2.	RO plant and water treatment	30,00,000
3.	Solar street light	30,000
4.	Solar panel	16,50,000
5.	Minibus	13,50,000
6.	Loudspeakers	1,20,000
7.	CC-TV cameras	70,000
8.	Wi-Fi connection	4,00,000
9.	Roads	12,00,000

Total initial cost for all the above facilities is estimated to be 25.18 million rupees.

2.11 Other Projects / Schemes of Gujarat / Indian Government

Integrated Rural Development Program (IRDP):

First introduced in 1978-79, IRDP has provided assistance to rural poor in the form of subsidy and bank credit for productive employment opportunities through successive plan periods. Subsequently, Training of Rural Youth for Self Employment (TRYSEM), Development of Women and Children in Rural Areas (DWCRA), Supply of Improved Tool Kits to Rural Artisans (SITRA) and Ganga Kalyan Yojana (GKY) were introduced as sub-programs of IRDP to take care of the specific needs of the rural population.

Objectives of the Integrated Rural Development Program (IRDP)

- The main objectives of the Integrated Rural Development Program are listed below
- To help families who lie below the poverty line and to enhance their state of living
- To empower the poor by helping them develop at every level.
- By providing productive assets and inputs to its target groups is the helpful work done by the program.
- The assets provided in the program could be in the primary, secondary or tertiary sector.
- A kind of financial assistance to these families in the form of government subsidies as well as loans or credit from financial institutions are encouraged by the program

Wage Employment Programs:

Anti-poverty strategies, like assistance to the rural poor families to bring them above the poverty line by ensuring appreciable sustained level of income through the process of social mobilization, training and capacity building. They create rural infrastructure which supports further economic activity. It encompasses Swarnjayanti Gram Swarozgar Yojana (SGSY), Sampoorna Grameen Rozgar Yojana (SGRY) and National Rural Employment Guarantee Act (NREGA) etc. NREGA is an act of parliament.

Employment Assurance Scheme (EAS):

EAS was launched in October 1993 covering 1,778 drought-prone, desert, and tribal and hill area blocks. It was later extended to all the blocks in 1997-98. The EAS was designed to provide employment in the form of manual work in the lean agricultural season. The works taken up under the program were expected to lead to the creation of durable economic and social infrastructure and address the felt needs of the people.

Objective of Employment Assurance Scheme (EAS):

The primary objective of the Employment Assurance Scheme is to provide gainful employment during lean agricultural season in manual work to all able bodied adults in rural areas who are in need and desirous of work, but cannot find it.

The secondary objective is the creation of economic infrastructure and community assets for sustained employment and development. Salient Features

The scheme is operative in the all-rural blocks of the country.

It is a demand driven scheme with no fixed earmarking of annual funds for any district or block.

Men and women over 18 years and below 60 years of age, nor-mally residing in the villages are covered.

3 Smart Village Concept Idea and its Visit

3.1 Introduction: Concepts, Definitions and Practices

Concept of smart (cities/village)

The basic concept of smart village is to collect community efforts and strength of people from various streams and integrate it with information technology to provide benefits to the rural community. According to Mahatma Gandhi's philosophy and thoughts smart village project provides, Global means to the local needs.

Following concepts can be applied to a city to make smart (cities/village),

- Adequate water supply
- 24x7 electricity supply
- Sanitary facilities including solid waste management
- Ease of mobility and accessibility to public transport
- E-government and digital services
- Safety and security of every citizen
- Improved health and higher Education

Definition of smart (cities/village)

Smart cities are urban areas which uses modern technologies that uses electrical methods and sensors to collect data, and to use such data for managing resources, providing better government services and to improve the operation of the city.

Smart village where bundle of services is provided to rural residents and improve their life style to control migration and keep people engaged in agriculture sector, farming sector, etc.

smart city also defined as smart cities use information and communication technologies (ICT) to be more intelligent and efficient in the use of resources, resulting in the cost and energy savings, improved service delivery and quality of life, and reduced environmental footprint all supporting innovation and the low carbon economy. The most representative features of the Smart City are shared ICT structures, time optimization, open government, energy efficient technologies, reduced emissions, and orientation towards green environment.

Practices of smart (cities/village)

1. Punsari Village

Punsari is a top smart village in Gujrat. Population of village is 6000. This village is located at 80 km away from the Gandhinagar & 20 km away from the Parvati hill. It follows punchayat system & 6 hectors land use as the agricultural purposes. Due to the following reasons, it has declared as smart village.

- 66 kw sub-station
- WiFi connectivity

- Air-conditioning system and CCTV camera in primary school
- Minibuses use for the transportation within village
- Reverse osmosis plant for supply clean water
- Completely underground sanitary and drainage system

2. Hiware Bazar

Hiware bazaar also a smart village in Maharashtra. Population if this village 1250 peoples. This village lies in drought-prone Ahmednagar. They are facing main problem of water so due to lack of the water the people are migrate so they main goal is conservation of the water they are used for the drip irrigation system for the conservation of the water also they are developed water harvesting system and also they are developed the percolation tank for the rising of the ground water table.

Hiware Bazar, a village in Maharashtra's drought-prone Ahmednagar district, was sliding into an abyss after degrading its environment. But in less than a decade it turned itself around into one of the most prosperous villages of the country. There was no magic wand, just common sense. It used funds from government schemes, to regenerate its natural resources--forests, watershed and soil--led by a strong village body. It had a role model in the district--Ralegan Siddhi, the village Anna Hazare turned around. Now Hiware Bazar is in turn an exemplar for the whole of Ahmednagar district, where others have used the same scheme to conserve and prosper. neha sakhuja travelled the district and came back with an inspirational story.

Sunderbai Gaekwad took the toughest decision in her life a decade ago--to return to her village from Mumbai. Even the precarious existence in Mumbai's slums looked good in comparison to life in Hiware Bazar, her village in Maharashtra's semi-arid Ahmednagar district, hit by constant drought and crop failure. "The village didn't offer any hope," she says. Gaekwad doesn't regret the decision. "This year, I earned Rs 80,000 from the onions I grew on 8 acres (over 3 hectares, ha). I am no more a daily labourer," she says.

Gaekwad returned to the village in 1998 after hearing that the state's Employment Guarantee Scheme (egs) was being implemented in her village. "Work on demand was the incentive," she says. "But what made the difference was the water conservation work that the village took up using the scheme." Gaekwad started sharecropping soon after her return on 2 ha. Water ensured by watershed development gave assured returns; wages from egs work supplemented that. In 2007, she bought 3 ha with a bank loan and started growing onions. The gram sabha (village council) stood guarantee. She doesn't need egs work anymore, like most other villagers.

3.2 vision - goals, standards, and performance measurement indicators:

Goals: Determine which technologies, strategies, applications, and institutional arrangements demonstrate the most potential to address and mitigate, if not solve, transportation challenges identified within a city.

Vision: Mobility on Demand (MOD) is an emerging concept built on shared use approaches and a shift in mass transit. It augments public transportation and supports the efficient

movement of people. A major component includes advanced traveler information systems that provide real time traffic, transit, parking, and other transportation-related information to travelers.

The vision of smart cities is the urban centre of future, made safe, secure environmentally green, and efficient because all structure – whether for power, water, transportation etc. Smart cities Standards into 3 main levels, Strategic, Process and Technical

Level 1: Strategic: These are smart city standards that aim to provide guidance to city leadership and other bodies on the "process of developing a clear and effective overall smart city strategy". They include guidance in identifying priorities, how to develop a roadmap for implementation and how to effectively monitor and evaluate progress along the roadmap.

Level 2: Process: Standards in this category are focused on procuring and managing smart city projects in particular those that cross both organizations and sectors. These essentially offer best practices and associated guidelines.

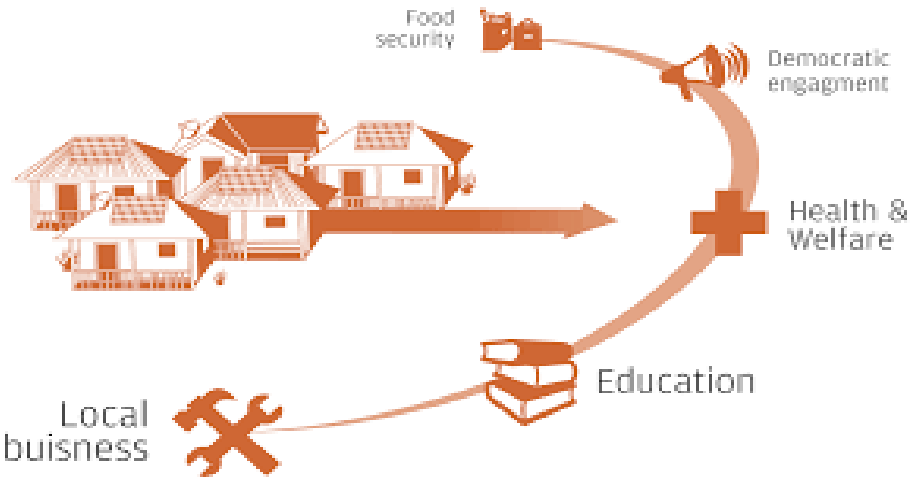
Level 3: Technical: This level covers the myriad technical specifications that are needed to actually implement Smart City products and services so that they meet the overall objectives.

What is performance measurement? (PM)

PM is a management technique that organization uses for regular monitoring and reporting of the performance of various programmers, departments, or work units. It is concerned with not only how much is being done, but also how efficiency of what quality. The City Managers‟ Association of Gujarat (CMAG) with technical assistance from International City/County Management Association (ICMA) and financial assistance from USAID had undertaken a programmer to introduce benchmarking as an analytical tool for policy makers to support the decision-making process in 2000. The performance assessment in this programme was applicable to all infrastructure aspects that come under the jurisdiction of a municipality and the financial aspects.

- Quantitative indicators that can be presented with a number.
- Qualitative indicators that can't be presented as a number.
- Leading indicators that can predict the outcome of a process.
- Input indicators that measure the amount of resources consumed during the generation of the outcome.
- Process indicators that represent the efficiency or the productivity of the process.
- Output indicators that reflect the outcome or results of the process activities.
- Practical indicators that interface with existing company processes.
- Directional indicators specifying whether or not an organization is getting better.
- Actionable indicators are sufficiently in an organization's control to effect change.
- Financial indicators used in performance measurement and when looking at an operating index.

3.3 Bench mark-vision goals: Smart village



Initiative focuses on improved resource use efficiency, empowered local self- governance, access to assured basic amenities and responsible individual and community behaviour to build a vibrant and happy society.

Figure 20 Benchmarks to smart village

Structural Planning:

At least 20% of all residential units to be occupied by economically weaker sections in each Transit Oriented Development Zone 800m from Transit Stations. 95% of residences should have daily needs retail, parks, primary schools and recreational areas accessible within 400m walking distance.

Transport:

Maximum travel time of 30 minutes in small & medium size cities and 45 minutes in metropolitan areas. High quality and high frequency mass transport within 800 m (10-15-minute walking distance) of all residences in areas over 175persons / ha of built area.

Solid management:

100% households are covered by daily door-step Collection system. 100% collection of municipal solid waste. 100% segregation of waste at source, i.e. biodegradable and non-degradable waste 100% recycling of solid waste.

Electricity:

100% households have electricity connection 24 x 7 supply of electricity. 100% metering of electricity supply.

3.4 Technological Options for Smart Cities:

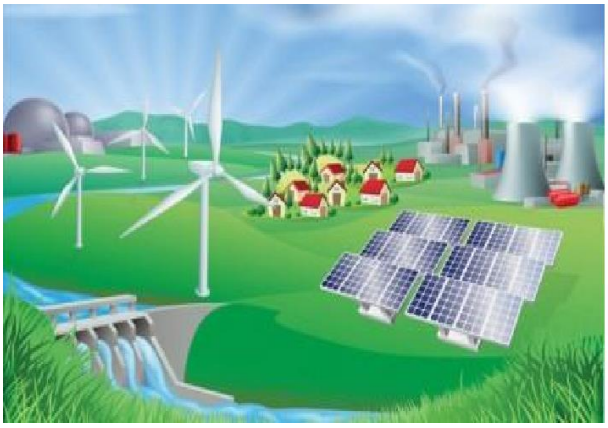
- Smart Energy
- Smart Mobility
- Smart Infrastructure
- Smart Public Services

• Smart Care

Smart infrastructure: The city has good infrastructure may move forward with other technologies and make meaningful changes in future city plan.

Smart mobility:

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



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

Smart transportation: A smart city supports multi-modal transportation, smart traffic lights and smart parking.

3.5 Issues & Challenges

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

Technology: There are certain technologies that are a part of the project and it is expensive to use them. Because of the advancement, some technologies are borrowed from other countries which make it more expensive. This hinders the success of smart city project. Another

challenge is in the discovery of technology and the need for a medium that can bring technology users and creators together to adopt faster platforms.

Problem of regulation and governance: Owing to a large set of investors, the list of stakeholders in the project is growing. In case of any legal issues, there is a strong need of separate legal framework in the stages of smart city mission. When the project is big there is a need of effective communication between central government, state and local governments.

3.6 Smart Infrastructure - Intelligent Traffic Management

Intelligent transport system (ITS) An intelligent transportation system (ITS) is an advanced application which aims to provide innovative services relating to different modes of transport and traffic management and enable users to be better informed and make safer, more coordinated, and smarter use of transport networks.

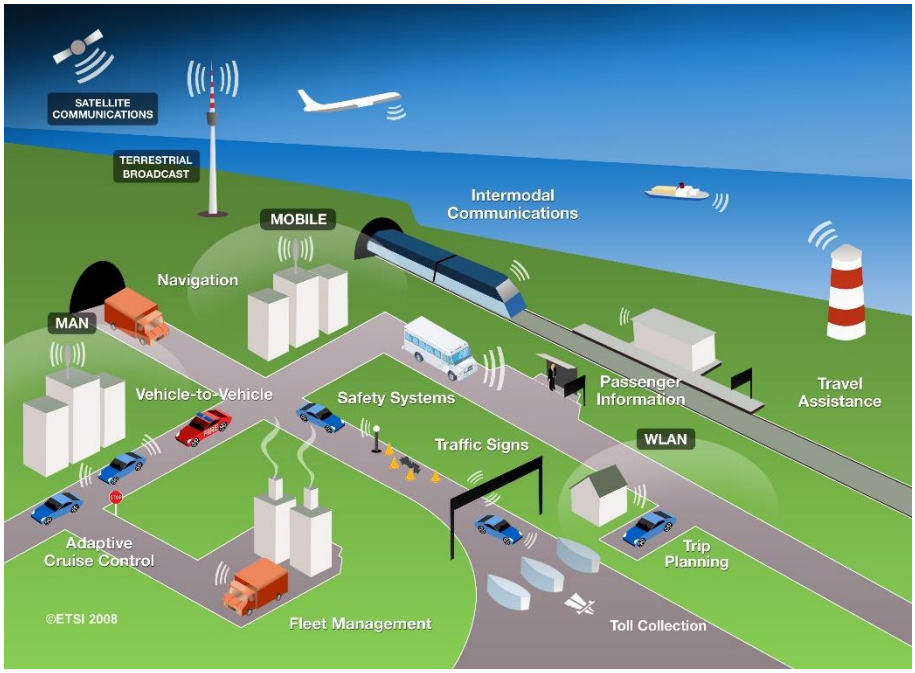


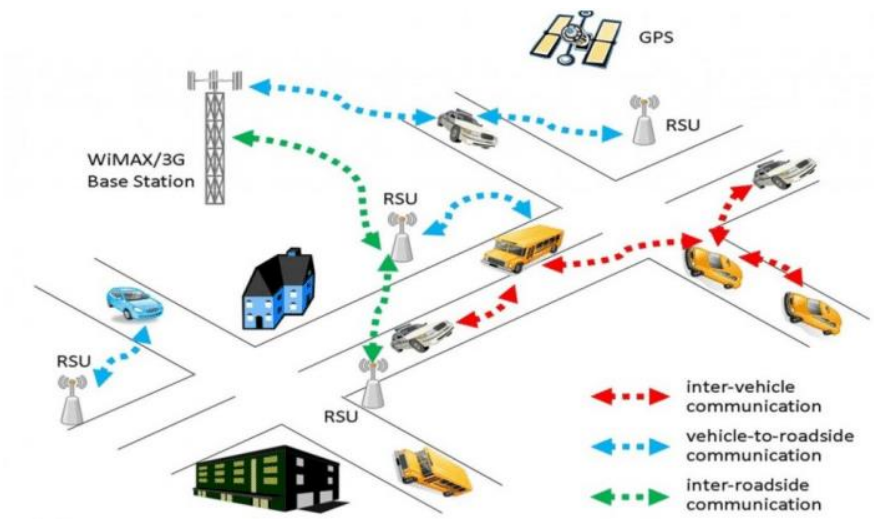
Figure 21 Intelligent transport system

In the developing world, the migration from rural to urbanized habitats has progressed differently. Many areas of the developing world have urbanised without significant motorisation and the formation of suburbs. A small portion of the population can afford automobiles, but the automobiles greatly increase congestion in these multimodal transportation systems. They also produce considerable air pollution, pose a significant safety risk, and exacerbate feelings of inequities in the society. High population density could be supported by a multimodal system of walking, bicycle transportation, motorcycles, buses, and trains.

Other parts of the developing world, such as China, India and Brazil remain largely rural but are rapidly urbanising and industrialising. In these areas a motorised infrastructure is being developed alongside motorisation of the population. Great disparity of wealth means that only a fraction of the population can motorise, and therefore the highly dense multimodal transportation system for the poor is crosscut by the highly motorised transportation system for the rich.

Intelligent transport systems vary in technologies applied, from basic management systems such as car navigation; traffic signal control systems; container management systems; variable

message signs; automatic number plate recognition or speed cameras to monitor applications, such as security CCTV systems, and automatic incident detection or stopped vehicle detection systems; to more advanced applications that integrate live data and feedback from a number of other sources, such as parking guidance and information systems; weather information and the like.



Additionally, predictive techniques are being developed to allow advanced modelling and comparison with historical baseline data. Some of these technologies are described in the following sections.

- Wireless communications
- Computational technologies
- Sensing
- Video vehicle detection
- Bluetooth detection
- Radar Detection
- Information fusion from multiple traffic sensing modalities

3.7 Road Map and Safe Guards for Smart Cities Road Map

A smart city roadmap consists of four/three (the first is an initial check) major components.

1. Study the Community: Before deciding to build a smart city, first we need to know why. This can be done by defining the benefits of such an initiative. Study the community to know the Citizens, the business's needs – know the citizens and the community's unique qualities, such as the age of the citizens, their education, hobbies, and attractions of the city.
2. Develop a Smart City Policy: Develop a policy to drive the initiatives, where roles, responsibilities, objective, and goals, can be defined. Create plans and strategies on how the goals will be achieved.
3. Engage the Citizens: This can be done by engaging the citizens through the use of e government initiatives, open data, sport events, etc.
4. GIS is an essential economic development tool that many cities use for planning, analyses, and building lively communities that attract businesses and residents.
5. The second step in establishing a smart city roadmap is by developing a policy that drives the whole initiatives. The policy needs to define the roles, responsibilities, strategies, and objectives of the smart cities.

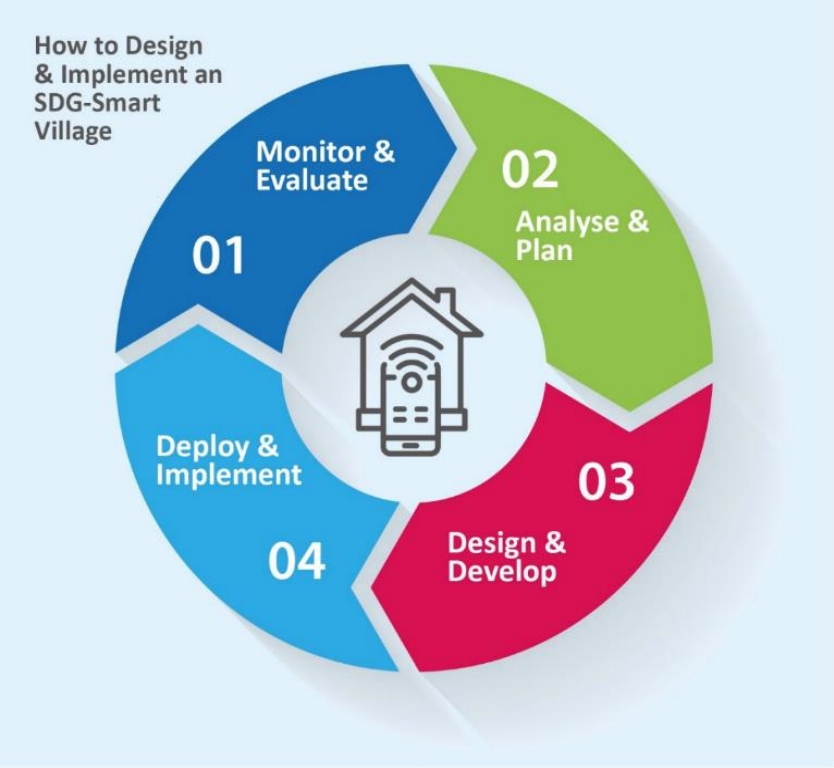


Figure 22 Way to smart village

6. Smart Maps are designed so that users can quickly and intuitively interact with them despite having virtually no training, ensuring that information reaches the widest possible audience. Smart Maps are built to update quickly and correctly as cities change and evolve

3.8 Strategic options for fast development

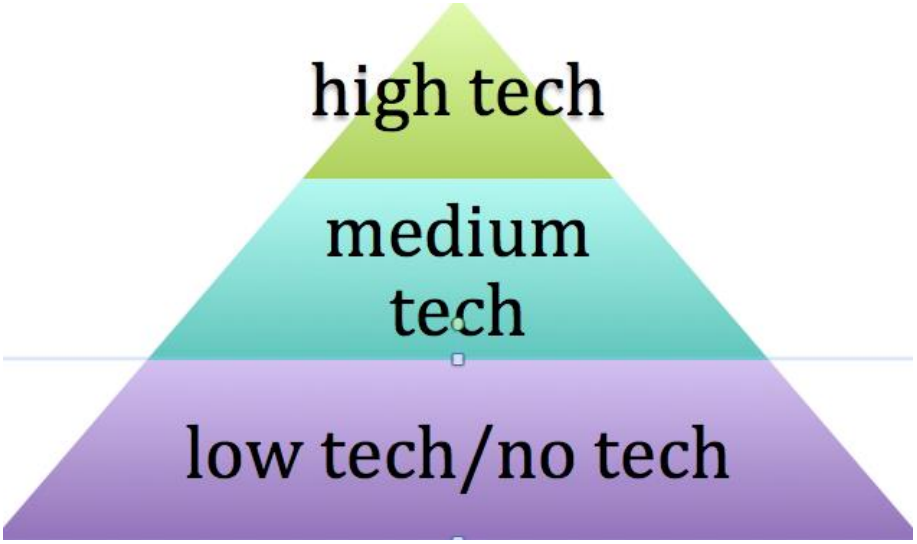


Figure 23 Level and scope of technology

Sometimes the smartest tech is low-tech

When exploring ways to extract value from open sensor data, don't overlook the invaluable role inexpensive, low-tech options can play in advancing Smart City goals.

Go small before you go big

The use of pilot projects and open sensor data can play a pivotal role in ensuring high returns for Smart City initiatives. Collaborate, collaborate, collaborated Open data sharing and collaboration with residents, civic tech communities and ecosystem partners is essential for driving Smart City innovation. Treat sensor data like a valuable asset: it is Cities are discovering the importance of having full access to their own Smart City data, and can share it with others.

3.9 Cyber Security:

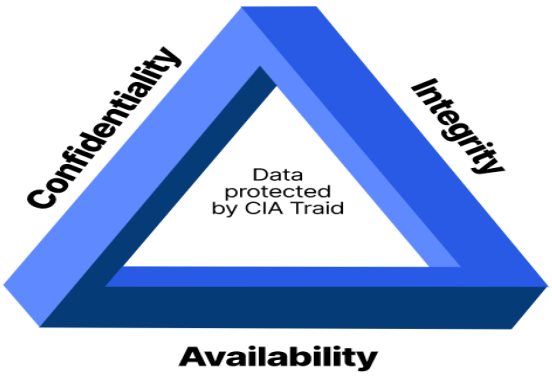


Figure 24 Cybersecurity

Cyber security is the body of technologies, processes and practices designed to protect networks, computers, programs and data from attack, damage or unauthorized access. In a computing context, security includes both cyber security and physical security. Ensuring cyber security requires coordinated efforts throughout an information system. Elements of cyber security include:

- Application security
- Network security
- Operational security
- Information security
- End-user education

Cyber security is important because government, military, corporate, financial, and medical organizations collect, process, and store unprecedented amounts of data on computers and other devices. A significant portion of that data can be sensitive information, whether that be

intellectual property, financial data, personal information, or other types of data for which unauthorized access or exposure could have negative consequences.

Organizations transmit sensitive data across networks and to other devices in the course of doing businesses, and cyber security describes the discipline dedicated to protecting that information and the systems used to process or store it. As the volume and sophistication of cyber-attacks grow, companies and organizations, especially those that are tasked with safeguarding information relating to national security, health, or financial records, need to take steps to protect their sensitive business and personnel information.

As early as March 2013, the nation's top intelligence officials cautioned that cyber-attacks and digital spying are the top threat to national security, eclipsing even terrorism.

For an effective cyber security, an organization needs to coordinate its efforts throughout its entire information system. Elements of cyber encompass all of the following:

- Network security: The process of protecting the network from unwanted users, attacks and intrusions.
- Application security: Apps require constant updates and testing to ensure these programs are secure from attacks.
- Endpoint security: Remote access is a necessary part of business, but can also be a weak point for data. Endpoint security is the process of protecting remote access to a company's network.
- Data security: Inside of networks and applications is data. Protecting company and customer information is a separate layer of security.
- Identity management: Essentially, this is a process of understanding the access every individual has in an organization.
- Database and infrastructure security: Everything in a network involves databases and physical equipment. Protecting these devices is equally important.
- Cloud security: Many files are in digital environments or the cloud‖. Protecting data in a 100% online environment presents a large number of challenges.
- Mobile security: Cell phones and tablets involve virtually every type of security challenge in and of themselves.
- Disaster recovery/business continuity planning: In the event of a breach, natural disaster or other event data must be protected and business must go on. For this, you'll need a plan. End-user education: Users may be employees accessing the network or customers logging on to a company app. Educating good habits (password changes, 2-factor authentication, etc.) is an important part of cybersecurity.

3.10 Retrofitting- Redevelopment- Greenfield Development District Cooling

Cities are engines of growth for the economy of every nation, including India. Nearly 31% of India's current population lives in urban areas and contributes 63% of India's GDP (Census 2011). With increasing urbanization, urban areas are expected to house 40% of India's

population and contribute 75% of India's GDP by 2030. This requires comprehensive development of physical, institutional, social and economic infrastructure. All are important in improving the quality of life and attracting people and investments to the City, setting in motion a virtuous cycle of growth and development. Development of Smart Cities is a step in that direction.

In the approach to the Smart Cities Mission, the objective is to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions. The focus is on sustainable and inclusive development and the idea is to look at compact areas, create a replicable model which will act like a light house to other aspiring cities. The Smart Cities Mission of the Government is a bold, new initiative. It is meant to set examples that can be replicated both within and outside the Smart City, catalysing the creation of similar Smart Cities in various regions and parts of the country.

District heating & cooling

- Introduction

The STORM project tackles energy efficiency at district level by developing an innovative district heating & cooling (DHC) network controller. Based on selflearning algorithms, the developed controller will enable to maximize the use of waste heat and renewable energy sources in DHC networks. The process of supplying district end users, for instance residential and commercial buildings, with thermal energy in order to cover heating and cooling demand, is in the scope of district heating and cooling networks involving efficient heat distribution designs. Since their dawn, District Cooling & Heating network systems exploited a variety of energy resources, namely, geothermal, fossil fuel and waste and biomass incarceration.

- Cradle to Cradle"

Design This means designing products that can be fully reclaimed or recycled into new products at the end of the product 's lifecycle. Almost everything in HVAC equipment can be recycled or reclaimed at the end of its life including the refrigerant used.

3.11 Indian's Urban Water and Sanitation Challenges and Role of Indigenous Technologies

More than 90% of the urban population has access to drinking water, and more than 60% of the population has access to basic sanitation. However, access to reliable, sustainable, and affordable water supply and sanitation (WSS) service is lagging behind. Are the Services Reliable? No Indian city receives piped water 24 hours a day, 7 days a week. Piped water is never distributed for more than a few hours per day, regardless of the quantity available. Raw sewage often overflows into open drains. Are the Services Technically and Financially Sustainable? Less than 50% urban population has access to piped water.

The Non-Revenue Water (NRW: due to leakages, unauthorized connections, billing and collection inefficiencies, etc.) is huge, estimated between 40-70% of the water distributed.

Operations and maintenance cost recovery through user charges is hardly 30-40%. Most urban operations survive on large operating subsidies and capital grants

- Urban Water & Sanitation Challenge

Figure 25 Sanitation and water for all

Water and sanitation are concurrent issues and influence each other in more ways than one. Largescale migration to cities is converting the erstwhile villages into disorganized urban sprawls which often remain outside the purview of urban planning or administration for a long time. Gosh and Sugam (2013) in their report on Urban Water and Sanitation in India underscore that: Water supply and sanitation utilities in India have suffered from poor design, poor operation and maintenance practices, lack of accountability, poor data and transparency, and inadequate investments.

- Role of Indigenous Technologies

Introduction Indigenous is associated with people originating or developing naturally in a particular land, region, or environment. So, the technology evolved by indigenous people is indigenous technology. Indigenous technology of India will be the technological development caused by an Indian.

- Some uses of Indigenous Technology Are Given below,

First Indigenous technologies are recognized as animate, imbued with the breath of life, they live in form and function having emerged from the realms of the invisible. Indigenous technologies emerge from the implicate order to reflect the art of skillful living. Indigenous technology is pragmatic. It is responsive and responsible to the ecology in which it lives. Indigenous technologies attract the learning spirit they provide a learning ecology that supports the revitalization and transformation of awareness and knowledge. Indigenous technology is intended to enhance the ability to maintain and renew balance and harmony within a multi-dimensional environment. Through meaningful interactions Indigenous technology seeks to engage and evoke significant knowledge and experiences reflective of the Indigenous world.

3.12 Initiatives in village development by local self-government

Town Panchayat and city corporations require regular energy audit supports. Technical support staff needs to be strengthened in each Urban Local Bodies and a dedicated Energy

Conservation Unit need to place at least in bigger urban local bodies. The ULBs are the competent authorities to enforce all energy saving measures in their jurisdiction; they need an enforcement unit with statutory powers. DPCs can initiate more proactive measures in energy conservation.

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

- Government of India initiated a program regarding wildlife conservation:

Talking about diversity, India is one of the 17 mega diversities in the world and is home to 7.6% of all mammal, 12.6% of bird, 6.2% of reptile, and 6.0% of flowering plant species. The country also has some of the most bio diverse regions on the planet and it comprises of four of 35 biodiversity hotspots of the world like the Western Ghats, the Eastern Himalayas, Indo-Burma and Nicobar Islands in Sunderland. So far, the country's wildlife is preserved in 120+ national parks, 515 wildlife sanctuaries, 26 wetlands, and 18 Bio Reserves, out of which 10 are part of the World Network of Biosphere Reserves. Evidently, this large bio diverse land needs protection, and inarguably conservation is a mandatory measure. The view which kept in mind was recent human encroachment, based on that the Indian Government took effective initiatives to conserve wildlife in the country, and amongst it, most commendable initiatives is the Wildlife Protection Act of 1972, which prohibits trade of rare and endangered species

3.14 How to implement other countries smart villages projects in Indian village context

A smart city and village are different. In city there are different opportunities to employ smart technologies. These are limited in villages. However, one can employ such technologies to improve several aspects of rural life. Some examples are,

1. Schooling – smart class rooms can improve the quality of education by providing access to a large number of educational resources.
2. Health care – improving information available on the availability, location and cost of various types of health care.
3. Agriculture – provide information to farmers on the types of crops that can fetch them returns, by ensuring that there is no glut of one product and shortage of another.

The above are some examples. There are also services that can be provided at village level, like getting various certificates.

Bhabha Atomic Research Centre (BARC) has developed several water purification devices and desalination techniques, as a part of its research and development efforts towards the betterment of society. A novel idea of coating polysulfide on a porous candle resulted in the development of a "Point of Use" water purifier. Unlike other devices available in the market which only deactivates the microorganisms, this device physically eliminates them. This device does not require any electricity or any addition of chemicals.

Removal of suspended particulates, colour and door are additional benefits available in these units. A typical unit provides nearly sufficient water per day at 3 meters' pressure head and can withstand up to 40 psig pressure (2.76 bar). Devices based on ultra-filtration membrane can physically remove bacteria, suspended solids and high molecular weight organics without the use of electricity, at tap water pressure, mainly by sieving (size-exclusion) mechanism. Some of the salient features are:

- Very effective as it removes bacteria to the extent of > 99.99% (4 log scale).
- Removes complete turbidity and produces crystal clear water.
- Works in a dead-end device so not a single drop of water is wasted.
- Does not need electricity or addition of any chemical.
- Provision to remove organic or collaring material if they are present in feed.
- Highly strong (both chemically and mechanically) membranes giving high life (3-5 years).
- Almost maintenance free except occasional cleaning of suspended solids which deposits on membrane surface and this does not take more than 3-4 minutes' time.

Many Important Environment and Biodiversity Acts Passed by Government of India

- Fisheries Act 1897
- Indian forest act 1927
- Prevention of cruelty to animal 1960
- Wildlife protection act 1972
- Forest conservation act 1980
- Environment protection act 1986
- Biological diversity act 2002
- Mining and mineral development regulation act 1957

4 About Vankaner

4.1 Introduction of Vankaner village

Vankaner is a village situated near Bardoli, Making Bardoli its parent-town. distance between Bardoli and Vankaner is about 10.8 km which approximately 20-25 minutes of travelling. The village's pin-code is 395620, address to Vankaner, Bardoli, Surat, Gujarat.

Vankaner had population of 7472 people, out of which 3748 males and 3724 females. The village has 0.9936 sex ratio. With 1658 numbers house-holds. The village is spreaded over 1148.52 Ha land with 969.78 Ha of agricultural land.

4.1.1 Need of study

To be in short need of this study is to observe and analyses particular village and find physible and economical solution with very personalized design for the village.

Once a person achieves essentials for life [roti, kapda & makan (food, clothing & shelter)], He/she might be willing to find better lifestyle. One might seek to have better facilities for sanitation, water supply, transportation, education, health care and banking facilities, etc.

This study will include collection of data of all facilities mentioned above and more, data of population and characteristics of population.

Nearly 70% of rural population depends upon agricultural and related activities which is one of crucial source of income for India. If we'll be able to provide development and better life in rural area, then and then only we'll be able to reduce rate of migration and keep people engage in agricultural activities.

4.1.2 Study Area

Vankaner is a village situated near **Bardoli,** Making Bardoli its parent-town. distance between Bardoli and Vankaner is about 10.8 km which approximately 20-25 minutes of travelling.

Figure 26 Vankaner satellite view (image source google maps)

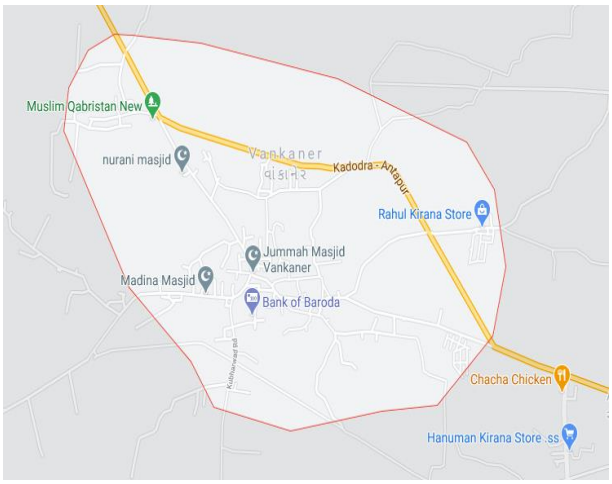


Figure 27 Vankaner road and traffic view (image source google maps)

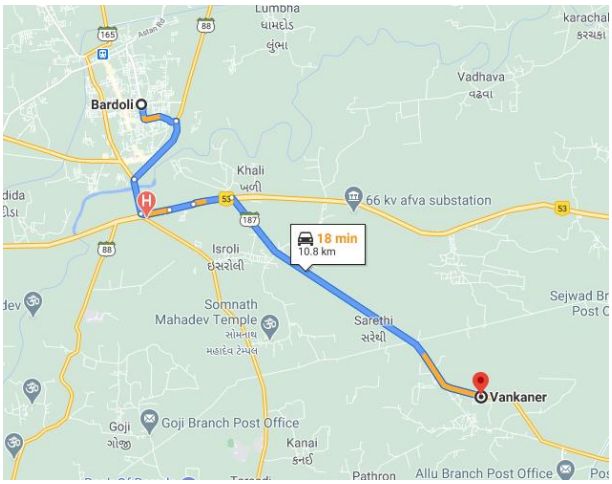


Figure 28 A route to the Vankaner from Bardoli

Vishwakarma Yojana directs to rural development, for which we have selected Vankaner village to study and analyse existing and lacking facilities of village and find better solution.

The village's pin-code is 395620, address to Vankaner, Bardoli, Surat, Gujarat.

4.1.3 Objectives of study

Following are objectives of this study,

- To asses quality of life in vanakaner village and to improvise the same.
- To offer entertainment by developing recreation facilities such as gardens, playground, cinema-hall, community facilities and shopping malls, etc.
- To develop new facilities or improve existing facilities like gas supply, check dams, Irrigation canals, electricity, water supply, etc.
- To develop better, inter and intra connectivity roads and transportation facilities.
- To develop quality housing, creating employment opportunities, necessary education facilities and infrastructure.
- To establish well healthy and peaceful environment by creating different sanitary facilities like sewage drains, solid waste management and primary health centers.

4.1.4 Scope of study

- Development of village will bring lots of scopes for different industries.
- Construction of infrastructures, buildings and public facilities will increase potential of construction industry.

- Better roadways and connectivity will bring latest technology, new equipment and advanced machineries in to village.
- Increase in productivity of village will give financial support to village and food supply to nation.

4.1.5 Methodology Frame Work for development of your village

Project roadmap: Method for development of village

Part-I (Odd Semester) Includes:

- Literature Review
- Visit of Ideal Village of Respective District
- Data Collection- Techno economic survey
- Data Presentation
- Sustainable Design Planning Proposals (Rain water harvesting, Biogas plant, waste to energy models, eco sanitation, Renewable Energy Sources Application & Other)
- Repair & Maintenance of Existing Infrastructure
- Facilities Suggestions and Recommendation

Part-II (Even Semester) Includes

- Gap Analysis (Guidelines, Regulation and Literature will be given for comparison)
- Design Proposals for Overall development of Village includes
    - Physical Infrastructure Facilities
    - Social Infrastructure Facilities
    - Socio Cultural Infrastructures Facilities
- Recommendation & Suggestions for Village Development
- Conclusion

4.1.6 Available Methodology for development of related to Civil

Methodology:

- Design objectives
- Technical approach
- Proposed sustainability features
- Identify customer needs
- Identify local/state/federal engineering and construction specifications
- Project management structure

- Budget
- Gantt Chart of project schedule
- Resumes of team members

Objects which were available in the Kamrol village were, Panchayat Building, Water Tank, Underground Sump, Post Office, Approach and Internal Road, Public Library, RO Water Plant, Dairy, Primary School, Anganwadi, Dharmshala, Government Grocery Shop, Village Temples, etc.

4.2 Vankaner study area profile

The **study profile** sets the spatial parameters of the fieldwork and provides a rich contextual backdrop for the following chapters. It surveys the significant demographic, economic, social, cultural and environmental characteristics of the **study area**.

4.2.1 Physical & Demographical Growth

Demographic increase (or total change) is the variation of a population during the year, whether this be an increase or a decrease. It is the sum of natural increase, migration balances and sometimes an adjustment intended to restore consistency among various statistical sources.

Vankaner had population of 7472 people, out of which 3748 males and 3724 females. The village has 0.9936 sex ratio. With 1658 numbers house-holds.

4.2.2 Geographical Detail

The village is spreaded over 1148.52 Ha land with 969.78 Ha of agricultural land.

4.2.3 Drinking Water / Water Management Facilities

Village has good sources of water like treated tap water, reverse osmosed water, bore water, well water, tube wells, hand pumps, 5 numbers of overhead tanks and pond.

4.2.4 Drainage Network / Sanitation Facilities

Drainage is the natural or artificial removal of a surface's water and sub-surface water from an area with excess of water. The internal drainage of most agricultural soils is good enough to prevent severe waterlogging (anaerobic conditions that harm root growth), but many soils need artificial drainage to improve production or to manage water supplies.

The village is equipped with adequate drainage facility for removal of sanitary water. These drains are closed drains made of soil pipes network. But these drains are directly discharged into river without any kind of treatment.

Sanitation refers to public health conditions related to clean drinking water and adequate treatment and disposal of human excreta and sewage. Preventing human contact with feces is part of sanitation, as is hand washing with soap. Sanitation systems aim to protect human health by providing a clean environment that will stop the transmission of disease, especially

through the fecal–oral route. For example, diarrhea, a main cause of malnutrition and stunted growth in children, can be reduced through adequate sanitation. There are many other diseases which are easily transmitted in communities that have low levels of sanitation, such as ascariasis (a type of intestinal worm infection or helminthiasis), cholera, hepatitis, polio, schistosomiasis, and trachoma, to name just a few.

Village has many public latrines-blocks and community-toilets with good condition but they don't have bathing facilities. Solid waste from such latrines and road has no proper disposal systems.

4.2.5 Transportation & Road Network

Village road network in well developed, it has metal roads as village approach roads, village streets and main road. Village is closest to the GJ SH 187.

To connect village with its parent town and other locations villagers has to take local transportation auto-rickshaw, after auto-rickshaw villagers can reach to the bus station Shekhpur Bus stop from where they can take state transportation bus to travel further, or they have to go to railway station or bus station situated in parent town bardoli.

4.2.6 Other Facilities

Village is provided with electricity by Gujarat Energy Transmission Corporation Limited(GETCO). Villagers can use this power supply for domestic uses, industrial uses, agriculture uses, commercial uses and public uses. Village's streets are provided with street-lightings. However, village lacks the facility of renewable energy like solar energy or wind energy.

4.2.7 Migration

people rushing from rural area to urban or sub-urban area for certain purposes which could be,

- Better life style
- Economic growth
- Employment,
- Higher education, Etc.

With such intentions one might seek to shift permanently which is called migration.

Such migrants wish to settle quickly but most of the time end up increasing slums in cities and create haphazard growth. Population of India is likely to be increased to 1.63 billion by 2050 (currently 1.38 billion; year 2020). Nearly 250 million of population will increase density of population in urban cities due to limitation over horizontal spread. Having large population concentration put much more pressure on existing services and amenities.

Population in urban-areas is getting denser and denser which is an obvious reason to worry. Out of many ways to stop such migration, one way is to provide better infra-structure, better and quick reach to the central market, better health and sanitary facilities, education facilities, etc. to anchorage people to stay in their villages and help in growth of nation.

4.3 Data collection Vankaner village

4.3.1 Describe Methods for data collection

The main methods for data collection are

1. Individual interviews

- Interviews of different stake holders of village
- Premade questionaries' should be prepared to focus on getting clear answers and through detail.

2. Focus groups

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

3. Observations - Field trips

- A field trip or excursion by a group of students to a place away to their allocated villages. It is a good source for providing extra information about a certain group, can use videography.

4. Questionary Survey

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

4.4 Infrastructural details

Infrastructure is the set of fundamental facilities and systems that support the sustainable functionality of households and firms. Serving a country, city, or other area, including the services and facilities necessary for its economy to function.

Infrastructure is composed of public and private physical structures such as roads, railways, bridges, tunnels, water supply, sewers, electrical grids, and telecommunications (including Internet connectivity and broadband access).

In general, infrastructure has been defined as "the physical components of interrelated systems providing commodities and services essential to enable, sustain, or enhance societal living conditions" and maintain the surrounding environment.

Especially in light of the massive societal transformations needed to mitigate and adapt to climate change, contemporary infrastructure conversations frequently focus on sustainable development and green infrastructure. Acknowledging this importance, the international

community has created policy focused on sustainable infrastructure through the Sustainable Development Goals, especially Sustainable Development Goal 9 "Industry, Innovation and Infrastructure".

4.4.1 Drinking Water / Water Management Facilities

Figure 29 Water tanks at village

Village has good sources of water like treated tap water, reverse osmosed water, bore water, well water, tube wells, hand pumps, 5 numbers of overhead tanks and pond. Village has tanks of different sizes from 1 lakh liters to 20000 liters.

While piped water is used as a drinking water source by most people in villages, the water supply is not continuous and varies between half to two hours daily or every second day. villagers have to withdraw water when available and store it until the next supply phase, increasing chances of contamination.

Vankaner has also provided water additional water supply at gram panchayat.

4.4.2 Drainage Network / Sanitation Facilities

Element of a drainage system are consists of regulating, protecting, and conducting networks with drainage outlets, manholes, over falls, chutes, bridges, pipe crossings, and other such structures. The type of drainage network is determined by the cause of excess water and by agricultural use of the land.

The village has adequate drainage facility for removal of sanitary water. These drains are closed drains made of soil pipes network. But these drains are directly discharged into river without any kind of treatment.

Village has many public latrines-blocks and community-toilets with good condition but they don’t have bathing facilities. Solid waste from such latrines and road have no proper disposal systems.

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Village roads are developed under the scheme of ‘Mukhiya Mantri Gaam Sadak Yojana’.

Figure 30 Mukhiya Mantri Gaam Sadak Yojana

Figure 31 Road condition in village

The state has total 18066 villages, out of these villages, 17856 villages are connected with "pucca" roads. Hence, 98.84% villages are connected by "pucca" roads. Out of these 17856 villages, 17478 villages are connected with asphalt surfaced roads where as 378 villages are connected with WBM surface road.

The Transport Sector play a crucial role in the development of an economy and social development. Considering its importance state has formulated ROAD POLICY detailed below in brief.

4.4.4 Housing condition

Village has all sorts of housing, from kutcha houses to well-constructed RCC structures.

Figure 32 Kutcha houses

Figure 33 Pukka houses

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

Village has PHC in good condition. All people, everywhere, deserve the right care, right in their community. This is the fundamental premise of primary health care.

Primary health care (PHC) addresses the majority of a person's health needs throughout their lifetime. This includes physical, mental and social well-being and it is people-centreed rather than disease-centreed. PHC is a whole-of-society approach that includes health promotion, disease prevention, treatment, rehabilitation and palliative care.

Figure 34 PHC

A secondary school describes an institution that provides secondary education and also usually includes the building where this takes place. Some secondary schools provide both lower secondary education (age 12 to 15) and upper secondary education (age 15 to 18) ie levels 2 and 3 of the ISCED scale, but these can also be provided in separate schools, as in the American middle and high school system. In the UK, elite public schools typically admit pupils between the ages of 13 and 18. UK state schools accommodate pupils between the ages of 11 and 18.

Figure 35 Secondary school at village

Village has library but the condition of library is very poor and required demolition. New design of library can be given for development.

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

Gram Panchayat (English: Village council) is a basic village-governing institute in Indian villages. It is a democratic structure at the grass-roots level in India. It is a political institute, acting as cabinet of the village. The Gram Sabha work as the general body of the Gram Panchayat. The members of the Gram Panchayat are elected by the Gram Sabha. Gram Panchayat: A Gram as defined under the Act (meaning a village or a cluster of villages) is divided into a minimum of five constituencies (again depending on the number of voters the Gram is having). From each of these constituencies one member is elected. Body of these elected members is called the Gram Panchayat. The building provided for administrative work of gram panchayat is called Gram panchayat bhawan.

Figure 36 Gram panchayat office

The gram panchayat office at

Vankaner is in good condition. The structure is big enough for better work place.

Established in various states of India, the Panchayat Raj system has three tiers: Zila Parishad, at the district level; Nagar Palika, at the block level; and Gram Panchayat, at the village level. Rajasthan was the first state to establish Gram Panchayat, Nagur village being the first village where Gram Panchayat was established, on 2 October 1959. The failed attempts to deal with local matters at the national level caused, in 1992, the reintroduction of Panchayats for their previously used purpose as an organisation for local self-governance.

