DETAILED PROJECT REPORT

VISHWAKARMA YOJNA: VIII AN APPROACH TOWARDS RURBANISATION

SONGADH VILLAGE

BHAVNAGAR DISTRICT

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
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GOVERNMENT ENGINEERING COLLEGE BHAVNAGAR

PROF. V.S. DAVE

(ASSISTANT PROFESSOR AND HEAD OF THE CIVIL ENGINEERING DEPARTMENT)

YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY

Chandkheda, Ahmedabad – 382424 Gujarat

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ON

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CERTIFICATE

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

Detailed Project Report for ,

VILLAGE SONGADH

DISTRICT BHAVNAGAR

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 project and how you do your vision project: Vishwakarma Yojana is an approach towards rurbanisation and Vishwakarma Yojana would provide "Design to Delivery" solution for development of villages in 'Rurban' areas. The team has conducted Vishwakarma Yojana Project for Songadh Village with the vision of the developmental work in villages that could be undertaken as per the need of the village, in particular includes Physical, Social and Sustainable infrastructure facilities.

About your village description: Songadh Village is located in Sihor Tehsil of Bhavnagar District in Gujarat, India. It is situated 8 km away from it's sub-district headquarter sihor, while it is 28Km away from it's district headquarter Bhavnagar. As per 2009 statistics, Songadh is the Gram Panchayat of Songadh Village. The total geographical area of village is 1975.58 hectares. Songadh has a total population of 6,301 peoples. There are about 989 houses in Songadh village. As per 2019 stats, Songadh Villages comes under Bhavnagar Rural assembly & Bhavnagar parliamentary constituency. The basic facilities available in the village are like post-office, small scale industries, panchayat building drainage facilities, pucca road, school, etc.

About existing village condition: In Songadh village, drainage system is ailable. The condition of roads is good. All the village roads are Pucca roads. There is no transportation terminal facility in the village. In the village lack of basic facilities like public toilet, poor condition of state transport terminal , Public toilet and bath building, public garden, community hall. Village is also not having secondary school. And village is also lacking proper agricultural building.

About your proposed designs your view for village development: For development of the village infrastructure facilities like panchayat building, secondary school and public facilities like bus station are required. For sustainable development of the village rain water harvesting system, solar street light may be provided. Based on the survey we tried to give design of required basic facilities to fulfill their needs. By providing these basic facilities to villager's migration rate will be decreased. And this is ultimate aim of the Vishwakarma yojana.

About future scope of the village development: According to UDPFI norms, the team can enhance and design basic facilities which are unavailable at present in the village. These may include but not limited to (a) physical infrastructure including Solid waste Management, Water supply in village, (b) social infrastructure including some Community Hall, Recreational club, socio cultural center, (c) Recreational Facilities like Joggers park, Redevelopment of existing Areas of Songadh village, etc. In a nutshell, the future scope would be study of urban replicating amenities that would be sustainable in rural areas of Bhavnagar.

Key Words: Rurban, Smart village, Gap analysis, Sustainable development

ACKNOWLEDGEMENT

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

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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An act of gratitude is expressed to our internal guide / Evaluator / Nodal Officer **Prof. V.S. Dave** (*Assistant professor and Head of the civil engineering department*) from Government Engineering College, Bhavnagar for their invaluable guidance, constant inspiration and active involvement in our project work.

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1.1 Background & Study Area Location

The term rural development represents improvement in the quality of life of the people in rural areas. As per Chambers (1983), "*rural development is a strategy to enable a specific group of people, poor rural women and men, to gain for themselves and their children more of what they want and need*".

The name of our opted ideal village is Sanosara, Near Sihor, Bhavnagar.

the team members visited Sanosara Village on 6th November, Friday. The overall atmosphere of village was remarkable and if the team members try to describe the actual environment then it was a type of a busy village. The involvement of people in various productive works at day time was also observed and could be categorized as high. The movements of people to and from the village were remarkable, as it was located on the state highway.

For the purpose of gathering more information about this village the team members decided to interact with the Talati Mantrishri of the village and also some members of Panchayat. The following information were gathered:

- **A brief introduction about Sanosara village:**

Sanosara village is situated in Sihor Teshil of Bhavnagar District in Gujarat State (India). Village has population of 9340 as per census data of 2011, in which male population is 4788 and female population is 4552. Total geographical area of Sanosara village is 2104.73 Hectares. Population density of Sanosara is 4 persons per Hectares. Total number of house hold in village is 1664.

Gram Panchayat name of the Sanosara village is Sanosara. CD Block name is Sihor and Teshil/Taluk or sub-district is Sihor. Data Reference year is 2009 of Census 2011. Sub District HQ Name is Sihor and Sub District HQ Distance is 22 Km from the village. District Head Quarter name is Bhavnagar and its distance from the village is 44 km, while the nearest town to the Sanosara village is Sihor, just 22 km away. Pincode of Sanosara village is 364230. As per census 2011 village code of village Sanosara is 516356.

- **Sex Ratio of Sanosara Village – Census 2011**

  As per the Census Data 2011 there are 951 Females per 1000 males out of 9340 total population of village. There are 844 girls per 1000 boys under 6 years of age in the village.

- **Literacy of Sanosara Village**

  Out of total population total 6307 people in Sanosara Village are literate, among them 3525 are male and 2782 are female in the village. Total literacy rate of Sanosara is 76.84%, for male literacy is 84.45% and for female literacy rate is 68.96%.

- **Workers profile of Sanosara Village**

  Total working population of Sanosara is 3154 which are either main or marginal workers. Total workers in the village are 3154 out of which 2523 are male and 631 are female. Total main workers are 2871 out of which female main workers are 2410 and male main workers are 461. Total marginal workers of village are 283.

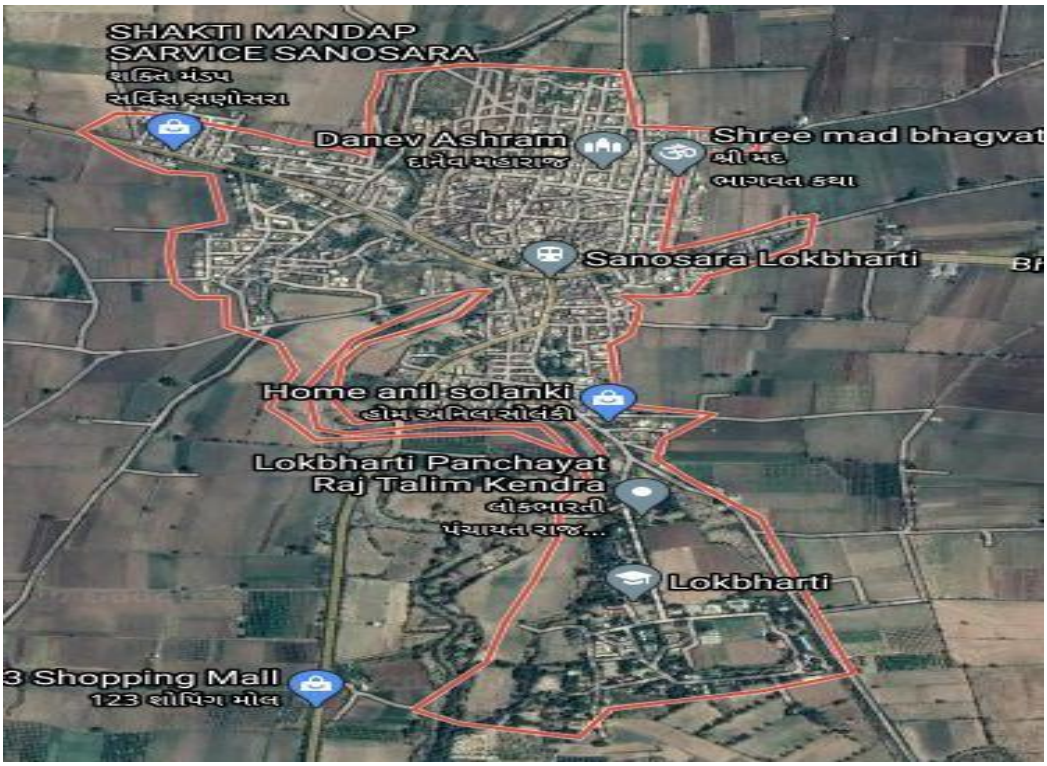
The major population of the village is running their household with the occupation in agriculture, the second and third most dominated occupancies of the village is diamond industry and labor work respectively.