4.4.7 Technology Mobile/ WIFI / Internet Usage Details

Figure 37 Mobile network tower

Today's generation is all about the digital progress and technological advancement. The immeasurable heights that technology has attained are a marker of growth and development. It is a benefaction for the country and apparently, the whole world. No aspect of our lives is devoid of this progressive innovation. Communication has become better than ever. Businesses are blooming, education is upgrading, jobs are being invented, and a lot more!

Village is well equipped with mobile network and high-speed internet provided by different local service provider.

4G (4G LTE) offers typical download speeds of around 20Mbps and theoretical ones of 150Mbps. So, for example, you could download a medium sized app in under 15 seconds or load a YouTube video in under 2 seconds. The same 500MB file should be downloadable in under 4 minutes.

4.4.8 Other Facilities

Village is provided with electricity by Gujarat Energy Transmission Corporation Limited(GETCO). Villagers can use this power supply for domestic uses, industrial uses, agriculture uses, commercial uses and public uses. Village's streets are provided with street-lightings. However, village lacks the facility of renewable energy like solar energy or wind energy.

5 Technical Options with Case Studies

5.1 Concept (Civil)

5.1.1 Advance Sustainable construction techniques / Practices and Quantity Surveying:

Figure 38 Advanced construction

The term 'advanced construction technology' covers a wide range of modern techniques and practices that encompass the latest developments in materials technology, design procedures, quantity surveying, facilities management, services, structural analysis and design, and management studies.

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

Sustainable construction technologies typically include mechanisms to lessen energy consumption. The construction of buildings with wood, for instance is a sustainable construction technology because it has a lower embodied energy in comparison to those build of steel or concrete. Sustainable green construction also makes use of designs that cuts back air leakage and allows for free flow of air while at the same time using high performance windows and insulation techniques.

Sustainable resource sourcing as the name suggests is a prime example of sustainable construction technology because it ensures the use of construction materials designed and created from recycled products and have to be environmentally friendly. In most cases, agricultural wastes or by-products are used to produce the construction materials. Overall, the materials are remanufactured, recycled, recyclable, and obtained from sustainable sources.

India's construction sector is assessed at Rs.4000 billion or $100 billion. As a result of government spending, private investments as well as foreign direct investment, has made India number one of the top ten spending nations on construction in the world. We manufacture more than 250 million tons of cement and are second only to China. A recent report "Global Construction 2020", estimates that India will be the third largest global construction market after China and USA. In order to improve the standard of living of her population, one of the key hurdles that faces today's India is to overcome the challenge of

infrastructure bottlenecks. Consequently, the federal government has announced our 11th five years plan which allocates 9% of the GDP to infrastructure projects. The National Planning commission - an apex federal body has estimated an allocation of $515 billion which is equivalent to Rs.23 trillion to infrastructure sectors over the next five years. This includes construction of Roads, Highways, Airports, Bridges, Ports, Railways as well as water supply and sanitation amongst few others. The 12th five years plan projects an investment of 10% of the national GDP into infrastructure which equates to a staggering $1 trillion or equivalently Rs.45 trillion.

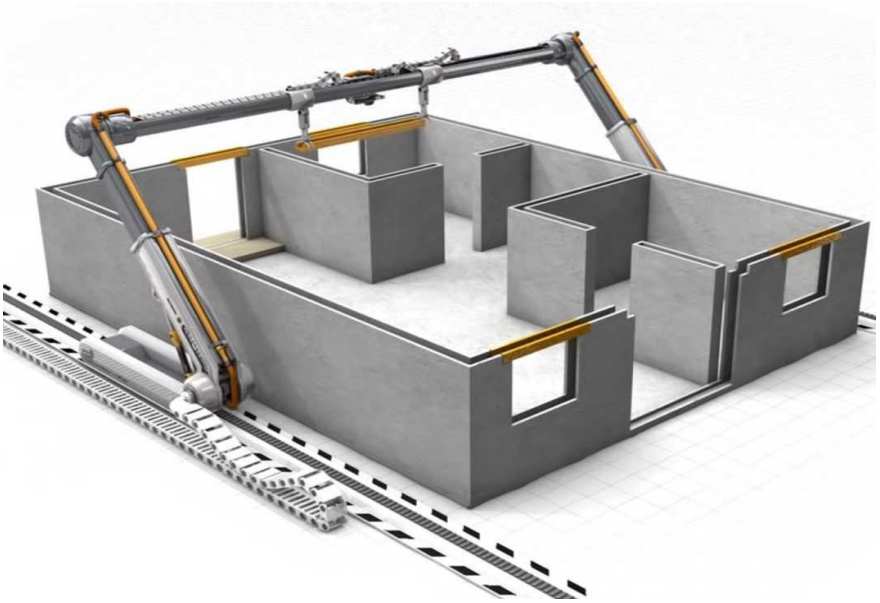
Drivers for Sustainability:

While India is preparing to tackle these growth plans with enthusiasm, it is imperative that the country should analysis and take into account the price that the future populations of the world and here will have to pay and the world in turn will have to pay, should this unprecedented growth take place without adequate thought to sustainability. Should we consume all our energy, materials, water resources without considering for the needs of our children and grandchildren, the future of the world and our nation is at peril. Obviously GHG emissions, climate change and sustainability are at stake. It is estimated that GHG emissions would increase from 2 billion tons to 6-7 billion tons of CO2 in 2030.

Some of us may question why India must slow down her pace of development and pay for the sins of already developed and industrialized Western nations. Clearly, the OECD or the industrialized countries must take the lead in mitigating climate change, reducing greenhouse gas emissions, but also large developing countries such as India and China will also have to start to reduce their emissions over the next 20 to 30 years if we truly want to give our children a chance at a future. Developing countries with large emissions should have some responsibility, although differentiated and different from the industrialized world. While sustainable practices and products may be slightly unintuitive and perceived as counterproductive to the growth of GDP in the short-term, in the long- term, the future growth of the country depends on it. Growth that is not sustainable is not true growth.

3D construction Printing:

3D construction Printing (3DCP) refers to various technologies that use 3D printing as a core method to fabricate buildings or construction components. Alternative terms are also in use, such as additive construction, Autonomous Robotic Construction System (ARCS), Large scale Additive Manufacturing (LSAM), or Freeform construction (FC), also to refer to sub-groups, such as '3D Concrete', used to refer to concrete extrusion technologies. There are a variety of 3D printing methods used at construction scale, with the main ones being extrusion (concrete/cement, wax, foam, polymers), powder bonding (polymer bond, reactive bond, sintering), and additive welding.



3D printing at a construction scale will have a wide variety of applications within the private, commercial, industrial and public sectors. Potential advantages of these technologies include faster construction, lower labor costs, increased complexity and/or accuracy, greater integration of function, and less waste produced. A number of different approaches have been demonstrated to date, which include on-site and off-site fabrication of buildings and construction components, using industrial robots, gantry systems and tethered autonomous vehicles. Demonstrations of construction 3D printing technologies to date have included fabrication of housing, construction components (cladding and structural panels and columns), bridges and civil infrastructure, artificial reefs, follies, and sculptures. The technology has seen a significant increase in popularity in recent years with many new companies, including some backed by prominent names from the construction industry and academia. This led to several important milestones, such as the first 3D printed building, the first 3D printed bridge, the first 3D printed part in a public building, the first living 3D printed building in Europe, and the first 3D printed building in Europe fully approved by the authorities (COBOD International), among many others.

Recommendations:

In mapping out sustainable practices that India must adopt a "cradle to grave" analysis is required. And for this we need to have a total approach than a patch work point system or a grade based certification system. In order to have a comprehensive plan for sustainable construction, every structure may be thought about based on the following parameters:

Planning, design and specifications based on performance and service life

Construction Practices

Material Conservation and Selection

Demolition and recycling

Energy Conservation

Planning, Design and Specifications:

Structures in India are designed well however so far in most specifications, there is no reference to any service life or calculations thereof. To this effect, deeper study of various

service life prediction models and calculations are essential. Specifications must to be performance based as opposed to their present form of being prescription based.

Construction Practices:

It is acknowledged that wastage in the construction industry is as high as 30%. That means at current valuation, we are talking about wastage to the tune of Rs.1200 billion or $27 billion in India. This is in itself a large, yet relatively simple and straight forward challenge to tackle. These wastages are activities that absorb resources, man hours and materials but create no value. Most developed countries have different forums / institutes / researchers / academic institutions for seeking solutions to mitigate these wastages and lean construction practices that emerged have yielded encouraging. Lean construction is a "way to design production systems to minimize waste of materials, time and efforts in order to generate the maximum possible value". While some novel initiatives are being taken in some parts of India to adopt leaner construction practices, India does not have a fully focused lean construction forum. Creation of an industry consortium or lean construction forum may be a good beginning.

Material Conservation and Selection:

Concrete is the largest synthesized material which has a per capita consumption of 1.5 tons per annum in India. Presence of concrete is all pervading simply because it has the capacity to utilize locally available ingredients, develop adequate engineering properties for a variety of applications, easily adapt to any shape and size and has comparatively low initial and maintenance costs. While concrete not be as big of an energy consumer as structural steel, aluminum and glass; concrete and particularly cement still remains a major energy 'sink' due to its sheer volume of production and also environmentally unsustainable due to large quantities of CO2 evolution associated with its manufacture. Raw materials for cement manufacture include non-renewable natural resources like lime stone, aggregates, manufactured sands (fine aggregates), and so on. Hence the Indian Concrete Industry needs to take a fresh look at these challenges. Some of the problems faced by Indian concrete industry towards achieving sustainability in concrete utilization are as follows:

Increase the use of fly ash and other cement substitutes; Use of manufactured sand; Use of lightweight aggregates

Demolition and Recycling

In India, the use of recycled aggregates has not been adequately explored. Reportedly, the construction and demolition waste has substantially increased as new super structures are being built on land after tearing down the smaller structures that previously existed. It is estimated that the construction industry in India generates about 10-12 million tons of waste annually. Projections for building materials requirement of the housing sector indicate a shortage of aggregates of about 55,000 million cu. m. An additional

Figure 39 Demolition of concrete structure

750 million cu.m. of aggregates would be required for achieving the targets of the road sector. Recycling of aggregate material from construction and demolition waste may reduce the demand-supply gap in both these sectors. There is also an increasing-acute shortage of dumping grounds and landfills particularly in metropolitan cities. SERC, Ghaziabad had taken up a pilot R&D project on Recycling and Reuse of Demolition and Construction Wastes in Concrete for Low Rise and Low Cost Buildings in mid-nineties with the aim of developing techniques/methodologies for use of recycled aggregate concrete in construction. The experimental investigations were carried out in Mat Science laboratory and Institutes around Delhi/GZB to evaluate the mechanical properties and durability parameters of recycled aggregate concrete made with recycled coarse aggregate collected from different sources. Also, the suitability in construction of buildings has been studied.

Energy Conservation

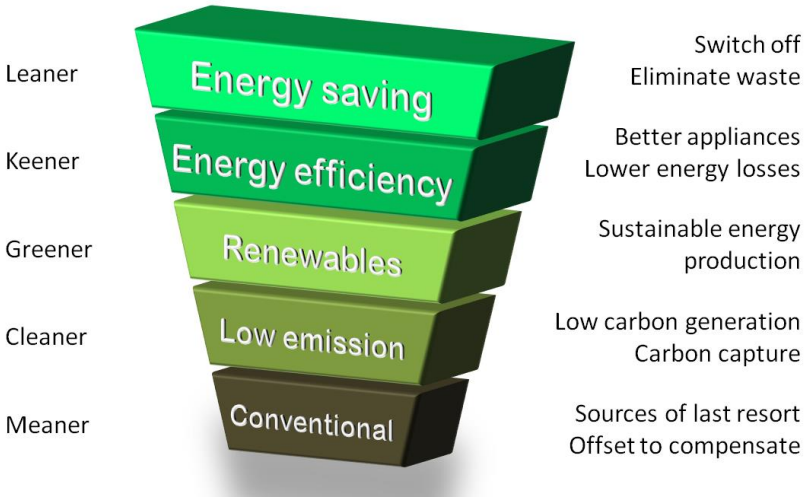


Figure 40 Energy conservation

Since sources of good quality, aggregates are fast depleting, the concrete industry in India needs to prepare itself to use locally available 'marginal' aggregates. The use of local materials helps reduce the carbon footprint associated with transport. Thus, from sustainability angle, the emphasis should be placed on using locally-available aggregates, even if there are small deficiencies in their quality. It has been amply demonstrated that desired properties of concrete can be

obtained by intelligent blending of available aggregates with crushed sand, inert fillers, supplementary cementanious materials and chemical admixtures. Another important issue is that river sand and other construction materials are usually transported by road. India has a well-developed and efficient rail and water transport system that need to be leveraged by the construction industry. This is not only more sustainable option but also most cost effective.

Conclusion:

India is an astoundingly growing economy and hence the pressure on the use of natural resources is very heavy. There is an awakening about the word's durability and then sustainability.

Though the durability is understood to a point the real meaning and importance of sustainability is not fully comprehended by engineering fraternity as well as planners. Some sporadic efforts are carried out in the form of very repetitive academic experimentation; however, these efforts are in extreme primitive conditions.

Industry has not opened to this "Sustainability aspect" proactively as they are busy joining the band wagon of growth machine.Federal authorities also are not well informed and hence not equipped to adopt 'Sustainability initiative'.

Also use of renewable energy and resources is not much sought-after option and not given due importance as the initial costs are high.At the same time, there is definite internal feeling in all that something is definitely needed to be done for next generation. Typically, not to leave them with depleted resources.

At the behest of ACI international – India Chapter of ACI has organized couple of international conferences on sustainability along with the help of other organizations and Institutions.

But this effort to create and spread awareness should be all pervasive. The proactive participation of all the institutions, professional bodies, academicians, industry as well as firm patronage and participation of government is extremely essential.

Figure 41 Sardar Sarovar Dam

'Lean Concrete' and 'Reduce Wastage' initiatives in the industry are very necessary.

India chapter of ACI has decided to take the lead role in this initiative by forming "JSI" like efforts in India. It was suggested by late President Dick Stehly to the chapter after he witnessed the capability of chapter to galvanize the support and participation of many in the recent international conference on "Sustainability".

- Technical case study of Sardar Sarovar Dam(SSD)

Introduction

The Sardar Sarovar Dam is a gravity dam on the Narmada river near Navagam, Gujarat in India. It is the largest dam and part of the Narmada Valley Project, a large hydraulic engineering project involving the construction of a series of large irrigation and hydroelectric multi-purpose dams on the Narmada river. The project took form in 1979 as part of a development scheme to increase irrigation and produce hydroelectricity. One of the 30 dams planned on river Narmada, Sardar Sarovar Dam (SSD) is the largest structure to be built. Following a number of controversial cases before the Supreme Court of India (1999, 2000, 2003), by 2014 the Narmada Control Authority had approved a series of changes in the final height – and the associated displacement caused by the increased reservoir, from the original 80 m (260 ft.) to a final 163 m (535 ft.) from foundation.

The project will irrigate more than 18,000 km2 (6,900 sq. mi), most of it in drought prone areas of Kutch and Saurashtra. The dam's main power plant houses six 200 MW Francis pump-turbines to generate electricity and include a pumped storage capability. Additionally, a power plant on the intake for the main canal contains five 50 MW Kaplan turbine-generators. The total installed capacity of the power facilities is 1,450 MW. Its final configuration is the second largest concrete gravity dam (by volume) after Grand Coulee Dam in the US and has the world's third largest spillway discharging capacity.

Advantages

- Population is growing - enough clean water for everyone
- Be able to install pipelines - water in all villages
- More women educated - marry later - less children
- Government making money from hydroelectric power
- Supplies 3.5 billion liters of drinking water
- Workers earn enough to send children to secondary school - more chance of tertiary jobs in the future - less primary industry jobs
- Cheaper power - cheaper electricity bills - cheaper cotton- more trade
- More stable wages for workers
- Workers get bonuses
- Environmentally friendly hydroelectric power

Disadvantages

- 254 villages flooded, 320,000 people forced to migrate
- They are still poor - children can't go to school - can't pay for
- medicine

- Wait for benefits to be felt
- Takes time
- Have to wait for money to be raised for pylons to be constructed.
- Nobody lives in Earthquake-proof buildings
- Lots of damage - expensive to fix - difficult to payAll weight will push on Earth's crust - earthquake - flood -
- destroying local eco-systems
- Farmers grow less crops - worse off
- Farmers will have to buy expensive fertilizers

Sr.no.	**Object**	**Description**
1.	**Main Dam**	**210 m long, 163 m high from the deepest foundation level Designed Live Storage Capacity of the Reservoir 5860 MCM (4.75 million acre feet)**
2.	Irrigation	1.905 million Ha (1.8 million Hector in Gujarat benefitting 1 million farmers)
3.	Drinking Water	9633 villages and 131 towns (29 million people)
4.	Hydropower	1,450 MW installed capacity (1 billion kWh every year)
5.	Canal Network	Approximately 75,000 km length within Gujarat

Table 5 Objectives of Sardar Sarovar Dam

Solar power generation

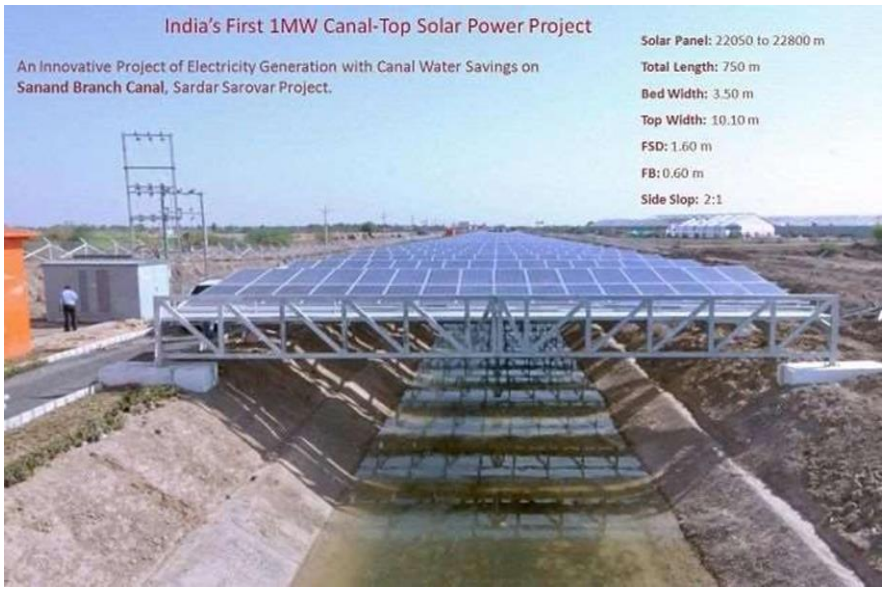


Figure 42 Solar power over Narmada canal

- In 2011, the government of Gujarat announced plans to generate solar power by placing solar panels over the canal, making it beneficial for the surrounding villages to get power and also help to reduce the evaporation of water.
- The first phase consists of placing panels along a 25 km length of canal, with capacity for up to 25 MW of power.

Geographical Location

To the south west of Malwa plateau, the dissected hill tracts culminate in the Mathwar hills, located in Alirajpur district of Madhya Pradesh. Below these hills Narmada river flows through a long, terrific gorge. This gorge extends into Gujarat where the river is tapped by the Sardar Sarovar dam.

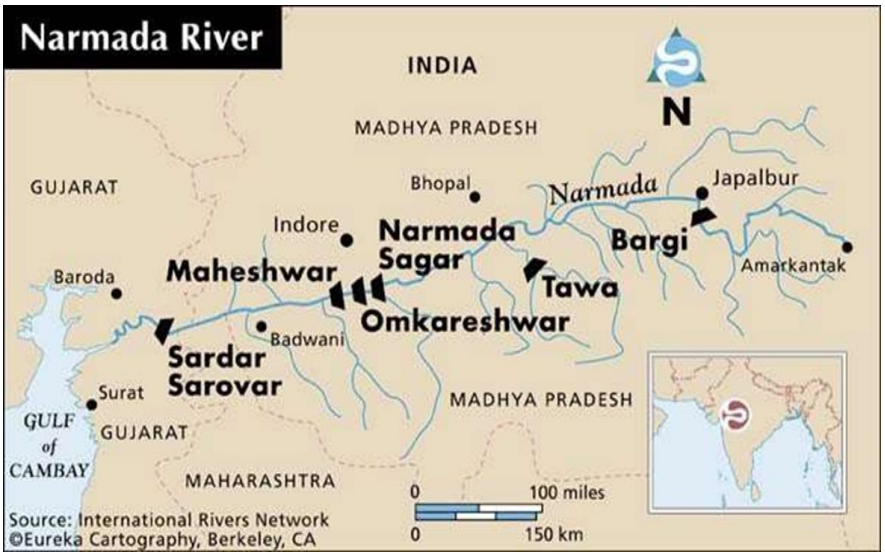


Figure 43 Narmada river basin

Narmada Canal

The dam will irrigate 17,920 km2 (6,920 sq mi) of land spread over 12 districts, 62 talukas, and 3,393 villages (75% of which is drought-prone areas) in Gujarat and 730 km2 (280 sq mi) in the arid areas of Barmer and Jalore districts of Rajasthan. The dam will also provide flood protection to riverine reaches measuring 30,000 ha (74,000 acres) covering 210 villages and Bharuch city and a population of 400,000 in Gujarat. Saurastra Narmada Avataran Irrigation is a major program to help irrigate a lot of regions using the canal's water.

Projected benefits

- The argument in favour of the Sardar Sarovar Project is that the benefits are so large that they substantially outweigh the costs of the immediate human and environmental disruption.
- Without the dam, the long term costs for people would be much greater and lack of an income source for future generations would put increasing pressure on the environment.
- If the water of the Narmada river continues to flow to the sea unused, there appears to be no alternative to escalating human deprivation, particularly in the dry areas of Gujarat.
- The project has the potential to feed as many as 20 million people, provide domestic and industrial water for about 30 million, employ about 1 million, and provide valuable peak electric power in an area with high unmet power demand (farm pumps often get only a few hours of power per day).
- It will also provide flood protection to riverine reaches measuring 30,000 ha. covering 210 villages and Bharuch city and a population of 4.0 lac in Gujarat.
- In addition, recent research shows substantial economic multiplier effects (investment and employment triggered by development) from irrigation development.
- Set against the future of about 70,000 project affected people, even without the multiplier effect, the ratio of beneficiaries to affected persons is well over 100:1.

Height increases

In February 1999, the Supreme Court of India gave the go ahead for the dam's height to be raised to 88 m (289 ft) from the initial 80 m (260 ft). In October 2000 again, in a 2-to-1 majority judgment in the Supreme Court, the government was allowed to construct the dam up to 90 m (300 ft). In May 2002, the Narmada Control Authority approved increasing the height of the dam to 95 m (312 ft). In March 2004, the Authority allowed a 15 m (49 ft) height increase to 110 m (360 ft). In March 2006, the Narmada Control Authority gave clearance for the height of the dam to increase from 110.64 m (363.0 ft) to 121.92 m (400.0 ft).

This came after 2003 when the Supreme Court of India refused allow the height of the dam to increase again. In August 2013, heavy rains raised the reservoir level to 131.5 m (431 ft), which forced 7,000 villagers upstream along the Narmada River to relocate. On June 2014, Narmada Control Authority gave the final clearance to raise the height from 121.92 m (400.0 ft) meters to 138.68 m (455.0 ft).

SARDAR SAROVAR RESERVOIR

Figure 44 SSD

The Full Reservoir Level (FRL) of the Sardar Sarovar Dam is fixed at RL 138.68 meters (455 feet). The Maximum Water Level is 140.21 meters (460 feet.) while minimum draw down level is 110.64 meters (363 feet.). The normal tail water level is 25.91 meters (85 feet.).

The gross storage capacity of the reservoir is 0.95 M. ha.m. (7.7 MAF) while live storage capacity is 0.58 M.ha.m. (4.75 MAF). The dead storage capacity below minimum draws down level is 0.37 M. ha. m. (2.97 MAF). The reservoir would occupy an area of 37,000 ha. and would have a linear stretch of 214 kilometer of water and an average width of 1.77 kilometer.

The submergence at Full Reservoir Level (FRL) is 37,690 ha. (86,088 acres), which comprises 11,279 ha. agricultural land, 13,542 ha. forests and 12,869 ha. river bed and waste land. In all 245 villages of the three states viz. 193 Villages of Madhya Pradesh, 33 villages of Maharashtra and 19 villages of Gujarat are affected. Only 3 villages of Gujarat are fully affected, while the remaining 16 villages are partly affected.

In Madhya Pradesh, out of 193 villages, more than 10% agricultural land will be submerged only in 79 villages, in 89 villages less than 10% agricultural land or only houses will be submerged under FRL, due to back water of 1 in 100 years' flood. In 25 villages, only Government waste land will be submerged.

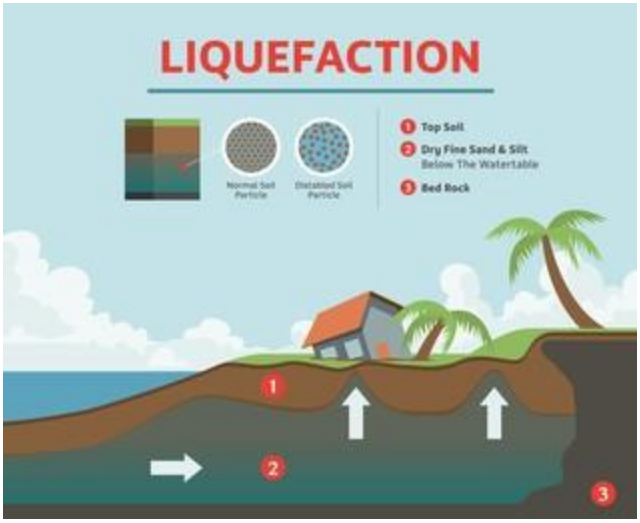


Figure 45 Soil liquefaction

5.1.2 Soil Liquefaction:

Soil liquefaction, also called earthquake liquefaction, ground failure or loss of strength that causes otherwise solid soil to behave temporarily as a viscous liquid. The phenomenon occurs in water-saturated unconsolidated soils affected by seismic S waves (secondary waves), which cause ground vibrations during earthquakes. Although earthquake shock is the best known cause of liquefaction, certain construction practices, including blasting and soil compaction and vibroflotation (which uses a vibrating probe to change the grain structure of the surrounding soil),

produce this phenomenon intentionally. Poorly drained fine-grained soils such as sandy, silty, and gravelly soils are the most susceptible to liquefaction. Effects of Liquefaction

1. Sand Boiling When liquefaction occurs below the surface that is fully compacted, the water pressure below the surface makes the water to break out like a bubble. These come out as boiling water. This is called as sand boiling.

2. Damage to offshore structures Liquefaction is common in soil that is submerged. These conditions cause huge damage for the bridge construction, structures supporting submerged soil deposits.

3. Failure of Dams and Retaining Walls The soils supporting Dams and Retaining walls undergoes liquefaction, which results in the collapse of these structures. As the structures lose the ability to control the huge water it further results in floods that are uncontrollable.

4. Surface Landslides The failure of water carrying bodies can result in surface landslides.

5. Failure of Structures under Earthquake Liquefaction followed by earthquake forces make the structures to lose its stability. They can either split or lean bringing complete collapse of the structure. Past earthquake records have shown a huge failure of building structures due to liquefaction. These hazards do not provide enough time for evacuation that it results in a huge loss of life and property.

Figure 46 Effect of Soil Liquefaction

Technical case study on soil liquefaction

Introduction

A Magnitude 7.6 (Mw 7.6) earthquake occurred in Gujarat state, India on 26 January 2001. The epicentre of the main shock of the event was near Bachau at 23.36° N and 70.34° E with a focal depth of about 23.6 km. The event, commonly referred to as the Bhuj Earthquake, was among the most destructive earthquakes that affected India.

A large number of small-to moderate-size earthen dams and reservoirs, constructed to fulfil the water demand of the area, were affected by Bhuj Earthquake. Most of these dams are embankment dams constructed across discontinuous ephemeral streams. Although many of these dams were within 150 km of the epicenters, the consequences of the damage caused by the earthquake to these facilities were relatively light primarily because the reservoirs were nearly empty during the earthquake.

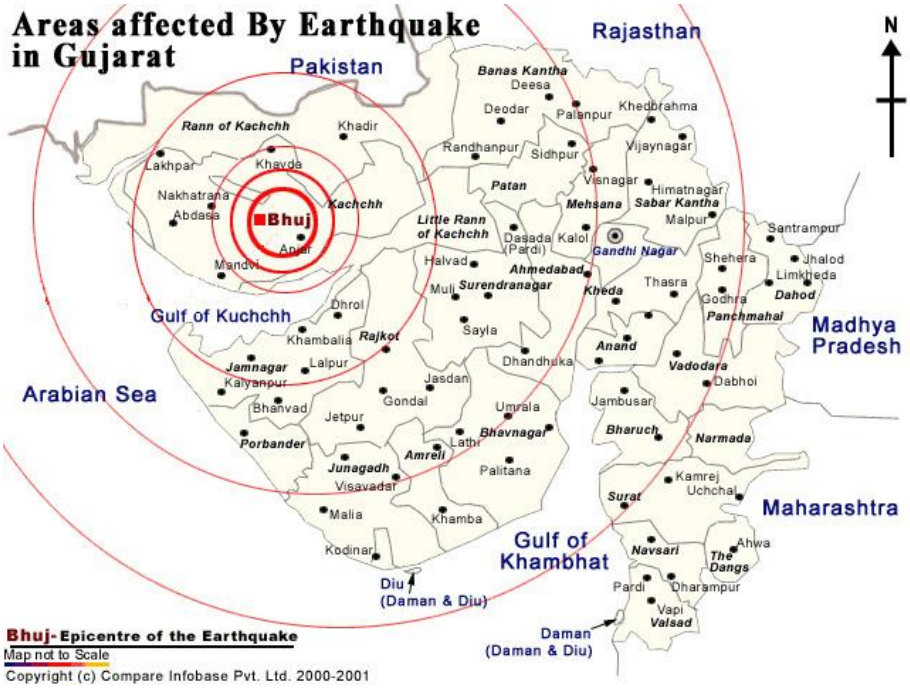


Figure 47 Epicenter for earthquake in Gujarat 2001

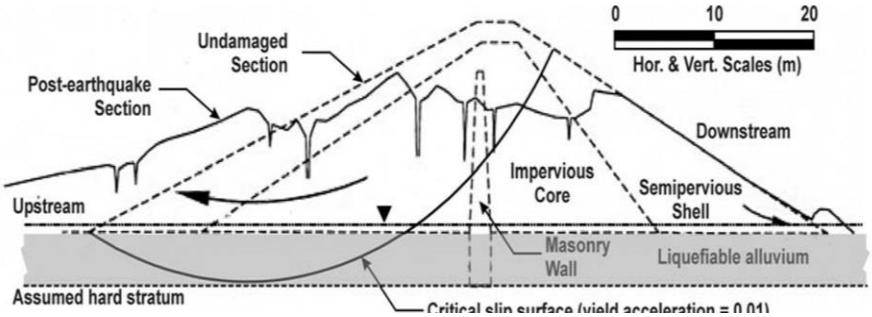


Figure 48 Cross section of Chang Earthen Dam

Performance of three such structures during Bhuj Earthquake has been examined here. Among these, Chang Dam was undergoing almost a complete collapse mainly because of liquefaction of shallow foundation soils. Damage to Fatehgadh Dam and Kaswati Dam was relatively less severe. Direct evidence of liquefaction was not found near Fatehgadh Dam and Kaswati Dam. However, localized liquefaction of foundation soils was one of the causes of the observed post-earthquake distress within these dams.

Chang Dam

Chang Dam, constructed in 1959, is an earth dam with 15.5 m height at its maximum section and 370 m crest length. No site-specific information was available about the subsurface soils other than the qualitative

information that the site is underlain by alluvial, loose to medium dense, sand-silt mixtures over shallow sandstone bedrock. Liquefaction susceptibility of the foundation soils was not considered in the original design. Chang Reservoir was nearly empty at the time of Bhuj Earthquake. However, the alluvium soils underneath the dam were possibly in a saturated state at that time. Bhuj Earthquake caused an almost complete collapse of the dam including damages to the impervious core and the masonry wall. Sand boils were observed near the upstream toe of Chang Dam following the earthquake. The deformation pattern is in fact indicative of a widespread liquefaction within the foundation soils.

Sr. no.	Dam	Crest (Length, height)	α_{max}	R(km)	Distress
1.	Chang	370, 15.5	0.50g	13	Liquefaction in foundation, failure of upstream and downstream slopes, slumping, cracking
2.	Fatehgadh	4049, 11.6	0.30g	80	Possible liquefaction in foundation near upstream toe, shallow failure in upstream slope, cracking
3.	Kaswati	1455, 8.8	0.28g	110	Possible liquefaction in foundation near upstream toe, shallow failure in upstream slope, cracking, leakage
4.	Rudramata	875, 27.4	0.30g	78	Possible liquefaction in foundation near upstream toe, shallow failure in upstream slope, cracking, leakage
5.	Shivlakha	300, 18.0	0.50g	28	Possible liquefaction in foundation, upstream and downstream slope failure, cracking
6.	Suvi	2097, 15.0	0.42g	37	Possible liquefaction in foundation near upstream toe, shallow failure in upstream slope, cracking
7.	Tapar	4054, 13.5	0.41g	43	Liquefaction in foundation near upstream toe, shallow failure in upstream slope, cracking

Table 6 Observed Performance of Selected Dams

Notes. 1. Estimates for α_{max} is based on Singh et al. (2003) attenuation relationship and Idriss (1990) site amplification relationship. 2. R is the approximate epicentre distance.

5.1.3 Transport Infrastructure / system:

Transport infrastructure consists of the fixed installations necessary for transport and includes roads, railways, airways, waterways, and terminals.

Transport is vital to the well-functioning of economic activities and a key to ensuring social well-being and cohesion of populations. Transport ensures everyday mobility of people and is crucial to the production and distribution of goods. Adequate infrastructure is a fundamental precondition for transport systems. In their endeavor to facilitate transport, however, decision-makers in governments and international organizations face difficult challenges. These include the existence of physical barriers or hindrances, such as insufficient or inadequate transport infrastructures, bottlenecks and missing links, as well as lack of funds to remove them. Solving these problems is not an easy task. It requires action on the part of the governments concerned, actions that are coordinated with other governments at international level.

- Road

A road is an identifiable route of travel, usually surfaced with gravel, asphalt or concrete, and supporting land passage by foot or by a number of vehicles. The most common road vehicle in the developed world is the automobile, a wheeled passenger vehicle that carries its own motor. As of 2002, there were 591 million automobiles worldwide. Other users of roads include motorcars, motorcycles, buses, trucks, bicycles and pedestrians, and special provisions are sometimes made for each of these. For example, the use of bus lanes give priority for public transport, and cycle lanes provide special areas of road for bicycles to use. Motorcars offer high flexibility, but are deemed with high energy and area use, and the main source of noise and air pollution in cities; buses allow for more efficient travel at the cost of reduced flexibility. Road transport by truck is often the initial and final stage of freight transport.

- Rail

Rail transport is a means of conveyance of passengers and goods by way of wheeled vehicles running on rail track, known as a railway or railroad. The rails are anchored perpendicular to railroad train consists of one or more connected vehicles that run on the rails. Propulsion is commonly provided by a locomotive, that hauls a series of unpowered cars, that can carry passengers or freight. The locomotive can be powered by steam, diesel or by electricity supplied by trackside systems.

Alternatively, some or all the cars can be powered, known as a multiple unit. Also, a train can be powered by horses, cables, gravity, pneumatics and gas turbines. Railed vehicles move with much less friction than rubber tires on paved roads, making trains more energy efficient, though not as efficient as ships. Intercity trains are long-haul services connecting cities; modern high-speed rail is capable of speeds up to 430 km/h (270 mph), but this requires a specially built track.

Regional and commuter trains feed cities from suburbs and surrounding areas, while intra-urban transport is performed by high capacity tramways and rapid transits, often making up the backbone of a city's public transport. Freight trains traditionally used box cars, requiring manual loading and unloading of the cargo. Since the 1960s, container trains have become the

dominant solution for general freight, while large quantities of bulk are transported by dedicated trains.

- Water

Water transport is the process of transport that a watercraft, such as a barge, boat, ship or sailboat, makes over a body of water, such as a sea, ocean, lake, canal or river. If a boat or other vessel can successfully pass through a waterway it is known as a navigable waterway. The need for buoyancy unites watercraft, and makes the hull a dominant aspect of its construction, maintenance and appearance. When a boat is floating on the water the hull of the boat is pushing aside water where the hull now is, this is known as displacement. In the 1800s, the first steamboats were developed, using a steam engine to drive a paddle wheel or propeller to move the ship. The steam was produced using wood or coal. Now, most ships have an engine using a slightly refined type of petroleum called bunker fuel.

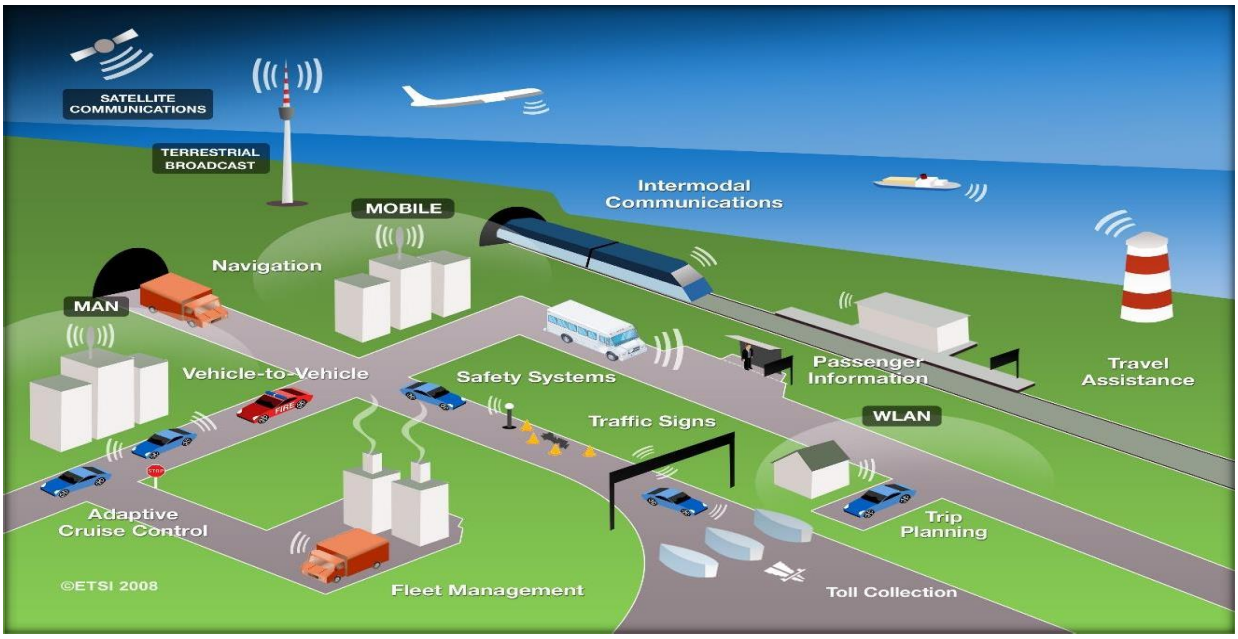


Figure 49 Transport Infrastructure

- Air

Air transport is the fastest method of transport, Commercial jets reach speeds of up to 955 kilometers per hour (593 mph) and a considerably higher ground speed if there is a jet stream tailwind, while piston-powered general aviation aircraft may reach up to 555 kilometers per hour (345 mph) or more. This celerity comes with higher cost and energy use, and aviation's impacts to the environment and particularly the global climate require consideration when comparing modes of transportation. The Intergovernmental Panel on Climate Change (IPCC) estimates a commercial jet's flight to have some 2-4 times the effect on the climate than if the same CO2 emissions were made at ground level, because of different atmospheric chemistry and radiative forcing effects at the higher altitude. U.S. airlines alone burned about 16.2 billion gallons of fuel during the twelve months between October 2013 and September 2014.WHO estimates that globally as many as 500,000 people at a time are on planes. The

global trend has been for increasing numbers of people to travel by air, and individually to do so with increasing frequency and over longer distances, a dilemma that has the attention of climate scientists and other researchers, the press and the World Wide Web. The issue of impacts from frequent travel, particularly by air because of the long distances that are easily covered in one or a few days, is called hypermobility and has been a topic of research and governmental concern for many years.

Advantages:

1. Less Capital Outlay:

Road transport required much less capital Investment as compared to other modes of transport such as railways and air transport. The cost of constructing, operating and maintaining roads is cheaper than that of the railways. Roads are generally constructed by the government and local authorities.

2. Door to Door Service:

The outstanding advantage of road transport is that it provides door to door or warehouse to warehouse service. This reduces cartage, loading and unloading expenses.

3. Service in Rural Areas:

Road transport is most suited for carrying goods and people to and from rural areas which are not served by rail, water or air transport. Exchange of goods, between large towns and small villages is made possible only through road transport.

4. Flexible Service:

Road transport has a great advantage over other modes of transport for its flexible service, its routes and timings can be adjusted and changed to individual requirements without much inconvenience.

5. Suitable for Short Distance:

It is more economic and quicker for carrying goods and people over short distances. Delays in transit of goods on account of intermediate loading and handling are avoided. Goods can be loaded direct into a road vehicle and transported straight to their place of destination.

6. Lesser Risk of Damage in Transit:

As the intermediate loading and handling is avoided, there is lesser risk of damage, breakage etc. of the goods in transit. Thus, road transport is most suited for transporting delicate goods like chinaware and glassware, which are likely to be damaged in the process of loading and unloading.

7. Saving in Packing Cost:

As compared to other modes of transport, the process of packing in motor transport is less complicated. Goods transported by motor transport require less packing or no packing in several cases.

8. Rapid Speed:

If the goods are to be sent immediately or quickly, motor transport is more suited than the railways or water transport. Water transport is very slow. Also much time is wasted in booking the goods and taking delivery of the goods in case of railway and water transport.

9. Less Cost:

Road transport not only requires less initial capital investment, the cost of operation and maintenance is also comparatively less. Even if the rate charged by motor transport is a little higher than that by the railways, the actual effective cost of transporting goods by motor transport is less. The actual cost is less because the motor transport saves in packing costs and the expenses of intermediate loading, unloading and handling charges.

10. Private Owned Vehicles:

Another advantage of road transport is that big businessmen can afford to have their own motor vehicles and initiate their own road services to market their products without causing any delay.

11. Feeder to other Modes of Transport:

The movement of goods begins and ultimately ends by making use of roads. Road and motor transport act as a feeder to the other modes of transport such as railways, ships and airways.

Disadvantages:

In spite of various merits, road/motor has some serious limitations:

1. Seasonal Nature:

Motor transport is not as reliable as rail transport. During rainy or flood season, roads become unfit and unsafe for use.

2. Accidents and Breakdowns:

There are more chances of accidents and breakdowns in case of motor transport. Thus, motor transport is not as safe as rail transport.

3. Unsuitable for Long Distance and Bulky Traffic:

This mode of transport is unsuitable and costly for transporting cheap and bulky goods over long distances.

4. Slow Speed:

The speed of motor transport is comparatively slow and limited.

5. Lack of Organization:

The road transport is comparatively less organized. More often, it is irregular and undependable. The rates charged for transportation are also unstable and unequal. The desirable features of mass transit systems are balanced by a number of serious drawbacks. In the first place, such systems are economically feasible only in areas that have relatively large populations.

5.1.4 Sustainable Sanitation:

Sustainable sanitation is a sanitation system designed to meet certain criteria and to work well over the long-term. Sustainable sanitation systems consider the entire "sanitation value chain", from the experience of the user, excreta and wastewater collection methods, transportation or conveyance of waste, treatment, and reuse or disposal. The Sustainable Sanitation Alliance (SuSanA) includes five features (or criteria) in its definition of "sustainable sanitation": Systems need to be economically and socially acceptable, technically and institutionally appropriate and protect the environment and natural resources. The purpose of sustainable sanitation is the same as sanitation in general: to protect human health.

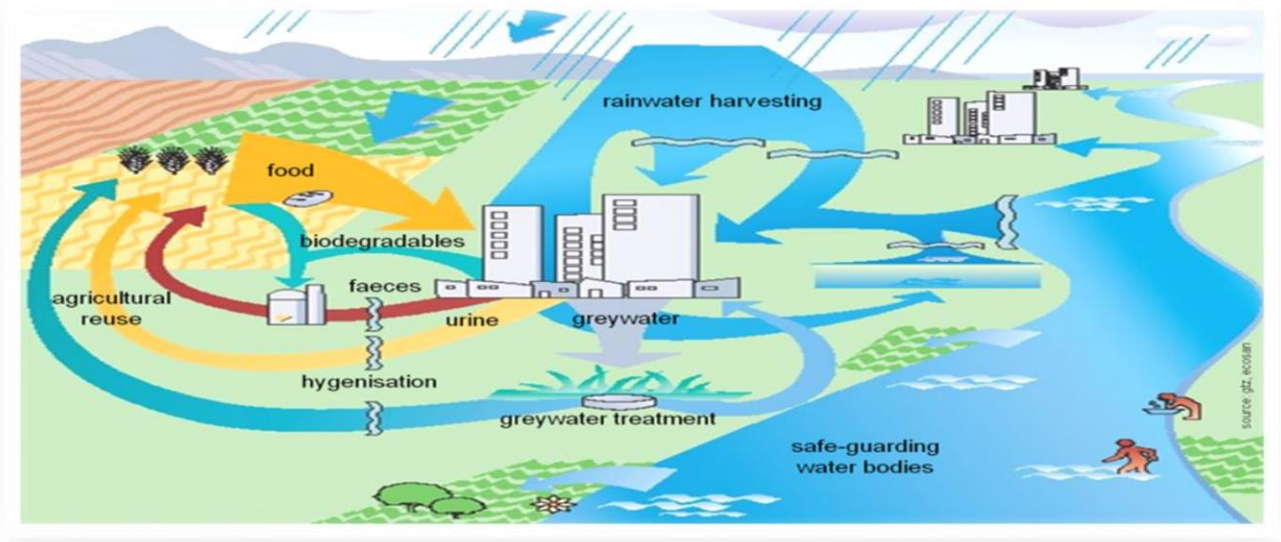


Figure 50 Sustainable sanitation

Health and hygiene:

The sanitation system must put an effective barrier between its user and the environment, and must prevent exposure that could affect public health at all points of the sanitation system: From the toilet, via the collection and treatment system, to the point of reuse or disposal and downstream populations. hence it also includes hygiene behavior.

Environment and natural resources:

In order to be sustainable, the sanitation system must protect and respect the natural environment and resources. Wherever possible, the resources contained in excreta and wastewater (energy, nutrients, water) are recycled, thereby protecting other resources (e.g. by replacing fossil fuels through biogas). Should use little energy, water or other resources (e.g. for construction, operation and maintenance), and should produce as little harmful emissions to the environment as possible.

Technology and operation:

A sustainable sanitation system utilizes a technology and a mode of operation that are well adapted to local circumstances. This includes the system's functionality and the ease with which the entire system including the collection, transport, treatment and reuse and/or final

disposal can be constructed, operated and monitored by the local community and/or the technical teams of the local utilities. Furthermore, the robustness of the system, its vulnerability towards power cuts, water shortages, floods, etc. and the flexibility and adaptability of its technical elements to the existing infrastructure and to demographic and socio-economic developments are important aspects to be evaluated.

Financial and economic issues:

The cost of a sanitation system must relate to the financial capacity of households, communities or institutions and includes not only the costs for construction, but also a rising costs for operation, maintenance and necessary reinvestments of the system. Besides the evaluation of these direct costs also direct benefits e.g. from recycled products (soil conditioner, fertilizer, energy and reclaimed water) and external costs and benefits have to be taken into account. Such external costs are e.g. environmental pollution and health hazards, while benefits include increased agricultural productivity and subsistence economy, employment creation, improved health and reduced environmental risks.

Socio-cultural and institutional aspects:

A sanitation system only lasts and can be sustainable if it is appropriate and accepted by the community. Again, this includes the whole sanitation system i.e. not only toilets, but also maintenance and operation and the recharge and reuse system adopted. A sustainable sanitation system must hence be socially acceptable, convenient, respect gender issues and impacts on human dignity, consider impacts on food security. In regards to institution aspects, it must be in compliance with the legal framework and must make for stable and efficient institutional settings.

5.1.5 Vertical Farming:

Figure 51 Vertical Farming

Vertical farming is the practice of growing crops in vertically stacked layers. It often incorporates controlled-environment agriculture, which aims to optimize plant growth, and

soilless farming techniques such as hydroponics, aquaponics, and aeroponics. Some common choices of structures to house vertical farming systems include buildings, shipping containers, tunnels, and abandoned mine shafts. As of 2020, there is the equivalent of about 30 ha (74 acres) of operational vertical farmland in the world. The modern concept of vertical farming was proposed in 1999 by Dickson Despommier, professor of Public and Environmental Health at Columbia University. Despommier and his students came up with a design of a skyscraper farm that could feed

50,000 people. Although the design has not yet been built, it successfully popularized the idea of vertical farming. Current applications of vertical farming coupled with other state-of-the-art technologies, such as specialized LED lights, have resulted in over 10 times the crop yield than would receive through traditional farming methods. The main advantage of utilizing vertical farming technologies is the increased crop yield that comes with a smaller unit area of land requirement. The increased ability to cultivate a larger variety of crops at once because crops do not share the same plots of land while growing is another sought-after advantage. Additionally, crops are resistant to weather disruptions because of their placement indoors, meaning less crops lost to extreme or unexpected weather occurrences. Because of its limited land usage, vertical farming is less disruptive to the native plants and animals, leading to further conservation of the local flora and fauna. Vertical farming technologies face economic challenges with large start-up costs compared to traditional farms. In Victoria, Australia, a "hypothetical 10 level vertical farm" would cost over 850 times more per cubic meter of arable land than a traditional farm in rural Victoria. Vertical farms also face large energy demands due to the use of supplementary light like LEDs. Moreover, if non-renewable energy is used to meet these energy demands, vertical farms could produce more pollution than traditional farms or greenhouses.

Advantages of Vertical Farming

Having greater output from a small cultivation area is not the only advantage of vertical farming. Following are some of the major benefits of vertical farming:

Preparation for Future: By 2050, around 68% of the world population is expected to live in urban areas, and the growing population will lead to an increased demand for food. The efficient use of vertical farming may perhaps play a significant role in preparing for such a challenge.

Increased and Year-Round Crop Production: Vertical farming allows us to produce more crops from the same square footage of growing area. In fact, 1 acre of an indoor area offers equivalent production to at least 46 acres of outdoor capacity. According to an independent estimate, a 30story building with a basal area of 5 acres can potentially produce an equivalent of 2,400 acres of conventional horizontal farming. Additionally, year-round crop production is possible in a controlled indoor environment which is completely controlled by vertical farming technologies.

Less Use of Water in Cultivation: Vertical farming allows us to produce crops with 70% to 95% less water than required for normal cultivation.

Not Affected by Unfavorable Weather Conditions: Crops in a field can be adversely affected by natural calamities such as torrential rains, cyclones, flooding or severe droughts events

which are becoming increasingly common as a result of global warming. Indoor vertical farms are less likely to feel the brunt of the unfavorable weather, providing greater certainty of harvest output throughout the year.

Increased Production of Organic Crops: As crops are produced in a well-controlled indoor environment without the use of chemical pesticides, vertical farming allows us to grow pesticide-free and organic crops. Human and Environmentally Friendly: Indoor vertical farming can significantly lessen the occupational hazards associated with traditional farming. Farmers are not exposed to hazards related to heavy farming equipment, diseases like malaria, poisonous chemicals and so on.

Limitations of Vertical Farming

Vertical farming has both pros and cons. Sometimes the pros of vertical farming are highlighted and not the cons. Following are the major limitations of vertical farming:

No Established Economics: The financial feasibility of this new farming method remains uncertain. The financial situation is changing, however, as the industry matures and technologies improve.

Difficulties with Pollination: Vertical farming takes place in a controlled environment without the presence of insects. As such, the pollination process needs to be done manually, which will be labor intensive and costly.

Labor Costs: As high as energy costs are in vertical farming, labor costs can be even higher due to their concentration in urban centers where wages are higher, as well as the need for more skilled labor. Automation in vertical farms, however, may lead to the need for fewer workers. Manual pollination may become one of the more labor-intensive functions in vertical farms.

Too Much Dependency on Technology: The development of better technologies can always increase efficiency and lessen costs. But the entire vertical farming is extremely dependent on various technologies for lighting, maintaining temperature, and humidity. Losing power for just a single day can prove very costly for a vertical farm. Many believe the technologies in use today are not ready for mass adoption.

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

Figure 52 Spalling of concrete

Corrosion Mechanism: The mechanism of corrosion in aqueous media is of electrochemical nature. This means that the oxidation of the metal is counterbalanced by the reduction of another substance in another region of the metallic surface. Therefore, zones (anodes and cathodes) with different electrochemical potential, develop. In the case of concrete, the electrolyte is constituted by the pore solution,

which is very alkaline. This pore solution is formed by mainly a mixture of KOH and NaOH presenting pH values ranging between 12,614. The solution is saturated in Ca(OH)2. Steel embedded in concrete is naturally protected by this high alkalinity and by the barrier effect of the cover itself.

The two main causes of electrochemical corrosion are carbonation and the presence of chlorides. Carbonation usually induces a generalized corrosion while chloride will lead into pitting or localized attack. The corrosion can be easily recognized by the rust presence on the rebar and by the appearance of cracks running parallel to the rebar.

Figure 53 Carbonation

Carbonation: Atmospheric carbon dioxide reacts with the calcium and alkaline hydroxides and cement phases, leading in a lowering of the pore solution pH value until values near neutrality. This process aims into the depassivation of the steel in contact with the carbonated zones.

Mechanism: In the case of Reinforced concrete structure the ingress of moisture or air may lead to corrosion of steel, cracking and spalling of the concrete cover thereby reducing durability of the concrete structure. Repair has been suggested as the protective solution for damaged structure due to corrosion. Corrosion of reinforcing steel is a significant economic and safety problem, preventing many buildings from attaining their design life. It is now a must look into field as corrosion of reinforcing steel is seen almost in every 10 out of 100 constructions within a life of 10 years. Nowadays the increase content of pollutants in the city atmosphere has very much affected the lifespan of RCC structures. The increased content of pollutants includes a very high rates of Sulphates and Chlorides which when these mixes with rain water and falls over these structures and damages the visible parts.

Chloride attack:

The chloride ions may be present in the concrete if they are added in the mix (admixtures, water or aggregates). However, this is fortunately not common. The most frequent is that chlorides penetrate from outside, either due to the structure is placed in marine environments or because deicing salts are used. Chlorides induce local disruption of steel passive layer dealing into pits or localized attack. In submerged zones or in fully saturated concrete, chlorides penetrate by diffusion.

Galvanization

Galvanized reinforcing steel is effectively and economically used in concrete where unprotected reinforcement will not have adequate durability. The susceptibility of concrete

structures to the intrusion of chlorides is the primary incentive for using galvanized steel reinforcement. Galvanized reinforcing steel is especially useful when the reinforcement will be exposed to the weather before construction begins. Galvanizing provides visible assurance that the steel has not rusted and requires no on-site repair, unlike most other coatings.

Prevention:

Corrosion of steel in reinforced concrete structures can be divided into four different categories, based on how they provide protection:

Re-alkalization:

This system is the equivalent of desalination for carbonated structures. It relies on the principle that the hydroxyl ions produced at the cathode re-alkalise the concrete from the reinforcement outwards. This is linked with a wet anode at the surface that contains calcium carbonate, which moves under electro-osmotic pressure and re-alkalizes the concrete from the surface inwards.

Corrosion repair techniques:

A recent development is the impregnation with chemical corrosion inhibitors which are widely used in the power generation, chemical and manufacturing industries. Recently, attempts have been made to introduce these chemicals into hardened concrete. If successful, then these could be good, relatively simple methods of increasing the life span, reducing maintenance and providing a 'minimum intervention' method of slowing or stopping corrosion. One of the most effective corrosion inhibiting systems is also one of the simplest. An inorganic admixture made with calcium nitrate, which is added to the concrete before casting, performs equally well or better than more complicated systems that include sealers applied to the concrete or coatings on the steel bars.

Alternative reinforcement and slab design method includes materials that electrically isolate the steel from the concrete and create a barrier for chloride ions, materials that protect steel galvanic-ally, and materials that have significantly higher corrosion thresholds than conventional reinforcing steel. Concrete slabs have been designed without any internal reinforcement.

Barrier methods protect reinforced concrete from corrosion damage by preventing water, oxygen, and chloride ions from reaching the reinforcement and initiating corrosion.

Electrochemical methods use current and an external anode to protect the reinforcement, even when the chloride ion concentration is above the corrosion threshold.

Corrosion inhibitors offer protection by raising the threshold chloride concentration level, by reducing the permeability of the concrete, or by doing both.

5.1.7 Sewage treatment plant

Sewage contains a wide diversity and concentration of bacteria. Bacteria have a different suite of fatty acids compared to most animals and plants. Most organisms higher in the evolutionary tree than bacteria produce even chain fatty acids through the fatty acid synthase system. Here, two carbon sub-units in the form of acetyl Co-A are added sequentially to form long-chain molecules.

As the cycle progresses, the chain length grows in acetyl (C2) increments leading to a series of even carbon numbered compounds. Bacteria can also use other precursors (e.g. valine) and this gives rise to a series of odd carbon chain lengths. The mechanism of addition can generate three different acids: straight chain, and iso or anteiso branched chains.

At the global level, an estimated 52% of municipal wastewater is treated. However, wastewater treatment rates are highly unequal for different countries around the world. For example, while high-income countries treat approximately 74% of their municipal wastewater, developing countries treat an average of just 4.2%. Wastewater that is discharged untreated into the environment can cause water pollution.

The term "sewage treatment plant" (or "sewage treatment works" in some countries) is nowadays often replaced with the term wastewater treatment plant or wastewater treatment station. Sewage can be treated close to where the sewage is created, which may be called a "decentralized" system or even an "on-site" system (in septic tanks, bio filters or aerobic treatment systems). Alternatively, sewage can be collected and transported by a network of pipes and pump stations to a municipal treatment plant. This is called a "centralized" system (see also sewerage and pipes and infrastructure).

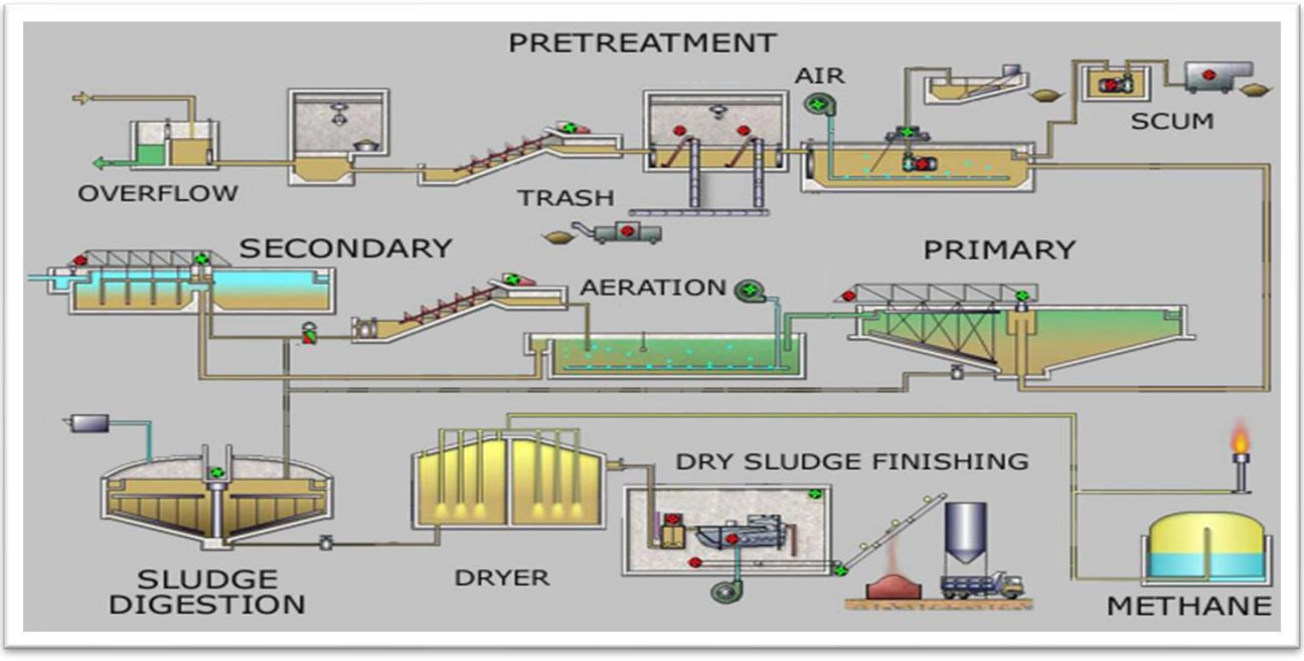


Figure 54 Typical Sewage Treatment Plant

Technical case study of sewage treatment in Surat

Introduction

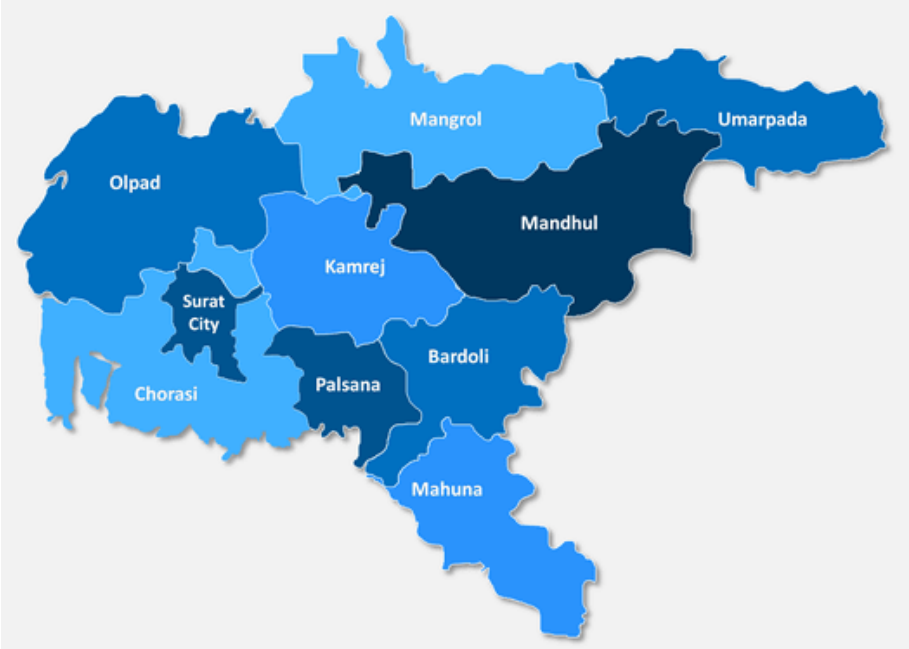


Figure 56 Map of Surat city

Surat city is located on west coast of India, in the southern part of Gujarat state. Surat experiences warm-humid climate with summer maximum temperature of 43^0 C and winter minimum temperature of 16 C. Annual rainfall varies between 1250 mm and 1300 mm and the relative humidity ranges from 50 to 80%. Surat is located on the banks of river Tapi. Ukai reservoir is located 90 km upstream of Surat on river Tapi. During rainy season, from June to September, Surat city frequently experiences flood. Interestingly, Surat and surrounding region is usually not flooded due to incessant rains but due to sudden release of water from Ukai reservoir often without much notice to residents (CDP, 2008; Taru and SMC, 2011).

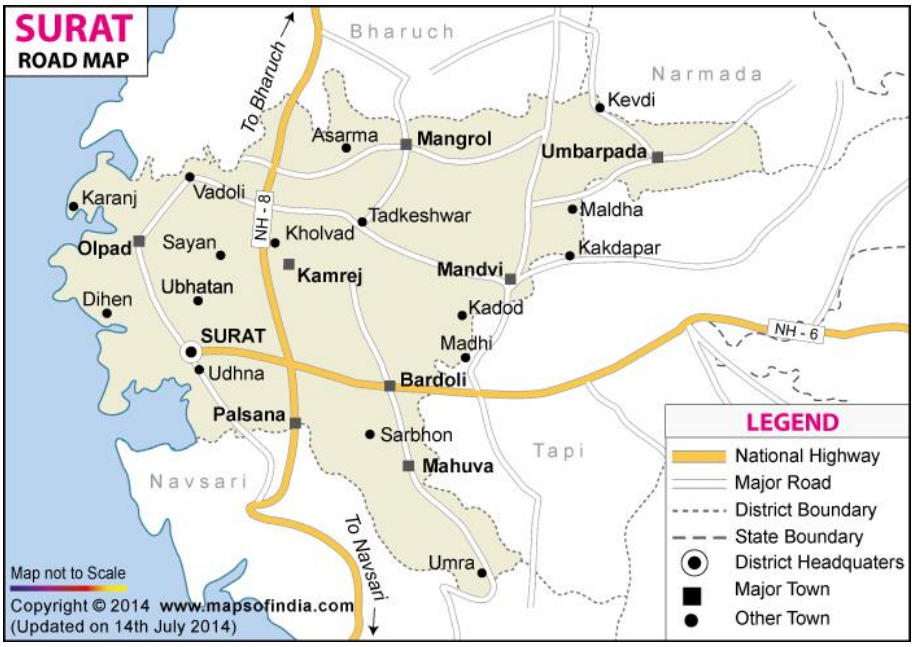


Figure 55 Maps of Surat city

City Profile and Governance

Surat is the 9th largest city in India, which has expanded its area from 8.12 sq. km. in 1961 to 326.5 sq. km. in 2009. The city with its continuing high rate of growth has reached a population of 4.4 million in 2011 from 2.8 million in 2001. It is likely to reach to 5.5 to 6.0 million by the year 2020 (CDP, 2008). Surat is also one of the major

economic centers in India. Surat is known for diamonds, textiles and for diamond-studded gold jewellery manufacturing. The city contributes 70% of India's rough diamond cutting and polishing which is about 42% of world's rough diamond cutting and polishing. 40% of manmade fabric and about 28% of manmade fiber produced in India's comes from Surat. It also accounts for 65% of India's diamond exports and 18% of manmade fiber exports (Taru and SMC, 2011).

Surat Municipal Corporation (SMC) is responsible for provisioning and maintaining civic functions whereas Surat Urban Development Authority (SUDA) is responsible for developing new infrastructure. Approximately 326 sq. km of the city area comes under the jurisdiction of SMC. SUDA covers the SMC area and additional peripheral areas (including peri-urban and rural areas) totaling to 722 sq. km. (SMC and SUDA, 2004). SUDA is responsible for preparing the Area Development Plans for the larger area including the area governed by SMC. Other institutions which have an important stake in the overall development of the city are Gujarat Pollution Control Board (GPCB), Surat Electricity Corporation, Public Works Department (PWD), State Highways Department and State Irrigation Department (Taru and SMC, 2011). The governance structure of SMC consists of both political and administrative wings. The political wing has a general body of elected councilors headed by a Mayor supported by the standing committees and other statutory committees that look after the specialized functions of SMC (SMC and SUDA, 2004). Executive wing of SMC is headed by the Municipal Commissioner who is responsible for the strategic and operational planning, and management of SMC.

As per Vision 2020 document prepared by SMC and SUDA, Surat is gearing up for becoming a city with global presence (SMC and SUDA, 2004). SMC has prepared a City Development Plan (CDP) which has identified projects to be undertaken on priority for execution at city level under Jawaharlal Nehru National Urban Renewal Mission (JnNURM). JnNURM is an initiative by Ministry of Urban Development, Government of India, which involves a total investment plan of more than USD 1320 billion over a period of seven years. This program is mainly to cater to the improvement in the quality of life and infrastructure development in 67 identified cities across the country. About 70% of the recent infrastructure of Surat has been developed under JnNURM. Three Sewerage sector projects were carried out under JnNURM assistance costing INR 4321.9 million which was 18% of the total sanctioned projects for Surat city (CDP, 2008; SMC, 2009b).

It needs to be highlighted here that success of any development program depends on the enabling environment. Indian Constitution empowers the ULBs to bear the sole responsibility for development and maintenance of urban areas. SMC has taken up these responsibilities with all earnestness and it is following the laid down standards and guidelines to ensure good quality development projects. Decentralization of roles and responsibilities within various levels at SMC has helped in achieving efficiency and smooth functioning of the system of urban governance in Surat. The city is divided into seven municipal administrative zones for decentralized administration. Unbundling of urban service provisions by involving private sector has created a synergy between public and private expertise which in turn has paved way to the success of many of the projects undertaken in Surat (Taru and SMC, 2011).

Sewage management in Surat

Prior to the year 1995, Surat was characterised as one of the dirtiest cities in India, typically due to filth and lack of hygiene, crowded and unorganized town and open sewers and poor handling of sewage and solid waste disposal. In 1994, due to heavy rains coupled with release of water from Ukai reservoir, major part of the Surat city was severely flooded. The situation was worsened due to clogged sewers. Sizeable number of animals died due to flood and carcasses could not be cleared in time. Rotting animal carcasses together with other waste created severe unhygienic conditions. This resulted in the outbreak of pneumonic plague in which many human lives were lost. Realizing the need for maintaining the minimum levels of hygiene in the city, the post plague clean-up work was carried out immediately (Swamy et al., 2010). Due to the post-plague efforts of SMC to clean-up the city and the continued efforts of maintaining the cleanliness, Surat city emerged as third cleanest cities of India in 2009e10 as per National City Rating exercise conducted by Ministry of Urban Development, Govt. of India. It took about fifteen years to transform Surat into one of the fastest growing and cleanest cities after the spread of Plague in 1994, and it has now become a role model for other cities of India (USHAA, 2011; Taru and SMC, 2011).

Figure 57 Present sewage treatment plant (Surat)

Surat has an almost flat terrain, which poses a challenge for planning the sewerage and storm-water drainage system. The SMC till the year 2005, had laid more than 1150 km of sewerage network with more than 38,500 manholes and had a total of eight STPs (total capacity 642.50 MLD) and 32 sewage pumping stations (total capacity 1163 MLD). Before the expansion of city's municipal areas, 97% of the city area was covered by piped networks for water supply and sewerage. However, after the expansion of city limits in year 2006 to 326 sq. km., about 86% of the population was served with sewerage network. Due to this the remaining domestic grey-water and sewage generated from peri-urban areas was being discharged in Tapi River. The resulting water pollution has led to algae blooms, proliferation of underwater hydrilla and surface variety of water hyacinth in river Tapi (SMC, 2012).

SMC has spent more than INR 9.93 billion as capital expenditure on water supply infrastructure from year 1995 to 2011e12. Due to the project investments, gross daily average water supply has increased from 180 MLD in year 1995 to about 850 MLD in 2012.

6 Swachh bharat abhiyan

To accelerate the efforts to achieve universal sanitation coverage and to put the focus on sanitation, the Prime Minister of India had launched the Swachh Bharat Mission on 2nd October 2014. Under the mission, all villages, Gram Panchayats, Districts, States and Union Territories in India declared themselves "open-defecation free" (ODF) by 2 October 2019, the 150th birth anniversary of Mahatma Gandhi, by constructing over 100 million toilets in rural India. To ensure that the open defecation free behaviors are sustained, no one is left behind, and that solid and liquid waste management facilities are accessible, the Mission is moving towards the next Phase II of SBMG i.e. ODF-Plus. ODF Plus activities under Phase II of Swachh Bharat Mission (Grameen) will reinforce ODF behaviors and focus on providing interventions for the safe management of solid and liquid waste in villages.

Cleanliness means that there is no dirt, no dust, no stains, no bad smells. The goals of cleanliness are health, beauty, absence of offensive odor and to avoid the spreading of dirt and contaminants to oneself and others.

With the help of cleanliness, we can keep our physical and mental health clean, which will make us feel good. Cleanliness gives rise to a good character by keeping body, mind, and soul clean and peaceful. Maintaining cleanliness is the essential part of healthy living because it is the cleanliness only which helps to improve our personality by keeping clean externally and internally.

It is everybody’s responsibility and one should keep themselves and their surroundings clean and hygienic. It also brings good and positive thoughts in the mind which slows down the occurrence of diseases.

Importance of Cleanliness

Sanitation and neatness play an important role in our day to day routine. It is important as it prevents dangerous diseases like Dengue, typhoid, hepatitis, and other diseases caused by mosquito bite, etc.

Diseases like Jaundice, Cholera, Ascariasis, Leptospirosis, Ringworm, Scabies, Schistosomiasis, Trachoma, etc. can be spread due to eating contaminated food, drinking contaminated water or living in an unhygienic condition. Trash also spread bad odor which is difficult to tolerate. There will also be an accumulation of trash and dirt if clean measures aren’t taken.

6.1 Swatchhta needed in Vankaner village -Existing Situation with photograph

The allocated village under panchayat of Mr. Mayur is fairly clean, its roads have least dust, daily sweeping and cleaning of village is in action.




Figure 58 Photos showing cleanliness of the village

6.2 Guidelines - Implementation in allocated village with Photograph

Clean roads encompass all public roads including those in residential as well as commercial areas. Cleaning of roads includes street sweeping, cleaning of public places and surface drains. Streets are classified based on their location, traffic intensity, type of street surface, land use of adjacent area and others. Some Suggestions/things to be implemented are:

Dry and Wet Dustbins

Garbage Collecting Cars

Sweepers with good skills to clean

Time management Responsible Residents

Public Toilets

Dustbins Near Individual Houses of the Village.

The Swachh Bharat Mission is split into two sub Missions Swachh Bharat Mission (Gramin) and Swachh Bharat Mission (Urban).

Swachh Bharat Mission (Gramin), Gram Panchayats and Zilla Parishads will work on war footing to make sure that all households in all villages have functional water supply and toilet facilities. Productive use of night soil as bio-fertilizers is also on the cards.

A project proposal shall be prepared by the District, scrutinized and consolidated by the State Government into a State Plan. The State Plan with district wise details will be shared with the Government of India (Swachh Bharat Mission-Ministry of Drinking Water and Sanitation). This Plan will include a 5-year Plan along with 5 independent Annual Plans which merge into the 5-year Plan. These plans shall be approved by the Ministry each year.

On the basis of formative research and consultation rounds, the State shall develop a tailor made Communication Strategy, a Communication Plan, and material and will train community mobilisers to use these tools. Funds are to be made available for these preliminary IEC works including for triggering Behaviour change. This will endeavor to reach every household in every community and shall disseminate information regarding the need for safe sanitation, the ill effects of open defecation, and getting the population oriented towards satisfying their felt-needs.

The provision of Incentives for individual household latrine units to the rural households is available to States that wish to provide the same. This may also be used to maximize coverage so as to attain community outcomes

7 Village condition due to Covid-19

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus.

Most people who fall sick with COVID-19 will experience mild to moderate symptoms and recover without special treatment.

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus.

Most people who fall sick with COVID-19 will experience mild to moderate symptoms and recover without special treatment.

Most common symptoms:

- Fever
- Dry cough
- Tiredness

Less common symptoms:

- Aches and pains
- Sore throat
- Diarrhea
- Conjunctivitis
- Headache
- Loss of taste or smell
- A rash on skin, or discoloration of fingers or toes

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

The coronavirus disease 2019 (COVID-19) pandemic in India has had an enormous impact on each livelihood in this country. A journey from the first reported case on 30 January, 2020, in Kerala to the present lockdown 5.0 has been difficult for all of us. In spite of the beginning of the containment plan for imported cases till the present ongoing mitigation strategy to curb the local transmission, we have not succeeded in controlling the increased number of positive cases, which was 1000 on 29 March, 10,000 on 13 April, 50,000 on 6 May, 1,00,000 on 19 May and 2,00,000 on 3 June and has reached 3,00,000. Along with the invocation of the Epidemic Diseases Act, 1897, the lockdown started on 24 March 2020 and is still on, affecting the entire 1.3 billion population of India, although some observers have doubted that it has slowed the growth rate of the pandemic. A report by the Oxford COVID-19 Government Response Tracker stated that the Indian Government Response Stringency Index was ‘75.46’ for strictness at this point in time and is better than many developed countries. However, these measures taken have come at a great economic and human cost in a diverse country like India. COVID-19 in our country reached a total of 2,97,535 positive cases, 1,47,195 cured/discharged/migrated and 8498 deaths as of 12 June 2020 (MOHFW). These figures must be alarming when we compare the poor with rich, literate and illiterate, private

and public health-care systems, rural and urban areas or towns and villages, however, difficult to get those strata.

With the migrant workers returning to village, gram panchayat must ensure 14 days of quarantine along with family members in the village. So that chances of transmission will be minimum. The National Institute of Rural Development and Panchayati Raj (NIRDPR), which is assisting the people with crisis management amid Coronavirus (Covid-19) outbreak, said that in case the workers do not have a house of their own to self-quarantine or their house is too small for the same, the Gram Panchayat (GP) will have to make necessary arrangements by converting Anganwadis or schools into quarantine centers or by establishing a makeshift quarantine space.

Awareness about COVID-19 transmission and protective measures

Clean your hands often

Cough or sneeze in your bent elbow not your hands! Avoid touching your eyes, nose and mouth. Limit social gatherings and time spent in crowded places. Avoid close contact with someone who is sick. Clean and disinfect frequently touched objects and surfaces.

7.2 Any other steps taken by the students / villagers

Preventive measures to reduce the chances of infection include staying at home, wearing a mask in public, avoiding crowded places, keeping distance from others, ventilating indoor spaces, washing hands with soap and water often and for at least 20 seconds, practising good respiratory hygiene, and avoiding touching the eyes, nose, or mouth with unwashed hands.

Those diagnosed with COVID-19 or who believe they may be infected are advised by the CDC to stay home except to get medical care, call ahead before visiting a healthcare provider, wear a face mask before entering the healthcare provider's office and when in any room or vehicle with another person, cover coughs and sneezes with a tissue, regularly wash hands with soap and water and avoid sharing personal household items.

8 Sustainable Design Planning Proposal (Prototype Design)- Part- I

8.1 Design proposal

Sustainable design: trickling filter

A trickling filter is a type of wastewater treatment system. It consists of a fixed bed of rocks, coke, gravel, slag, polyurethane foam, sphagnum peat moss, ceramic, or plastic media over which sewage or other wastewater flows downward and causes a layer of microbial slime (biofilm) to grow, covering the bed of media. Aerobic conditions are maintained by splashing, diffusion, and either by forced-air flowing through the bed or natural convection of air if the filter medium is porous. The treatment of sewage or other wastewater with trickling filters is among the oldest and most well characterized treatment technologies.

Social Design: Library

A library is a curated collection of sources of information and similar resources, selected by experts and made accessible to a defined community for reference or borrowing. It provides physical or digital access to material, and may be a physical location or a virtual space, or both. A library's collection can include printed materials and other physical resources in many formats such as DVDs, as well as access to information, music or other content held on bibliographic databases.

Sociocultural design: public toilet

A public toilet is a room or small building with toilets (or urinals) and sinks that does not belong to a particular household. Rather, the toilet is available for use by the general public, customers, travelers, employees of a business, school pupils, prisoners. Public toilets are commonly separated into male and female facilities, although some are unisex, especially for small or single-occupancy public toilets. Increasingly, public toilets are accessible to people with disabilities. Public toilets are known by many other names depending on the country. Examples are: restroom, bathroom, men's room, women's room in the US, washroom in Canada, and toilets, lavatories, water closet (W.C.), ladies and gents in Europe. In some parts of the world, they are referred to as the loo.

Heritage Village Design: Village Entrance Gate

Entrance gate is provided at very start of village to show warm welcome to visitors, it also helps people to indicate that village area will start from the point. This gate is generally provided open (i.e. no shutters gate).

Smart village design: ATM

ATMs are machines made at different location in or out of the bank building for purpose of withdrawing money anytime, balance checking and other bank facility. ATM machines needs small cabin like structure for protection and security purpose.

Physical design: Gym

In the past village dwellers mostly associated with farming and activities involved though physical jobs. apparently that helped people to stay healthy and fit but nowadays urban facilities are creating white collar job which requires less physical efforts to maintain good physics gym like facilities are required in village.

8.1.1 Sustainable Design: Trickling filter

Scenario

A trickling filter is a type of wastewater treatment system. It consists of a fixed bed of rocks, coke, gravel, slag, polyurethane foam, sphagnum peat moss, ceramic, or plastic media over which sewage or other wastewater flows downward and causes a layer of microbial slime (biofilm) to grow, covering the bed of media. Aerobic conditions are maintained by splashing, diffusion, and either by forced-air flowing through the bed or natural convection of air if the filter medium is porous. The treatment of sewage or other wastewater with trickling filters is among the oldest and most well characterized treatment technologies.

Existing situation

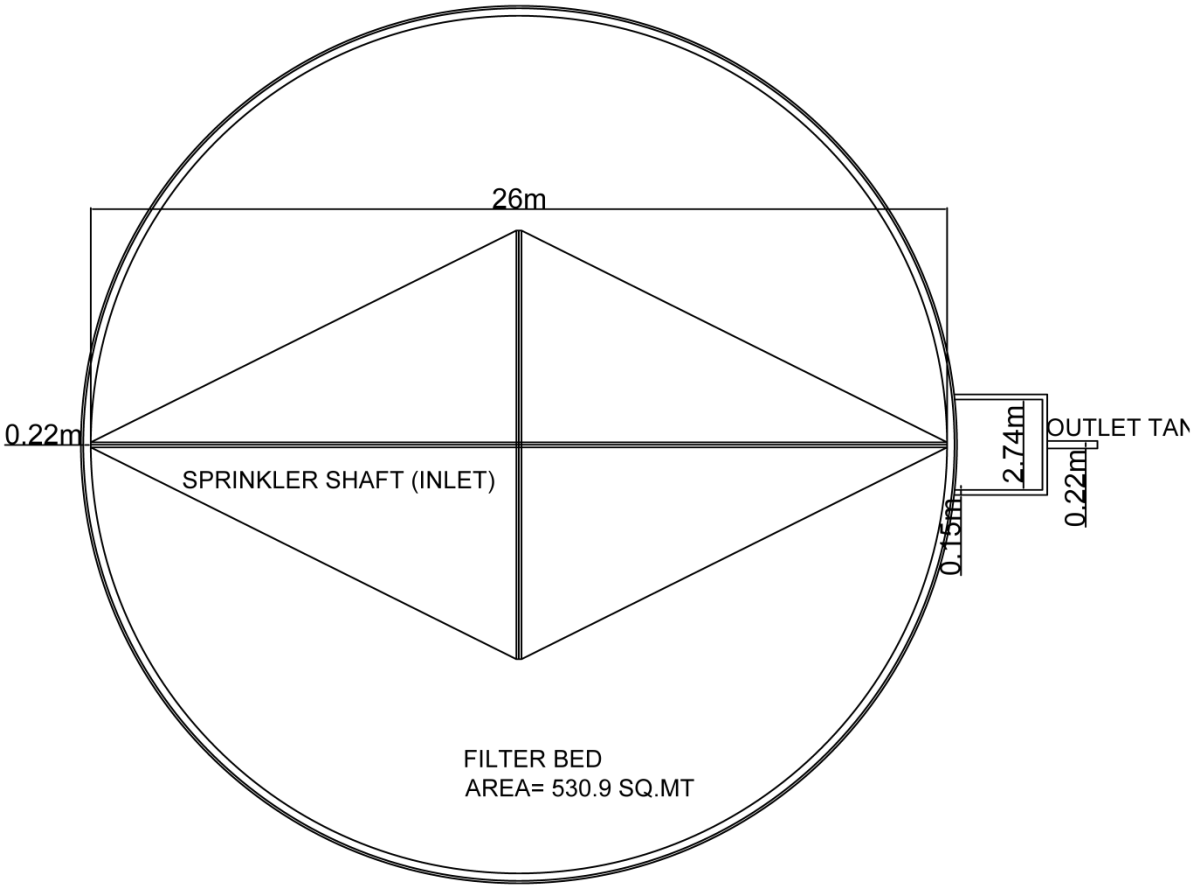
Vankaner village has many developed facilities like electricity, irrigation facility, etc. but it lacks at waste management facility. Sewage generated by village dwellers is directly disposed into a khadi and ultimately into river. This method can disturb river aquaculture not only that but due to water pollution many wasters bound disease can spread around the village.

Sustainability of Proposal

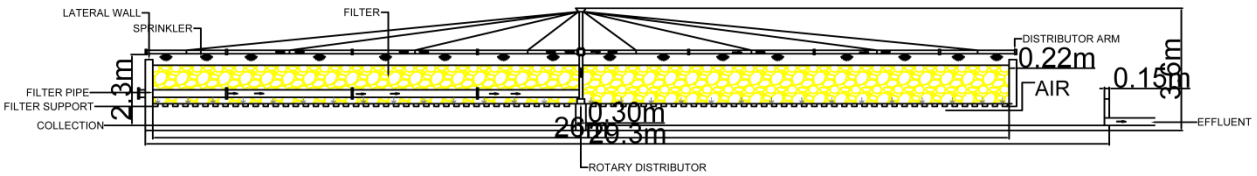
Because of their large air-water interface can remove co2,h2s, n2 & other gases.

- A portion of liquid in underdrain system is recycled:
- It improves the treatment efficiency.
- To dilute strength of incoming wastewater.
- To maintain enough wetting of slime layer.
- Prevents ponding in **filter**.
- Suitable for shock loads.

Proposed Design in Auto cad



PLAN



ELEVATION

Water supply per day	150	Lpcd					
Total population	10000	People					
Consider wastage	15%						
Total sewage generation per day		1275000	L/day				
Design of tickling filter							
Assumed data							
Bod5	150	Mg/l					

Surafece loading rate	2500	L/sqm/day					
Organic loading	165	G/cum/day					
Total 5 days bod present in sewage			191250	Gm/day			
Volume of tickling filter			1159.091	Cum			
Surface area required for the filter			510	Sqm			
Depth of filter bed required			2.3	M			
Diameter of filter			26	M			
Actual volume			1221.137	Cum			
Efficiency of filter							
Actual organic loading = u			156.6163	Gm/cum/day			
		=	1566.163	Kg/ham/day			
Efficiency of filter = e =			85%				

Measurement sheet

Sr. No.	Description	No.	L	B	H	Total quantity
1	Excavation for foundation circular	1	82.62	0.9	0.4	29.7432
2	Pcc in foundation	1	82.62	0.9	0.3	22.3074
3	Brick work on periphery	1	82.62	0.3	2	49.572
4	Plastering on walls	2	120.6	-	2	482.4
5	White washing	-	-	-	-	482.4
6	Painting on wall	-	-	-	-	482.4

Abstract sheet					
Sr. No.	Description	No/quant	Rate	Per	Amount
1	Excavation for foundation circular	29.743	70	M3	2082.024
2	Pcc in foundation	22.307	2500	M3	55768.5
3	Brick work on periphery	49.572	3000	M3	148716
4	Plastering on walls	482.4	150	M2	72360
5	White washing	482.4	100	M2	48240
6	Painting on wall	482.4	200	M2	96480
7	Media filling in filter bed	543.25	100	M2	54325
8	Lump sum plumbing cost	-	-	-	50000
			2%	Contingencies	10559.43
			10%	Contractor profit	52797.15
				Grant total	591328.1

Approximate cost of making trickling filter for serving population of 10000 people will be around 6 lakh rupees.

8.1.2 Social Design: Library

Scenario

A library is a curated collection of sources of information and similar resources, selected by experts and made accessible to a defined community for reference or borrowing. It provides physical or digital access to material, and may be a physical location or a virtual space, or both. A library's collection can include printed materials and other physical resources in many formats such as DVDs, as well as access to information, music or other content held on bibliographic databases.

Existing situation

At present Vankaner village does not have any facility for peaceful reading. Where people can come and have peaceful environment to read different literature, novels or mere newspaper. So, we have made design of library building to provide such facility.

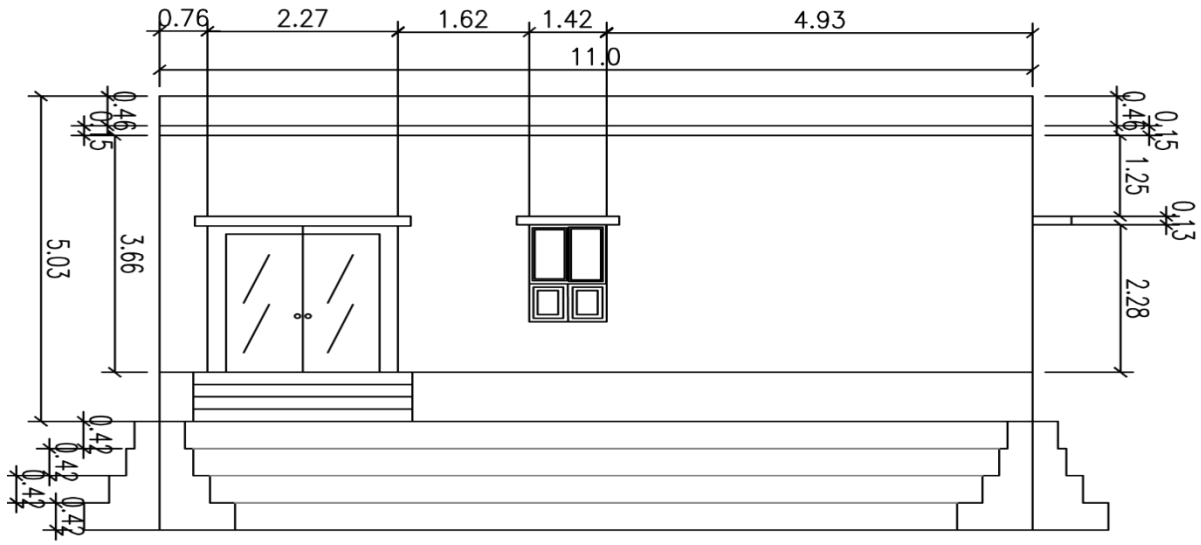
Sustainability of Proposal

Libraries are important cornerstones of a healthy community. Libraries give people the opportunity to find jobs, explore medical research, experience new ideas, get lost in wonderful stories, while at the same time providing a sense of place for gathering.

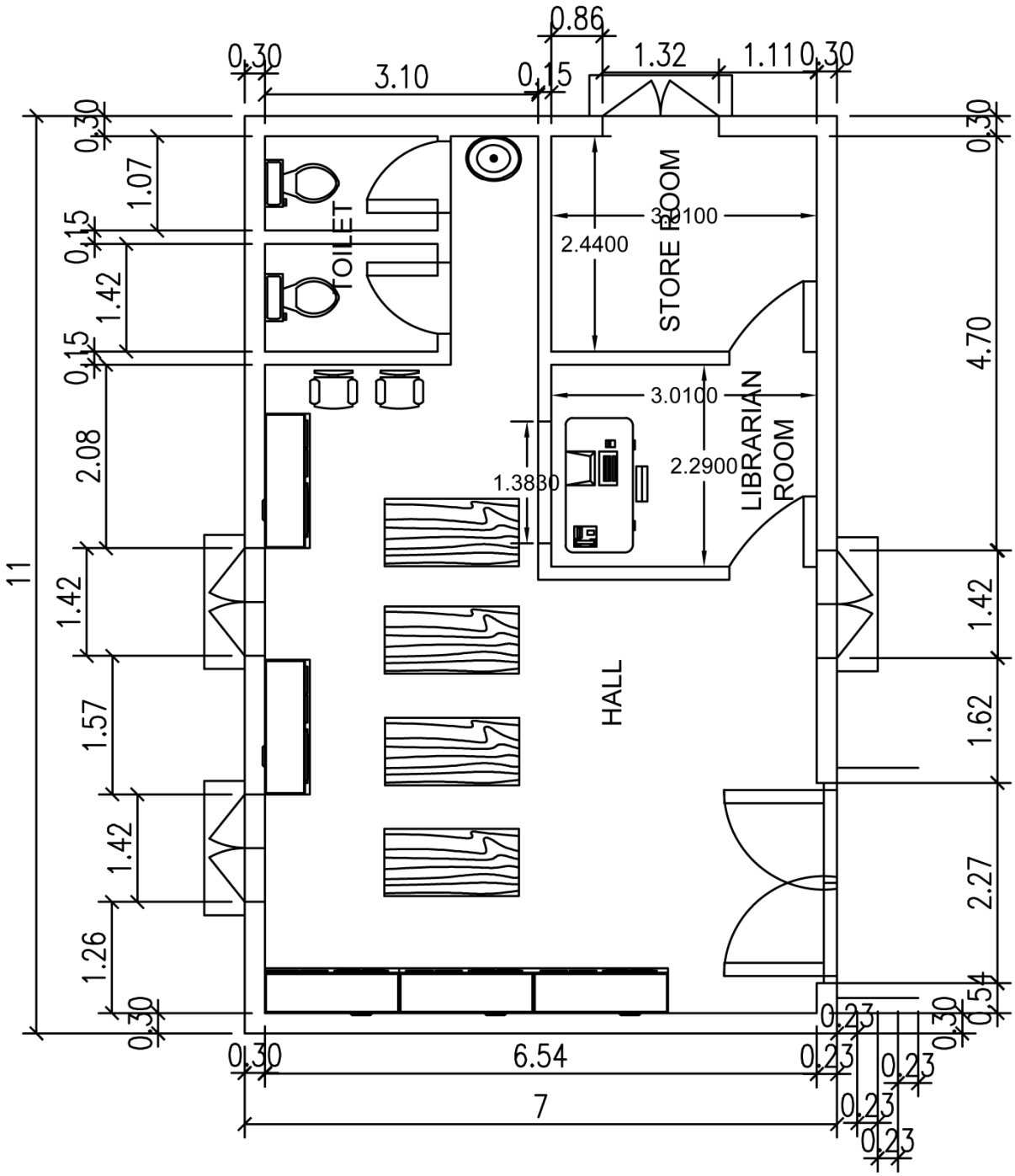
The library reflects the diversity and character, and the needs and expectations of our community. Those needs and expectations are often extensive, and the services invaluable.

The library is often the only readily available source of comprehensive information needed by people for personal, family and job-related purposes. Our community's economy benefits when business people use library resources to make wise business decisions, employees use it to improve job skills, or the disadvantaged use it to help break the cycle of poverty. During economic hardship, our citizens turn to and depend on the library.