- **Sanosara Manufacturers and Agricultural Commodities Data**

Description Type	Commodities
Agricultural Commodities (First)	COTTON
Manufacturers Commodities (First)	N/A
Agricultural Commodities (Second)	PEARLMILLET/BAJRA
Agricultural Commodities (Third)	SESAME

TABLE 1- SANOSARA MANUFACTURERS AND AGRICULTURAL COMMODITIES DATA

- **Map of Sanosara Village**



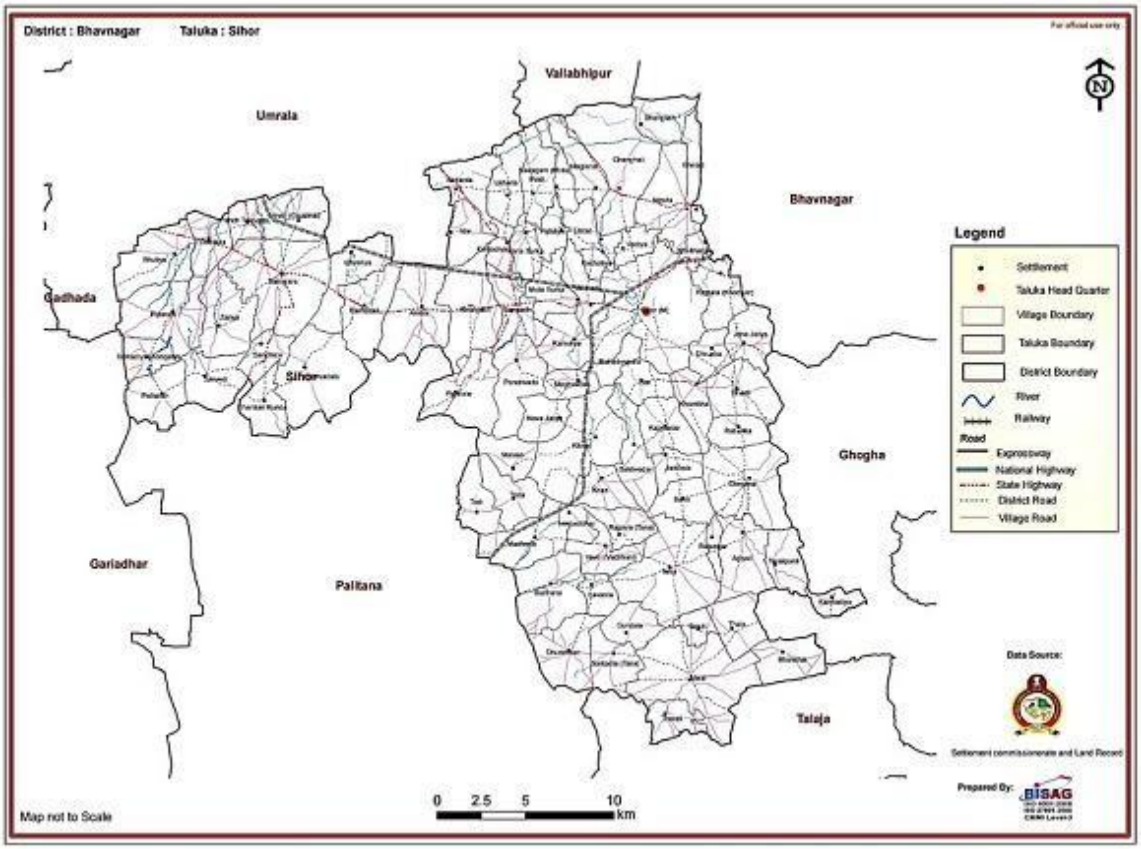


FIGURE-1 (A) GOOGLE MAP IMAGE, (B) MAP OF SONGATH VILLAGE FROM REVENUE DEPARTMENT

- **Photo of our interaction with Hon.Talati-Cum-Mantri And Panchayat members**

FIGURE-2 PHOTO OF OUR INTERACTION WITH HON.TALATI CUM-MATRI AND PANCHAYAT MEMBERS

1.2 Concept: Ideal Village, Normal Village

1.2.1 Objective:

68.9% of our population lives in rural areas (Census 2011). Though number is expected to fall in the coming years, it is still estimated that more than half of our population would be rural even in 2050. Despite there being several past initiatives by governments at all levels –Central, State and Local –in the past, the level of improvement has not kept pace with the rising aspirations among Indians. On most development parameters, there is still a significant gap between rural and urban India. Hence, in this context, the major objectives of ideal village in context of normal village should be as follows:

- Prevent distress migration from rural to urban areas, which is a common phenomenon in India's villages due to lack of opportunities and facilities that guarantee a decent standard of living.
- Make the model village a "hub" that could attract resources for the development of other villages in its vicinity.
- Provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such villages.
- Contribute towards social empowerment by engaging all sections of the community in the task of village development.
- Create and sustain a culture of cooperative living for inclusive and rapid development.

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

The case of village Punsari from the Sabharkantha District of the state of Gujarat has been studied as an example/live case study of ideal village of Gujarat, as it stands out as a smart and model village. The grassroot leadership, community participation, decentralisation of powers to local bodies in rural areas and financial support in the form of various government schemes have brought far reaching changes in the rural landscape of India. Economic progress has to coincide with social progress which is inclusive, sustainable, and sensitive not only to its environment but to its people as well. The village has received several awards from the state as well as national government for its outstanding achievements and has become extremely popular across the country.