Proposed Design in Auto cad



ELEVATION


0.86
0.30
3.10
0.15
1.32
1.11
0.30
0.30
1.07
0.15
1.42
0.15
2.08
11
1.42
1.57
1.42
1.26
0.30
TOILET
STORE ROOM
3.0100
2.4400
3.0100
2.2900
1.3830
LIBRARIAN ROOM
HALL
4.70
1.42
1.62
2.27
0.54
0.30
0.23
0.23
0.23
0.23
0.23
0.30
6.54
7

PLAN

Library: measurement sheet

Sr.no	Description	No	L	B	H	Quantity
1	Excavation in foundation					
	30cm	1	34.8	0.9	1.68	52.6176
	15cm	1	15.73	0.7	1.68	18.4985
						71.1161
2	Pcc in foundation					
	30cm	1	34.8	0.9	0.42	13.1544
	15cm	1	15.73	0.7	0.42	4.62462
						17.779
3	Brickwork in foundation					
	1st step					
	30cm	1	34.8	0.7	0.42	10.2312
	15cm	1	16.43	0.5	0.42	3.4503
						13.6815
	2nd step					
	30cm	1	34.8	0.5	0.42	7.308
	15cm	1	17.13	0.3	0.42	2.15838
						9.46638
	Plinth below gl					
	30cm	1	34.8	0.3	0.42	4.3848
	15cm	1	17.78	0.15	0.42	1.12014
						5.50494
	Plinth above gl					
	30cm	1	34.8	0.3	0.76	7.9344
	15cm	1	17.78	0.15	0.76	2.02692
						9.96132
					Total bw	38.6141
4	Brickwork in super structure					
	30cm	1	34.8	0.3	3.5	36.54
	Brick work on parapet	1	34.8	0.3	0.45	4.698
	15cm	1	17.78	0.15	2.6	6.9342
						48.1722
	Deduction of opening					
	D1 x 30	1	2.27	0.3	2.28	1.55268
	D2 x 15	3	0.75	0.15	2.1	0.70875
	W1	3	1.42	0.3	1.2	1.5336
	W2	1	1.32	0.3	1.2	0.4752
	Deducion for lintels					
	D1 x 30	1	2.57	0.3	0.15	0.11565
	D2 x 15	3	1.05	0.15	0.15	0.07088
	W1	1	1.72	0.3	0.15	0.0774
	W2	1	1.62	0.15	0.15	0.03645

					Total ded	4.57061
					Net bw	34.0435
5	Plastering					
	Internal plaster					
	Main hall					
	Ceiling	1	7.75	6.4	1	49.6
	Sides wall	2	7.75	1	3.66	56.73
	Up/down wall	2	1	6.4	3.66	46.848
	Store room / librarian office					
	Ceiling	2	2.64	3.29	1	17.3712
	Sides wall	4	2.64	1	3.66	38.6496
	Up/down wall	4	1	3.29	3.66	48.1656
	Toilet					
	Ceiling	2	2.1	7	1	29.4
	Sides wall	4	11	1	2.6	114.4
	Up/down wall	4	1	7	2.6	72.8
	Deduction					
	D2	3	0.75	1	2.1	4.725
					Total ded.	4.725
					Net plaster	469.239
	External plaster					
	On wall	1	36	1	5.03	181.08
	Top of parapet	2	11	0.3	1	6.6
		2	6.4	0.3	1	3.84
	Inside of parapet	2	10.4	1	0.45	9.36
		2	6.4	1	0.45	5.76
						206.64
	Deduction for openings					
	D1	1	2.27	1	2.28	5.1756
	W1	3	1.42	1	1.2	5.112
	W2	1	1.32	1	1.2	1.584
					Total ded	11.8716
					Net plaster	194.768
			Total (inside + outside) plaster			664.008
6	Rcc work					
	Slab	1	11	7	0.15	11.55
	Lintels	-	-	-	-	0.30038
	Loft over toilets	1	2.79	2.1	0.15	0.87885
					Total rcc	12.7292
	Steel work	Assume	1%	Steel		
	Total steel work in kg					999.244
7	Dado work in toilet					

	Sides	4	2.1	1	2.6	21.84
	Up/down	1	1.42	1	2.6	3.692
		1	1.07	1	2.6	2.782
						28.314
8	Painting					
	Same as plaster	-	-	-	-	664.008
9	White washing					
	Same as plaster	-	-	-	-	664.008
10	Wood work for shutters					
	D1 x 30	1	2.27	0.3	2.28	1.55268
	D2 x 15	3	0.75	0.15	2.1	0.70875
	W1	3	1.42	0.3	1.2	1.5336
	W2	1	1.32	0.3	1.2	0.4752
					Total ww	4.27023
11	Flooring	-	-	-	-	96.3712
12	Pcc in flooring 7.5cm	-	-	-	0.075	7.22784
13	Brickbat filling in flooring	-	-	-	1.605	154.676

Library: abstract sheet

Sr. No.	Description	No/quan	Rate	Per	Amount
1	1st class bw	34.0435	3000	M3	102131
2	2n class bw	38.6141	2800	M3	108120
3	Excavation in foundation	71.1161	70	M3	4978.13
4	Pcc (1:2:4) in foundation	17.779	2500	M3	44447.6
5	Plstering (12mm thick)(1:4)	611.915	150	M2	91787.2
6	Rcc in slab and lintel (1:2:4)	12.7292	5500	M3	70010.7
7	Painting on walls	611.915	200	M2	122383
8	White washing	611.915	100	M2	61191.5
9	Wood work of shutters	4.27023	4000	M2	17080.9
10	Dado work	28.314	400	M2	11325.6
11	Flooring	87.6856	400	M2	35074.2
12	Pcc in flooring 7.5cm	6.57642	2500	M3	16441.1
13	Brickbat filling in flooring	140.735	400	M3	56294.2
				Total	741264
			2%	Contingencies	14825.3
			10%	Contractor	74126.4
				Total	830216

8.1.3 Sociocultural Design: Public toilet and bath

Scenario

A public toilet is a room or small building with toilets (or urinals) and sinks that does not belong to a particular household. Rather, the toilet is available for use by the general public, customers, travelers, employees of a business, school pupils, prisoners. Public toilets are commonly separated into male and female facilities, although some are unisex, especially for small or single-occupancy public toilets. Increasingly, public toilets are accessible to people with disabilities. Public toilets are known by many other names depending on the country. Examples are: restroom, bathroom, men's room, women's room in the US, washroom in Canada, and toilets, lavatories, water closet (W.C.), ladies and gents in Europe. In some parts of the world, they are referred to as the loo.

Existing situation

Currently in vankaner village lacks many facilities to be provided on multiple location. Public toilets are required in more numbers depending upon population. Vankaner has population of 7.5 k people in existence. Therefore, public toilets are necessary to be provided where ever necessary.

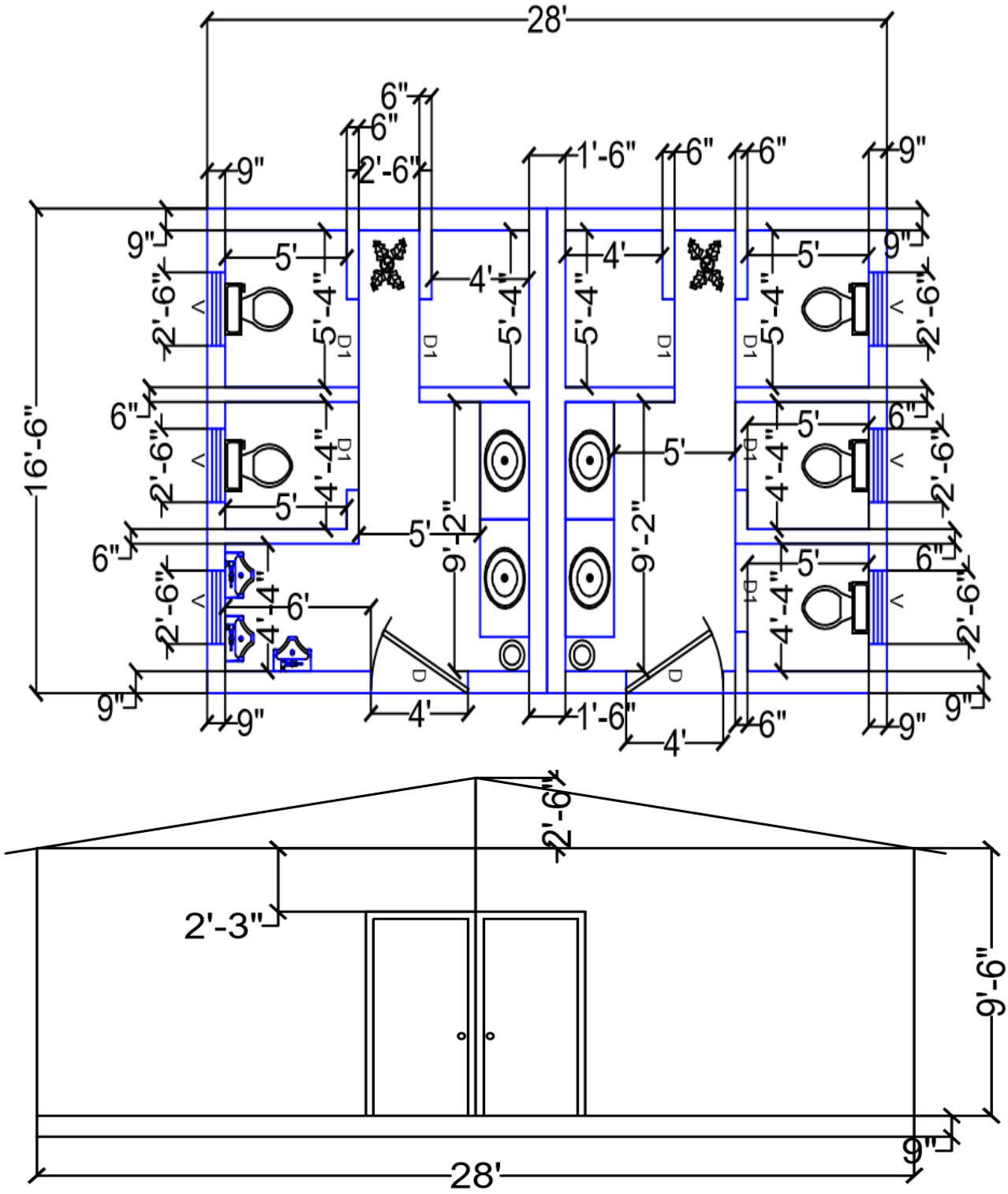
Sustainability of Proposal

1. Today, 2.4 billion people or about one-third of the world's population lack access to improved sanitation—facilities that hygienically separates human excreta from human contact—and 1 billion people still practice open defecation
2. In 2012 the WHO estimated that the global economic return on sanitation spending is $5.5 for every dollar invested – nearly triple the $2 economic return on water spending.
3. Open defecation (the practice whereby people go out in fields, bushes, forests, open bodies of water, or other open spaces rather than using the toilet to defecate) is a leading cause of diarrheal death, says the WHO. The diarrhoea death toll stands at around 6,000 a day, mostly young children.
4. In South Asia alone, 1 billion people lack access to improved sanitation and 675 million practice open defecation, more than any other region in the world.

Proposed Design in Auto cad

Given drawing is measured in foots but quantity measurement is done in meter. For getting conversion following will be use full.

Prime Unit	Equivalent unit
1 meter (m)	3.28 foots (ft.)
1 foot	30.48 centimeter (cm)
1 inch (“)	2.54 cm



ELEVATION

Sr.no	Description	No	L	B	H	Quantity
1	Excavation in foundation					
	23cm	1	25.3	0.9	1.68	38.2536
	15cm	1	14.89	0.7	1.68	17.5106
						55.7642
2	Pcc in foundation					
	23cm	1	25.3	0.9	0.42	9.5634
	15cm	1	14.89	0.7	0.42	4.37766
						13.9411
3	Brickwork in foundation					
	1st step					
	23cm	1	25.5	0.7	0.42	7.497
	15cm	1	16.29	0.5	0.42	3.4209
						10.9179
	2nd step					
	23cm	1	25.7	0.5	0.42	5.397
	15cm	1	17.69	0.3	0.42	2.22894
						7.62594
	Plinth below gl					
	23cm	1	25.97	0.23	0.42	2.5087
	15cm	1	19.4	0.15	0.42	1.2222
						3.7309
	Plinth above gl					
	23cm	1	25.97	0.23	0.76	4.53956
	15cm	1	19.4	0.15	0.76	2.2116
						6.75116
					Total bw	29.0259
4	Brickwork in super structure					
	23cm	1	26.2	0.3	2.9	22.794
	15cm	1	18.94	0.2	2.1	7.9548
						30.7488
	Deduction of opening					
	D x 23	2	1.2	0.23	2.1	1.1592
	D1 x 15	7	0.75	0.15	2.1	1.65375
	V	6	0.75	0.3	0.75	1.0125
	Deduction for lintels					
	D1 x 30	2	1.5	0.23	0.15	0.1035
	D2 x 20	7	1.05	0.15	0.15	0.16538
	V	6	1.05	0.3	0.15	0.2835
					Total ded	4.37783
					Net bw	24.6481
5	Plastering					
	Internal plaster					
	Main hall					
	Ceiling	2	3.8	4.1	1	31.16

	Sides wall	4	3.8	1	2.9	44.08
	Up/down wall	4	1	4.1	2.9	47.56
	W/cs					
	Sides wall	10	1.52	1	2.1	31.92
	Up/down wall	8	1	1.56	2.1	26.208
	Baths					
	Sides wall	6	1.26	1	2.1	15.876
	Deduction					
	D1	5	0.75	1	2.1	7.875
					Total ded.	7.875
					Net plaster	188.929
	External plaster					
	On wall	2	13.56	1	3.66	99.2592
						99.2592
	Deduction for openings					
	D	2	1.2	1	2.1	5.04
					Total ded	5.04
					Net plaster	94.2192
			Total (inside + outside) plaster			283.148
6	Rcc work					
	Slab	1	8.5	5.03	0.12	5.1306
	Lintels	-	-	-	-	0.55238
					Total rcc	5.68298
	Steel work	Assume	1%	Steel		
	Total steel work in kg					446.114
8	Painting					
	Same as plaster	-	-	-	-	283.148
9	White washing					
	Same as plaster	-	-	-	-	283.148
10	Wood work for shutters					
	D	2	1.2	1	2.1	5.04
	D1	5	0.75	1	2.1	7.875
					Total ww	12.915
11	Flooring	-	-	-	-	31.16
12	Pcc in flooring 7.5cm	-	-	-	0.075	2.337
13	Brickbat filling in flooring	-	-	-	1.605	50.0118

Abstract sheet

Sr. No.	Description	No/quant	Rate	Per	Amount
1	1st class bw	24.6481	3000	M3	73944.2
2	2n class bw	29.0259	2800	M3	81272.5
3	Excavation in foundation	55.7642	70	M3	3903.5
4	Pcc (1:2:4) in foundation	13.9411	2500	M3	34852.7
5	Plastering (12mm thick)(1:4)	283.148	150	M2	42472.2
6	Rcc in slab and lintel (1:2:4)	5.68298	5500	M3	31256.4
7	Painting on walls	283.148	200	M2	56629.6
8	White washing	283.148	100	M2	28314.8
9	Wood work of shutters	12.915	4000	M2	51660
10	Flooring	31.16	400	M2	12464
11	Pcc in flooring 7.5cm	2.337	2500	M3	5842.5
12	Brickbat filling in flooring	50.0118	400	M3	20004.7
				Total	442617
			2%	Contingencies	8852.34
			10%	Contractor	44261.7
				Total	495731

Approximate construction cost of one public toilet unit will be 5 lakh rupees. Multiple units will be required for fulfilling total requirement of village.

8.1.4 Heritage Village Design: Village Entrance Gate

Scenario

Entrance gate is provided at very start of village to show warm welcome to visitors, it also helps people to indicate that village area will start from the point. This gate is generally provided open (i.e. no shutters gate).

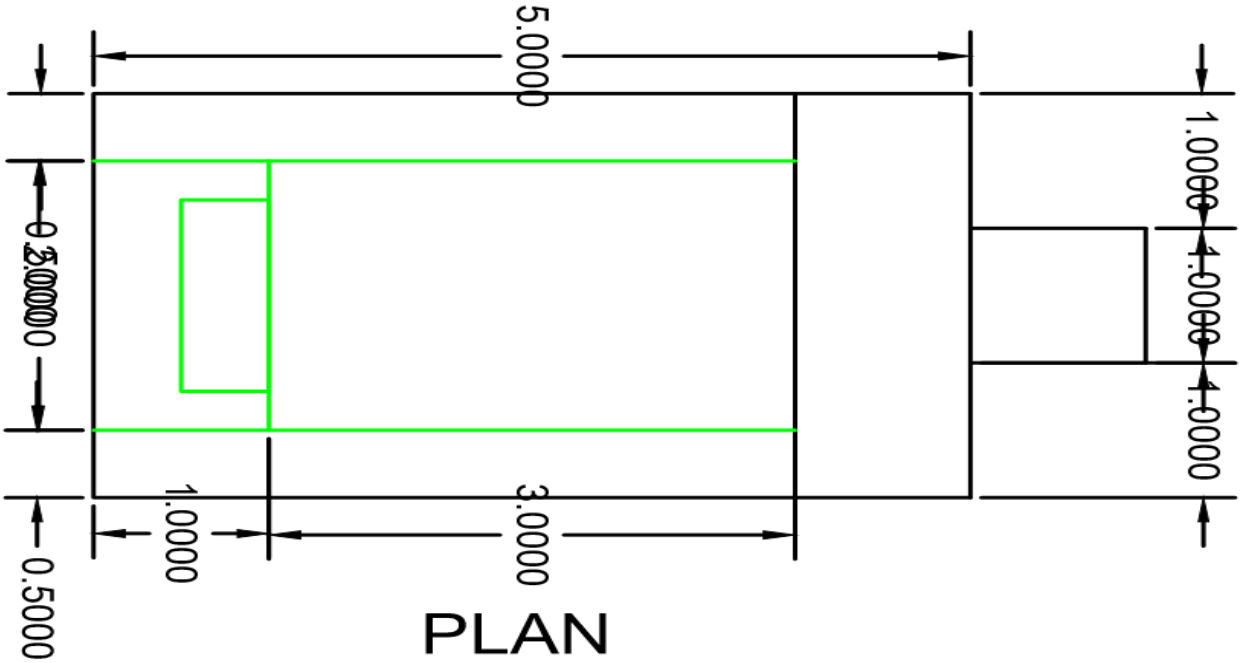
Existing situation

At present Vankaner village does not have any so called entrance. Which can show starting of village area and also guide people toward village direction. So have made design of village entrance gate to provide such facility.

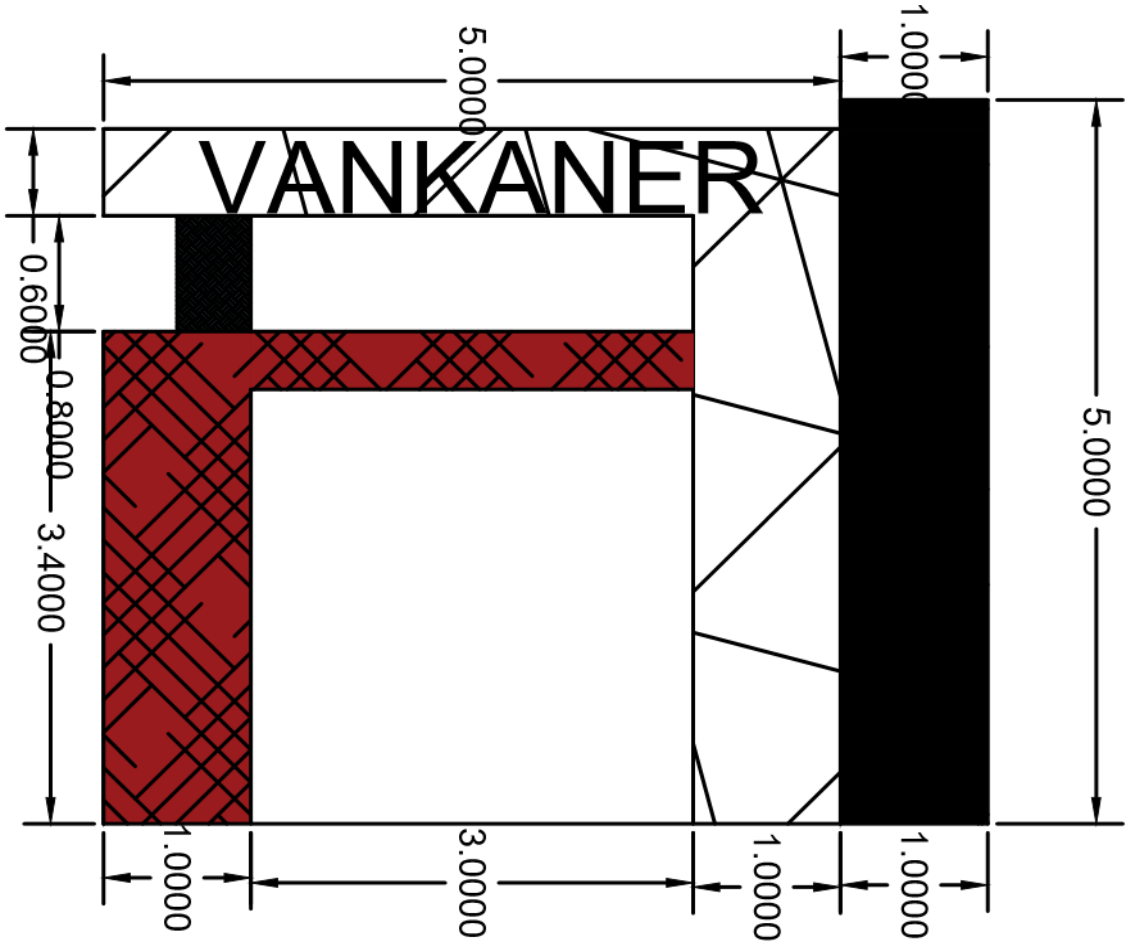
Sustainability of Proposal

To give better esthetic of village and welcome people to village, for ease to guide visitors and can be block during unfavorable situation.

Proposed Design in Auto cad



PLAN



ELEVATION

Village Entrance Gate: measurement sheet

Sr. No.	Description	No.	L	B	H	Quantity
1	Excavation In Foundation					
	1st+2nd Hollow Columns	1	2.4	1.2	0.8	2.304
	3rd Hollow Column	1	1.2	1.2	0.8	1.152
					Total	3.456
2	1st Class Brick Works					
	1st Hollow Column	1	2.8	0.3	5.5	4.62
	2nd Hollow Column	1	6.8	0.3	4.9	9.996
	3rd Hollow Column	1	4.8	0.3	3.2	4.608
					Total	19.224
3	Rcc Work (1:2:4)					
	Rcc Beams-1	2	6	0.3	0.4	1.44
	Rcc Beams-2	2	5	0.3	0.4	1.2
	Rcc Columns	4	0.4	0.4	4.2	2.688
	Slab-1	1	5	3	0.2	3
	Slab-2	1	4	2	0.2	1.6
						9.928
	Steel Work In Kg	Assume	1%	Steel		779.348
4	Plastering					
	Column-1	1	3	1	5	15
	Column-2	1	7	1	5	35
	Column-3	1	6	1	3.4	20.4
	Rcc Beams-1	2	6	1	0.4	4.8
		2	6	0.3	1	3.6
	Rcc Beams-2	2	5	1	0.4	4
		2	5	0.3	1	3
					Total	85.8
5	Painting					
	Same As Plastering	-	-	-	-	85.8
6	White Washing					
	Same As Plastering	-	-	-	-	85.8

Village Entrance Gate: Abstract sheet

Sr. No.	Description	No/Qua.	Rate(Rs.)	Per	Amount(Rs.)
1	1st Class Brick Works	19.224	3000	M3	57672
2	Excavation In Foundation	3.456	70	M3	241.92
3	Rcc Work (1:2:4)	9.928	5500	M3	54604
4	Plastering	85.8	150	M2	12870
5	Painting	85.8	400	M2	34320
6	White Washing	85.8	100	M2	8580
				Sub-Total	168287.9
			2%	Contingencies	3365.758
		Contractor	10%	Profit	16828.79
				Grand Total	188482.5

8.1.5 Smart Village Design: ATM

Scenario

ATMs are machines made at different location in or out of the bank building for purpose of withdrawing money anytime, balance checking and other bank facility. ATM machines needs small cabin like structure for protection and security purpose.

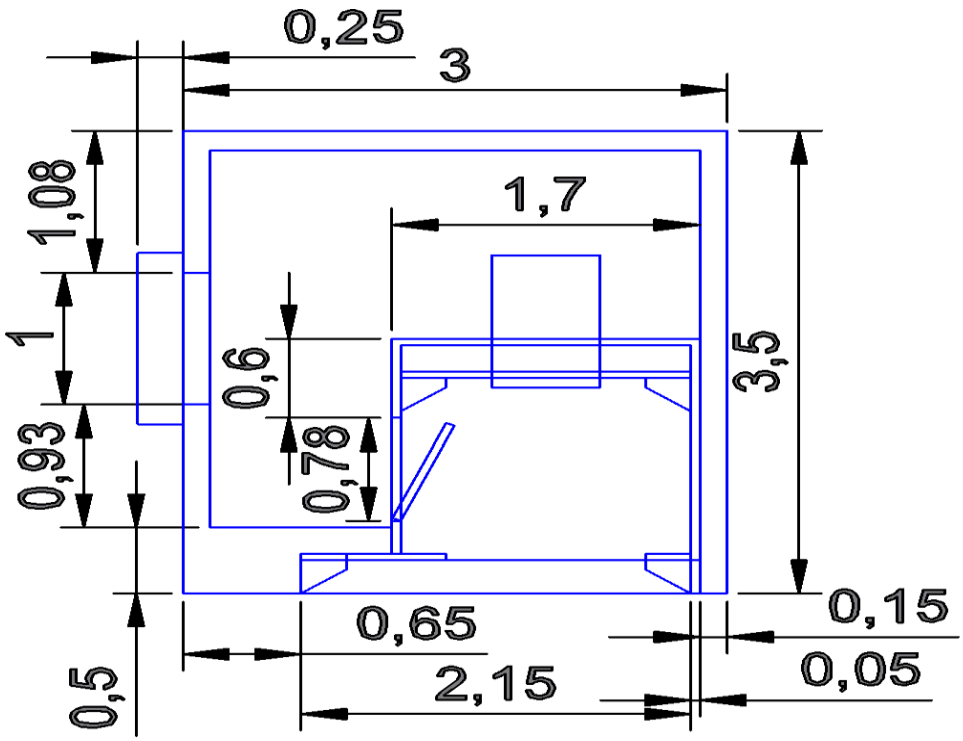
Existing situation

In Vikander village ATM services is already available but village is big enough to have multiple ATMs. Providing multiple ATMs will reduce travel time and help in getting money even if other machine is broken or under maintenance.

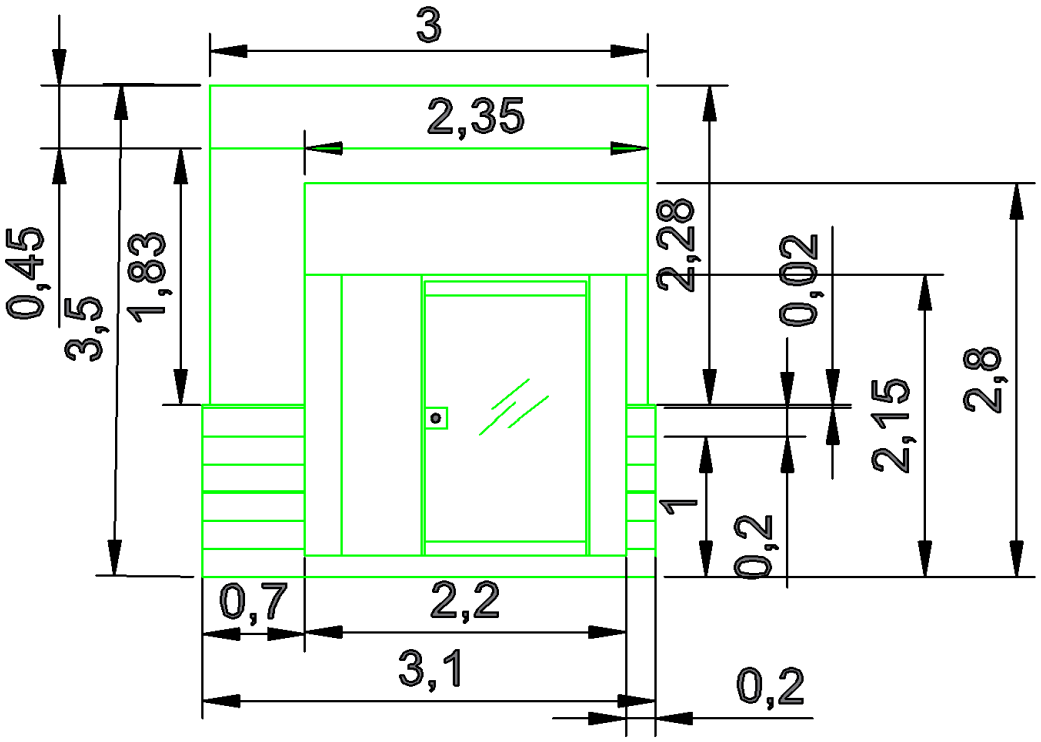
Sustainability of Proposal

The ATM facility will help village dwellers in easy and quick access to their money.

Proposed Design in Auto cad



PLAN



ELEVATION

Sr.no	Description	No	L	B	H	Quantity
1	Excavation in foundation					
	30cm	1	11.8	0.9	1.68	17.8416
						17.8416
2	Pcc in foundation					
	30cm	1	11.8	0.9	0.42	4.4604
						4.4604
3	Brickwork in foundation					
	1st step					
	30cm	1	11.8	0.7	0.42	3.4692
						3.4692
	2nd step					
	30cm	1	11.8	0.5	0.42	2.478
						2.478
	Plinth below gl					
	30cm	1	11.8	0.3	0.42	1.4868
						1.4868
	Plinth above gl					
	30cm	1	11.8	0.3	0.76	2.6904
						2.6904
					Total bw	10.1244
4	Brickwork in super structure					
	30cm	1	11.8	0.3	3	10.62
	Brick work on parapet	1	11.8	0.3	0.9	3.186
						13.806
	Deduction of opening					
	D1 x 30	2	1.5	0.3	2.1	1.89
	Deduction for lintels					
	D1 x 30	1	1.8	0.3	0.15	0.081
					Total ded	1.971
					Net bw	8.1534
5	Plastering					
	Internal plaster					
	Ceiling	1	2.4	2.9	1	6.96
	Sides wall	2	2.4	1	3	14.4
	Up/down wall	2	1	2.9	3	17.4
	Deduction					
	D1 x 30	1	1.5	1	2.1	3.15
					Total ded.	3.15
					Net plaster	35.61
	External plaster					
	On wall	1	13	1	3.5	45.5
						45.5
			Total (inside + outside) plaster			81.11
6	Rcc work					

	Slab	1	3	3.5	0.12	1.26
	Lintels	-	-	-	-	0.081
					Total rcc	1.341
	Steel work	Assume	1%	Steel		
	Total steel work in kg					105.2685
8	Painting					
	Same as plaster	-	-	-	-	81.11
9	White washing					
	Same as plaster	-	-	-	-	81.11
10	Glass work for shutters of doors and windows					
	D1	2	1.5	0.3	2.1	1.89
					Total ww	1.89
11	Flooring	-	-	-	-	6.96
12	Pcc in flooring 7.5cm	-	-	-	0.075	0.522
13	Brickbat filling in flooring	-	-	-	1.605	11.1708

Abstract sheet

Sr. No.	Description	No/quant	Rate	Per	Amount
1	1st class bw	8.1534	3000	M3	24460.2
2	2n class bw	10.1244	2800	M3	28348.32
3	Excavation in foundation	17.8416	70	M3	1248.912
4	Pcc (1:2:4) in foundation	4.4604	2500	M3	11151
5	Plastering (12mm thick) (1:4)	81.11	150	M2	12166.5
6	Rcc in slab and lintel (1:2:4)	1.341	5500	M3	7375.5
7	Painting on walls	81.11	200	M2	16222
8	White washing	81.11	100	M2	8111
9	Glass work of shutters	1.89	6000	M2	11340
10	Flooring	6.96	400	M2	2784
11	Pcc in flooring 7.5cm	0.522	2500	M3	1305
12	Brickbat filling in flooring	11.1708	400	M3	4468.32
				Total	128980.752
			2%	Contingencies	2579.61504
			10%	Contractor	12898.0752
				Total	144458.4422

Construction cost for making one ATM cabin will be 1.5 lakh rupees and plus cost of ATM will be approximately 6 lakhs rupees overall cost should be 7.5 lakh rupees.

8.1.6 Physical design: Gym

Scenario

In the past village dwellers mostly associated with farming and activities involved though physical jobs. apparently that helped people to stay healthy and fit but nowadays urban facilities are creating white collar job which requires less physical efforts to maintain good physics gym like facilities are required in village.

Existing situation

At present Vankaner village does not have any gym facilities through following design village dwellers can work out in their village for better physics.

Sustainability of Proposal

Vankaner village dwellers can work out in gym which's design in given below. It is an important facility for helping people to stay fit.

Sr.no	Description	No	L	B	H	Quantity
1	Excavation in foundation					
	30cm	1	49.5662	0.9	1.68	74.9441
						74.9441
2	Pcc in foundation					
	30cm	1	49.5662	0.9	0.42	18.73603
						18.73603
3	Brickwork in foundation					
	1st step					
	30cm	1	49.5662	0.7	0.42	14.57246
						14.57246
	2nd step					
	30cm	1	49.5662	0.5	0.42	10.4089
						10.4089
	Plinth below gl					
	30cm	1	49.5662	0.3	0.42	6.245342
						6.245342
	Plinth above gl					
	30cm	1	49.5662	0.3	0.76	11.30109
						11.30109
					Total bw	42.5278
4	Brickwork in super structure					
	30cm	1	49.5662	0.3	3	44.60958
	Brick work on parapet	1	49.5662	0.3	0.9	13.38288
						57.99246
	Deduction of opening					
	D1 x 30	2	1.5	0.3	2.1	1.89
	W1	2	4.5	0.3	2.55	6.885

	W2	1	1.8	0.3	1.2	0.648
	Deducion for lintels					
	D1 x 30	1	1.8	0.3	0.15	0.081
	W1	1	4.8	0.3	0.3	0.432
	W2	1	2.1	0.2	0.15	0.063
					Total ded	9.999
					Net bw	32.5288
5	Plastering					
	Internal plaster					
	Main hall					
	Ceiling	1	12.25	8.6	1	105.35
	Sides wall	2	12.25	1	3	73.5
	Up/down wall	2	1	8.6	3	51.6
	Toilet					
	Ceiling	1	2.1811	2.73558	1	5.966568
	Sides wall	2	2.1811		3	13.08659
	Up/down wall	2		2.73558	3	16.41348
	Deduction					
	D1 x 30	2	1.5	1	2.1	6.3
	W1	2	4.5	1	2.55	22.95
					Total ded.	29.25
					Net plaster	236.6666
	External plaster					
	On wall	1	21.844	1	4.8	104.8512
	Top of parapet	2	49.5662	0.3	1	29.73972
	Inside of parapet	2	24.8	1	0.9	44.64
		2	17.8	1	0.9	32.04
						211.2709
	Deduction for openings					
	D1 x 30	2	1.5	1	2.1	6.3
	W1	2	4.5	1	2.55	22.95
	W2	1	1.5	1	1.2	1.8
					Total ded	31.05
					Net plaster	180.2209
			Total (inside + outside) plaster			416.8876
6	Rcc work					
	Slab	1	12.7	9.15	0.12	13.9446
	Lintels	-	-	-	-	0.576
					Total rcc	14.5206
	Steel work	Assume	1%	Steel		
	Total steel work in kg					1139.867
8	Painting					
	Same as plaster	-	-	-	-	416.8876

9	White washing					
	Same as plaster	-	-	-	-	416.8876
10	Glass work for shutters of doors and windows					
	D1	2	1.5	0.3	2.1	1.89
	W1	2	4.5	1	2.55	22.95
	W2	1	1.5	1	1.2	1.8
					Total ww	26.64
11	Flooring	-	-	-	-	105.35
12	Pcc in flooring 7.5cm	-	-	-	0.075	7.90125
13	Brickbat filling in flooring	-	-	-	1.605	169.0868

Abstract sheet:

Sr. No.	Description	No/quan	Rate	Per	Amount
1	1st class bw	32.5288	3000	M3	97586.4
2	2n class bw	42.5278	2800	M3	119078
3	Excavation in foundation	74.9441	70	M3	5246.09
4	Pcc (1:2:4) in foundation	18.736	2500	M3	46840.1
5	Plstering (12mm thick) (1:4)	416.888	150	M2	62533.1
6	Rcc in slab and lintel (1:2:4)	14.5206	5500	M3	79863.3
7	Painting on walls	416.888	200	M2	83377.5
8	White washing	416.888	100	M2	41688.8
9	Glass work of shutters	26.64	6000	M2	159840
10	Flooring	105.35	400	M2	42140
11	Pcc in flooring 7.5cm	7.90125	2500	M3	19753.1
12	Brickbat filling in flooring	169.087	400	M3	67634.7
				Total	825581
			2%	Contingencies	16511.6
			10%	Contractor	82558.1
				Total	924651

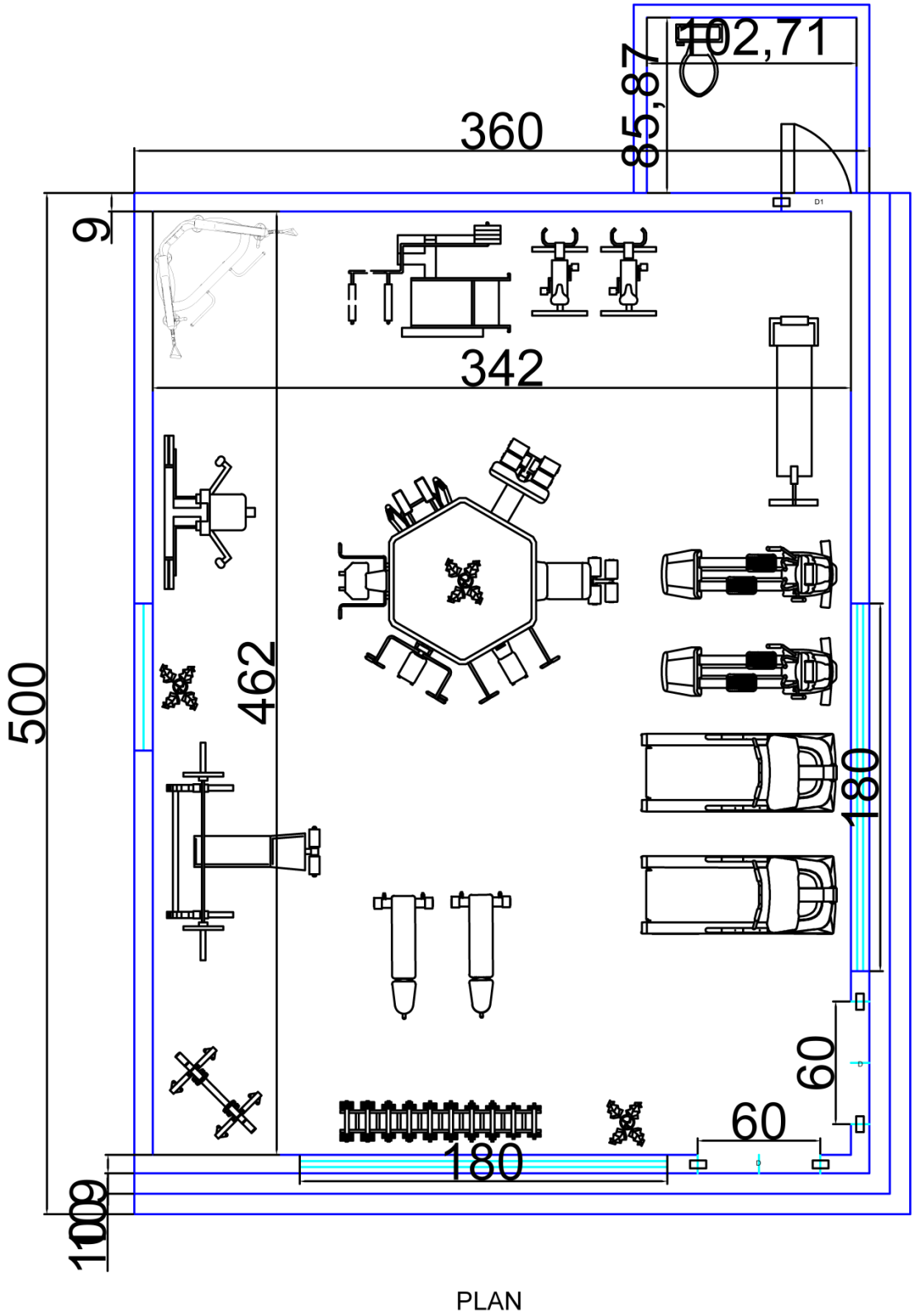
Besides the construction cost of gym equipment and machine might cost around 4 lakh rupees making overall cost of gym 13 lakh rupees.

NOTE:

Given drawing is measured in inches but quantity measurement is done in meter. For getting conversion following will be use full.

Prime Unit	Equivalent unit
1 meter (m)	3.28 foots (ft.)
1 foot	30.48 centimeter (cm)
1 inch (“)	2.54 cm
1 m	39.4”

Proposed Design in Auto cad



8.2 Reason for Students Recommending this Design

Reason to provide library is to create peaceful and calming environment for village dwellers for reading different paper works and researches.

Reason to provide Village Entrance gate is to give better aesthetic look at start of village area.

Libraries are important cornerstones of a healthy community. Libraries give people the opportunity to find jobs, explore medical research, experience new ideas, get lost in wonderful stories, while at the same time providing a sense of place for gathering.

The Library reflects the diversity and character, and the needs and expectations of our community. Those needs and expectations are often extensive, and the services invaluable.

The Library is often the only readily available source of comprehensive information needed by people for personal, family and job-related purposes. Our community's economy benefits when business people use library resources to make wise business decisions, employees use it to improve job skills, or the disadvantaged use it to help break the cycle of poverty. During economic hardship, our citizens turn to and depend on the library.

Vankaner village dwellers can work out in gym which's design in given below. It is an important facility for helping people to stay fit.

The ATM facility will help village dwellers in easy and quick access to their money.

Today, 2.4 billion people or about one-third of the world's population lack access to improved sanitation—facilities that hygienically separates human excreta from human contact—and 1 billion people still practice open defecation

In 2012 the WHO estimated that the global economic return on sanitation spending is $5.5 for every dollar invested – nearly triple the $2 economic return on water spending.

Open defecation (the practice whereby people go out in fields, bushes, forests, open bodies of water, or other open spaces rather than using the toilet to defecate) is a leading cause of diarrheal death, says the WHO. The diarrhea death toll stands at around 6,000 a day, mostly young children.

In South Asia alone, 1 billion people lack access to improved sanitation and 675 million practice open defecation, more than any other region in the world.

Trickling filter is good solution for sewage treatment because of their large air-water interface can remove co2, h2s, n2 & other gases.

A portion of liquid in under drain system is recycled: It improves the treatment efficiency.

- To dilute strength of incoming wastewater.
- To maintain enough wetting of slime layer.
- To Prevents ponding in filter. Suitable for shock loads.

8.3 About designs Suggestions / Benefit of the villagers

Libraries are important cornerstones of a healthy community. Libraries give people the opportunity to find jobs, explore medical research, experience new ideas, get lost in wonderful stories, while at the same time providing a sense of place for gathering.

Entrance gate: The Vankaner village has no main entrance gate at the village approach road. So that we have designed the village entrance gate as heritage village design.

Vankaner village dwellers can work out in gym which's design in given below. It is an important facility for helping people to stay fit.

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9 Sustainable Design Planning Proposal (Prototype Design)-PART-II

Sustainable design: sludge drying bed

The sludge drying method consists of applying the sludge on specially prepared open beds of land. This method is suitable for hot countries just like India. The remains of this process can be disposed on farm land because of its fertilizing properties

Physical design: Pukka houses

Pukka housing (or pukka or Pukka) refers to dwellings that are designed to be solid and permanent. This term is applied to housing in South Asia built of substantial material such as stone, brick, cement, concrete, or timber.

Sociocultural Design: Community hall

Community centers or community halls are public locations where members of a community tend to gather for group activities, social support, public information, and other purposes. They may sometimes be open for the whole community or for a specialized group within the greater community. Community centers can be religious in nature, such as Christian, Islamic, or Jewish community centers, or can be secular, such as youth clubs.

Social Design: Shopping complex

shopping mall - mercantile establishment consisting of a carefully landscaped complex of shops representing leading merchandisers shopping mall - mercantile establishment consisting of a carefully landscaped complex of shops representing leading merchandisers; usually includes restaurants and a convenient parking area; a modern version of the traditional marketplace; "a good plaza should have a movie house"; "they spent their weekends at the local malls"

Heritage Village Design: public garden

A public garden is an institution that maintains collections of plants for the purposes of public education and enjoyment, in addition to research, conservation, and higher learning. It must be open to the public and the garden's resources and accommodations must be made to all visitors. Public gardens are staffed by professionals trained in their given areas of expertise and maintain active plant records systems.

Smart Village Design: Sports arcade

Sports arcade is a modern worlds recreational facility. It is not only recreation facility but it can also generate revenue, so it is commercial recreation facility where people can play numbers of different indoor and outdoor games inside the building only.

10 Conclusion of the Entire Village Activities of the Project

We study the ideal village Baben and that visit enhanced our knowledge about the type of infrastructure needed by the village. With help of techno-economic survey and gap analysis and also studying our ideal village Baben, we were able to broadly define requirements of development for people of Vankaner village.

In the Vankaner village, the basic requirements like community hall, bank, etc. were existing. The village is rapidly growing with many advance technological aspects like metal roads, 4G network, concrete frame buildings, etc. in such growth village lacks places for relaxing and recreation facility. So, we have given designs of public library, village entrance gate, GYM, ATM, public toilet, tickling filter, sludge drying beds, pukka house, community hall, shopping complex, public garden and indoor sports club.

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

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

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

Students who want to work towards preservation of rural soul of country can do many things for our own good and environment. By implanting given design proposals, we can say that all the missing amenities are provided will stop the migration of rural people towards the urban area. This can cause reduce the load on urban areas as well as pollution in both sector can be minimized gradually.

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.