The facilities like (a) *infrastructure development* in the village in context of electrical supply, CCTV, public address system (in the form of 120 waterproof loud speakers), (b) *education*, in the form of 5 primary schools and 4 secondary schools, comprises other advantages like LED screen, CCTV in the schools, separate toilets for boys and girls, computer labs, stocked libraries, mid-day-meal (MDM), (c) *health, sanitation and woman empowerment* in the village are in the form of 24/7 primary health center equipped with a pharmacy and library and maternity ward with zero maternity death, door-to-door waste collection, training for collection and disposal, street polluters are heavily fined and a self-made group for providing vocational training to empower women, (d) *democratic governance* in the form of a team of 22 full-time and 47 part-time employees along with the elected officials of the gram Panchayat along with grievance redress toll free number and complaint register. As "Swarajya (self-governance) to Surajya (good governance)" has been found as the mantra for rural development in the Pansuri Village of Sabarkantha District of Gujarat State, it has been considered as an ideal village case study for the report preparation.

1.2.3 The Idea of a model/Smart Village

Development is a highly complex, relative, and multi-dimensional concept. The core focus of this term even today continues to be economic growth. However, some quintessential terms such as sustainability and inclusiveness have been added to broaden the scope of this concept. From a holistic perspective, development is directed to achieve goals in health, education, public infrastructure, and empowerment of the

people particularly at grass-roots level. The term rural development represents improvement in the quality of life of the people in rural areas. As per Chambers (1983), "rural development is a strategy to enable a specific group of people, poor rural women and men, to gain for themselves and their children more of what they want and need". According to Sreedhar and Rajasekhar (2014), rural development as a phenomenon can be viewed as the result of interactions between various physical, environmental, technological, economic, socio-cultural, and institutional factors in the rural areas of a nation. Sreedhar and Rajasekhar add that as a strategy, rural development is the approach or operational design to bring about the desired positive change in the socio-economic and cultural life of the people. Although development of rural areas has always been a priority of Indian government since independence, off late rapid urbanisation has diverted attention of the government onto urban areas. Hence, in a nutshell, an equal attention needs to be paid to the goal of rural rejuvenation.