11 References

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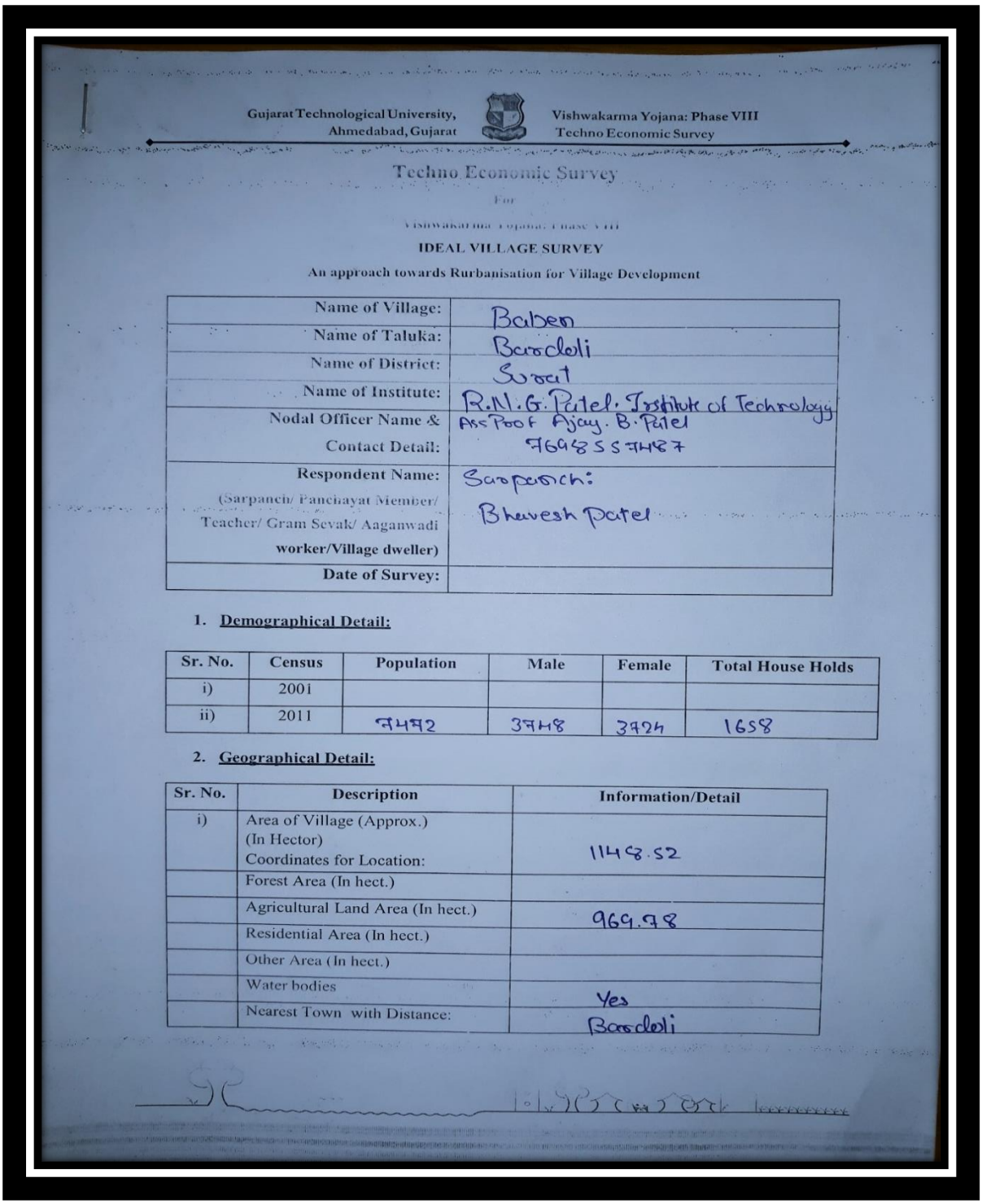
8. 'Vishwakarma Yojana: Rural Development Approach by GTU (Anand & Kheda District, Gujarat, India)' Prof. Amitkumar D. Raval, Prof. Arti Pamnani, Prof. B. G. Rajgor
9. **'Study and development of village as a smart village'** Rutuja Somwanshi, Utkarsha Shindepatil, Deepali Tule, Archana Mankar, Namdev Ingle Guided By- Dr. V. S. Rajamanya, Prof. A. Deshmukh
10. Vishwakarma Yojana: An Approach Towards Rurbanisation for Pali Village, Kheda District.AkshayArdeshasna & Rachit Sitapara Batchelor of Civil Engineering, Prof. H. J. Chauhan, Birla Vishwakarma Mahavidhyalaya

12 Annex for attachments

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



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

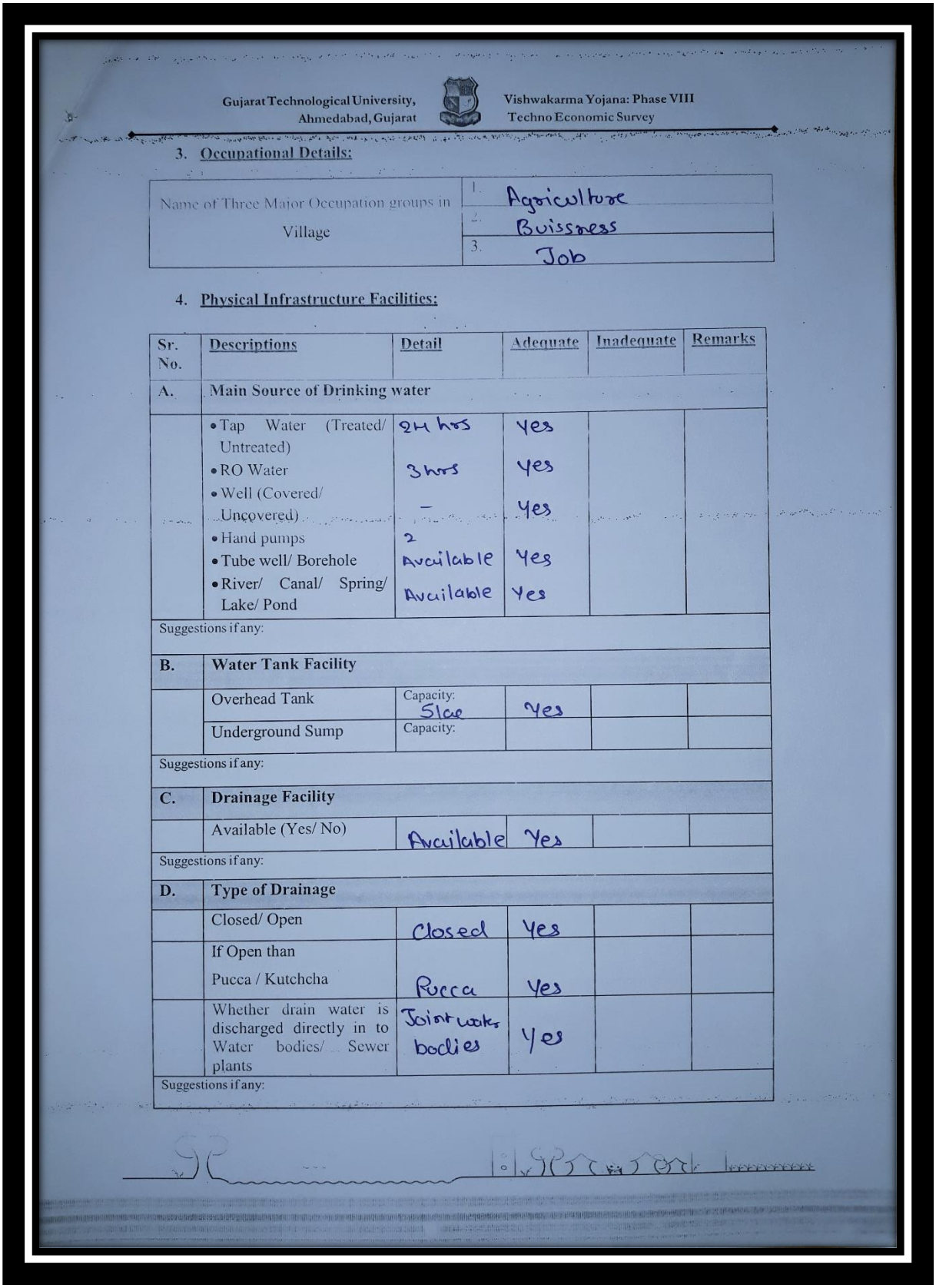
Name of Village:	Baben
Name of Taluka:	Bardoli
Name of District:	Surat
Name of Institute:	R.N.G. Patel. Institute of Technology
Nodal Officer Name & Contact Detail:	Ass Prof Ajay. B. Patel 7698557487
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sarpanch: Bhavesh Patel
Date of Survey:	

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001				
ii)	2011	7492	3768	3724	1658

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	1148.52
	Forest Area (In hect.)	
	Agricultural Land Area (In hect.)	969.78
	Residential Area (In hect.)	
	Other Area (In hect.)	
	Water bodies	Yes
	Nearest Town with Distance:	Bardoli



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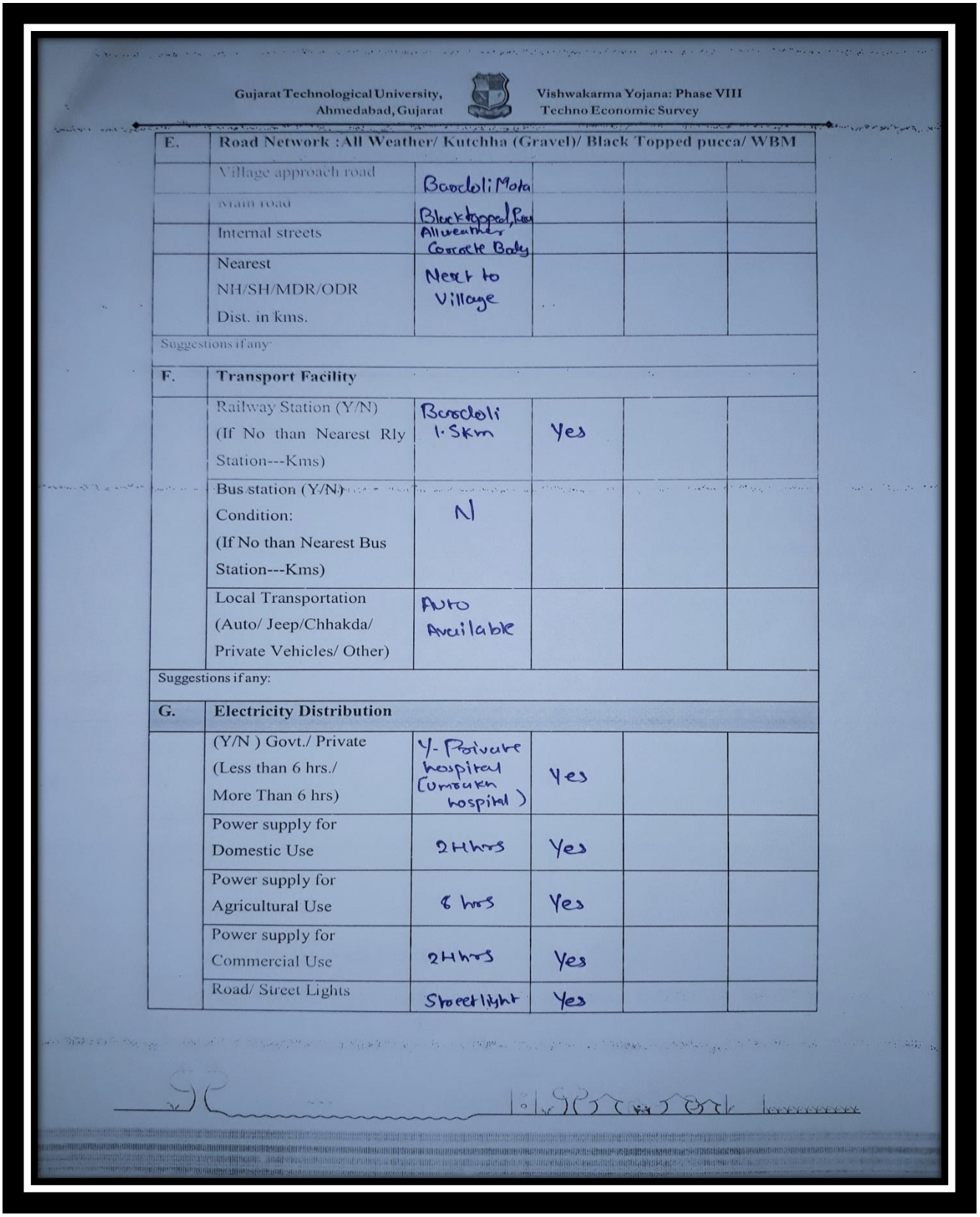
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1.	Agriculture
	2.	Buissness
	3.	Job

4. **Physical Infrastructure Facilities:**

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated)	24 hrs	Yes		
	• RO Water	3 hrs	Yes		
	• Well (Covered/ Uncovered)	–	Yes		
	• Hand pumps	2			
	• Tube well/ Borehole	Available	Yes		
	• River/ Canal/ Spring/ Lake/ Pond	Available	Yes		
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity: Slab	Yes		
	Underground Sump	Capacity:			
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	Available	Yes		
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	Closed	Yes		
	If Open than Pucca / Kutchcha	Pucca	Yes		
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	Joint water bodies	Yes		
Suggestions if any:					



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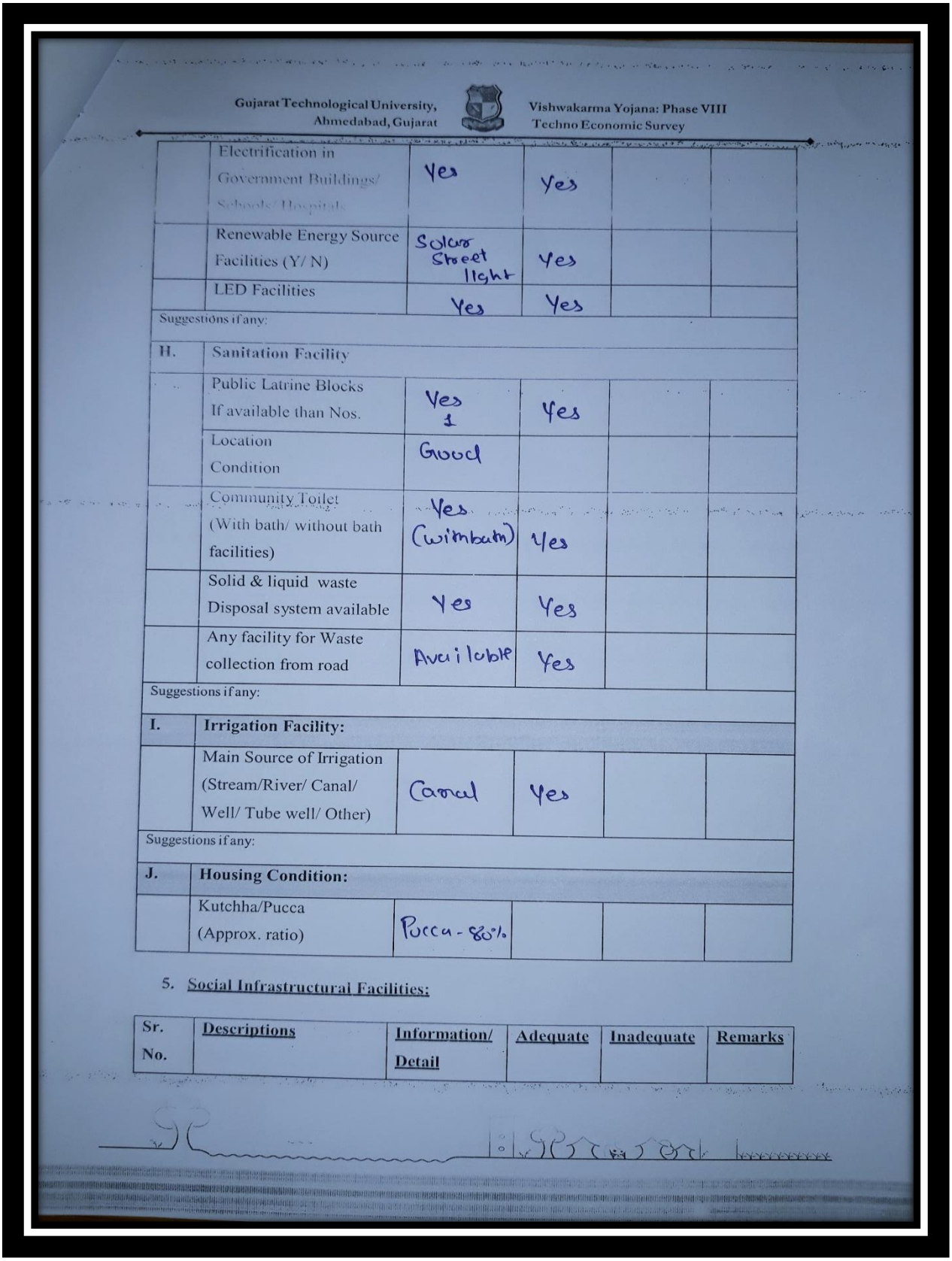
E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Boocloli Mota			
	Main road	Blacktopped, Pucca			
	Internal streets	All weather Concrete Body			
	Nearest NH/SH/MDR/ODR Dist. in kms.	Next to Village			
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Boocloli 1.5Km	Yes		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	N			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto Available			
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Y- Private hospital (Umraken hospital)	Yes		
	Power supply for Domestic Use	24hrs	Yes		
	Power supply for Agricultural Use	8 hrs	Yes		
	Power supply for Commercial Use	24hrs	Yes		
	Road/ Street Lights	Streetlight	Yes		



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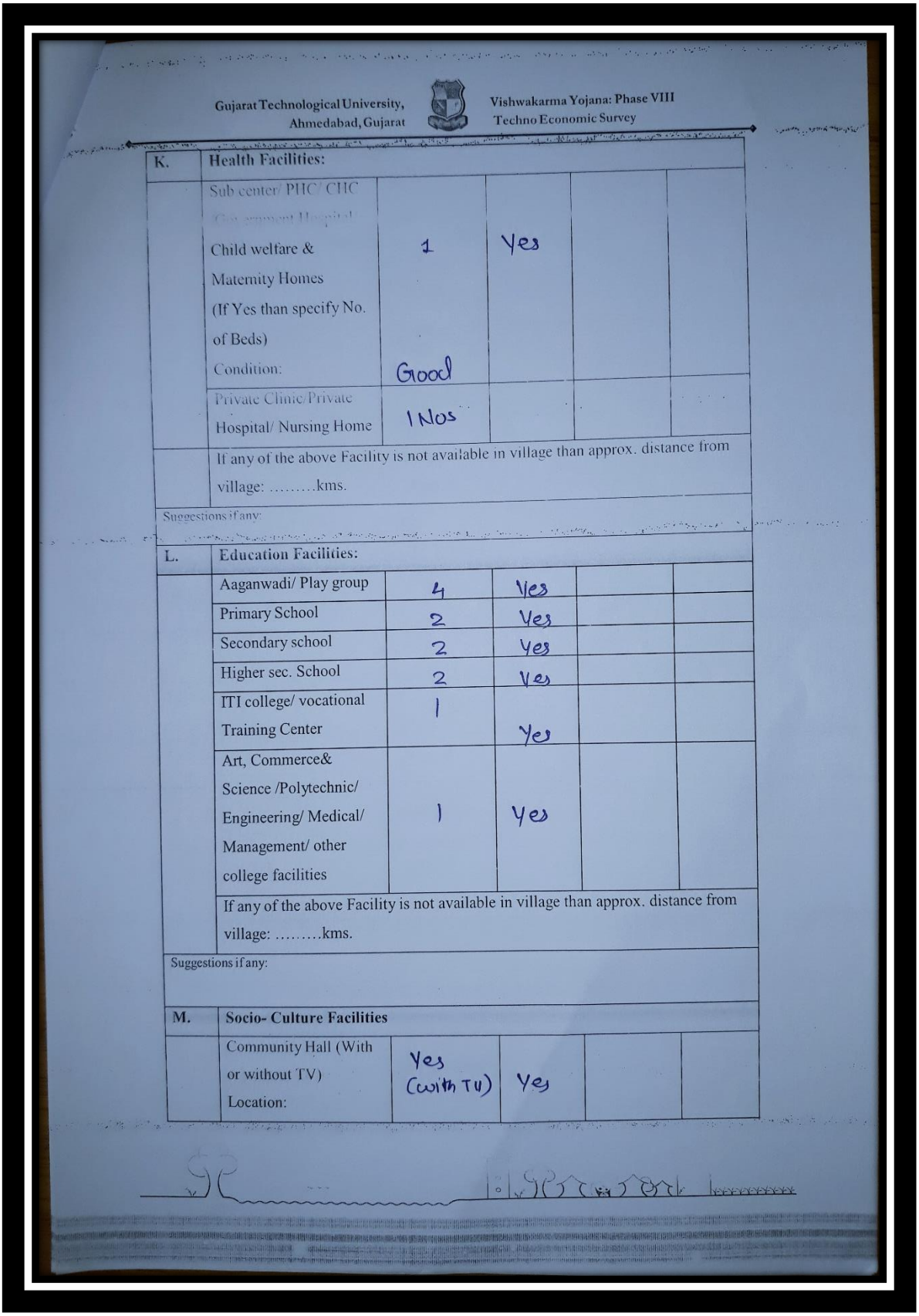
	Electrification in Government Buildings/ Schools/ Hospitals	Yes	Yes		
	Renewable Energy Source Facilities (Y/ N)	Solar Street light	Yes		
	LED Facilities	Yes	Yes		
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes 1	Yes		
	Location Condition	Good			
	Community Toilet (With bath/ without bath facilities)	Yes (with bath)	Yes		
	Solid & liquid waste Disposal system available	Yes	Yes		
	Any facility for Waste collection from road	Available	Yes		
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	Canal	Yes		
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Pucca - 80%			

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks



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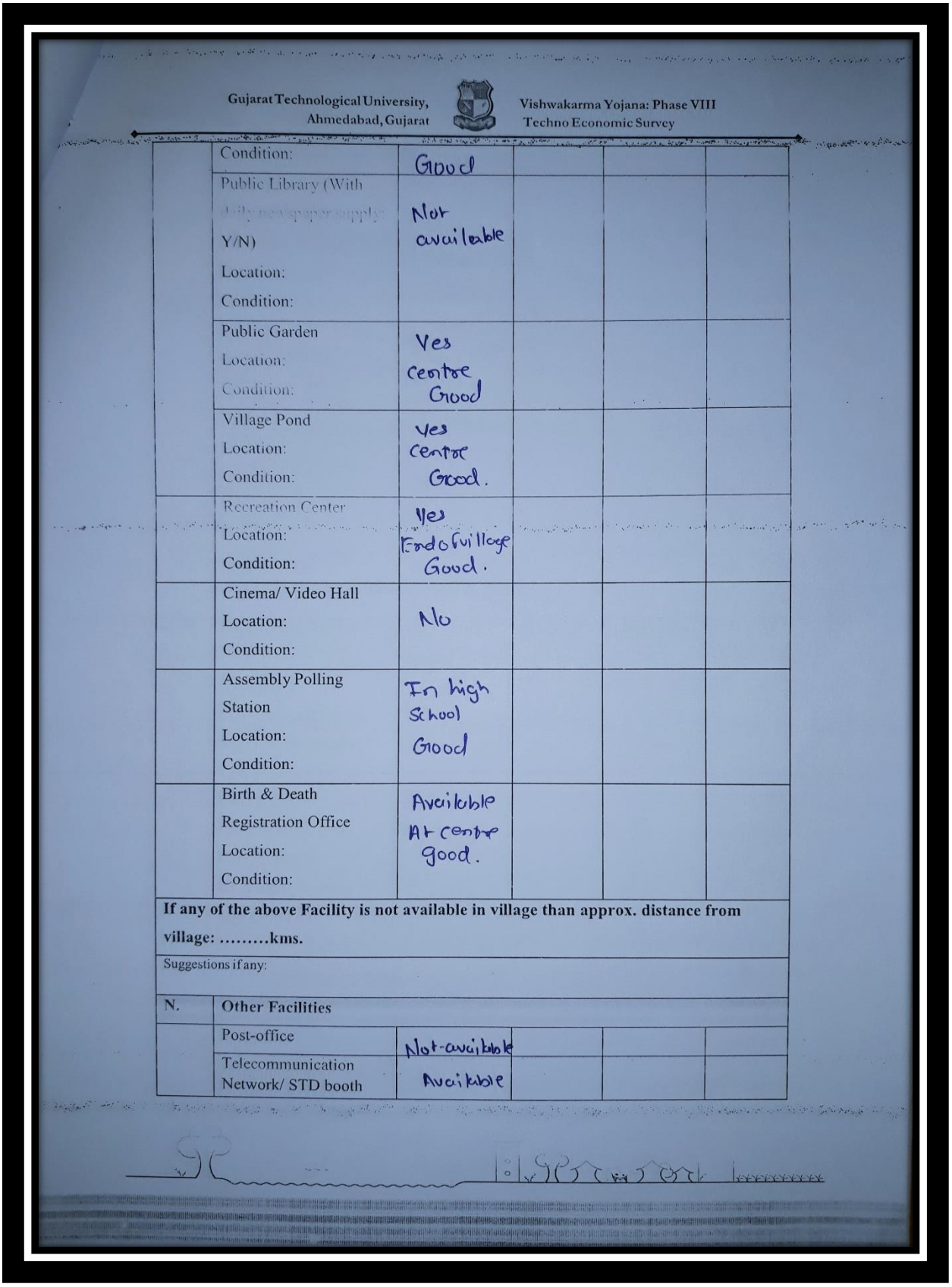
K.	Health Facilities:				
	Sub center/ PHC/ CHC Government Hospital				
	Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	1 Good	Yes		
	Private Clinic/Private Hospital/ Nursing Home	1 Nos			
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					

L.	Education Facilities:				
	Aaganwadi/ Play group	4	Yes		
	Primary School	2	Yes		
	Secondary school	2	Yes		
	Higher sec. School	2	Yes		
	ITI college/ vocational Training Center	1	Yes		
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	1	Yes		
	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 (with TV)	Yes		



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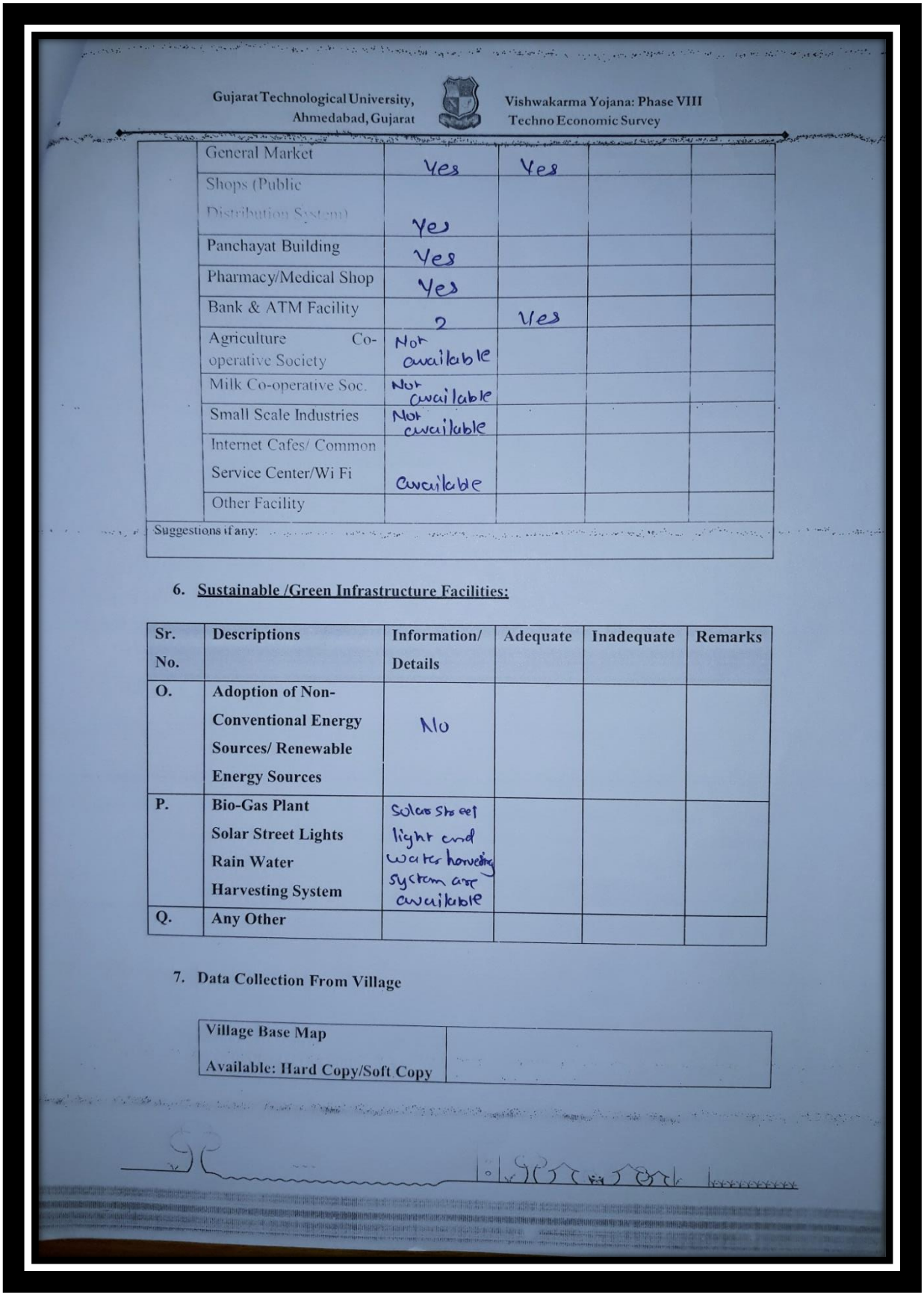
	Condition:	Good			
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	Not available			
	Public Garden Location: Condition:	Yes centre Good			
	Village Pond Location: Condition:	Yes centre Good.			
	Recreation Center Location: Condition:	Yes End of village Good.			
	Cinema/ Video Hall Location: Condition:	No			
	Assembly Polling Station Location: Condition:	In high School Good			
	Birth & Death Registration Office Location: Condition:	Available At centre 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	Not-available			
	Telecommunication Network/ STD booth	Available			



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	General Market	Yes	Yes		
	Shops (Public Distribution System)	Yes			
	Panchayat Building	Yes			
	Pharmacy/Medical Shop	Yes			
	Bank & ATM Facility	2	Yes		
	Agriculture Co-operative Society	Not available			
	Milk Co-operative Soc.	Not available			
	Small Scale Industries	Not available			
	Internet Cafes/ Common Service Center/Wi Fi	available			
	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	Solar street light and water harvesting system are available			
Q.	Any Other				

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	

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Techno Economic Survey

Recent Projects going on for Development of Village	Library project in progress
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	–	–

9. Smart Village Proposal Design

Sr. No.	Descriptions	Information/ Detail	Remarks
1.			

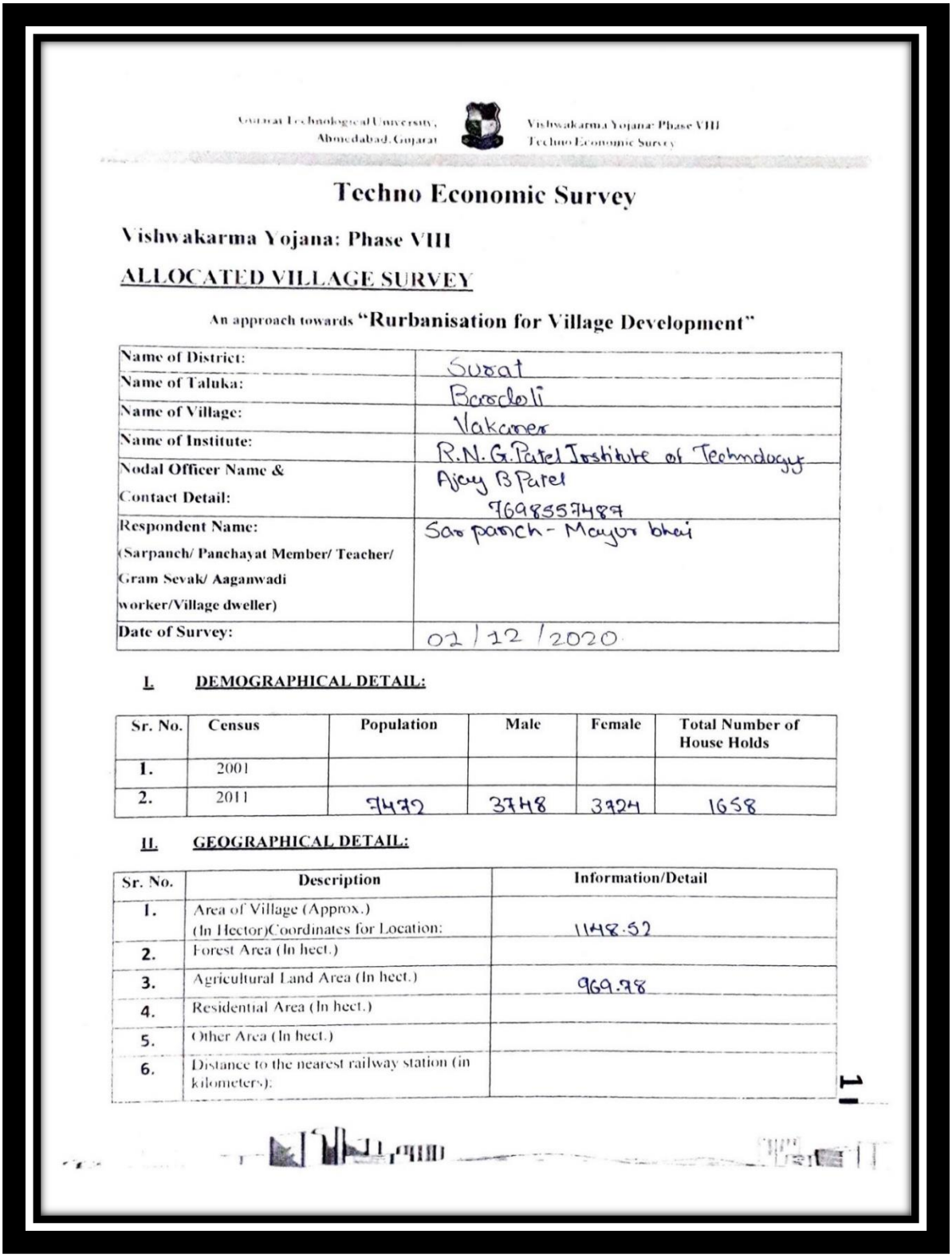
Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

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

F. B Patel
સરપંચ
ગ્રામ પંચાયત બાબેન
તા. બારડોલી, જી. સુરત.

ગ્રામ પંચાયત, બાબેન
તા. બારડોલી.

12.2 Survey form of Allocated 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

ALLOCATED VILLAGE SURVEY

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

Name of District:	Surat
Name of Taluka:	Bardoli
Name of Village:	Vakaner
Name of Institute:	R.N.G.Patel Institute of Technology
Nodal Officer Name & Contact Detail:	Ajay B Patel 9698557487
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sarpanch - Mayur bhai
Date of Survey:	02/12/2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	7472	3748	3724	1658

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1148.52
2.	Forest Area (In hect.)	
3.	Agricultural Land Area (In hect.)	969.78
4.	Residential Area (In hect.)	
5.	Other Area (In hect.)	
6.	Distance to the nearest railway station (in kilometers):	

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

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

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1.	Farm Cultivator (labour work)
	2.	Farmer
	3.	Animal husbandary

Major crops grown in the village:	1.	
	2.	
	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	Vankaner Village has enough sources for drinking clean water like tap water, RO water etc Main source of water is bore-hole.	Yes		No development is required.
2.	**DUG WELL** Protected Well Un Protected Well		Yes		
3.	**WATER FROM SPRING** Protected Spring Unprotected Spring		Yes		
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL)** Irrigation Channel		Yes		
	Rainwater Tanker Truck Cart With Small Tank Bottled Water Hand Pump				

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Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Other(Specify)**Lake/ Pond**	Yes			
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	5 Nos		
	Underground Sump	Capacity:	–		
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1	Yes			
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Pucca			
	Main road	Pucca			
	Internal streets	Pucca			
	Nearest NH/SH/MDR/ODR Dist. in kms.	Connecting to GJSH189			
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	N	Borodoli Railway Station 21km		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	N Bus stop's available	Shekhpur Busstation Mahuwa - 8km		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Y	Auto		
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Y	More than 6 hrs		

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	Power supply for Domestic Use	Y			
	Power supply for Agricultural Use	Y			
	Power supply for Commercial Use	Y			
	Road Street Lights	Y			
	Electrification in Government Buildings Schools Hospitals	Y			
	Renewable Energy Source Facilities (Y, N)	N			
	LED Facilities	Y			
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes	1		
	Location Condition	Good			
	Community Toilet (With bath/ without bath facilities)	Y Without bath			
	Solid & liquid waste Disposal system available	No			
	Any facility for Waste collection from road	No			
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL OTHER (SPECIFY)	Canal			
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Pucca 84%	Kutchha 16%		

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	PHC	5beds	Good Condition	
	Sub-Centre				
	PHC				
	BLOCK PHC				
	CHC/RH				
	District/ Govt. Hospital	Private Clinic		Good Condition	
	Govt. Dispensary		2		
	Private Clinic				
	Private Hospital/ Nursing Home				
	AYUSH Health Facility				
	sonography /ultrasound facility				
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	9nos			
	Primary School	6nos			
	Secondary school	1nos			
	Higher sec. School	1nos			
	ITI college/ vocational Training Center	11km from Village, bardoli			
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	11km from Village, bardoli			

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	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
L.	**Socio- Culture Facilities**	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	Yes	At centre of village without TV		
	Public Library (With daily newspaper supply: Y/N)	No	11km from village.		
	Public Garden	No	11km from village		
	Village Pond	Yes			
	Recreation Center	No			
	Cinema/ Video Hall	No			
	Assembly Polling Station	No			
	Birth & Death Registration Office	No			
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	Yes			
	Telecommunication Network/ STD booth	No			
	General Market	No			
	Shops (Public Distribution System)	Yes			
	Panchayat Building	Yes			
	Pharmacy/Medical Shop	No			
	Bank & ATM Facility	Yes			
	Agriculture Co-operative Society	Yes			
	Milk Co-operative Soc.	Yes			
	Small Scale Industries	~~No~~			
	Internet Cafes/ Common Service Center/Wi Fi	No			
	Youth Club	No			
	Mahila Mandal	No			

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	Not available			
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	Not available			
3.	Any Other				

VII. DATA COLLECTION FROM VILLAGE

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

VIII. ADDITIONAL INFORMATION REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities,	-	-
	School Building	NO	-
	Health Center	NO	-
	Panchayat Building	NO	-
	Public Toilets & any other	NO	-
		NO	-
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 ?	Pond Beautification Development	

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:
GTUVY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

સરપંચશ્રી,
ગ્રામ પંચાયત વાંકાનેર
મુ.પો.વાંકાનેર,તા.બારડોલી

12.3 Village Interaction with Sarpanch Report with the photograph

Village Interaction with Sarpanch/Talati Letter

Vishvakarma yojna phase VIII
Vankaner village, Bardoli taluka, Surat district,
Village pin code 395620

Subject: village interaction with sarpanch/talati of Vankaner village

I sarpanch of Vankaner village undersigned gives approval of doing village interaction activity under Vishvakarma yojna phase VIII an approach toward rurbanisation by students of R.N.G. Patel Institute of Technology, Bardoli. Named Tailor mo.Nadeem I.(180843106020) and Patel Yash S.(170840106046).

ગ્રામ પંચાયત વાંકાનેર
તા. બારડોલી, જી. સુરત.

સરપંચશ્રી
ગ્રામ પંચાયત વાંકાનેર
મુ.પો.વાંકાનેર,તા.બારડોલી

Date: -
Sign: -

Seal of Gram panchayat

12.4 Gap analysis of allocated village Vankaner

12.4 Gap Analysis of the Allocated Village: VILLAGE GAP Analysis				
Village Facilities	**Planning Commission/UDPFI Norms**		**Village Name:**	**VANKANER**
Population:			**7472**	
Existing	**Required as per Norms**		**Smart Vilage / Cities / Heritage Future Projection Design**	**Gap**
Social Infrastructure Facilities				
Education				
Anganwadi	Each or Per 2500 population	3	9	0
Primary School	Each Per 2500 population	3	6	0
Secondary School	Per 7,500 population	1	1	0
Higher Secondary School	Per 15,000 Population	0	1	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/Panchyat Dispensary or Sub PHC or Health Centre	Each Village	1	1	0
Primary Health & Child Health Center	Per 20,000 population	1	1	0
Child Welfare and Maternity Home	Per 10,000 population	0	0	0
Multispeciality Hospital	Per 100000 Population	0	0	0
Public Latrines	1 for 50 families (if toilet is not there in home, especially for slum pockets & kutcha house)	0	0	0
Physical Infrastructure Facilities				
Transportation		Adequate		
Pucca Village Approach Road	Each village		Adequate	
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	Adequate	1	0
Drinking Water (Minimum 70 lpcd)				
Over Head Tank	1/3 of Total Demand	3	6	0
U/G Sump	2/3 of Total Demand	Adequate		
Drainage Network - Open	Adequate		0	
Drainage Network - Cover	Adequate		0	
Waste Management System	Inadequate		1	
Socio- Cultural Infrastructure Facilities				
Community Hall	Per 10000 Population	1 (Not Adequate)	1	1
Community hall and Public Library	Per 15000 Population	1	0	1
Cremation Ground	Per 20,000 population	1	1	0
Post Office	Per 10,000 population	1	1	0
Gram Panchayat Building	Each individual/group panchayat	1	1	0
APMC	Per 100000 Population	0	0	0

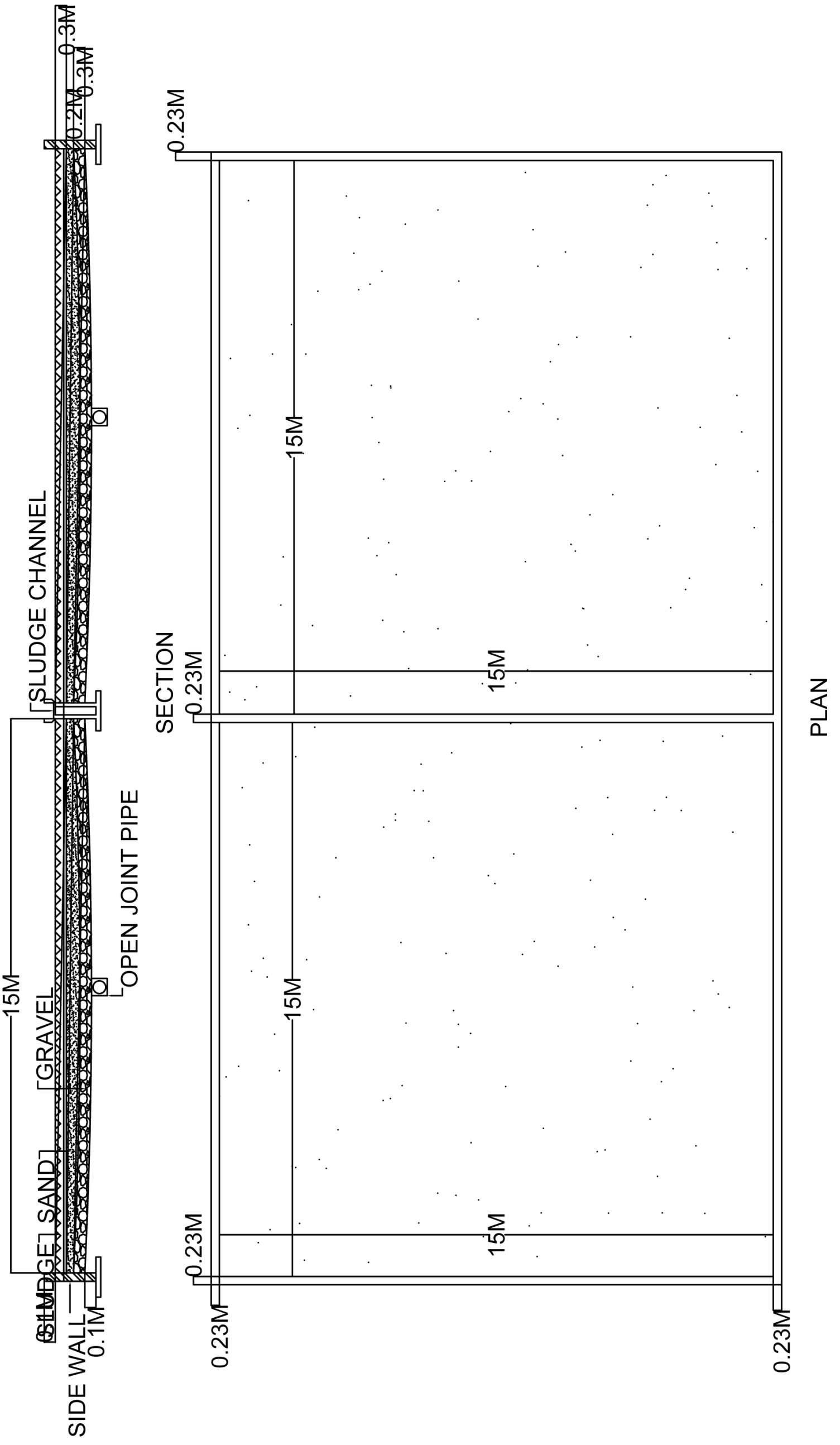
12.5 Summary Details of All the Villages Designs in Table form as Part-I and Part-II:

Sr. no.	Discipline	Part-1	Part-2
1	civil	Trickling filter	Sludge drying beds
2	civil	Library	Pukka houses
3	Civil	Public toilet and bath	Community hall
4	Civil	Village entrance gate	Shopping complex
5	Civil	ATM	Public garden
6	Civil	Gym	Sports arcade

12.6 Drawings

Sr. no.	Drawing name	Page reference
1.	Trickling filter	92
2.	Library	95
3.	Public toilet and bath	100
4.	Village entrance gate	104
5.	ATM	107
6.	GYM	114
7.	1BK houses	152
8.	Community hall	157
9.	Shopping complex	162
10.	Public garden	172
11.	Sports arcade	177

Sludge drying beds



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


આયુષ્માન ભારત
પ્રાથમિક આરોગ્ય કેન્દ્ર પાંડાનેર


આયુષ્માન ભારત
પ્રાથમિક આરોગ્ય કેન્દ્ર પાંડાનેર


પ્રાથમિક આરોગ્ય કેન્દ્ર પાંડાનેર

13 From the Chapter- 9 future designs of the aspects

13.1 Design proposal

Sustainable design: sludge drying bed

The sludge drying method consists of applying the sludge on specially prepared open beds of land. This method is suitable for hot countries just like India. The remains of this process can be disposed on farm land because of Its fertilizing properties

Physical design: Pukka houses

Pukka housing (or pukka or Pukka) refers to dwellings that are designed to be solid and permanent. This term is applied to housing in South Asia built of substantial material such as stone, brick, cement, concrete, or timber.

Sociocultural Design: Community hall

Community centers or community halls are public locations where members of a community tend to gather for group activities, social support, public information, and other purposes. They may sometimes be open for the whole community or for a specialized group within the greater community. Community centers can be religious in nature, such as Christian, Islamic, or Jewish community centers, or can be secular, such as youth clubs.

Social Design: Shopping complex

shopping mall - mercantile establishment consisting of a carefully landscaped complex of shops representing leading merchandisers shopping mall - mercantile establishment consisting of a carefully landscaped complex of shops representing leading merchandisers; usually includes restaurants and a convenient parking area; a modern version of the traditional marketplace; "a good plaza should have a movie house"; "they spent their weekends at the local malls"

Heritage Village Design: public garden

A public garden is an institution that maintains collections of plants for the purposes of public education and enjoyment, in addition to research, conservation, and higher learning. It must be open to the public and the garden's resources and accommodations must be made to all visitors. Public gardens are staffed by professionals trained in their given areas of expertise and maintain active plant records systems.

A garden is a planned space, usually outdoors, set aside for the display, cultivation, or enjoyment of plants and other forms of nature, as an ideal setting for social or solitary human life. The single feature identifying even the wildest wild garden is control. The garden can incorporate both natural and man-made materials.

Gardens often have design features including statuary, follies, pergolas, trellises, stumperies, dry creek beds and water features such as fountains, ponds (with or without fish), waterfalls or creeks. Some gardens are for ornamental purposes only, while others also produce food crops, sometimes in separate areas, or sometimes intermixed with the ornamental plants.

Smart Village Design: Sports arcade

Sports arcade is a modern worlds recreational facility. It is not only recreation facility but it can also generate revenue, so it is commercial recreation facility where people can play numbers of different indoor and outdoor games inside the building only.

13.1.1 Sustainable design: sludge drying beds

Scenario

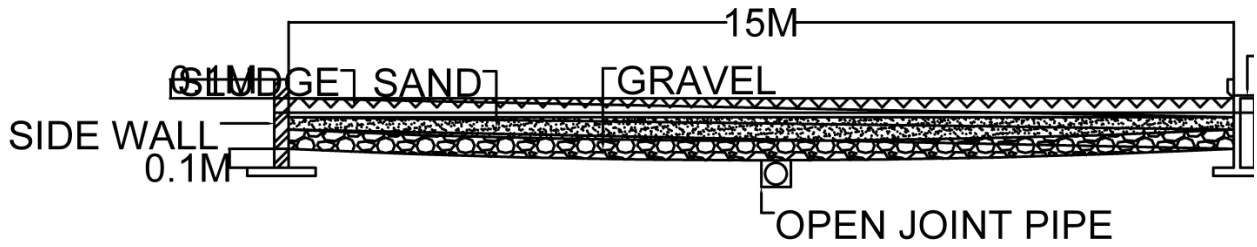
The sludge drying method consists of applying the sludge on specially prepared open beds of land. This method is suitable for hot countries just like India. The remains of this process can be disposed on farm land because of Its fertilising properties.

Sustainability of Proposal

This method will not only help in disposal of sewage sludge but it'll also help in farming process by using sludge in farm land.

Year	Population of Vankaner	Increase in population	Percentage increase					
1991	7194							
2001	7987	793	11%					
2011	7472	-515	-6%					
Average values		139.00	2.29%					
Forecasting of population for next 3 decays (30 years)					Geometric increase method			
2021	7642.926							
2031	7817.761							
2041	7996.596							
Providing design of sludge drying beds for population of 10000 people						Population	10000	
Assuming sludge content per capita per day is 0.070 kg and moistures content of sludge as 95%								
Sludge content			0.07		Moisture content		95%	
Dry sludge content produced by 10000 people				700	Kg/day			
95% of moisture content means			100	Kg of wet sludge will produce			5 Kg	dry
Therefore,	700	Kg of sludge will be produced by			14000	Kg of wet sludge every day		
Assuming density of sludge			1050	Kg/cum				
Volume of wet sludge		13.33333	Cum/day					
Let, the depth of the sludge drying beds				25	Cm			
Therefore,	Area of beds required		53.33333	Sqm/day				
Providing	2	Weeks of drying period						
Numbers of time the bed can be utilised in a year				26				
Area required per year		750	Sqm					
Making	100%	Allowance for storage, repairs and resting of beds, etc.						
Total area required		1500	Sqm					
Now using,	15	X	30	m sized beds				
	Numbers of beds required			4				

Proposed Design in Auto cad



Sr. No.	Description	No	Length(m)	Width(m)	Height(m)	Total quantity
1	Excavation for foundation	1	150.91	0.7	0.3	31.6911
2	Pcc in foundation	1	150.91	0.7	0.15	15.84555
3	Brickwork	1	151.38	0.23	1	34.8174
4	Plaster work					
	Inside plaster	4	30	-	1	120
		4	15	-	1	60
	Outside plaster	2	61.15	-	1	122.3
					Total	302.3
5	Gravel filling	2	15	30	0.3	270
6	Sand filling	2	15	30	0.2	180

Abstract sheet

Sr. No.	Description	No/quant	Rate	Per	Amount
1	1st class bw	34.82	3000	M3	104452
2	Excavation in foundation	31.69	70	M3	2218.38
3	Pcc (1:2:4) in foundation	15.85	2500	M3	39613.9
4	Plastering (12mm thick)(1:4)	302.3	150	M2	45345
5	Painting on walls	302.3	200	M2	60460
6	White washing	302.3	100	M2	30230
7	Gravel filling	270	250	M2	67500
8	Sand filling	180	200	M2	36000
				Total	385819
			2%	Contingencies	7716.39
			10%	Contractor	38581.9
				Total	432118

Total cost of making 2 adjacent drying beds will be approximately 4.5 lakh but as per requirement total 4 beds are required total cost of making sludge drying beds will be 9 lakh rupees.

13.1.2 Physical design: 1BK (1 room and kitchen) houses

Scenario

Pukka housing (or pukka or Pukka) refers to dwellings that are designed to be solid and permanent. This term is applied to housing in South Asia built of substantial material such as stone, brick, cement, concrete, or timber.

The term Pukka means "solid" and "permanent", from Hindustani pukka, lit. '"ripe, cooked, experienced"'. It is contrasted with kutcha housing (lit. '"unripe, raw, inexperienced"'), referring to buildings of flimsy construction. Pukka homes are typically made of concrete, stone, clay tiles and/or metal, in contrast to older homes made of mud and organic material. These building methods are costlier and labour-intensive than the more traditional building methods.

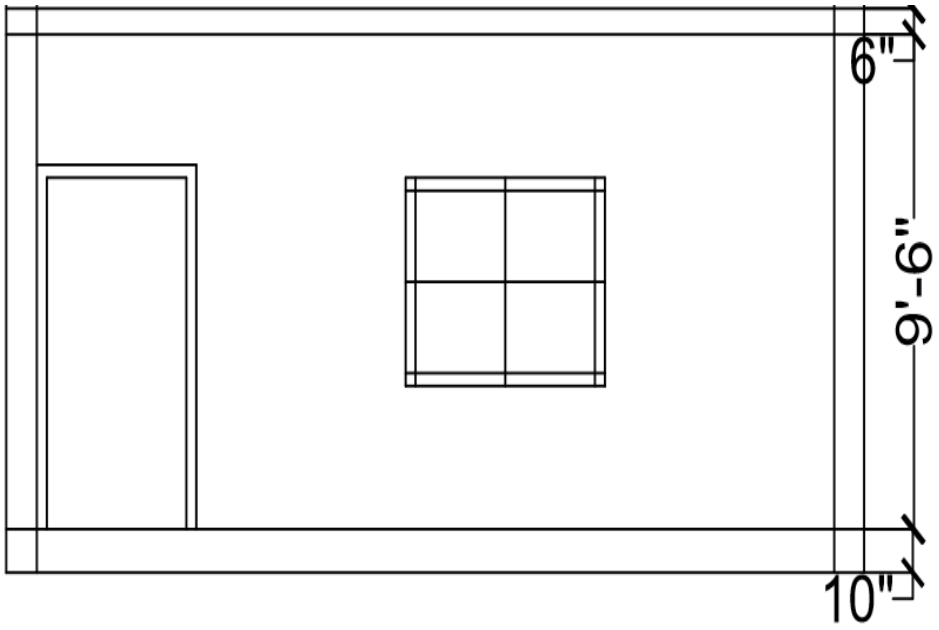
Existing situation

In Vankaner village there are many people still live-in kuccha houses. Kuccha houses are made of weak material like clay and mud. Which is not safe against climatic condition and it shows low life style. It is difficult to live in such houses.

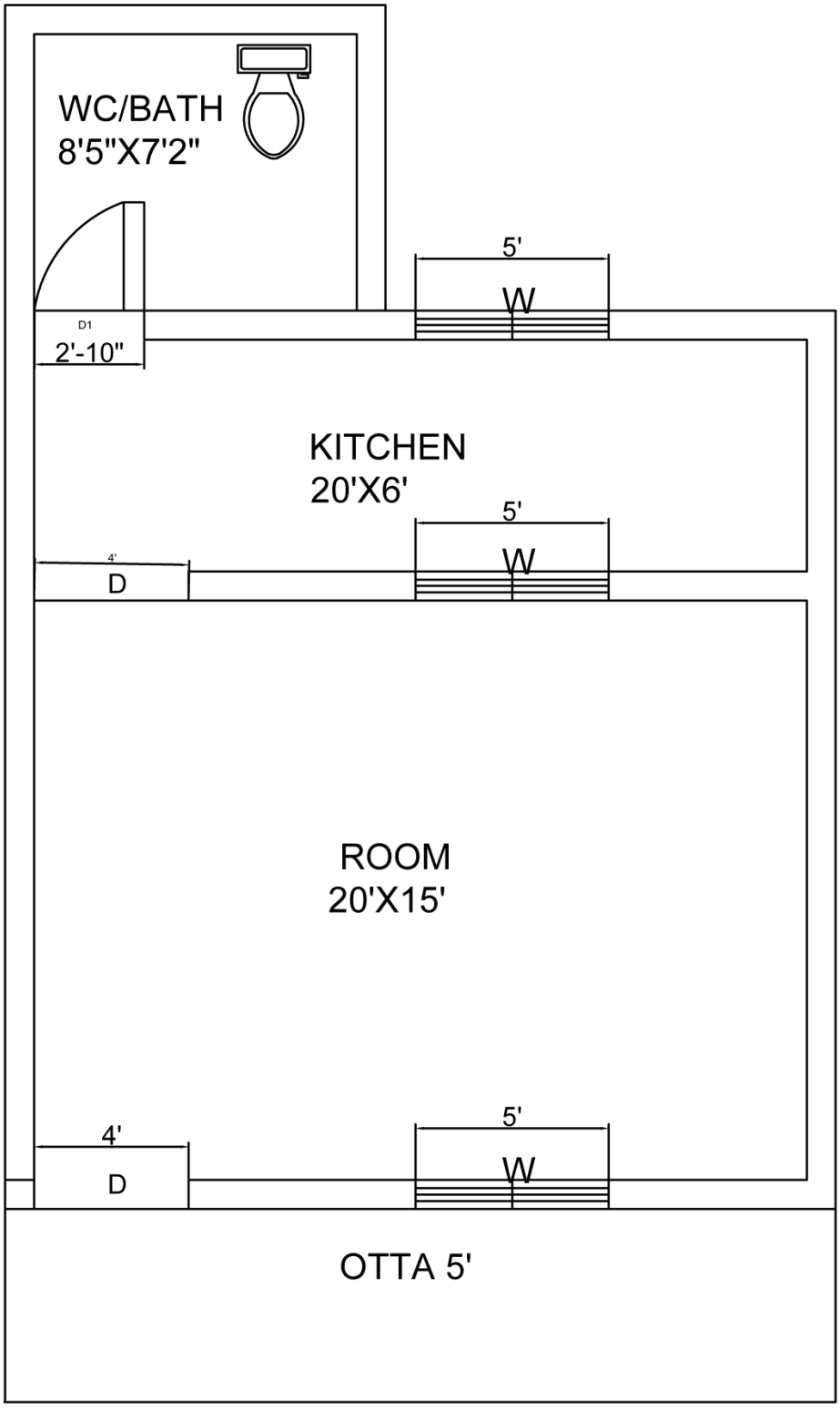
Sustainability of Proposal

It is permanent. It will last for many years. It will be not destroyed by huge winds.

Proposed Design in Auto cad



ELEVATION


WC/BATH
8'5"X7'2"
5'
W
D1
2'-10"
KITCHEN
20'X6'
5'
W
4'
D
ROOM
20'X15'
5'
W
4'
D
OTTA 5'

PLAN

Given drawing is measured in foots but quantity measurement is done in meter. For getting conversion following will be use full.

Prime Unit	Equivalent unit
1 meter (m)	3.28 foots (ft.)
1 foot	30.48 centimeter (cm)
1 inch (“)	2.54 cm

Sr.no	Description	No	L	B	H	Quantity
1	Excavation in foundation					
	23cm	1	39.1524	0.9	1.68	59.1985
						59.1985
2	Pcc in foundation					
	23cm	1	39.1524	0.9	0.42	14.7996
						14.7996
3	Brickwork in foundation					
	1st step					
	23cm	1	39.3524	0.7	0.42	11.5696
						11.5696
	2nd step					
	23cm	1	39.5524	0.5	0.42	8.30601
						8.30601
	Plinth below gl					
	23cm	1	39.7524	0.3	0.42	5.00881
						5.00881
	Plinth above gl					
	23cm	1	39.7524	0.3	0.76	9.06356
						9.06356
					Total bw	33.948
4	Brickwork in super structure					
	23cm	1	39.7524	0.3	3	35.7772
						35.7772
	Deduction of opening					
	D	3	2.1	0.23	2.1	3.0429
	W	3	1.5	0.23	2.1	2.1735
	Deducion for lintels					
	D	1	2.4	0.3	0.15	0.108
	W	3	1.8	0.2	0.15	0.162
					Total ded	5.4864
					Net bw	28.4616
5	Plastering					
	Internal plaster					
	Kitchen					
	Ceiling	1	1.8	6.1	1	10.98

	Sides wall	2	6.1	1	3.66	44.652
	Up/down wall	2	1	1.8	3.66	13.176
	Room					
	Ceiling	1	4.6	6.1	1	28.06
	Sides wall	2	6.1	1	3.66	44.652
	Up/down wall	2	1	4.6	3.66	33.672
	Wc/bath					
	Ceiling	1	2.17988	2.57622	1	5.61584
	Sides wall	2	2.17988		3	13.0793
	Up/down wall	2		2.57622	3	15.4573
	Deduction					
	D	3	1.2	1	2.1	7.56
					Total ded.	7.56
					Net plaster	201.784
	External plaster					
	On wall	2	13.63	1	3.76	102.498
						102.498
	Deduction for openings					
	D	1	2.27	1	2.28	5.1756
	W	3	1.42	1	1.2	5.112
					Total ded	10.2876
					Net plaster	92.21
			Total (inside + outside) plaster			293.994
6	Rcc work					
	Slab	1	7.1	6.55	0.12	5.5806
	Lintels	-	-	-	-	0.27
					Total rcc	5.8506
	Steel work	Assume	1%	Steel		
	Total steel work in kg					459.272
7	Painting					
	Same as plaster	-	-	-	-	293.994
8	White washing					
	Same as plaster	-	-	-	-	293.994
9	Wood work for shutters					
	D	3	1.2	-	2.1	7.56
	W	3	1.5	-	1.2	5.4
					Total ww	12.96
10	Flooring	-	-	-	-	39.04
11	Pcc in flooring 7.5cm	-	-	-	0.075	2.928
12	Brickbat filling in flooring	-	-	-	1.605	62.6592

Abstract sheet

Sr. No.	Description	No/quan	Rate	Per	Amount
1	1st class bw	28.4616	3000	M3	85384.8
2	2n class bw	33.948	2800	M3	95054.4
3	Excavation in foundation	59.1985	70	M3	4143.89
4	Pcc (1:2:4) in foundation	14.7996	2500	M3	36999.1
5	Plstering (12mm thick)(1:4)	293.994	150	M2	44099.2
6	Rcc in slab and lintel (1:2:4)	5.8506	5500	M3	32178.3
7	Painting on walls	293.994	200	M2	58798.9
8	White washing	293.994	100	M2	29399.4
9	Wood work of shutters	12.96	4000	M2	51840
11	Flooring	39.04	400	M2	15616
12	Pcc in flooring 7.5cm	2.928	2500	M3	7320
13	Brickbat filling in flooring	62.6592	400	M3	25063.7
				Total	485898
			2%	Contingencies	9717.95
			10%	Contractor	48589.8
				Total	544205

Construction of making single unit of pukka residential house for family of 5-6 people can be 5.5 lakh rupees. Depending upon numbers of kuccha house dweller numbers of required pukka houses can be determined.

13.1.3 Sociocultural Design: Community Hall

Scenario

Community centers or community halls are public locations where members of a community tend to gather for group activities, social support, public information, and other purposes. They may sometimes be open for the whole community or for a specialized group within the greater community. Community centers can be religious in nature, such as Christian, Islamic, or Jewish community centers, or can be secular, such as youth clubs.

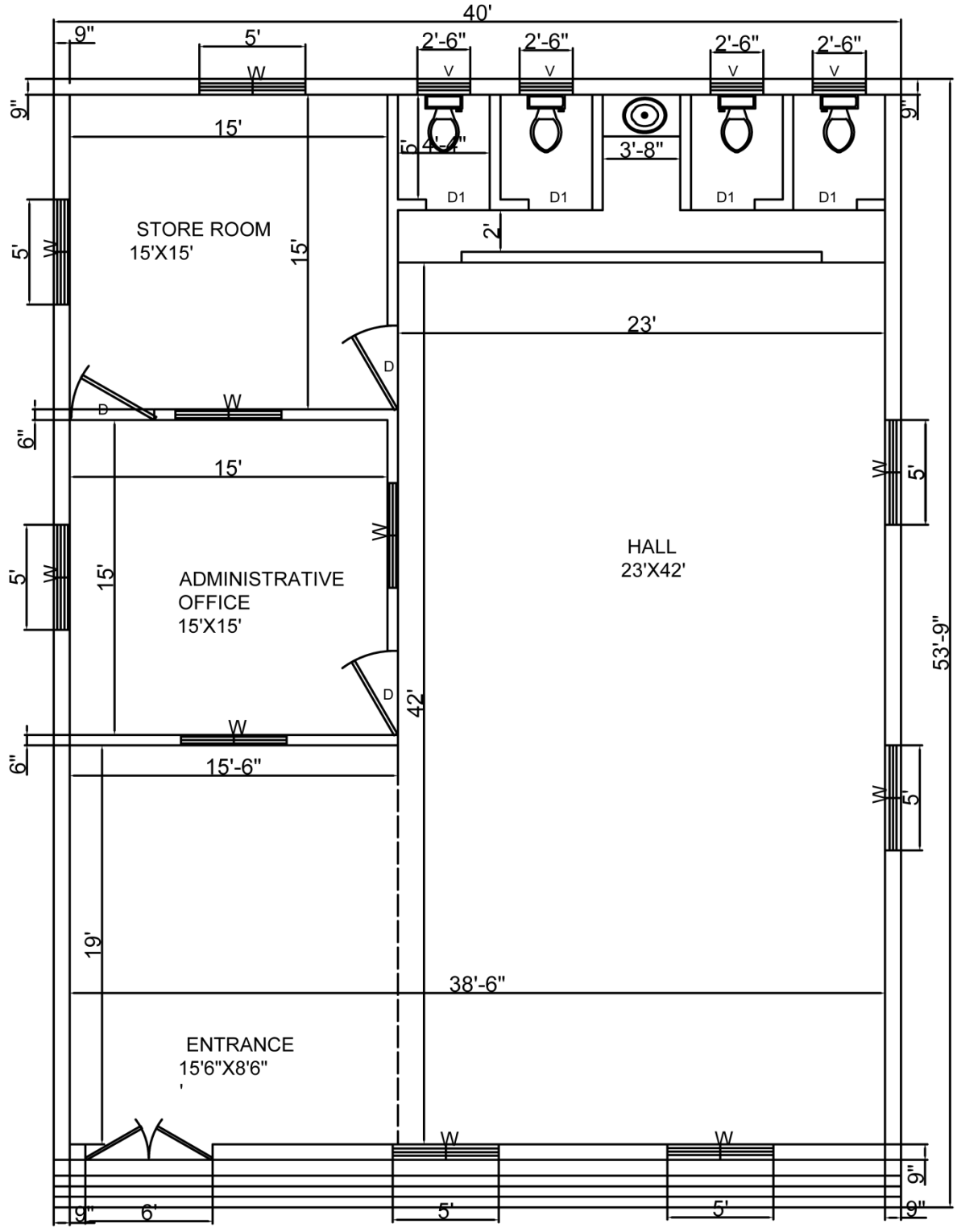
Existing situation

Vankaner is big village and its population will soon exceed 10k people. The community hall it currently possesses is need of repair and maintenance. But due to growing population we understand better design of such important facility is required to fulfill needs of community.

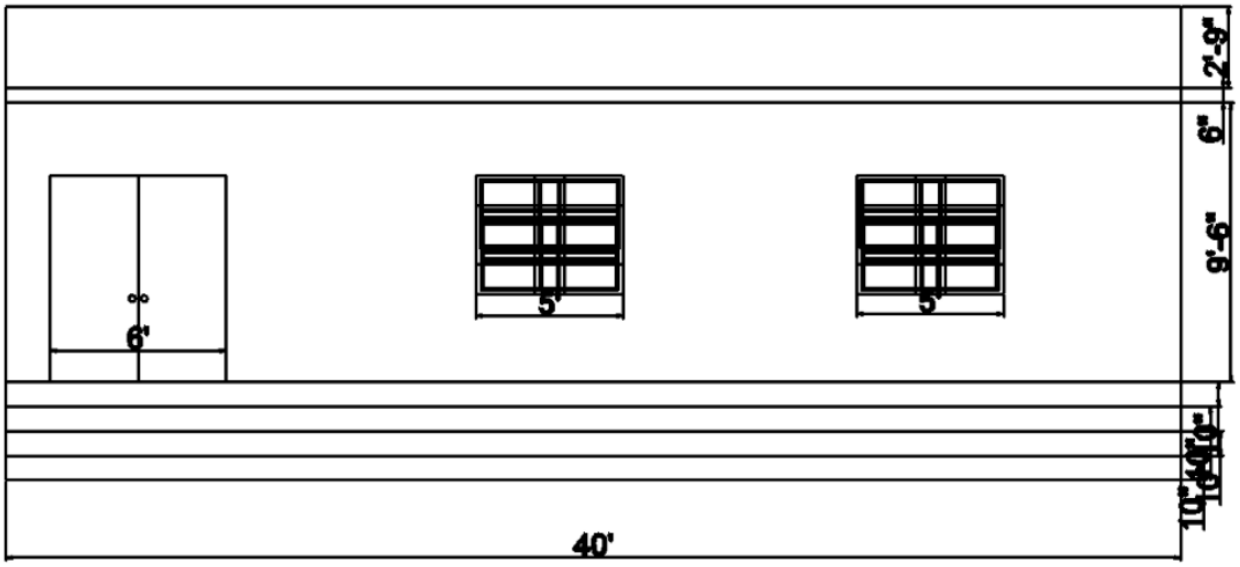
Sustainability of Proposal

Community centers bring people together to work on wider community projects, such as organizing clean-ups or working on improving a gardening space. Community centers provide a vital place to visit for older members of the community, or people who feel isolated from those around them. Studies show almost a fifth of the population feel lonely always or often. Having a place to visit regularly is vital for many people. It provides routine, something to look forward to and new opportunities.

Proposed Design in Auto cad


40'
9"
5'
W
2'-6"
V
2'-6"
V
2'-6"
V
2'-6"
V
9"
15'
5'
4'-4"
3'-8"
D1
D1
D1
D1
STORE ROOM
15'X15'
5'
W
15'
2'
23'
D
D
W
6"
15'
W
5'
5'
W
15'
ADMINISTRATIVE
OFFICE
15'X15'
HALL
23'X42'
53'-9"
D
42'
W
6"
15'-6"
W
5'
19'
38'-6"
ENTRANCE
15'6"X8'6"
W
W
9"
9"
6'
5'
5'

PLAN



NOTE:

Given drawing is measured in foots but quantity measurement is done in meter. For getting conversion following will be use full.

Prime Unit	Equivalent unit
1 meter (m)	3.28 foots (ft.)
1 foot	30.48 centimeter (cm)
1 inch (“)	2.54 cm

Sr.no	Description	No	L	B	H	Quantity
1	Excavation in foundation					
	23cm	1	54.84	0.9	1.68	82.9181
	15cm	1	37.1863	0.7	1.68	43.7311
						126.649
2	Pcc in foundation					
	23cm	1	54.84	0.9	0.42	20.7295
	15cm	1	37.1863	0.7	0.42	10.9328
						31.6623
3	Brickwork in foundation					
	1st step					
	23cm	1	54.84	0.7	0.42	16.123
	15cm	1	37.9863	0.5	0.42	7.97713
						24.1001
	2nd step					
	23cm	1	54.84	0.5	0.42	11.5164
	15cm	1	38.7863	0.3	0.42	4.88708
						16.4035
	Plinth below gl					

	23cm	1	54.84	0.3	0.42	6.90984
	15cm	1	39.5363	0.2	0.42	3.32105
						10.2309
	Plinth above gl					
	23cm	1	54.84	0.23	1	12.6132
	15cm	1	39.8063	0.15	1	5.97095
						18.5842
					Total bw	69.3186
4	Brickwork in super structure					
	23cm	1	54.84	0.23	2.9	36.5783
	Brick work on parapet	1	54.84	0.3	0.85	13.9842
	15cm	1	39.8063	0.15	2.6	15.5245
						66.087
	Deduction of opening					
	D1 x 30	1	1.8	0.3	2.1	1.134
	D2 x 20	3	1.2	0.2	2.1	1.512
	W1	13	1.52	0.3	1.2	7.1136
	Deducion for lintels					
	D1	1	2.1	0.23	0.15	0.07245
	D2	3	1.5	0.15	0.15	0.10125
	W1	13	1.82	0.3	0.15	1.0647
					Total ded	10.998
					Net bw	58.3206
5	Plastering					
	Internal plaster					
	Main hall					
	Ceiling	1	11.74	15.24	1	178.918
	Sides wall	2	15.24	1	2.9	88.392
	Up/down wall	2	1	11.74	2.9	68.092
	Store room					
	Sides wall	2	4.6	1	2.9	26.68
	Up/down wall	2	1	4.6	2.9	26.68
	Office room					
	Sides wall	2	4.6	1	2.9	26.68
	Up/down wall	2	1	4.6	2.9	26.68
	Toilet					
	Ceiling	4	1.52	1.31	1.00	7.99
	Sides wall	8	1.31	1.00	2.90	30.41
	Up/down wall	8	1.00	1.52	2.90	35.37
	Deduction					
	D2	3	1.2	1	2.1	7.56
					Total ded.	7.56
					Net plaster	434.562
	External plaster					
	On wall	2	27.9	1	4.9	273.42

	Top of parapet	2	12.2	0.23	1	5.612
		2	15.54	0.23	1	7.1484
	Inside of parapet	2	12	1	0.85	20.4
		2	15.3	1	0.85	26.01
						332.59
	Deduction for openings					
	D1	1	1.8	1	2.1	3.78
	W1	9	1.52	1	1.2	16.416
					Total ded	20.196
					Net plaster	312.394
			Total (inside + outside) plaster			746.956
6	Rcc work					
	Slab	1	12.2	15.7	0.15	28.731
	Lintels	-	-	-	-	1.2384
					Total rcc	29.9694
	Steel work	Assume	1%	Steel		
	Total steel work in kg					2352.6
8	Painting					
	Same as plaster	-	-	-	-	746.956
9	White washing					
	Same as plaster	-	-	-	-	746.956
10	Wood work for shutters					
	D1 x 30	1	1.8	1	2.1	3.78
	D2 x 20	3	1.2	1	2.1	7.56
	W1	13	1.2	1	1.2	18.72
					Total ww	30.06
11	Flooring	-	-	-	-	178.918
12	Pcc in flooring 7.5cm	-	-	-	0.075	13.4188
13	Brickbat filling in flooring	-	-	-	1.605	287.163

Abstract sheet

Sr. No.	Description	No/quan	Rate	Per	Amount
1	1st class bw	58.3206	3000	M3	174962
2	2n class bw	69.3186	2800	M3	194092
3	Excavation in foundation	126.649	70	M3	8865.45
4	Pcc (1:2:4) in foundation	31.6623	2500	M3	79155.8
5	Plstering (12mm thick)(1:4)	746.956	150	M2	112043
6	Rcc in slab and lintel (1:2:4)	29.9694	5500	M3	164832
7	Painting on walls	746.956	200	M2	149391
8	White washing	746.956	100	M2	74695.6
9	Wood work of shutters	30.06	4000	M2	120240
11	Flooring	178.918	400	M2	71567
12	Pcc in flooring 7.5cm	13.4188	2500	M3	33547.1
13	Brickbat filling in flooring	287.163	400	M3	114865
				Total	1298256
			2%	Contingencies	25965.1
			10%	Contractor	129826
				Total	1454047

Construction cost of a community hall could be 14 lakh rupees for given design. This design is made so that it can easy hold function of 300-350 people at once.

13.1.4 Social Design: Shopping complex

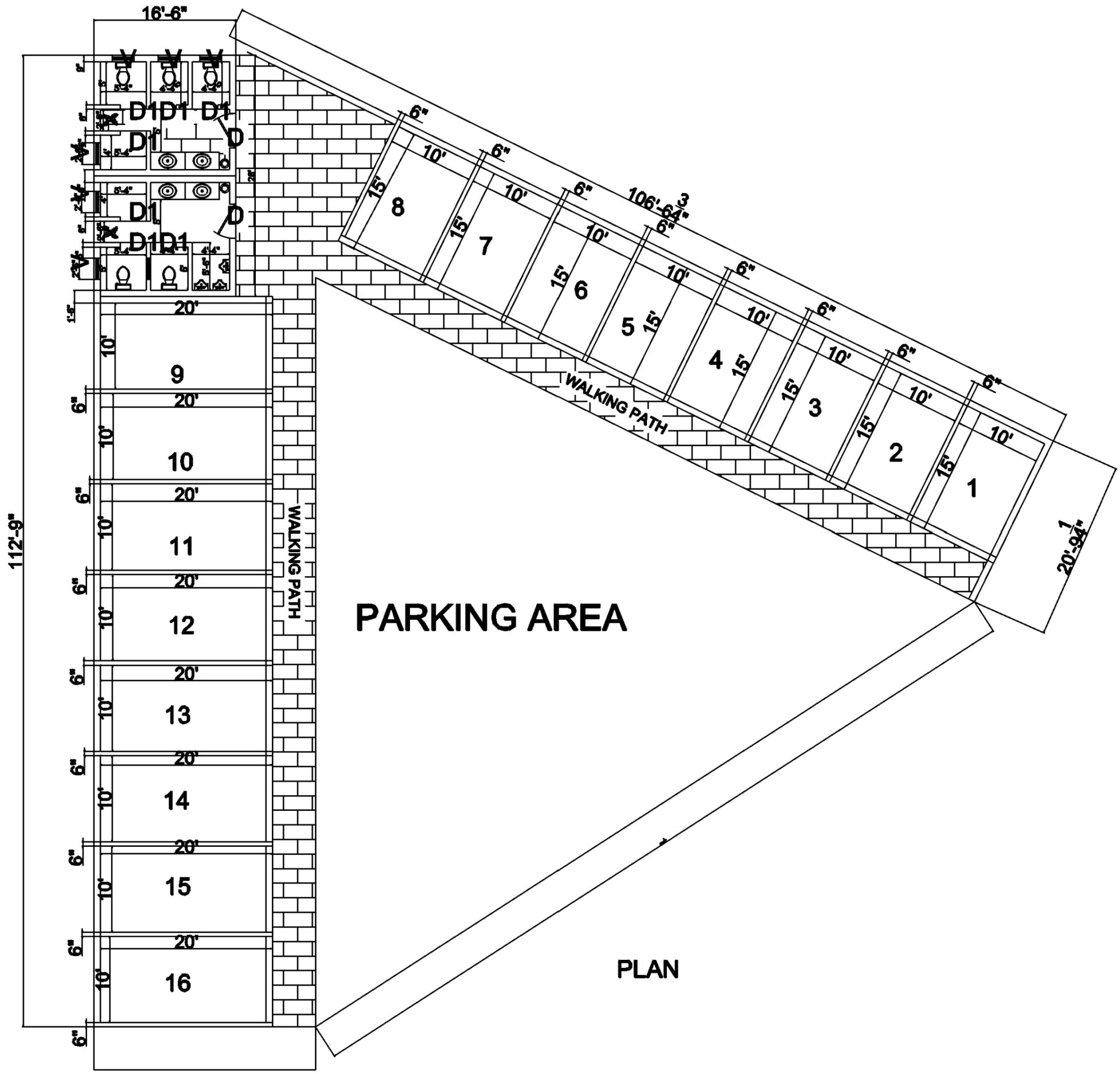
Scenario

shopping mall - mercantile establishment consisting of a carefully landscaped complex of shops representing leading merchandisers shopping mall - mercantile establishment consisting of a carefully landscaped complex of shops representing leading merchandisers; usually includes restaurants and a convenient parking area; a modern version of the traditional marketplace; "a good plaza should have a movie house"; "they spent their weekends at the local malls"

Existing situation

Vankaner is fairly developed village at base needs further development which can generate employment and create opportunities for small scale business structure for setting up is primary need. This design will provide space and structure to create business environment.

Proposed Design in Auto cad



NOTE:

Given drawing is measured in foots but quantity measurement is done in meter. For getting conversion following will be use full.

Prime Unit	Equivalent unit
1 meter (m)	3.28 foots (ft.)
1 foot	30.48 centimeter (cm)
1 inch (“)	2.54 cm

Measurement sheet for single 20’ x 10’ unit

Sr.no	Description	No	L	B	H	Quantity
1	Excavation in foundation					
	23cm	1	7	0.9	1.68	10.584
	15cm	1	12.65	0.7	1.68	14.8764
						25.4604
2	Pcc in foundation					
	23cm	1	7	0.9	0.42	2.646
	15cm	1	12.65	0.7	0.42	3.7191
						6.3651
3	Brickwork in foundation					
	1st step					
	23cm	1	7	0.7	0.42	2.058
	15cm	1	12.75	0.5	0.42	2.6775
						4.7355
	2nd step					
	23cm	1	7	0.5	0.42	1.47
	15cm	1	12.85	0.3	0.42	1.6191
						3.0891
	Plinth below gl					
	23cm	1	7	0.3	0.42	0.882
	15cm	1	12.95	0.2	0.42	1.0878
						1.9698
	Plinth above gl					
	23cm	1	7	0.23	1	1.61
	15cm	1	12.985	0.15	1	1.94775
						3.55775
					Total bw	13.3522
4	Brickwork in super structure					
	23cm	1	7	0.23	3.5	5.635
	15cm	1	12.985	0.15	3.5	6.81713
						12.4521
	Deduction of opening					
	Rolling shutter x 23	1	2.44	0.23	2.5	1.403
	Deducion for lintels					
	Rolling shutter x 23	1	2.74	0.23	0.3	0.18906
					Total ded	1.59206
					Net bw	11.7601
5	Plastering					
	Internal plaster					
	Shop					
	Ceiling	1	6.1	3.05	1	18.605
	Sides wall	2	3.05	1	3.5	21.35
	Up/down wall	2	1	6.1	3.5	42.7

	Deduction					
	Rolling shutter x 23	1	2.44	1	2.5	6.1
					Total ded.	6.1
					Net plaster	76.555
	External plaster					
	On wall	1	6.86	1	4.26	29.2236
						29.2236
	Deduction for openings					
	Rolling shutter x 23	1	2.44	1	2.5	6.1
					Total ded	6.1
					Net plaster	23.1236
			Total (inside + outside) plaster			99.6786
6	Rcc work					
	Slab	1	6.3	3.25	0.15	3.07125
	Lintels	-	-	-	-	0.18906
					Total rcc	3.26031
	Steel work	Assume	1%	Steel		
	Total steel work in kg					255.934
8	Painting					
	Same as plaster	-	-	-	-	99.6786
9	White washing					
	Same as plaster	-	-	-	-	99.6786
10	Steel for shutters					
	Rolling shutter x 23	1	2.44	1	2.5	6.1
					Total ww	6.1
11	Flooring	-	-	-	-	18.605
12	Pcc in flooring 7.5cm	-	-	-	0.075	1.39538
13	Brickbat filling in flooring	-	-	-	1.605	29.861

Abstract sheet

Sr. No.	Description	No/quan	Rate	Per	Amount
1	1st class bw	11.7601	3000	M3	35280.3
2	2n class bw	13.3522	2800	M3	37386
3	Excavation in foundation	25.4604	70	M3	1782.23
4	Pcc (1:2:4) in foundation	6.3651	2500	M3	15912.8
5	Plstering (12mm thick)(1:4)	99.6786	150	M2	14951.8
6	Rcc in slab and lintel (1:2:4)	3.26031	5500	M3	17931.7
7	Painting on walls	99.6786	200	M2	19935.7
8	White washing	99.6786	100	M2	9967.86
9	Steel rolling shutters	6.1	3000	M2	18300
11	Flooring	18.605	400	M2	7442
12	Pcc in flooring 7.5cm	1.39538	2500	M3	3488.44
13	Brickbat filling in flooring	29.861	400	M3	11944.4
				Total	194323
			2%	Contingencies	3886.46
			10%	Contractor	19432.3
				Total	217642

Cost of making single unit of 20 x 10 foot will be approximately 2.5 lakh rupees. In purposed design we are willing to construct 8 numbers of od such units which will cost total of 20 lakh rupees.

Measurement sheet for single 15 x 10-foot unit

Sr.no	Description	No	L	B	H	Quantity
1	Excavation in foundation					
	23cm	1	7	0.9	1.68	10.584
	15cm	1	8.69	0.7	1.68	10.2194
						20.8034
2	Pcc in foundation					
	23cm	1	7	0.9	0.42	2.646
	15cm	1	8.69	0.7	0.42	2.55486
						5.20086
3	Brickwork in foundation					
	1st step					
	23cm	1	7	0.7	0.42	2.058
	15cm	1	8.79	0.5	0.42	1.8459
						3.9039
	2nd step					

	23cm	1	7	0.5	0.42	1.47
	15cm	1	8.89	0.3	0.42	1.12014
						2.59014
	Plinth below gl					
	23cm	1	7	0.3	0.42	0.882
	15cm	1	8.99	0.2	0.42	0.75516
						1.63716
	Plinth above gl					
	23cm	1	7	0.23	1	1.61
	15cm	1	9.025	0.15	1	1.35375
						2.96375
					Total bw	11.095
4	Brickwork in super structure					
	23cm	1	7	0.23	3.5	5.635
	15cm	1	9.025	0.15	3.5	4.73813
						10.3731
	Deduction of opening					
	Rolling shutter x 23	1	2.44	0.23	2.5	1.403
	Deducion for lintels					
	Rolling shutter x 23	1	2.74	0.23	0.3	0.18906
					Total ded	1.59206
					Net bw	9.50289
5	Plastering					
	Internal plaster					
	Shop					
	Ceiling	1	4.57	3.05	1	13.9385
	Sides wall	2	3.05	1	3.5	21.35
	Up/down wall	2	1	4.57	3.5	31.99
	Deduction					
	Rolling shutter x 23	1	2.44	1	2.5	6.1
					Total ded.	6.1
					Net plaster	61.1785
	External plaster					
	On wall	1	6.86	1	4.26	29.2236
						29.2236
	Deduction for openings					
	Rolling shutter x 23	1	2.44	1	2.5	6.1
					Total ded	6.1
					Net plaster	23.1236
			Total (inside + outside) plaster			84.3021
6	Rcc work					
	Slab	1	4.75	3.25	0.15	2.31563
	Lintels	-	-	-	-	0.18906
					Total rcc	2.50469
	Steel work	Assume	1%	Steel		

	Total steel work in kg					196.618
8	Painting					
	Same as plaster	-	-	-	-	84.3021
9	White washing					
	Same as plaster	-	-	-	-	84.3021
10	Steel for shutters					
	Rolling shutter x 23	1	2.44	1	2.5	6.1
					Total ww	6.1
11	Flooring	-	-	-	-	13.9385
12	Pcc in flooring 7.5cm	-	-	-	0.075	1.04539
13	Brickbat filling in flooring	-	-	-	1.605	22.3713

Abstract sheet

Sr. No.	Description	No/quan	Rate	Per	Amount
1	1st class bw	9.50289	3000	M3	28508.7
2	2n class bw	11.095	2800	M3	31065.9
3	Excavation in foundation	20.8034	70	M3	1456.24
4	Pcc (1:2:4) in foundation	5.20086	2500	M3	13002.2
5	Plstering (12mm thick) (1:4)	84.3021	150	M2	12645.3
6	Rcc in slab and lintel (1:2:4)	2.50469	5500	M3	13775.8
7	Painting on walls	84.3021	200	M2	16860.4
8	White washing	84.3021	100	M2	8430.21
9	Steel rolling shutters	6.1	3000	M2	18300
11	Flooring	13.9385	400	M2	5575.4
12	Pcc in flooring 7.5cm	1.04539	2500	M3	2613.47
13	Brickbat filling in flooring	22.3713	400	M3	8948.52
				Total	161182
			2%	Contingencies	3223.64
			10%	Contractor	16118.2
				Total	180524

Cost of making single unit of 15 x 10 foot will be approximately 2 lakh rupees. In purposed design we are willing to construct 8 numbers of od such units which will cost total of 16 lakh rupees.

Measurement sheet for toilet block

Sr.no	Description	No	L	B	H	Quantity
1	Excavation in foundation					
	23cm	1	25.3	0.9	1.68	38.2536
	15cm	1	14.89	0.7	1.68	17.5106
						55.7642
2	Pcc in foundation					
	23cm	1	25.3	0.9	0.42	9.5634
	15cm	1	14.89	0.7	0.42	4.37766

						13.9411
3	Brickwork in foundation					
	1st step					
	23cm	1	25.5	0.7	0.42	7.497
	15cm	1	16.29	0.5	0.42	3.4209
						10.9179
	2nd step					
	23cm	1	25.7	0.5	0.42	5.397
	15cm	1	17.69	0.3	0.42	2.22894
						7.62594
	Plinth below gl					
	23cm	1	25.97	0.23	0.42	2.5087
	15cm	1	19.4	0.15	0.42	1.2222
						3.7309
	Plinth above gl					
	23cm	1	25.97	0.23	0.76	4.53956
	15cm	1	19.4	0.15	0.76	2.2116
						6.75116
					Total bw	29.0259
4	Brickwork in super structure					
	23cm	1	26.2	0.3	2.9	22.794
	15cm	1	18.94	0.2	2.1	7.9548
						30.7488
	Deduction of opening					
	D x 23	2	1.2	0.23	2.1	1.1592
	D1 x 15	7	0.75	0.15	2.1	1.65375
	V	6	0.75	0.3	0.75	1.0125
	Deduction for lintels					
	D1 x 30	2	1.5	0.23	0.15	0.1035
	D2 x 20	7	1.05	0.15	0.15	0.16538
	V	6	1.05	0.3	0.15	0.2835
					Total ded	4.37783
					Net bw	24.6481
5	Plastering					
	Internal plaster					
	Main hall					
	Ceiling	2	3.8	4.1	1	31.16
	Sides wall	4	3.8	1	2.9	44.08
	Up/down wall	4	1	4.1	2.9	47.56
	W/cs					
	Sides wall	10	1.52	1	2.1	31.92
	Up/down wall	8	1	1.56	2.1	26.208
	Baths					
	Sides wall	6	1.26	1	2.1	15.876
	Deduction					

	D1	5	0.75	1	2.1	7.875
					Total ded.	7.875
					Net plaster	188.929
	External plaster					
	On wall	2	13.56	1	3.66	99.2592
						99.2592
	Deduction for openings					
	D	2	1.2	1	2.1	5.04
					Total ded	5.04
					Net plaster	94.2192
			Total (inside + outside) plaster			283.148
6	Rcc work					
	Slab	1	8.5	5.03	0.12	5.1306
	Lintels	-	-	-	-	0.55238
					Total rcc	5.68298
	Steel work	Assume	1%	Steel		
	Total steel work in kg					446.114
8	Painting					
	Same as plaster	-	-	-	-	283.148
9	White washing					
	Same as plaster	-	-	-	-	283.148
10	Wood work for shutters					
	D	2	1.2	1	2.1	5.04
	D1	5	0.75	1	2.1	7.875
					Total ww	12.915
11	Flooring	-	-	-	-	31.16
12	Pcc in flooring 7.5cm	-	-	-	0.075	2.337
13	Brickbat filling in flooring	-	-	-	1.605	50.0118

Abstract sheet					
Sr. No.	Description	No/quant	Rate	Per	Amount
1	1st class bw	24.6481	3000	M3	73944.2
2	2n class bw	29.0259	2800	M3	81272.5
3	Excavation in foundation	55.7642	70	M3	3903.5
4	Pcc (1:2:4) in foundation	13.9411	2500	M3	34852.7
5	Plastering (12mm thick)(1:4)	283.148	150	M2	42472.2
6	Rcc in slab and lintel (1:2:4)	5.68298	5500	M3	31256.4
7	Painting on walls	283.148	200	M2	56629.6
8	White washing	283.148	100	M2	28314.8
9	Wood work of shutters	12.915	4000	M2	51660
10	Flooring	31.16	400	M2	12464
11	Pcc in flooring 7.5cm	2.337	2500	M3	5842.5
12	Brickbat filling in flooring	50.0118	400	M3	20004.7
				Total	442617
			2%	Contingencies	8852.34
			10%	Contractor	44261.7
				Total	495731

Cost of construction of toilet block will be 5 lakh rupees. This toilet-block is given between all the shop-holders. After considering all segments and toilet block total cost of project should be 41 lakh rupees.

13.1.5 Heritage Village Design: public garden

Scenario

A public garden is an institution that maintains collections of plants for the purposes of public education and enjoyment, in addition to research, conservation, and higher learning. It must be open to the public and the garden's resources and accommodations must be made to all visitors. Public gardens are staffed by professionals trained in their given areas of expertise and maintain active plant records systems.

Existing situation

Currently vankaner village doesn't have any village garden. With this design peoples of the village will be able to enjoy floral atmosphere. Despite villages have all the greenery in it but still having a place to visit with family and enjoy the atmosphere while gazing on flowers unique plantation will provide pleasure to relax mind and soul.

Sustainability of Proposal

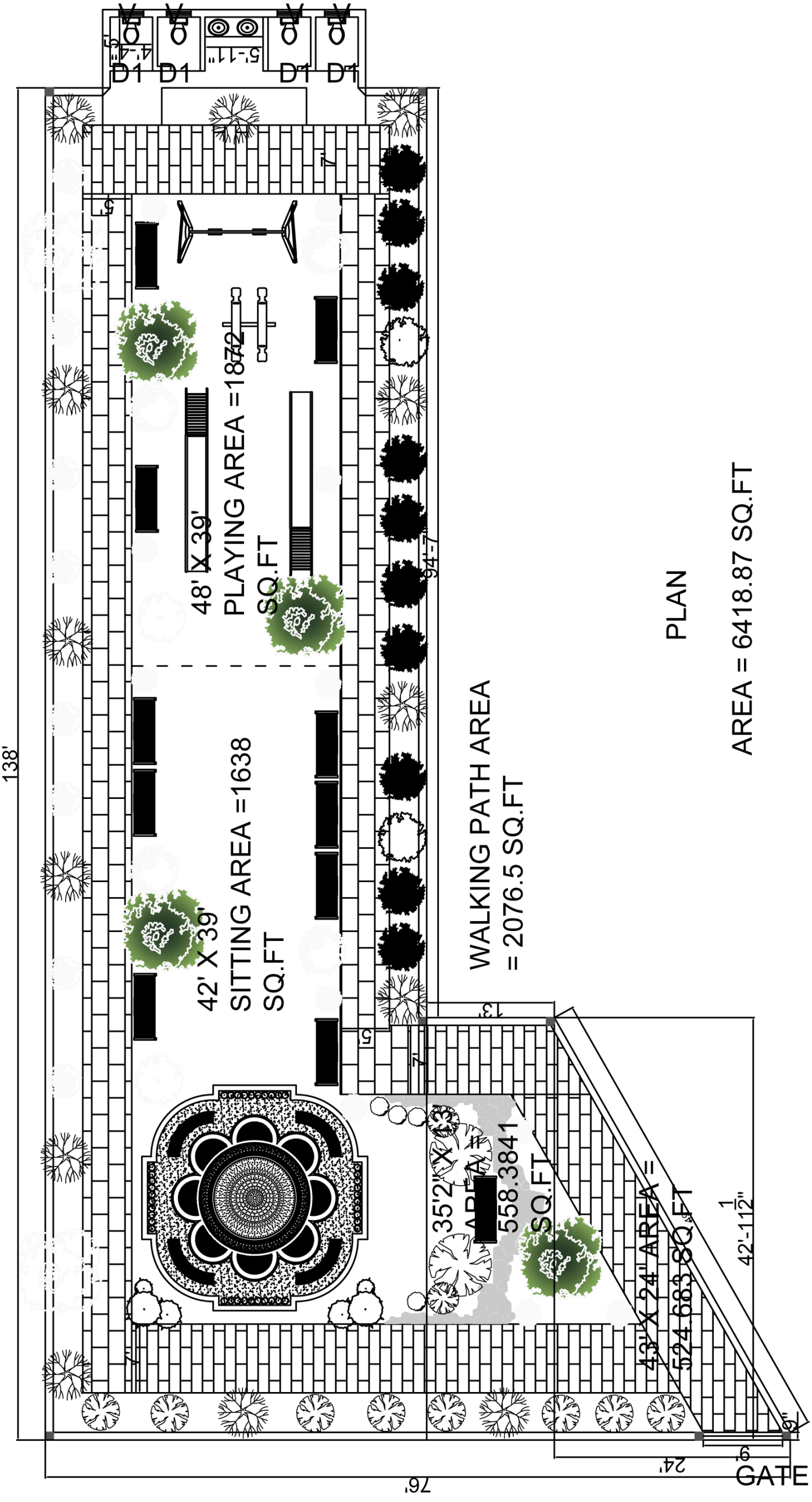
1. Improves the health and wellbeing of those involved.
2. Improves the quality of life for people in the garden.
3. Connects people to their community.
4. Provides a catalyst for neighbourhood and community development.
5. Stimulates Social Interaction.

NOTE:

Given drawing is measured in foots but quantity measurement is done in meter. For getting conversion following will be use full.

Prime Unit	Equivalent unit
1 meter (m)	3.28 foots (ft.)
1 foot	30.48 centimeter (cm)
1 inch (“)	2.54 cm

Proposed Design in Auto cad



PLAN

AREA = 6418.87 SQ.FT

Sr. No.	Description	No.	L	B	H	Total quantity
1	Excavation for foundation	1	135.6	0.9	0.4	48.816
2	Pcc in foundation	1	135.6	0.9	0.3	36.612
3	Brick work	1	135.6	0.4	2	108.48
4	Plastering on walls	2	135.6	-	2	542.4
	Plastering on Ceiling	4	1.52439	1.320122		8.049524
5	White washing	-	-	-	-	542.4
6	Painting	-	-	-	-	542.4

Abstract sheet

Sr. No.	Description	No/quant	Rate	Per	Amount
1	Excavation for foundation	48.816	70	M3	3417.12
2	Pcc in foundation	36.612	2500	M3	91530
3	Brick work	108.48	3000	M3	325440
4	Plastering on walls	550.45	150	M2	82567.43
5	White washing	542.4	100	M2	54240
6	Painting	542.4	200	M2	108480
7	Gardening/landscaping	680	1100	M2	748000
			2%	Contingencies	28273.49
			10%	Contractor profit	141367.5
				Grant total	1583315

The approximate cost of developing public garden of 680 m^2 will be 16 lakh rupees.

13.1.6 Smart Village Design: Sports arcade

Scenario

Sports arcade is a modern worlds recreational facility. It is not only recreation facility but it can also generate revenue, so it is commercial recreation facility where people can play numbers of different indoor and outdoor games inside the building only.

Existing situation

Vankaner is fairly developed village but it lacks recreation facilities like theatres, gardens, parks, etc. but with this design of sports arcade villagers can enjoy their time by playing games. It'll also help in socialization among villages. Many games required more than one person to play it'll increase communication between villagers

Sustainability of Proposal

This design of sports arcade villagers can enjoy their time by playing games. It'll also help in socialization among villages. Many games required more than one person to play it'll increase communication between villagers.

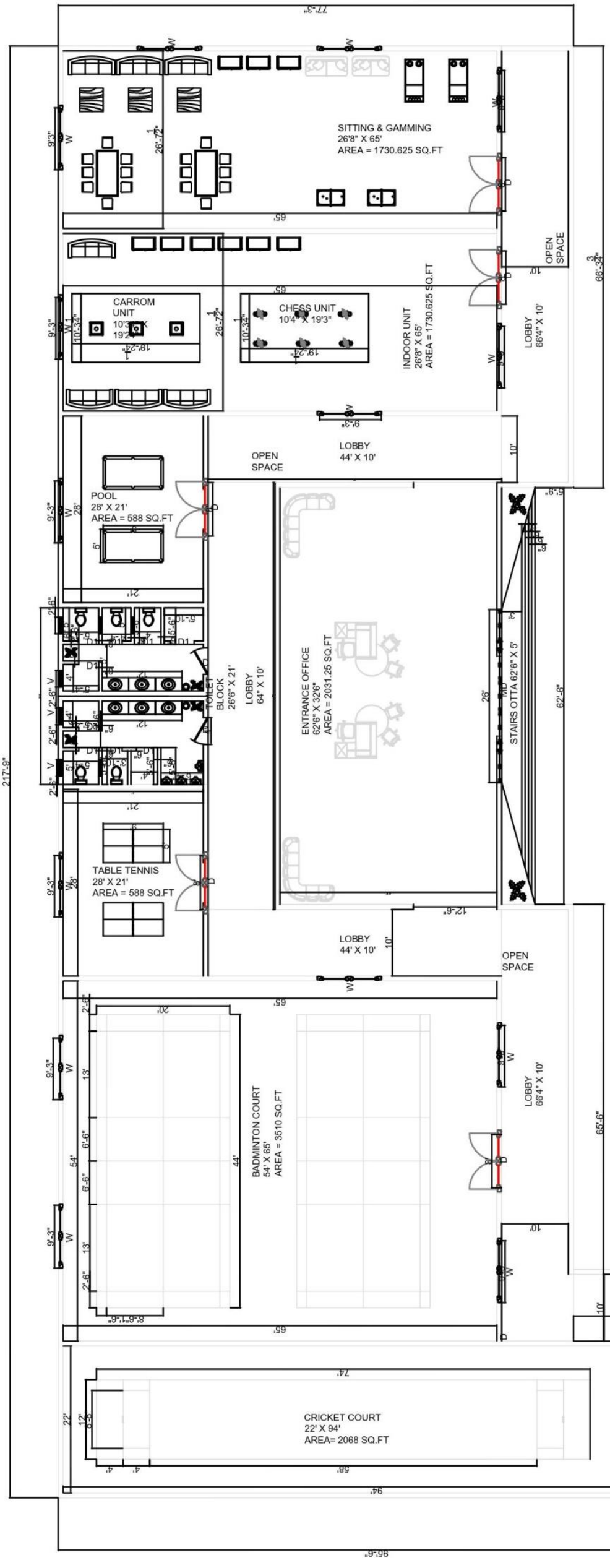
Measurement sheet

Sr.no	Description	No	L	B	H	Quantity
1.00	Excavation in foundation					
	23cm	1.00	339.16	0.90	1.68	512.81
						512.81
2.00	Pcc in foundation					
	23cm	1.00	339.16	0.90	0.42	128.20
						128.20
3.00	Brickwork in foundation					
	1st step					
	23cm	1.00	340.26	0.70	0.42	100.04
						100.04
	2nd step					
	23cm	1.00	341.36	0.50	0.42	71.69
						71.69
	Plinth below gl					
	23cm	1.00	342.85	0.23	0.42	33.12
						33.12
	Plinth above gl					
	23cm	1.00	342.85	0.23	1.30	102.51
						102.51
					Total bw	307.35
4.00	Brickwork in super structure					
	23cm	1.00	344.11	0.23	4.06	321.33
	Parapet 23cm	1.00	196.60	0.23	0.85	38.44
						359.77
	Deduction of opening					
	D x 23	1.00	7.92	0.23	3.00	5.47
	D1	6.00	2.44	0.23	2.10	7.07
	W	14.00	2.78	0.23	1.20	10.72
	Deducion for lintels					
	D x 23	1.00	8.22	0.23	0.15	0.28
	D1	6.00	2.74	0.23	0.15	0.57
	W	14.00	3.08	0.23	0.15	1.49
					Total ded	25.59
					Net bw	281.76
5.00	Plastering					
	Internal plaster					
	Cricket court					
	Ceiling	1.00	28.65	6.71	1.00	192.12
	Sides wall	2.00	28.65	1.00	4.03	230.93
	Up/down wall	2.00	1.00	6.71	4.03	54.05
	Badminton					
	Ceiling	1.00	19.81	16.46	1.00	326.09

	Sides wall	2.00	19.81	1.00	4.03	159.68
	Up/down wall	2.00	1.00	16.46	4.03	132.66
	Chess & carrom/gaming & social club					
	Ceiling	2.00	19.81	8.12	1.00	321.56
	Sides wall	4.00	19.81	1.00	4.03	319.37
	Up/down wall	4.00	1.00	8.12	4.03	130.82
	Pool/table tennis					
	Ceiling	2.00	8.53	6.40	1.00	109.25
	Sides wall	4.00	8.53	1.00	4.03	137.57
	Up/down wall	4.00	1.00	6.40	4.03	103.18
	Passage 1					
	Ceiling	1.00	3.05	5.87	1.00	17.88
	Sides wall	2.00	3.05	1.00	4.03	24.57
	Up/down wall	2.00	1.00	5.87	4.03	47.29
	Passage 2					
	Ceiling	1.00	3.05	16.69	1.00	50.86
	Sides wall	1.00	3.05	1.00	4.03	12.28
	Up/down wall	2.00	1.00	16.69	4.03	134.50
	Passage 3					
	Ceiling	1.00	3.05	6.63	1.00	20.21
	Sides wall	1.00	3.05	1.00	4.03	12.28
	Up/down wall	2.00	1.00	6.63	4.03	53.43
	Passage 4					
	Ceiling	1.00	3.05	22.10	1.00	67.35
	Sides wall	1.00	3.05	1.00	4.03	12.28
	Up/down wall	2.00	1.00	22.10	4.03	178.11
	Passage 5					
	Ceiling	1.00	3.05	6.63	1.00	20.21
	Sides wall	1.00	3.05	1.00	4.03	12.28
	Up/down wall	2.00	1.00	6.63	4.03	53.43
	Passage 6					
	Ceiling	1.00	3.05	17.16	1.00	52.32
	Sides wall	1.00	3.05	1.00	4.03	12.28
	Up/down wall	2.00	1.00	17.16	4.03	138.34
					Total plaster	3137.22
	Deduction for openings					
	D	1.00	7.92	1.00	3.00	23.77
	D1	6.00	2.44		2.10	30.72
	W	6.00	2.78		1.20	19.98
					Total ded	74.48
					Net plaster	3062.74
	External plastering					
	On walls	1.00	196.60	-	6.32	1243.42
	Inside parapet	1.00	194.31	-	0.90	174.88
	Deduction					

	D	1.00	7.92	-	3.00	23.77
	W	8.00	2.78	-	1.20	10.72
			Total (inside + outside) plaster			4446.55
6.00	Rcc work					
	Slab	1.00	1475.71	Sqm	0.15	216.23
	Lintels	-	-	-	-	2.34
					Total rcc	218.56
	Steel work	Assume	0.01	Steel		
	Total steel work in kg					17157.07
7.00	Painting					
	Same as plaster	-	-	-	-	4446.55
8.00	White washing					
	Same as plaster	-	-	-	-	4446.55
9.00	Wood work for shutters					
	D	2.00	1.20	1.00	2.10	5.04
	D1	5.00	0.75	1.00	2.10	7.88
					Total ww	12.92
10.00	Flooring	-	-	-	-	1444.55
11.00	Pcc in flooring 7.5cm	-	-	-	0.08	108.34
12.00	Brickbat filling in flooring	-	-	-	1.61	2318.50

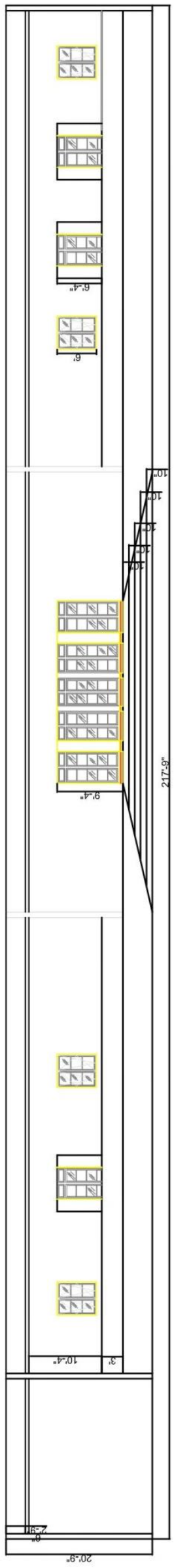
Abstract sheet					
Sr. No.	Description	No/quan	Rate	Per	Amount
1.00	1st class bw	281.76	3000.00	M3	845275.49
2.00	2n class bw	307.35	2800.00	M3	860584.26
3.00	Excavation in foundation	512.81	70.00	M3	35896.69
4.00	Pcc (1:2:4) in foundation	128.20	2500.00	M3	320506.20
5.00	Plastering (12mm thick)(1:4)	4446.55	150.00	M2	666981.83
6.00	Rcc in slab and lintel (1:2:4)	218.56	5500.00	M3	1202088.01
7.00	Painting on walls	4446.55	200.00	M2	889309.10
8.00	White washing	4446.55	100.00	M2	444654.55
9.00	Wood work of shutters	12.92	4000.00	M2	51660.00
10.00	Flooring	1444.55	400.00	M2	577819.27
11.00	Pcc in flooring 7.5cm	108.34	2500.00	M3	270852.78
12.00	Brickbat filling in flooring	2318.50	400.00	M3	927399.93
				Total	7093028.13
			2%	Contingencies	141860.56
			10%	Contractor	709302.81
				Total	7944191.50



PLAN

AREA INCLUDING WALL = 17087.0247 SQ.FT

ALL THE WALLS HAS THE THICKNESS OF 9"



ELEVATION

After the finished construction there will be need of 50 lakh rupees of furniture and in addition 5 lakh of toilet. Complete project will cost approximately 1.35 crore rupee

Given drawing is measured in foots but quantity measurement is done in meter. For getting conversion following will be use full.

Prime Unit	Equivalent unit
1 meter (m)	3.28 foots (ft.)
1 foot	30.48 centimeter (cm)
1 inch (“)	2.54 cm

13.2 Reason for Students Recommending this Design

The sludge drying method consists of applying the sludge on specially prepared open beds of land. This method is suitable for hot countries just like India. The remains of this process can be disposed on farm land because of Its fertilising properties.

Pukka housing (or pukka or Pukka) refers to dwellings that are designed to be solid and permanent. This term is applied to housing in South Asia built of substantial material such as stone, brick, cement, concrete, or timber.

The term Pukka means "solid" and "permanent", from Hindustani ا pukka, lit. '"ripe, cooked, experienced"'. It is contrasted with kutcha housing (lit. '"unripe, raw, inexperienced"'), referring to buildings of flimsy construction. Pukka homes are typically made of concrete, stone, clay tiles and/or metal, in contrast to older homes made of mud and organic material. These building methods are costlier and labour-intensive than the more traditional building methods.

Vankaner is big village and its population will soon exceed 10k people. The community hall it currently possesses is need of repair and maintenance. But due to growing population we understand better design of such important facility is required to fulfill needs of community.

Vankaner is fairly developed village at base needs further development which can generate employment and create opportunities for small scale business structure for setting up is primary need. This design will provide space and structure to create business environment.

Currently vankaner village doesn’t have any village garden. With this design peoples of the village will be able to enjoy floral atmosphere. Despite villages have all the greenery in it but still having a place to visit with family and enjoy the atmosphere while gazing on flowers unique plantation will provide pleasure to relax mind and soul.

Vankaner is fairly developed village but it lacks recreation facilities like theatres, gardens, parks, etc. but with this design of sports arcade villagers can enjoy their time by playing games. It’ll also help in socialization among villages. Many games required more than one person to play it’ll increase communication between villagers

13.3 About designs Suggestions / Benefit of the villagers

Sludge drying bed method will not only help in disposal of sewage sludge but it'll also help in farming process by using sludge in farm land.

Pukka house is permanent. It will last for many years. It will be not destroyed by huge winds.

Community centers bring people together to work on wider community projects, such as organising clean-ups or working on improving a gardening space. Community centers provide a vital place to visit for older members of the community, or people who feel isolated from those around them. Studies show almost a fifth of the population feel lonely always or often. Having a place to visit regularly is vital for many people. It provides routine, something to look forward to and new opportunities.

Commercials spaces by virtue of their location (proximity to markets, malls, shopping centers) are likely to fetch you businessmen and entrepreneurs who would want to own the place for longer durations, ensuring you a fair return for a longer time. This enhances the stability of your investment and also reduces potential losses due to an interim vacancy. This leads to a win-win situation for both the tenant and the landlord.

Public garden can give following advantages to people,

1. Improves the health and wellbeing of those involved.
2. Improves the quality of life for people in the garden.
3. Connects people to their community.
4. Provides a catalyst for neighbourhood and community development.
5. Stimulates Social Interaction.

Given design of sports arcade villagers can enjoy their time by playing games. It'll also help in socialization among villages. Many games required more than one person to play it'll increase communication between villagers.

14 Technical Options with Case Studies

14.1 Civil Engineering

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

Self-healing of concrete

Concrete is one of the most used materials in the world with robust applications and increasing demand. Despite considerable advancement in concrete and cementanious materials over last centuries, infrastructure built in the present world with these materials, such as dams, roads, bridges, tunnels and buildings requires intensive repair and maintenance throughout its design life. Self-healing concrete and cementanious materials, which have the ability to recover after initial damage, have the potential to address these challenges. Self-healing technology in concrete and cementanious materials can mitigate the unnecessary repair and maintenance of built infrastructure as well as overall CO2 emission due to cement production. This chapter provides the state-of-the-art of self-healing concrete and cementanious materials, mainly focusing on autogenic or intrinsic self-healing using fiber, shrinkable polymers, minerals and supplementary cementanious materials, and autonomic self-healing using non-traditional concrete materials such as microscale to macroscale capsule as well as vascular systems with polymeric, mineral and bacterial agents.

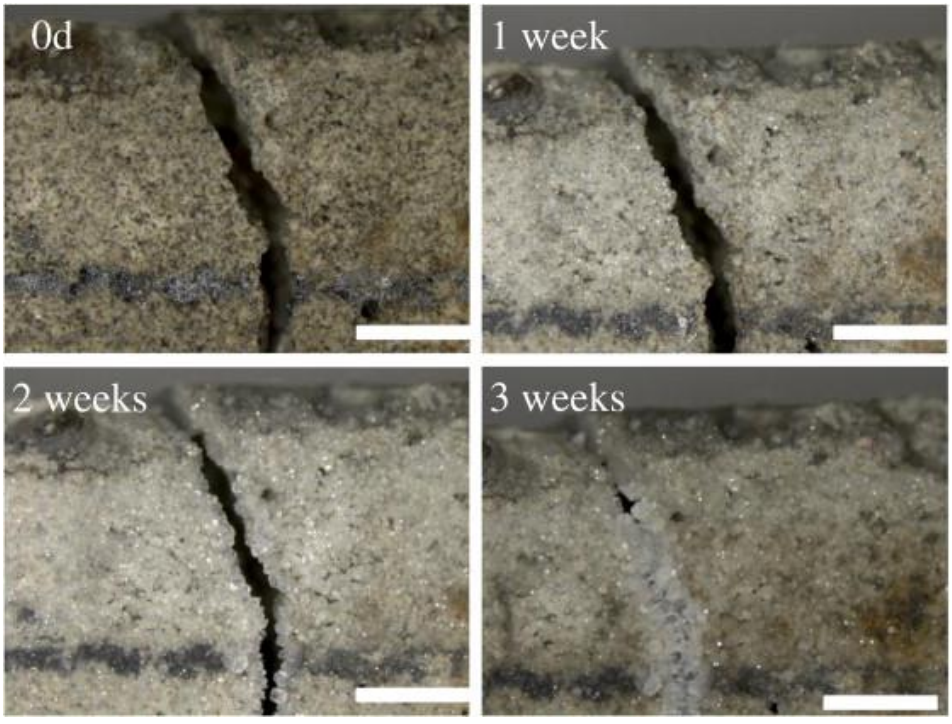


Figure 59 Self-healing concrete

Cracks in concrete are a common phenomenon due to the relatively low tensile strength. Durability of concrete is impaired by these cracks since they provide an easy path for the transportation of liquids and gasses that potentially contain harmful substances. If micro-cracks grow and reach the reinforcement, not only the concrete itself may be attacked, but also the reinforcement will be corroded. Therefore, it is important to control the crack width and to heal the cracks as soon as possible. Since the costs involved for maintenance and repair of

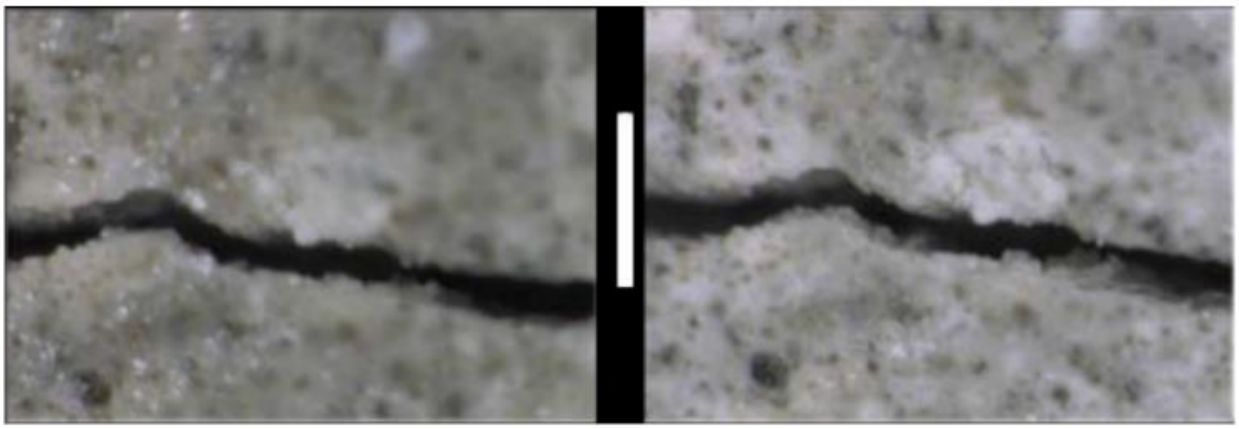
concrete structures are usually high, this research focuses on the development of self-healing concrete. Self-healing of cracks in concrete would contribute to a longer service life of concrete structures and would make the material not only more durable but also more sustainable.

The self-healing system in concrete is principally divided into two types, autogenic and autonomic. Autogenic self-healing in concrete is an intrinsic material-healing property wherein the self-healing process initiates from the generic materials present. For example, cementitious materials exhibit a self-repairing ability due to the rehydration property of unhydrated cement remaining on the crack surface. In contrast, a self-healing process that involves the incorporation of material components that are not traditionally used in the concrete is termed autonomic self-healing.

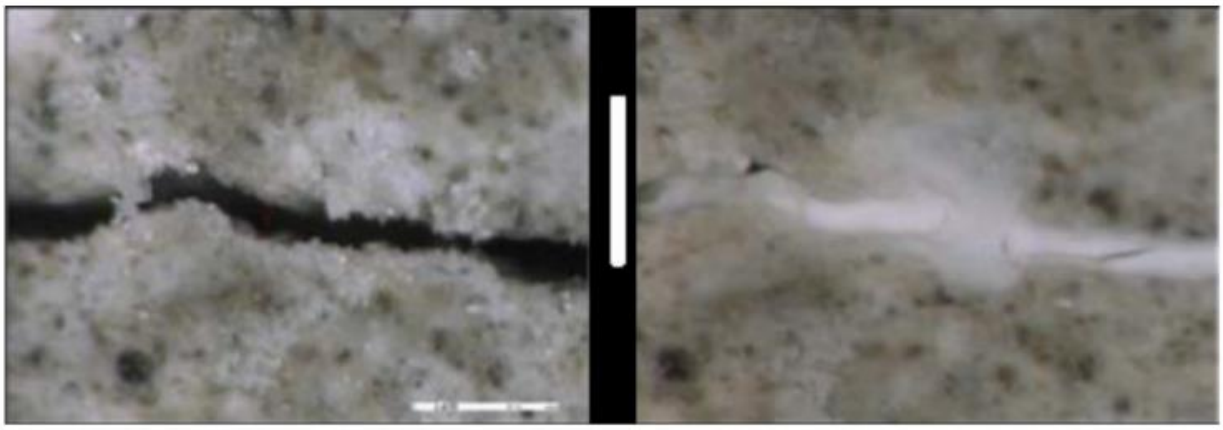
Case study - applicability of concrete treated with Self-healing bacterial agents in Kolhapur

Kolhapur is a tourist city at the foothills of the Western Ghats which has a deep-rooted and ancient history. A number of ancient structures such as forts and pilgrim places are responsible for scenic aesthetics of the city, which are the main reasons for tourist footfall into the city

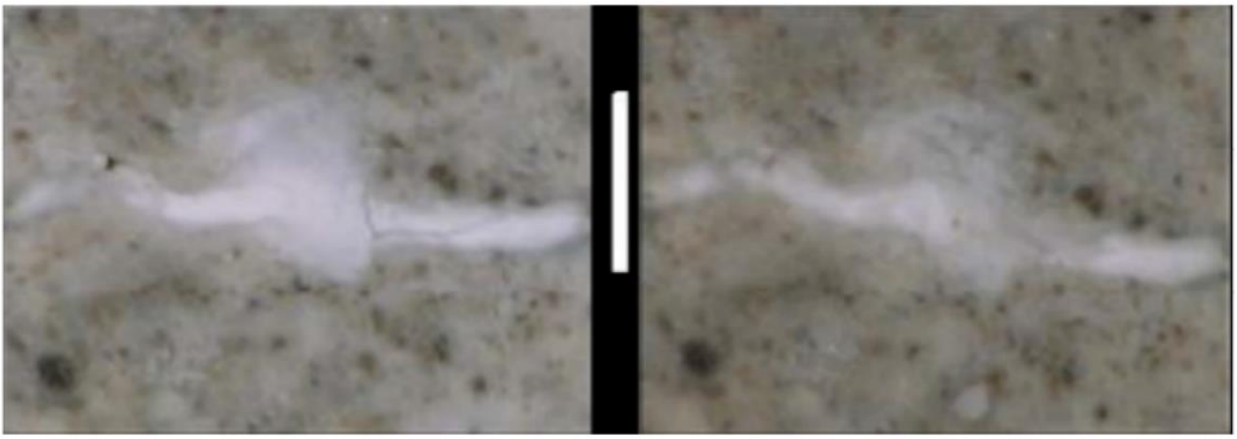
The capsules of bacteria and calcium lactate are inserted with the concrete during construction, the reason to use it in the capsule form is to avert interaction between them. The capsules used are dormant and can last upto a century. The concrete structures are bound to have microcracks due to the physical reactions which decrease its durability. The capsules require water for their nutrition which gets leaked into the cracks when they are exposed to environment. After reaction with water, calcium lactate forms limestone which heals the cracks. It spreads throughout the cracks leading to the healing of the cracks .after formation of limestone, the chances of water leaking inside is next to impossible. It leads to increase in the sustainability. They are basically added as spores which are inactive having very high survival rate and when the surviving conditions are against the odd, they active bacteria again forms spores and become dormant.



3 days 7 days



14 days 28 days



40 days 200 days

Since healing agent requires water for reaction, it is difficult to imply it in a dry region where there is deficit of water. To encourage the use of self-healing concrete in such dry regions, the use of plant fibers along with self-healing agent is suggested. The principle feature of plant fibers is that they have large storage volume for liquids. They act as a reservoir for the healing agents for the supply of water so that it can form limestone and the cracks can be healed. It primarily acts as glue. The diameter of plant fibers should be 200 microns and ideal length should be 10mm.

This case study portrays the advantages of cement treated with self healing agents in the form of comparison between amount incurred in construction of cement road with conventional cement mix vs. the cement treated with self healing agents. For the purpose, a cement road of 2km from Kolhapur toll to Shivaji University. This cement road is a two lane road prepared using conventional methods.

Length of road = 2 km Breadth (2 lanes)= 24 m

Depth = 0.38 m • Volume = 18,240 m

Construction using Conventional Method

• Amount of Cement = 10.7 bags/m3 • COST of cement required = Rs.5,14,99,280

• Amount of Fine aggregate = 683.24 kg/m3

• COST of fine aggregate required = RS.96,32,945

• Amount of Coarse aggregate = 1108 kg/m3

• COST of coarse aggregate required = Rs.2,45,47,710

• Amount of Plasticisers = 4.6681l/m3

• COST of plasticisers required = Rs.1572 • Total cost of construction = Rs.8,56,81,507

Construction using Cement Treated with Self Healing Agents.

• Amount of cement = 9.23 bags/m3

• COST of cement required =Rs.4,59,64,800

• Amount of Fine aggregate= 673.3 kg/m3

• COST of fine aggregate required = Rs.94,92,816

• Amount of Coarse aggregate = 1006 kg/m3

• COST of Coarse aggregate required = Rs.2,22,88,409 • Amount of Plasticisers = 4.32l/m3

• COST of Plasticisers = Rs.1568

• Amount of SELF HEALING AGENT = 158.15 Kg/m3

• Cost of SELF HEALING AGENT required = Rs.2,61,51,869

• Total cost of construction = Rs.10,38,99,463.

From the above statistics it is clear that construction cost of cement road using treated concrete is more than that by using conventional methods. Although, the cost of construction has increased by about 2 crores, but on the long run, this method is actually economic. This can be understood by analyzing the additional cost required for the repair and maintenance of roads made using conventional methods. Furthermore, the bacteria lasts for a century, hence improving durability manifold

14.1.2 Advanced Earthquake Resistant

Earthquake-resistant structures are structures designed to protect buildings from earthquakes. While no structure can be entirely immune to damage from earthquakes, the goal of earthquake-resistant construction is to erect structures that fare better during seismic activity than their conventional counterparts. According to building codes, earthquake-resistant structures are intended to withstand the largest earthquake of a certain probability that is likely to occur at their location. Currently, there are several design philosophies in earthquake engineering, making use of experimental results, computer simulations and observations from past earthquakes to offer the required performance for the seismic threat at the site of interest.

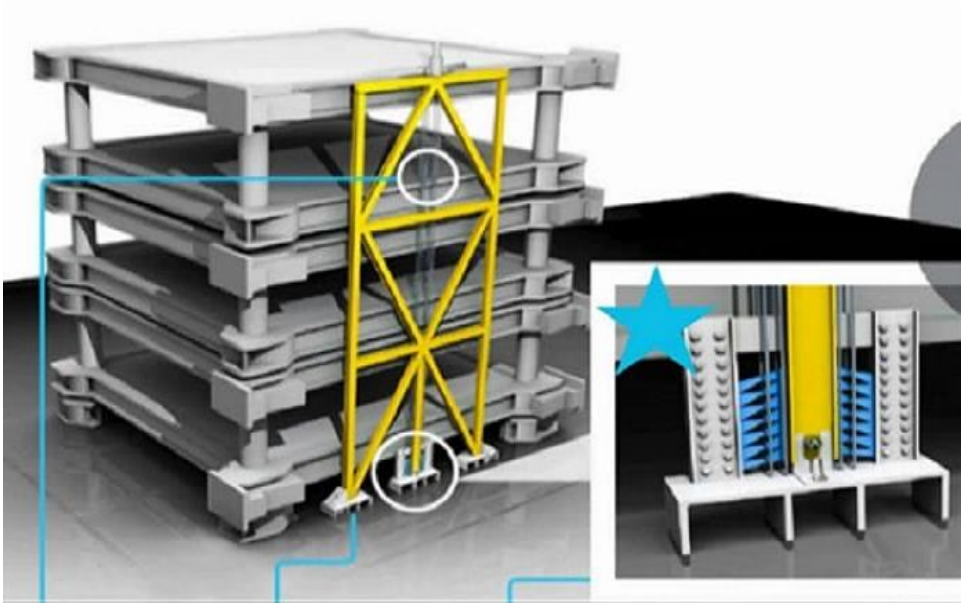
Of the 500,000 or so detectable earthquakes that occur on Planet Earth each year, people will “feel” about 100,000 of them and about 100 will cause damage.

Although most earthquakes are moderate in size and destructive potential, a severe earthquake occasionally strikes a community that is not adequately prepared and thousands of lives and

billions of dollars in economic investment are lost. For example, a great earthquake and the fires it initiated destroyed much of San Francisco in 1906 and a significant portion of Anchorage, Alaska, was destroyed

by a large earthquake in 1964. Within the past 200 years, major destructive earthquakes also occurred in Charleston, South Carolina, and Memphis, Tennessee. Within the past 50 years, smaller but damaging earthquakes occurred several times in both Los Angeles and Seattle. Overall, more than 20 states have a moderate or high risk of experiencing damaging earthquakes. Earthquakes are truly a national problem.

One of the key ways a community protects itself from potential earthquake disasters is by adopting and enforcing a building code with appropriate seismic design and construction standards. The seismic requirements in U.S. model building codes and standards are updated through the volunteer efforts of design professionals and construction industry representatives under a process sponsored by the Federal Emergency Management Agency (FEMA) and administered by the Building Seismic Safety Council (BSSC). At regular intervals, the BSSC develops and FEMA publishes the NEHRP (National Earthquake Hazards Reduction Program)



Recommended Seismic Provisions for New Buildings and Other Structures (referred to in this publication as the NEHRP Recommended Seismic Provisions or simply the Provisions). The Provisions serves as a resource used by the codes and standards development organizations as they formulate sound seismic-resistant design and construction requirements. The Provisions also provides design professionals, building officials, and educators with in-depth commentary on the intent and preferred application of the seismic regulations.

14.1.3 Seismic Retrofitting of Buildings

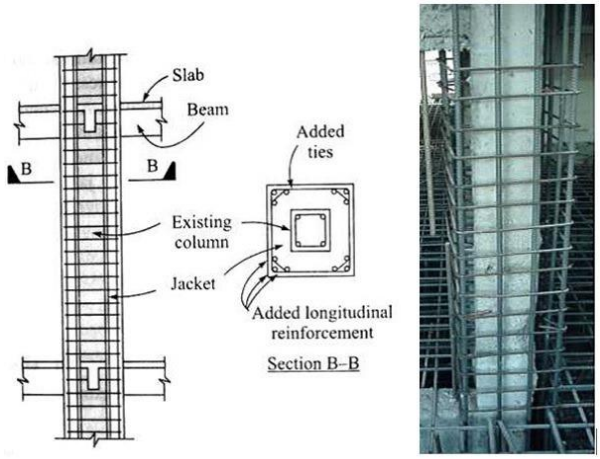


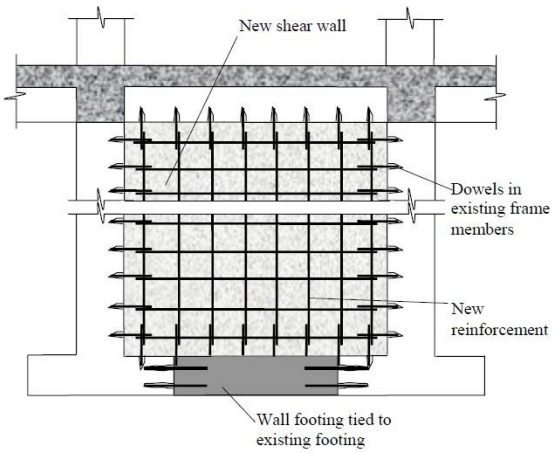
Figure 60 Retrofitting

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. For example:

- Sealing buildings to improve their air-tightness can cause condensation problems.
- Insulating a roof without also ventilating it can cause decay of timber structure.
- Internal wall insulation will remove the benefits of thermal mass which may have a detrimental effect on fuel usage.
- External wall insulation will prevent the thermal store of heat from solar gain to be utilised within the building.
- Poorly installed cavity wall insulation can create cold spots that then have damp problems that are extremely difficult to rectify.
- Pre-existing problems can be covered up, and so more difficult to diagnose and rectify.

Shear Wall Seismic Resisting Systems



The reinforced concrete shear walls generally start at foundation level and are continuous throughout the building height. Shear walls are usually provided along both length and width of buildings as shown in Figure. Shear walls are like vertically-oriented wide beams that carry earthquake loads downwards to the foundation.

Shear wall buildings are a popular choice for reinforced concrete buildings in many earthquake zone countries, like USA, Canada, Chile and New Zealand. Shear walls are easy to construct, because reinforcement detailing of walls is relatively straight-forward and therefore easily implemented at site. Shear walls are efficient,

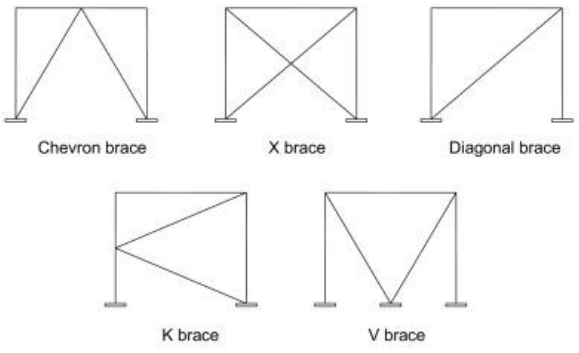
both in terms of construction cost and effectiveness in minimizing earthquake damage in structural and non-structural elements. Properly designed and detailed buildings with shear walls have shown very good performance in past earthquakes. In many cases the ‘‘failure’’ mode of adequately reinforced concrete walls in severe earthquakes has been the formation of horizontal or diagonal cracks which are easily repaired after the earthquake.

Most of the reinforced concrete buildings with shear walls also have columns and these columns primarily carry gravity loads. Shear walls provide large strength and stiffness to buildings in the direction of their orientation, which significantly reduces lateral side-sway of the building. Due to shear walls carry large horizontal earthquake forces, the overturning effects on them are large. Thus, design of their foundations requires special attention. For higher overturning demands, pile foundations, possibly including tension tie-down capacity, can be used.

Walls should be well distributed within the building plan providing resistance to story shears in each principal direction and also they should be positioned such that their center of resistance is close to the center of mass to avoid induced torsion. Walls located near the perimeter may be preferred because they maximize torsional resistance. Furthermore, good connections between diaphragms and structural walls are essential to the seismic force path. Selection of special reinforced concrete shear walls as primary seismic force-resisting 9 elements is influenced by considerations of seismic performance, functionality, constructability, and cost. For low-to mid-rise buildings, shear walls typically are more cost-effective than other systems such as concrete moment frames.

Braced-Frame Seismic Resistance Systems

Concentric Steel Braced Frames Concentrically braced frames (CBFs) are widely used as lateral-load resisting systems in buildings throughout the US. The standard bridge or roof truss is loaded vertically by gravity and spans horizontally, while the braced frame is loaded primarily horizontally by seismic inertia loads and acts as a vertical cantilever. The source of truss’ stability is based on its basic unit of triangle which is a structural unit that resists structural loads via development of axial forces in its members. Pure truss action results when the forces in the members are aligned with the centerlines of pinned joints. Concentrically braced frames (CBFs) join beams, columns, and braces at common work points such as shown in Figure. The braced frame is a direct, economical, and effective seismic solution.



When the strain in a braced frame member exceeds its elastic limit, it may cause the material to have a permanent deformation and the system can’t release to the strain safely unless special seismic inelastic design features are incorporated. Buckling of beams and columns cannot represent acceptable means of dissipating seismic energy as such response would endanger the gravity load carrying capacity of the structure. Thus, inelastic action under earthquakes must only take place in the diagonal bracing members and adequate detailing must be provided to ensure that the braces can go through the expected inelastic demand. A basic seismic design principle is that the structure should gradually

deform as the seismic load increases into the inelastic range, allowing it to dissipate energy safely rather than suddenly breaking. In addition, seismic codes encourage redundancy. At a given story, on each line of bracing, diagonal braces should share the lateral load exerted in a given direction by having some resist in tension while others take compression. The failure modes caused by the non-ductile braced frame behaviors must be prevented and include the following

(1) The diagonal delivers too much force to the connection at the beam-column joint and the connection breaks; (2) The seismic brace or buckles in compression;

(3) A tension-only (e.g. tie-rod) diagonal stretches inelastically, but on the next repetition of a cycle when it is again loaded in tension, there is slack in the system and the frame must resist a ‘‘slamming’’ effect, and the hysteresis loop is pinched;

(4) If diagonals frame into columns (as in a K brace) or beams (as in a V or chevron brace), the force delivered by the brace damages the column or beam.

Concentric steel braced frames are often used in low-rise residential and industrial buildings. The high stiffness of the bracing tends to put these structures at the low-period end of the response spectrum which in turn usually means higher response (e.g., greater spectral acceleration) than in the long-period range. These greater accelerations affect the structure as well as the equipment and contents. The positive aspect to a stiff, low-period structure, however, is that it tends to protect built-in non-structural components such as partitions from drift-induced damage.

Indian Standard Codes for Earthquake Design of Structures:

- IS: 1893-2002 (part-1) Criteria for Earthquake Resistant Design of Structures (Part 1 : General Provision and Buildings) - Code of Practice
- IS: 4326-1993 Earthquake Resistant Design and Construction of Buildings – Code of Practice
- IS: 13920-1993 Ductile Detailing of Reinforced Concrete Structures subjected to Seismic Forces – Code of Practice
- IS: 13935-1993 Repair and Seismic Strengthening of Buildings – Guidelines
- IS: 13828-1993 Improving Earthquake Resistance of Low Strength Masonry Buildings – Guidelines
- IS: 13827-1993 Improving Earthquake Resistance of Earthen Buildings – Guidelines

14.1.4 Engineering Aspects of Soil mechanics - Environmental Impact Assessment

Soil mechanics is defined as the application of the laws and principles of mechanics and hydraulics to engineering problems dealing with soil as an engineering material. Soil has many different meanings, depending on the field of study. To a geotechnical engineer, soil has a much broader meaning and can include not only agronomic material, but also broken-up fragments of rock, volcanic ash, alluvium, Aeolian sand, glacial material, and any other residual or transported product of rock weathering.

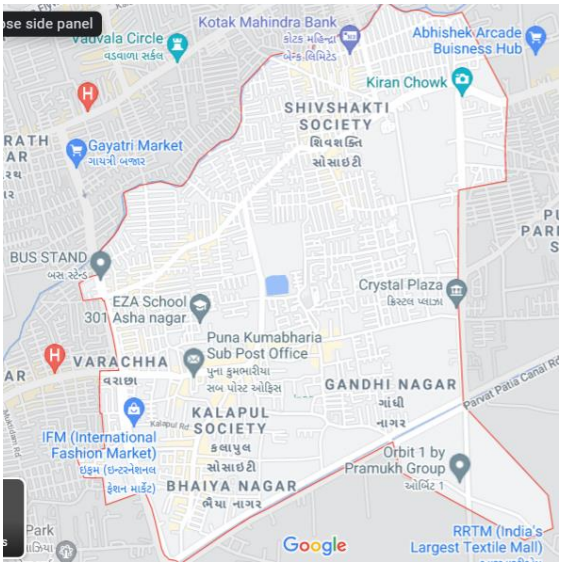
As the name Soil Mechanics implies the subject is concerned with the deformation and strength of bodies of soil. It deals with the mechanical properties of the soil materials and with the application of the knowledge of these properties to engineering problems. In particular it is concerned with the interaction of structures with their foundation material. This includes both conventional structures and also structures such as earth dams, embankments and roads which are their-selves made of soil.

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

Water supply

Water is the most precious gift of nature. It is most crucial for sustaining life and is required in almost all the activities of mankind i.e., domestic use, industrial use, for irrigation; to meet the growing food and fibre needs, power generation, navigation, recreation etc., and also required for animal consumption. The common source of water mainly comprises of Rain water, Surface water, Ground water and Water obtained from reclamation. The development, conservation and use of water form one of the main elements in country's development planning. It is necessary to adopt a new approach to design urban water supply networks; water shortages are expected in the forthcoming decades and environmental regulations for water utilization and waste-water disposal are increasingly stringent.

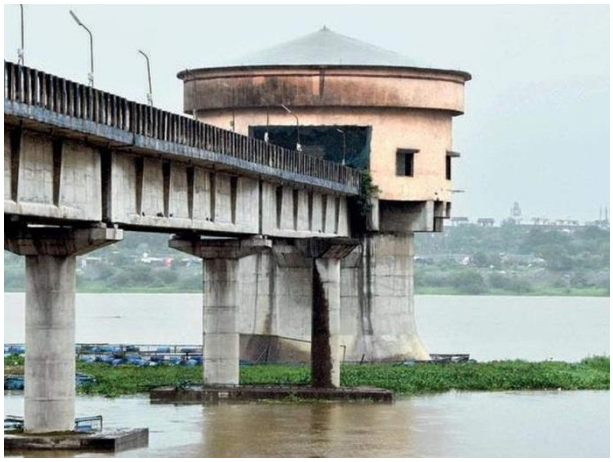
Case study Surat



Water distribution systems consist of pipeline networks and associated components, most of which is underground and exposed to soil corrosion and mechanical stress from the surrounding soil, surface traffic, and internal water pressure. Pipe failure in water distribution systems disrupts the water supply to consumers and reduces the reliability of the system. It is found that about 10% to 15% of the supplied volume is wasted due to pipe leakages. Therefore, inspection, control and planned maintenance and rehabilitation programs are necessary to properly operate existing water distribution systems. There is still not a convenient evaluation for the reliability of water distribution systems. Traditionally, a water distribution network design is based on the proposed street plan and the topography. Using commercial software, the modeller simulates flows and pressures in the network and flows in and out to/from the tank for essential loadings. For this study area Punagam Zone of Surat City has been identified and the network model for the area under consideration will be prepared and studied for water losses.

Surat is located on the western part of India in the state of Gujarat. It is one of the most dynamic cities of India with one of the fastest growth rate due to migration from various parts of Gujarat and other states of India. It has experienced a very growth during the last 20 year with highest decadal growth rate of 47% (Census, 2001) and second highest population

density after Ahmadabad due to its important location between Ahmadabad-Mumbai golden corridors. Piped water supply system for the Surat City was started first time in year 1894 and first water works was setup at Varachha. Initially water was supplied through surface water from the River Tapti. Gradually, other sources of water came in to existence as the need aroused with respect to population and industrial growth in the city. Main source of water for Surat is the river Tapi flowing through the city. Surface water is drawn by intake wells from perennial channel of the river throughout the year. Water thus drawn is treated by the water treatment plants and then the same is supplied to the citizens after post chlorination. In the year 2006 area of Surat city was increased from 12.28 km2 to 326.51 km2 . Punagam area is a part of Surat city.



Punagam area is located in East zone of Surat. The population of study area is 2, 22,252. The study area covers residential area about 600.83 Ha. When the water from the distribution network reaches to the Punagam area there is sudden decrease in the pressure head due to which water related problems arises. Leakages, failure of pipes and other factors are there which affects the water distribution network. Therefore it's required to analyse the existing network of the Punagam area using EPANET and compared computed result with actual result which is obtained from Surat Municipal Corporation. The water distribution system of Punagam area i.e. WDS-E3 consists of following five network systems namely ESR-E7, ESR-E8, ESRE9, ESR-E9A, ESR-E10.

An important part of the environmental degradation su_ered by the planet is caused by the discharge of untreated or poorly treated wastewater. Industrial, urban, and agricultural wastewater contain many dierent types of pollutants such as biodegradable and nonbiodegradable organic matter, suspended solids, turbidity, nutrients, heavy metals, pesticides, pathogens, etc. All of these pose a threat to the environment and human health, so the selected treatment techniques must be adapted to their nature in order to optimize their removal. In addition to e_ciency, wastewater treatment methods must be sustainable, not only from an environmental point of view, but also economically and ethically. As a result, no technological dependence should be generated in less developed countries or communities. Therefore, this Special Issue deals with improvements in various aspects of wastewater treatment including die rent aspects of water treatment such as the development of mathematical models, the application of life cycle techniques, or the experimental optimization of wastewater treatment methods. Thirteen articles were accepted covering some of the most relevant fields of wastewater treatment: activated sludge, nanoparticle treatment, constructed wetlands, energy–water nexus, nutrient recovery, eco-friendly sorbents, and reverse osmosis.

The centralised sewage treatment technologies have proven to be expensive, complex and are failing to cater to the total wastewater generated. The untreated/partially treated wastewater

makes its way to the water body causing immense degradation of the ecosystem and the environmental health.
Need is for sustainable wastewater treatment technologies - to locally treat the sewage and also reuse/recycle. The decentralised sewage treatment can be both electro-mechanical system that have higher energy requirement or natural systems with less or no energy requirement.
CSE has reviewed and documented select case studies that present innovative, sustainable and affordable ways treating the sewage locally including reuse/recycle. The case studies comprise of the wastewater treatment systems which have been implemented at individual, community/cluster and at municipal level. The case studies documented discuss the principle, salient features, and performance indicators and provide details of individuals or agencies/institutions who have implemented the system.

- Location: Rainbow Drive, Bangalore
- Scale: Community
- Implementing Agency: Petrichor (Private Company) Technical
- Consultant: NEERI
- Date of Operation: October, 2014
- Designed Capacity: 250 KLD
- Capital cost: INR 55 lakhs
- O&M cost (including electricity): INR 10,000 per month.

Phytorid, is a natural technology which involves creating constructed wetlands (using plants such as Elephant Grass, Canna etc.) which are normally found in natural wetlands and have effective filtration and treatment capability. The technology is a subsurface flow system in which wastewater is applied to cell/system filled with porous media such as gravel and stones. The plant Canna indica are grown on the media. The hydraulics are maintained in such a manner that wastewater does not rise to the surface retaining a free board at the top of the filled media.

- The system consists of three zones :
- Inlet zone comprised of gravels and different sizes of stones
- Treatment zone consist of same media as in inlet zone with plant species and Outlet zone.
- The system with a capacity to treat 250 KL of waste water has following components;
- Anaerobic baffle reactor (8m * 8m * 4m depth), Reed bed of 100ft x 30ft x 2.5m depth

15 Smart and/or Sustainable features of Chapter 8 & 13 designs, Impact on society.

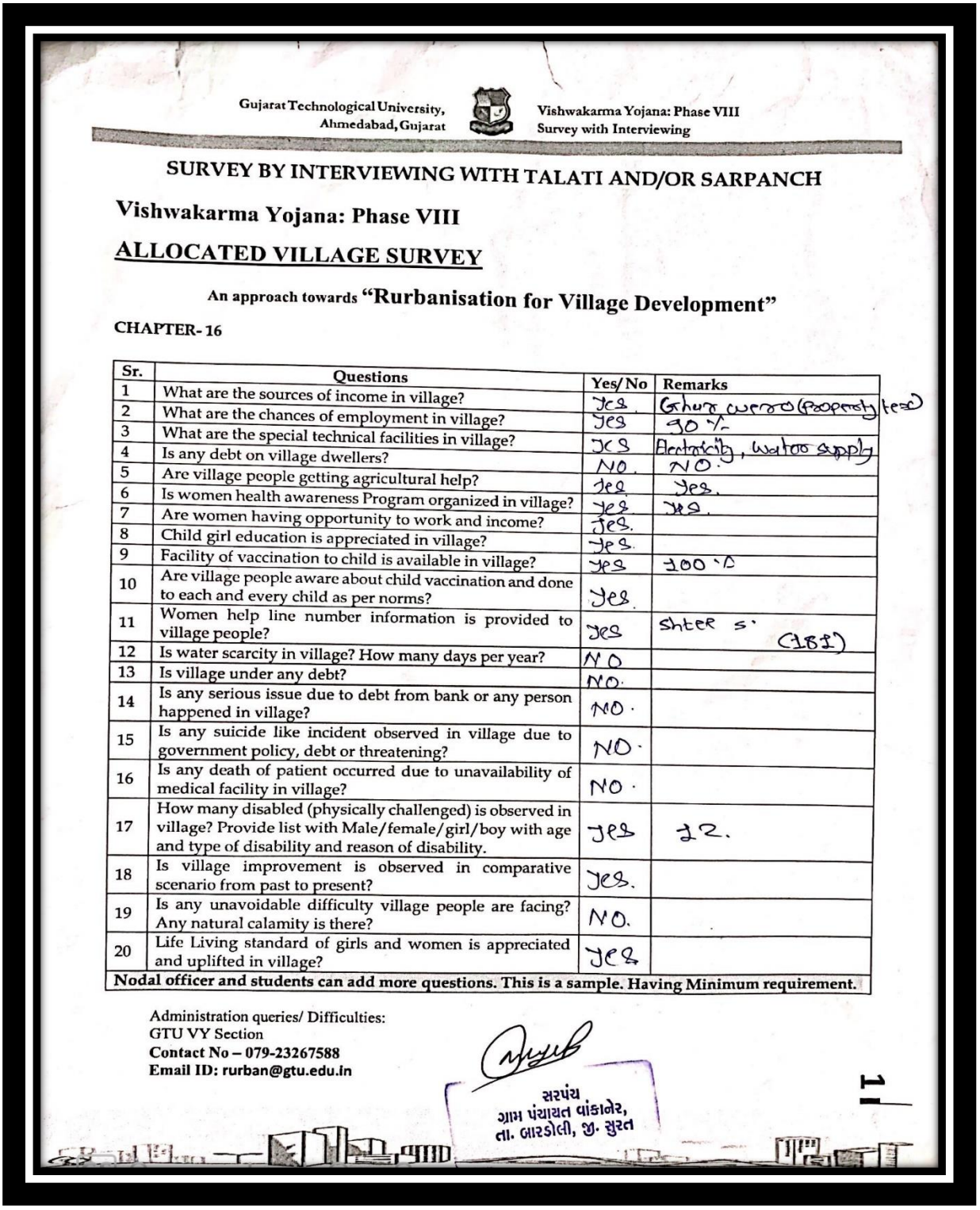
(For vankaner village development, villagers happiness, comfortable and for enhancement of the village) (With the Smart village development Concept as per Your Idea and Village Visit, modern technology with innovation).

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.
b) If possible, List the sources of the funding available with the Village gram panchayat

Sr. no.	Facility	Cost of construction In lakhs	Requirement	Benefit
1.	Trickling filter	6	Immediately	Easy disposable water
2.	Library	9	Within a year	Place for gaining knowledge
3.	Public toilet and bath	5	Immediately	Place for doing daily sanitation
4.	Village entrance gate	2	Long term	Better aesthetics
5.	ATM	7.5	Immediately	Easy money withdrawal
6.	Gym	13	Within a year	Place to exercise and achieve better health
7.	Sludge drying beds	9	Immediately	Easy to dispose remains of waste water treatment
8.	Pukka houses	5.5 per unit	Within a year	Better place to live for poor villagers
9.	Community hall	14	Within a year	Sophisticated place for holding people gathering
10.	Shopping complex	41	Long term	Business and employment
11.	Public garden	16	Within a year	Relaxing and enjoying
12.	Sports arcade	135	Long term	Enjoying sports

16 Survey By Interviewing With Talati And/or Sarpanch



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Survey with Interviewing

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

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

CHAPTER- 16

Sr.	Questions	Yes/No	Remarks
1	What are the sources of income in village?	Yes	Ghar, weaving (Property tax)
2	What are the chances of employment in village?	Yes	90 %
3	What are the special technical facilities in village?	Yes	Electricity, water supply
4	Is any debt on village dwellers?	NO.	NO.
5	Are village people getting agricultural help?	Yes	Yes.
6	Is women health awareness Program organized in village?	Yes	Yes.
7	Are women having opportunity to work and income?	Yes.	
8	Child girl education is appreciated in village?	Yes.	
9	Facility of vaccination to child is available in village?	Yes	100 %
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes.	
11	Women help line number information is provided to village people?	Yes	Shter s. (181)
12	Is water scarcity in village? How many days per year?	NO	
13	Is village under any debt?	NO.	
14	Is any serious issue due to debt from bank or any person happened in village?	NO.	
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	NO.	
16	Is any death of patient occurred due to unavailability of medical facility in village?	NO.	
17	How many disabled (physically challenged) is observed in village? Provide list with Male/female/girl/boy with age and type of disability and reason of disability.	Yes	12.
18	Is village improvement is observed in comparative scenario from past to present?	Yes.	
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	NO.	
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes	

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

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

સરપંચ
ગ્રામ પંચાયત વાંકાનેર,
તા. બારડોલી, જી. સુરત

11

17 Irrigation/Agriculture Activities and Agro Industry, Alternate Technique and Solution

Water is an essential element for survival. About seventy per cent of the human body consists of water while plants contain almost 90 per cent of water. Still, we have to depend on some outside sources to fulfil the water requirements of our body.

Similarly, crops require water for their growth and development. The process of supplying water to the crops is known as irrigation.

- Types of Irrigation

There are different types of irrigation practised for improving crop yield. These types of irrigation systems are practised based on the different types of soils, climates, crops and resources. The main types of irrigation followed by farmers include:

- Surface Irrigation

In this system, no irrigation pump is involved. Here, water is distributed across the land by gravity.

- Localized Irrigation

In this system, water is applied to each plant through a network of pipes under low pressure.

- Sprinkler Irrigation

Water is distributed from a central location by overhead high-pressure sprinklers or from sprinklers from the moving platform.

- Drip Irrigation

In this type, drops of water are delivered near the roots of the plants. This type of irrigation is rarely used as it requires more maintenance.

- Centre Pivot Irrigation

In this, the water is distributed by a sprinkler system moving in a circular pattern.

- Sub Irrigation

Water is distributed through a system of pumping stations gates, ditches and canals by raising the water table.

- Manual Irrigation

This a labour intensive and time-consuming system of irrigation. Here, the water is distributed through watering cans by manual labour.

Methods of Irrigation

Irrigation can be carried out by two different methods:

- Traditional Methods
- Modern Methods
- Traditional Methods of Irrigation

In this method, irrigation is done manually. Here, a farmer pulls out water from wells or canals by himself or using cattle and carries to farming fields. This method can vary in different regions.

The main advantage of this method is that it is cheap. But its efficiency is poor because of the uneven distribution of water. Also, the chances of water loss are very high.

Some examples of the traditional system are pulley system, lever system, chain pump. Among these, the pump system is the most common and used widely.

- Modern Methods of Irrigation

The modern method compensates the disadvantages of traditional methods and thus helps in the proper way of water usage.

The modern method involves two systems:

- Sprinkler system
- Drip system
- Sprinkler System

A sprinkler system, as its name suggests, sprinkles water over the crop and helps in an even distribution of water. This method is much advisable in areas facing water scarcity.

Here a pump is connected to pipes which generate pressure and water is sprinkled through nozzles of pipes.

- Drip System

In the drip system, water supply is done drop by drop exactly at roots using a hose or pipe. This method can also be used in regions where water availability is less.

Importance of Irrigation

The importance of irrigation can be explained in the following points:

Insufficient and uncertain rainfall adversely affects agriculture. Droughts and famines are caused due to low rainfall. Irrigation helps to increase productivity even in low rainfall.

The productivity on irrigated land is higher as compared to the un-irrigated land.

Multiple cropping is not possible in India because the rainy season is specific in most of the regions. However, the climate supports cultivation throughout the year. Irrigation facilities make it possible to grow more than one crop in most of the areas of the country.

Irrigation has helped to bring most of the fallow land under cultivation.

Irrigation has stabilized the output and yield levels.

Irrigation increases the availability of water supply, which in turn increases the income of the farmers.

Irrigation should be optimum because even over-irrigation can spoil the crop production. Excess water leads to waterlogging, hinder germination, increased salt concentration and uprooting because roots can't withstand standing water. Thus, the proper method is to be used for the best cultivation.

Agriculture Activities

- Agriculture involves rearing of animals and crop cultivation.
- Agriculture aims at providing enough, healthy food to feed the population worldwide.
- Different types of agricultural activities are practiced in different regions across the world.
- Factors such as climate affect the type of agricultural activity a farmer can practice.
- Types of agricultural activities include subsistence farming, nomadic herding, commercial plantation, livestock rearing, etc.

Agriculture involves plants and animals breeding and land cultivation to offer fibre, food and medicine. It also provides other products necessary for life enhancement and sustenance. During the sedentary human civilization, agriculture was a critical aspect of development. Domesticated plant and animal species were farmed for food surpluses to sustain people living in cities.

Agricultural science is the study of agriculture, a field whose history dates back thousands of years. People began planting grains about 11,500 years ago prior to their domestication. On the other hand, wild grains were gathered over 105,000 years ago. However, sheep, pigs and cattle were first domesticated more than 10,000 years ago.

Crops have their origin in about 11 regions across the world. Within the previous century, large-scale monoculture has driven the growth of industrial agriculture and thus its

domination of agricultural output. However, more than 2 billion people worldwide rely on subsistence agriculture for sustenance.

Technological developments, plant breeding, modern agronomy and agrochemicals such as fertilizers and pesticides have spurred agricultural output. However, they've also led to widespread environmental and ecological damage.

Similarly, animal husbandry practices and selective breeding have increased meat output. On the converse, concerns are rising regarding environmental damage and animal welfare. They've led to deforestation, global warming, hormonal growth in meat produced industrially, aquifers depletion and resistance to antibiotics. Although genetically modified organisms (GMOs) are banned in many countries, their use is widespread.

Fuels, foods, raw materials such as rubber and fibres are the major groups of agricultural products. Food classes comprise of vegetables, oils, fungi, grains or cereals, fruits, eggs, meat and milk. The agricultural field employs more than a third of the total number of workers worldwide after the service industry. However, the number of workers in the agricultural sector of developed nations has reduced over the last centuries.

Top 13 Types of Agriculture

Although agriculture is not uniform across the world, it is the most widespread activity. It is classified based on the type of crop being grown, scale of cultivation, intensity, mechanization level, combinations of livestock and how farm produce is distributed. The following are the different types of agricultural activities worldwide:

1. Shifting Cultivation

Shifting cultivation is commonly practiced in the tropics. It involves forest clearance through burning and slashing. The cleared land is cultivated until its fertility declines, or for three to five years or until native flora and weeds overtake it. When that happens, farmers abandon the land for a fallow period and clear another forest area for cultivation.

It is a type of subsistence farming usually done manually. People in the tropical regions such as south-east Asia tend to adopt this type of agricultural activity with a focus on growing grains. However, due to the pressure environmentalists and activists exert to support environment protection from such unsustainable practices, the activity is declining.

2. Nomadic Herding

Nomadic herding is the practice of keeping and grazing animals on natural pastures. It is common in the arid and semi-arid regions such as certain parts of Saudi Arabia, northern Africa and northern parts of Eurasia. The practice resembles pastoral farming.

Nomads move with their animals from one place to another in search of water and pasture for their animals. The type of animals herded vary from one region to another. They include sheep, cattle, camel, goats, donkeys and horses. The activity is a form of subsistence farming meant to feed the family.

3. Rudimentary Sedentary Tillage

Unlike other types of agricultural activities, rudimentary sedentary cultivation is a type of subsistence farming practiced on the same piece of land year-in, year-out. Land is then left fallow after some years to regain its soil fertility. It is commonly practiced in the tropics and involves the growth of tree crops such as the Para rubber tree and grains.

4. Livestock Ranching/Pastoral Farming

Livestock ranching focuses on rearing animals. Unlike nomadic herding, farmers do not move from one place to another in search of pasture and water, but live-in settlements. Pasture lands are developed for grazing the animals. Many areas across the globe with large pieces of land with enough grazing areas for animals practice this type of agriculture for commercial reasons.

South America, North America and Australia are some regions across the world that intensively practice commercial pastoral farming on large-scale due to low rains received in the areas. The animals in ranches are mainly kept for wool and meat. Dairy farming is also a critical aspect of pastoral farming.

However, the activity is not sustainable because excessive grazing can lead to destruction of natural pastures. Therefore, farmers end up buying feeds for their animals, making the practice costly.

5. Commercial Plantations

Also known as tree crop farming, industrialized agriculture or plantation farming, commercial plantations cover large land areas. Even if practiced on a smaller piece of land, the activity has a high commercial value. It involves the cultivation of tropical crops such as tea, rubber, coffee, coconut, cocoa, grapes, apples, spices, oranges, avocado, mangoes and palm oil.

It is commonly practiced in regions with European colonial influence such as Africa, Asia and Latin America. Colonial governments established most of the plantations in their colonies to supply the European markets with tropical crops. It requires high capital to establish with the majority of the crops grown being tree crops.

Some plantation farms have processing factories. Various farming techniques are adopted to increase farm yield because the goal of such farms is to make profits.

6. Mixed Farming

Also known as grain and livestock farming, mixed farming involves the growing of crops and rearing of animals. It has its origins in the humid, mid-latitudes, excluding Asia. It is an agricultural activity with its roots mainly in Europe. Mixed farming develops in close relation to market infrastructure. It is commonly practiced in New Zealand and Great Britain.

Mixed farming involves continuous cropping and the growth of crops with varying maturity periods on the same piece of land. It does well in areas with sufficient rainfall or proper facilities for irrigation.

7. Specialized Horticulture

Increased demand for horticultural products in highly urbanized areas with dense populations led to the development of specialized horticulture. It has been successfully adopted in northern Hungary, France and the Swiss Lake regions for vineyard cultivation.

8. Subsistence Farming

Subsistence farming involves growing crops and keeping animals for the sole purpose of feeding the farmer and his family. It involves the use of simple farm tools on small pieces of land. Most subsistence farmers are believed to be poor and thus cannot afford to buy improved seeds and fertilizers. Therefore, they farm on land with low soil fertility or rough terrains.

Subsistence farming has low productivity and does not involve the use of irrigation systems or electricity, facilities often unavailable to such farmers. Since the food grown is often consumed by the farmer and his household, almost none is sold for an extra coin.

The agricultural activity is rampant in mid-latitude areas, but has been declining over the years due to Russian farming collectivization; the activity was majorly practiced in Russia.

9. Intensive Subsistence Farming with/without Rice as a Dominant Crops

Farming with Rice as a Dominant Crop

Tropical regions with dense populations and high rainfall are the areas where intensive subsistence farming is practiced. Rice is the major crop grown because it can fee and employ many people in every unit area. It is mainly adopted in south-east Asia and farmers make use of animal and manual power to carry out farming activities. Most farmers use manures to improve the productivity of their farms per unit area.

Farming without Rice as a Dominant Crop

Just like subsistence farming with rice as the main crop, this activity is practiced in areas with low rainfall. Apart from rice, farmers grow other grain crops such as millet and wheat. The agricultural activity is practiced in Central America and southern Africa and areas in northern Africa, Asia and the Middle East without much rainfall throughout the year.

10. Mediterranean Agriculture

Mediterranean agriculture involves the rearing of animals and growing of crops in the rugged, Mediterranean terrain. Small animals and crops such as citrus fruits, vineyards and wheat are the crops mainly grown in the region. Horticulture is also practiced with the majority of crops sown in winter due to winter rains.

11. Dairy Farming

Dairy farming involves the rearing of cattle for milk. With its origins in Europe, the activity is highly developed in Sweden and Denmark. However, it has spread to other parts of the world and is practiced in areas near markets. It thrives in regions that enjoy temperate climate.

12. Commercial Grain Farming

Commercial grain farming resulted from mechanization of farms. It is mainly practiced in areas with less-dense population and low rainfall. The grains grown in these areas are drought and weather hardy and thus can survive in dry conditions. Mainly adopted in steppes, prairies

and the temperate grasslands of Australia and South America, the activity mainly involves wheat monoculture.

13. Arable Farming

Arable farming, unlike pastoral or mixed farming, involves the growing of crops without keeping animals. It can be practiced on a large, commercial or small scale. Annual crops such as plantains, vegetables, grains, cassava, potatoes and legumes are often grown in arable farms.

Although existing types of agricultural activities have been classified based on the elaborate Whittlesey's agricultural technique of classification, it is not permanent. Agricultural pattern worldwide has changed and continues to change due to increased development in agricultural technology and the ever-changing market demands since Whittlesey carried out her study.

Increased demand for fruits and vegetables worldwide as populations adopt healthy lifestyles has led to the modification of how land is used across the globe. With such factors, agricultural activities increasingly become dynamic.

Agro Industry

The Agro-based industries are the industries whose raw material requirements are fulfilled by agricultural output. These industries process the agricultural output into consumer goods making them more valuable than before. These industries contribute a lot to industrial production as well as to the economy of the country by supporting a lot of lives by providing them employment and opportunity to improve their economic status.

Importance of Agro-Based Industries

- They are important because Agro-based industries support a huge part of our population by providing them with employment.
- They help us to enhance our exports and foreign exchange.
- They support the development of backward and uneducated people, farmers and women by giving them the opportunities to enhance their financial condition.
- They are highly responsible for the development of rural areas and the lives of people living there.
- They are beneficial for the farmers dependent on agriculture as it stabilizes their income.
- It also helps by preventing the migration of rural population to urban areas.
- It reduces the chances of exploitation of farmers by middlemen.
- Encourage farmers to have better produces they get better prices for their produce.

Types of Agro-Based Industries

Agro-based industries are classified into various sub-divisions based on the raw material they use and the service and output provided by them. There are majorly four types of agro-based industries present in the market, which are as follows-

- Agro-processing units

In these types of units, no new products are produced. Instead of producing new products they just process the raw materials in a way to increase their lifetime by adding preservatives and package them in a way to make their transport easier and cheaper.

- Agro-produce manufacturing units

In such units the production of new completely different end product takes place. Here usually, the raw materials are converted into goods that are more suitable for consumers.

- Agro input manufacturing units

These units are mainly responsible for the development of the agriculture sector as they produce goods that are majorly responsible for increasing the productivity of the agriculture sector including its mechanization.

- Agro service centre

These units are basically units that provide agriculture-related services to people like farm equipment repairing, educational workshops etc.

Top 10 Agro-Based Industries in India

Here are is the list of ten major agro-based industries of India-

1. Textile Industry

Raw Material: Cotton, jute, silk, wool and man-made fibre.

End Product: Household, apparel, furniture etc.

The textile industry is the largest agro-based industry in India. This industry deals with the manufacturing of garments. It is a self-reliant industry that produces everything from raw material to the final value-added product to its customer. It has a major contribution to the economy of the nation.

The industry is basically divided into the following branches-

- Cotton Textile

This specific domain of this textile industry uses cotton as a raw material to produce its product. It covers a significant portion of its parent industry and is currently growing at a very fast rate.

- Woollen Textile

The woollen textile industry in India is partly a cottage industry and partly a factory industry. This industry uses wool of sheep as raw material and is majorly located in Northern India.

- Silk Textiles

India is the second-largest producer of silk after China and it is important as silk textile industry contribute significantly towards the total exports. The industry gives employment to about 55 lakh people. The specific area of silk in agriculture is known as sericulture.

These are some subdivisions of textile industries, other than these, its divisions include synthetic textiles.

2. Food Processing Industry

Raw Material: All kind of agricultural produce

End Product: Processed food

India's food processing industry is one of the largest food processing industries in the world making it the fifth-largest industry in India and the most important agro-based industry. India's food processing industry is one of the most important parts of our economy as it supports many lives in our country by providing them with employment. Major food processing industries in India include

3. Dairy Industry

Raw Material: Milk

End Product: Butter, Cheese, Cream, Condensed Milk, Dried Milk, Packaged Milk, Ice Cream etc.

Dairy Industry is one of the most important sectors in India as it contributes to up to 4% of the economy. It is one of the best source of second-hand income for farmers in India making it one of the most practised activities in rural areas all over India. Its continuous practice all over India for the past many years has made India a 20% contributor to the total world milk production.

4. Sugar Industry

Raw Material: Sugarcane

End Product: Brown Sugar, white sugar etc.

India is the world's largest consumer of sugar stands as the world's largest sugarcane and second-largest sugar-producing country in the world making the sugar industry one of the most important agro-based industries in India. Sugarcane is the fundamental source of sugar production in our country hence, even though this industry supports a lot of people in India but this supports don't last for the whole year as this industry is majorly active only during the harvesting months of the sugarcane.

5. Vegetable Oil Industry

Raw Material: Olive, peanuts, safflowers etc. or their crude oil

End Product: Edible vegetable oil

Vegetable oil is the primary source of fat in the Indian diet. Vanaspati is a hydrogenated vegetable oil that is widely used in India. Different regions use different materials based on the technology they use. The most common raw material for this industry includes coconut, mustard, and groundnut. Among all the vegetable oil-producing state Madhya Pradesh remains at the first because of its high volume of oilseed production.

6. Tea Industry

Raw Material: Green tea leaves

End Product: Instant tea, cosmetics etc.

Tea is a favourite beverage consumed by Indians and so is its production. Tea is mostly cultivated in Assam, West Bengal, and Kerala. The industry runs throughout the year and gives employment to about 1 million people while producing a billion kilos of tea per year, making it the second-largest tea producing country in the World.

7. Coffee Industry

Raw Material: Seeds or coffee beans

End Product: Instant coffee etc.

Coffee is highly preferred for its blending quality. Indian coffee has found its own different place because of its distinct taste. As well as it contributes 70% of total production to the international market making it the third-largest coffee producer in Asia.

8. Leather Goods Industry

Raw Material: Cattle hide

End Product: Leather goods, belts etc.

The basic raw material of this industry is hides and skins, which come from pelts of cattle and large animals and small animals like sheep and goat. In India Kanpur is known for leather industries and as it has some of the finest leather industries known for their high-quality products. This industry is also known for having a large amount of young workforce, hence giving the youth of our country a high number of employment opportunities.

9. Jute Industry

Raw Material: Jute

End Product: Gunny bags, Hessian, Carpets, Ropes, Strings, Packing material etc.

Jute Industry is one of the most popular industries in West Bengal as 60 out of 70 jute industries are based in West Bengal near the banks of the Hooghly River. Jute Industry is an important agro-based industry as it supports the life of around 4 million people in India. The jute industry is currently growing at a very good rate as well as it has now become an important part of our economy.

10. Bamboo Industry

Raw Material: Bamboo

End Product: Furniture, Plywood, Matboards, Handicraft, Utensils etc.

The bamboo plantation is one of the major practices in eastern states of India, making it a good source of income in these states. Day by day as the environmental issues are coming to light, bamboo-based sustainable products are getting popular, making the bamboo industry one of the most important bamboo industries.

Britannia Industries Ltd., Kohinoor Foods Ltd (Satnam Overseas Ltd), LT Foods Ltd (Daawat), McCain Foods India Pvt. Ltd. etc.

All these Agro-industries are very important for our nation's economy. As they provide employment to a very large part of our population while supporting our economy.

18 Social Activities – Any Activates Planned By Students

Social activity is a event or pursuit that brings members of the community together.

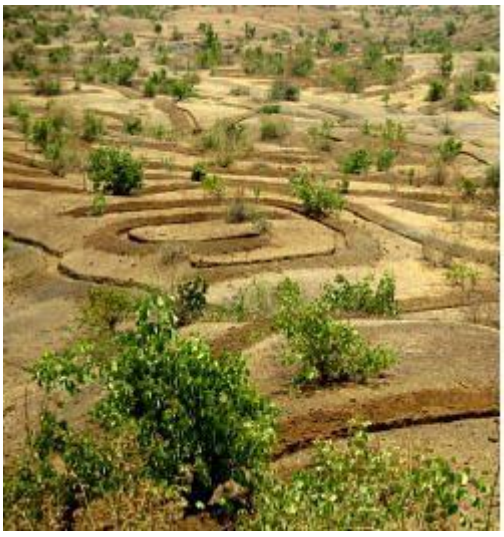
“The future of India lies in its villages” said by Mahatma Gandhi.

Seventy percent of India’s population roughly one-tenth of humanity lives in the countryside. This makes rural India a focal point for issues of national and global concern: the impact of high population and development on natural resources; lack of sanitation and its impact on health; water pollution from raw sewage and pesticide runoff; soil loss and desertification due to erosion, overgrazing and deforestation.

Over the years, a few of India’s resilient rural villages have been trying to remain relevant and adapt to change without losing their valued traditions and skills that have survived down the ages.

Dharnai, Bihar

Once struggling to get basic electricity like most villages in India, Dharnai has now changed its fate and become the first village in India to completely run on solar power. Residents of Dharnai had been using diesel-based generators and hazardous fuel like cow dung to meet the electricity requirement for decades, which were both costly and unhealthy. Since the launch of Greenpeace’s solar-powered 100 kilowatt micro-grid in 2014, quality electricity is being provided to more than 2,400 people living in this village in Jehanabad district.



Payvihir, Maharashtra

An obscure village in the foothills of Melghat region of Amravati district in Maharashtra, Payvihir, has set an example for the country by consistently showing how communities and NGOs can work together to conserve the environment and ensure sustainable livelihood for people.

In 2014, Payvihir bagged the Biodiversity Award from the United Nation’s Development Programme for turning a barren, 182-hectare land under community

forest right, into a forest. Recently, the village also came up with an out-of-the-box idea of selling organic sitafals (custard apples) and mangoes in Mumbai under their brand Naturals Melghat!

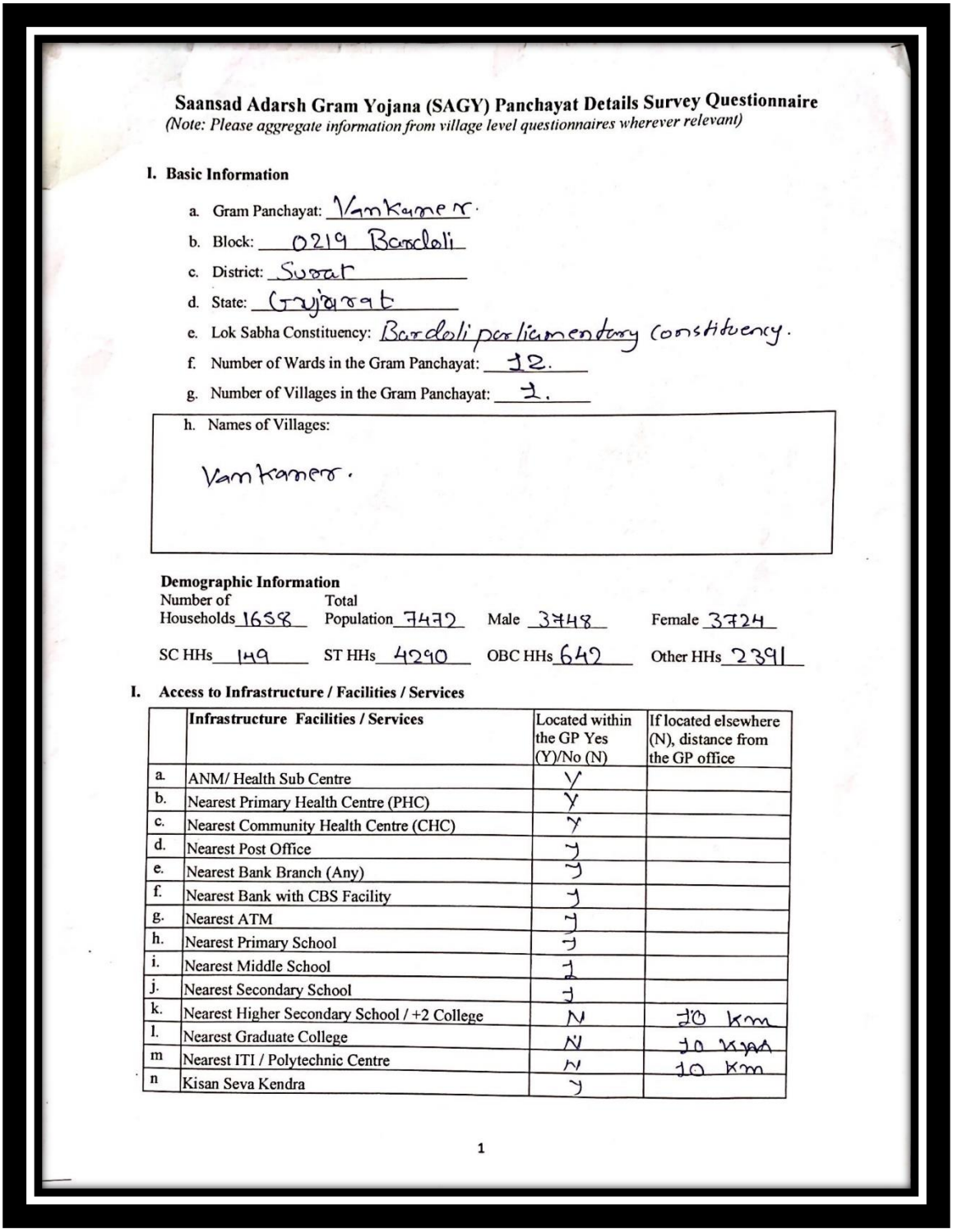
Hiware Bazaar, Maharashtra

Amid the desperate denizens scrounging for water in the drought-affected parts of Maharashtra stands a village that has not felt the need to call a single water tanker – in fact, it hasn't called for one since 1995. The village also has 60 millionaires and the highest per-capita income in India.

Facing a major water crisis each year because of the measly rainfall it gets, the village decided to shun water-intensive crops and opted for horticulture and dairy farming. Their consistent water conservation initiatives led to rising groundwater levels and the village started to prosper. Today, the village has 294 open wells, each brimming with water just as the village brims with prosperity.

There are many social activities which can be done for village people and their better lives. Unfortunately, due to corona pandemic we were not able to visit village so frequently to do such noble work.

19 Vankaner SAGY Questionnaire Survey form with the Sarpanch Signature



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: Vankaner.

b. Block: 0219 Bardoli

c. District: Surat

d. State: Gujarat

e. Lok Sabha Constituency: Bardoli parliamentary constituency.

f. Number of Wards in the Gram Panchayat: 12.

g. Number of Villages in the Gram Panchayat: 2.

h. Names of Villages:

Vankaner.

Demographic Information

Number of Households 1658 Total Population 7472 Male 3748 Female 3724

SC HHs 149 ST HHs 4290 OBC HHs 642 Other HHs 2391

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	Y	
b.	Nearest Primary Health Centre (PHC)	Y	
c.	Nearest Community Health Centre (CHC)	Y	
d.	Nearest Post Office	Y	
e.	Nearest Bank Branch (Any)	Y	
f.	Nearest Bank with CBS Facility	Y	
g.	Nearest ATM	Y	
h.	Nearest Primary School	Y	
i.	Nearest Middle School	Y	
j.	Nearest Secondary School	Y	
k.	Nearest Higher Secondary School / +2 College	N	20 km
l.	Nearest Graduate College	N	10 km
m	Nearest ITI / Polytechnic Centre	N	10 km
n	Kisan Seva Kendra	Y	

1

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
o	Agriculture Credit Cooperative Society	N	
p	Nearest Agro Service Centre	Y	8 km
p	MSP based Government Procurement Centre	Y	10 km
q	Milk Cooperative /Collection Centre	Y	
r	Veterinary Care Centre	Y	
s	Ayurveda Centre	N	
t	E – Seva Kendra	N	
u	Bus Stop	Y	
v	Railway Station	N	10 km
w	Library	N	
x	Common Service Centre	N	

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 2 Public 2 Private –

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 9

b. Number of villages without Angan Wadi Centres –

Names of such villages: _____

c. Schools (Number)

Primary Private: 3 Primary Govt.: 3

Middle Private: 2 Middle Govt.: –

Secondary Private: – Secondary Govt.: _____

Higher Secondary Private: – Higher Secondary Govt: –

VI. Public Distribution System

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

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 No	Vankaner	-
b.	Hand Pump Coverage in Villages:	Covered Yes Not Covered	Vankaner	-
c.	Coverage under Covered Drains:	Covered Yes Not Covered	Vankaner	-
d.	Coverage under Open Drains:	Covered Not Covered No	Vankaner	-
e.	Villages with Household Electricity Connection (Numbers)	Connected Yes Not Connected	Vankaner	-

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		e.	Forests/ Plantations		h.	Wells/Bore Wells	
c.	Un-irrigated Land		f.	Other Common Land		i	Tanks /Ponds	

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

3

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

IX. Parameters relating to Households & Institutions

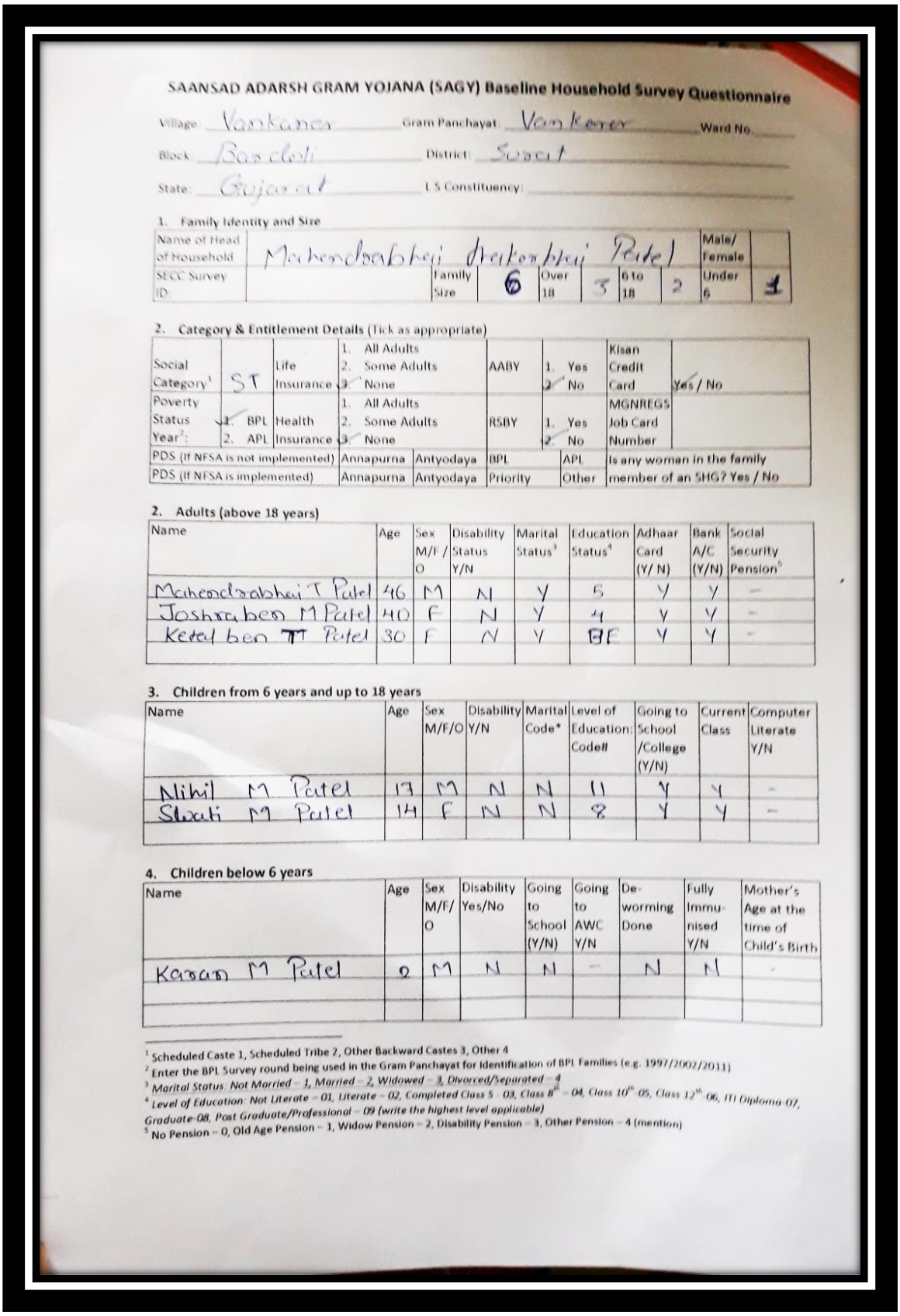
		Number
a)	Number of eligible Households for pension (old age, widow, disability)	500 -600
b)	Number of Households receiving pension (old age, widow, disability)	30 - 40
c)	Number of eligible Households who are not receiving pension	530
d)	Number of Households eligible for Ration Card	950
e)	Number of 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	-
k)	Number of BPL families	715
l)	Number of landless households	-
m)	Number of IAY beneficiaries	-
n)	Number of FRA[2] beneficiaries	-
o)	Number of Community Sanitary Complexes	-
p)	Number of Households headed by single women	-
q)	Number of Households headed by physically handicapped persons	-
r)	Total number of Persons with Disability in the village	-
s)	Number of SHGs	-
t)	Number of active SHGs	-
u)	Number of SHG Federations	-
v)	Number of Youth Clubs	-
w)	Number of Bharat Nirman Volunteers	-

Name and Signature of Surveyor and Respondent'

Surveyor	PRI Respondent (Preferably Gram Panchayat Chairperson)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	09/08/2021 Date of Survey

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

4



SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Vankaner Gram Panchayat: Vankaner Ward No.

Block: Bardoli District: Surat

State: Gujarat LS Constituency:

1. Family Identity and Size

Name of Head of Household	Mahendrabhai Dhirubhai Patel						Male/ Female	
SECC Survey ID:		Family Size	6	Over 18	3	6 to 18	2	Under 6	1

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]	ST	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]
Mahendrabhai T Patel	46	M	N	Y	5	Y	Y	-
Joshnaben M Patel	40	F	N	Y	4	Y	Y	-
Ketal ben TT Patel	30	F	N	Y	BE	Y	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
Nihil M Patel	17	M	N	N	11	Y	Y	-
Shati M Patel	14	F	N	N	8	Y	Y	-

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
Karan M Patel	2	M	N	N	-	N	N	-

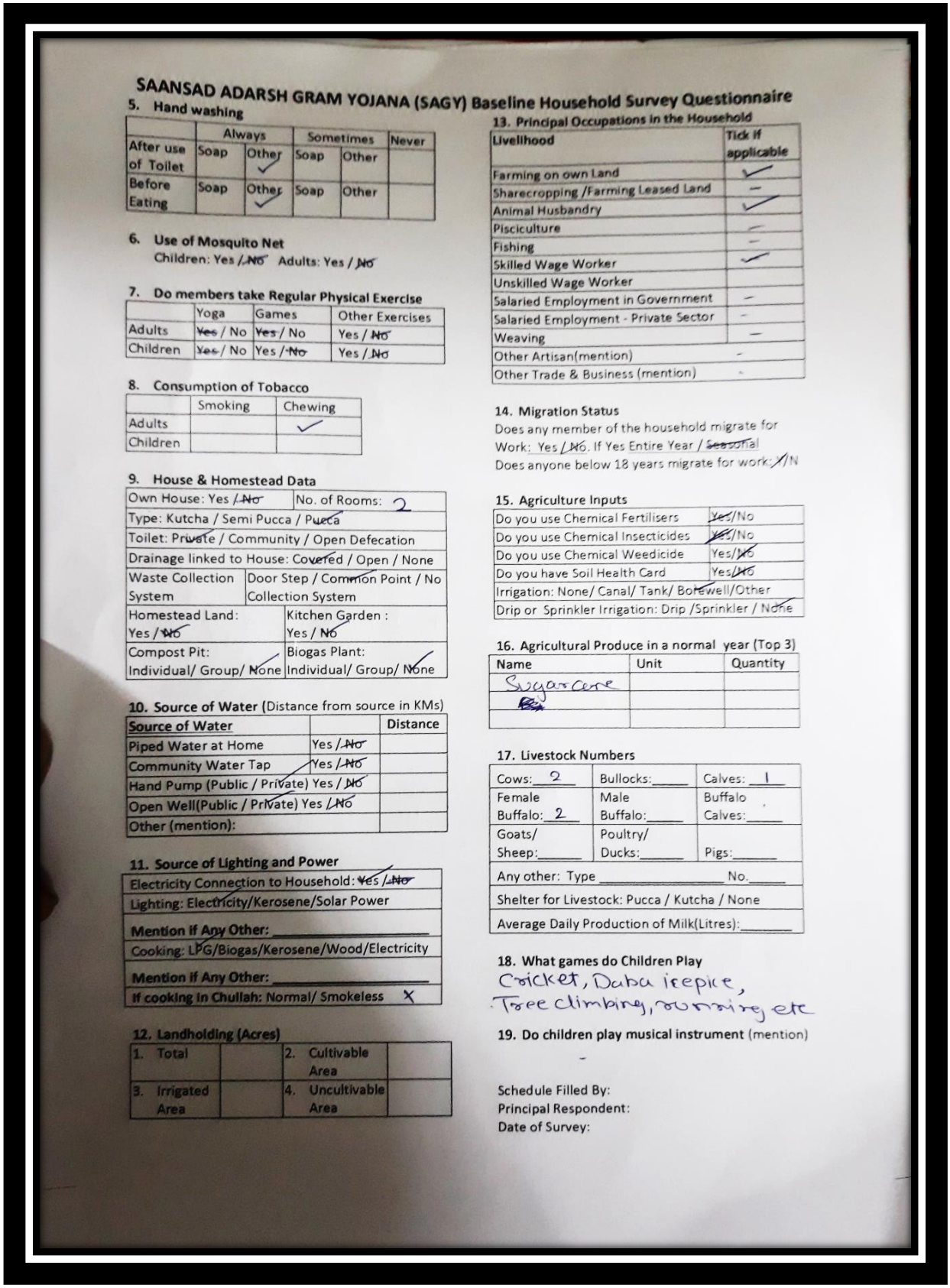
[1] Scheduled Caste 1, Scheduled Tribe 2, Other Backward Castes 3, Other 4

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

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

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

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



SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

5. Hand washing

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

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

7. Do members take Regular Physical Exercise

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

8. Consumption of Tobacco

	Smoking	Chewing
Adults		✓
Children		

9. House & Homestead Data

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

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

Source of Water		Distance
Piped Water at Home	Yes / ~~No~~	
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 X

12. Landholding (Acres)

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

13. Principal Occupations in the Household

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

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

15. Agriculture Inputs

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

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

Name	Unit	Quantity
Sugarcane		
Bajra		

17. Livestock Numbers

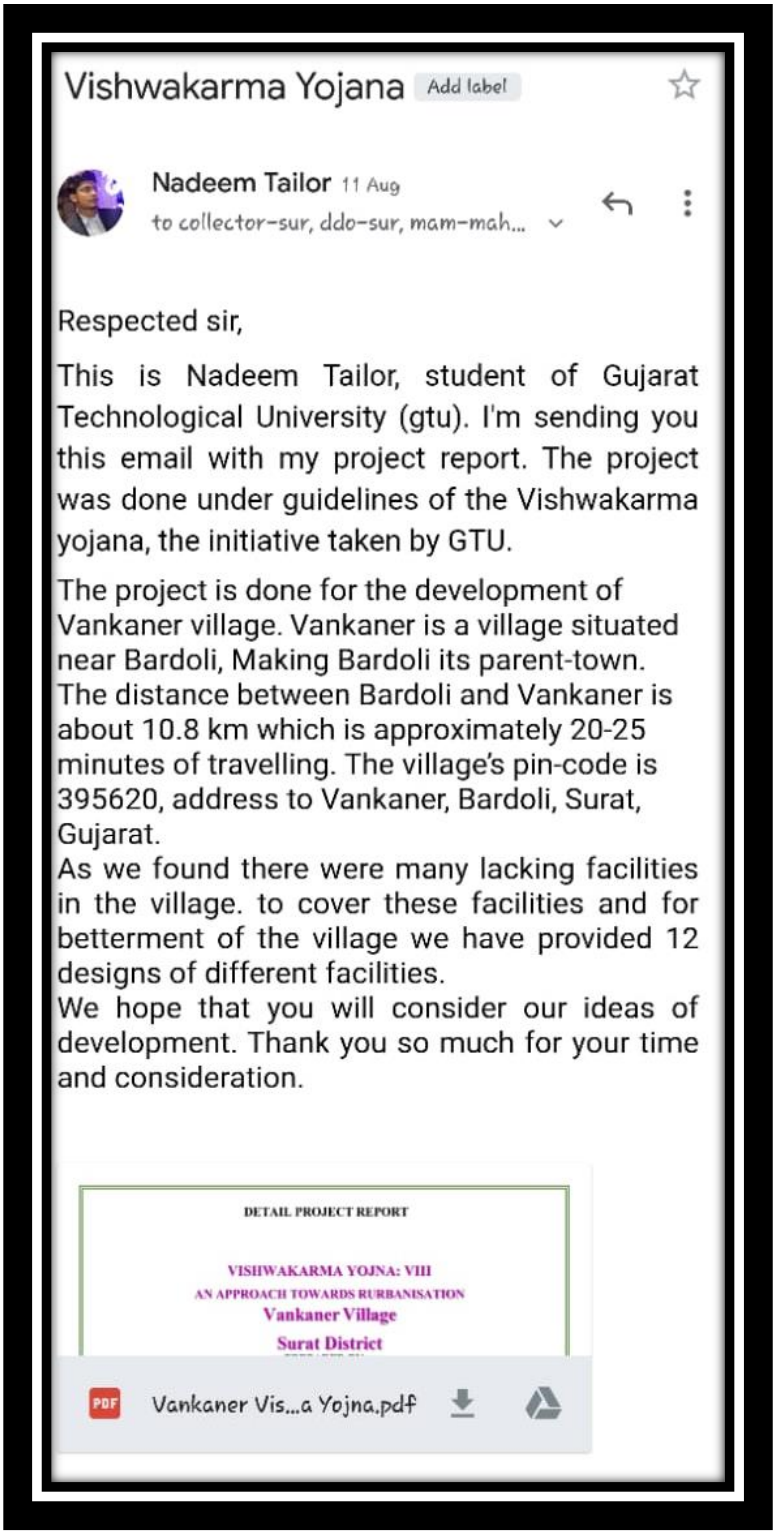
Cows: 2	Bullocks:____	Calves: 1
Female Buffalo: 2	Male Buffalo:____	Buffalo Calves:____
Goats/ Sheep:____	Poultry/ Ducks:____	Pigs:____
Any other: Type _____		No.____
Shelter for Livestock: Pucca / Kutcha / None		
Average Daily Production of Milk(Litres):_____		

18. What games do Children Play
Cricket, Dabu ipepice, Tree climbing, running etc

19. Do children play musical instrument (mention)
-

Schedule Filled By:
Principal Respondent:
Date of Survey:

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



21 Comprehensive report for entire village

A comprehensive report is intended to explore a topic or an idea in great detail. In this report details of entire village (Vankaner village) are covered.

Our allocated village is Vankaner village. Vankaner is 9.5 km away from its parent town bardoli. Village has population of more than 7.5k people out of which 3748 males and 3724 females. Village covers total 1148.52 Ha area out of which 969.78 Ha is agriculture land.

Under the guidance of Vishwakarma yojana we have done technoeconomic survey through which we have found many lacking facilities in the village. We have tried to design some of these facilities for better development of the village.

List of facilities designed for Vankaner village are as follow,

1. Trickling filter
2. Library
3. Public toilet and bath
4. Village entrance gate
5. ATM
6. Gym
7. Sludge drying beds
8. Pukka houses
9. Community hall
10. Shopping complex
11. Public garden
12. Sports arcade

1. Trickling filter

Trickling filter is a water filter mainly used for treating domestic waste water (sewage). Its tank is made of masonry or concrete walls and the tank is filled with filter media for allowing bacterial growth for decomposing of organic matters in sewage. This decomposing method will breakdown the complex compound in sewage and converts into much simpler matters.

Cost of construction: 6 lakhs

2. Library

A library is a collection of resources in a variety of formats that is (1) organized by information professionals or other experts who (2) provide convenient physical, digital, bibliographic, or intellectual access and (3) offer targeted services and programs (4) with the mission of educating, informing, or entertaining a variety of audiences (5) and the goal of stimulating individual learning and advancing society as a whole.

Cost of construction: 9 lakhs

3. Public toilet and bath

Toilets may also be called lavatories, washrooms or bathrooms in different functional, physical, social and cultural situations. A public toilet is a toilet built and/or managed by a government or public agency, or a privately managed toilet, which is available for public access. Sometimes it is free to use otherwise basic fees is collected from users.

Cost of construction: 5 lakhs

4. Village entrance gate

Village entrance is grand entrance at very starting of road for reaching village. It shows villages entrance and gives warm welcome to all the visitors. It provides pleasant aesthetics of the village entrance. This entrance can also be used to block in coming or out going traffic in the time of need.

Cost of construction: 2 lakhs

5. ATM

An automated teller machine (ATM) is an electronic banking outlet that allows customers to complete basic transactions without the aid of a branch representative or teller. Anyone with a credit card or debit card can access cash at most ATMs,

Cost of construction and equipment: 7.5 lakhs

6. Gym

Gym is a private club where people go to do physical exercise in order to stay or become healthy and fit.

Cost of construction: 13 lakhs

7. Sludge drying beds

Digested sewage sludge is usually dewatered before disposal. Dewatered sludge still contains a significant amount of water often as much as 70 percent but, even with that moisture content, sludge no longer behaves as a liquid and can be handled as a solid material. Sludge-drying beds provide the simplest method of dewatering. Digested sludge slurry is spread on an open bed of sand and allowed to remain until dry.

Cost of construction: 9 lakhs

8. Pukka houses

In village many people live in kuccha houses, which are made of mud and straws. Such houses are not so durable and their aesthetic is very poor. During the time of monsoon water can leak from all over the houses. While in winter or summer such material cannot provide much insulation from harsh environment. Therefore, it is very important to provide pucca houses: these pukka houses are made of masonry and cement concrete. Though, it’s much costlier, pukka houses should be provided for better lifestyle of poor villagers.

Cost of construction: 5.5 lakhs per unit

9. Community hall

Generally, for different gathering occasions/programs villages uses temporary tent called mandap. This tent is made on road or open spaces which create lot of problems of people in surrounding area. Therefore, community hall is provided. Community hall means the use of building for community activities and generally not used for commercial purposes, and the control of which is vested in the Town of Killam, a local board or agent thereof.

Cost of construction: 14 lakhs

10. Shopping complex

A shopping Centre is made of stores and businesses facing a system of enclosed walkways for pedestrians. Numbers of shops of same or different things are located in same big structure. Shopping Centre not only provides living essential to buyers but it also creates opportunity for business and employment.

Cost of construction: 41 lakhs

11. Public garden

Public garden is open to people for given time. People can visit garden for relaxing and enjoying nature. Public garden is a collection of plants for the purposes of public education and enjoyment, in addition to research, conservation, and higher learning. It must be open to the public and the garden's resources and accommodations must be made to all visitors. Public gardens are staffed by professionals trained in their given areas of expertise and maintain active plant records systems.

Cost of construction: 16 lakhs

12. Sports arcade

Sports arcade in building where multiple indoor/outdoor games can be played. People can play all kinds of sports provide in arcade.

Cost of construction: 135 lakhs