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

Following the Gandhian vision and dream of Gram Swaraj (village level self-governance) (Bardhan, 2007), rural development has always been given critical salience in the planning process of independent India. It began with launching of the Community Development Programmes (hereafter CDP) in 1952 followed by the National Extension Services (hereafter NES) in 1953. These two programmes had ambitious objectives and envisioned community participation but failed miserably due to their topdown development paradigm (see the works of Sreedhar & Rajasekhar, 2014; Patel, 2014; UNDP, 2000). Later, successive Five-Year Plans led to the creation of essential physical and institutional infrastructure to bring about socio-economic changes in rural areas (Patel, 2014). The Fifth Five-Year Plan proposed different approaches to rural development such as Area Development, Target Group Approach, and comprehensive development approach. Schemes involving special financial and fiscal concessions, bank loans on soft terms, and capital subsidies were also introduced into underdeveloped areas to attract increased investments for development. (Patel, 2014). The Integrated Rural Development Programme (hereafter IRDP) launched in 1976 aimed at alleviating rural poverty and at holistic rural development through self-employment opportunities. The IRDP was conceptualized as a programme oriented towards development of a given area rather than development of a specific sector. It was designed to alleviate poverty through local level planning, taking into account the development of local resources including human resources through formulating projects on scientific lines.

IRDP also failed to realise its targets. "Swarnjayanti Gram Swarozgar Yojana" (SGSY) is a programme for self-employment of the rural poor and has been implemented since 1999, after restructuring and merging the erstwhile IRDP and its allied programmes. In 2011, the government announced National Rural Livelihood mission with an objective to further the cause of rural development. All these programmes have met with partial success but still much needs to be achieved. It is important to identify and understand specific concerns, needs, and challenges in different rural areas of the country and adopt specific policies rather than adopting a "one – size fits-all" approach. Universal programmes need to be tweaked to suit local requirements so that their success is guaranteed.

India has a chequered history of Panchayati Raj (rural grass-roots institutions) starting from self-sufficient and self-governing village communities to modern-day organized village governance system in the format of Panchayati Raj Institutions or PRIs. The informal village level council of five elderly men (traditional Panchayats) and the present day democratically elected Panchayats state a lot about the deep-rooted culture of self-governance in this country. Sir Charles Metcalf called the traditional Panchayats of India little republics. However, these informal Panchayats suffered the onslaught of Mughal and British imperialism and could never be revived through democratic means in the pre- independence period. The CDP and NES were the first failed baby steps taken in that direction. The Balwant Rai Mehta Committee (1956) and Ashok Mehta committee (1966) recommended that a formal democratically elected structure had to be crafted at the grass-roots level in order to actualise the objectives of rural development programmes. Most of the other government committees7 also recommended that people's participation in planning and implementation and

grass-roots leadership is a key to fructify objectives of rural development.

During his position as a Prime Minister of India, Late Shri Rajivbhai Gandhi's contribution to realising the Gandhian dream of rural self – governance is unforgettable. However, his government's initiative in the form of the 65th and 66th constitutional amendment bills was defeated in the upper house of the Indian Parliament. Finally, after the pronouncement of New Economic Policy in 1991, what followed in 1993 was a new polity policy in the form of the historic 73rd and 74th Constitutional Amendment Acts, which added the third tier to the Indian federal polity. These two acts constitutionally recognised rural local governance and made it responsible for performing twenty-nine functions. These functions are exclusively to be performed by a three-tier Panchayati Raj Structure which begins with Gram Panchayat (local body at the village level), Panchayat Samiti (local body at the block level, i.e. above village) and Zilla Parishad (local body at the district level, i.e. above block). This has led to decentralization of not only functions but also of functionaries and finances. It has widened the scope for people's participation in the process of rural as well as self-development. Joshi (2017) calls these Panchayats the central processing units of Indian democracy.

The above stated history can be concluded as a statement that 'These grass-roots level units are the schools of Indian democracy.' If they are fed with appropriate inputs, it will be easier to earn outputs that will strengthen democracy as a whole in India. These institutions have been strengthened through salient constitutional provisions such as reservation of seats for women and marginalised sections of the society, and constitution of state election commission and state finance commission. However, the ground analysis of these institutions reveals that they have not been honestly vested with the functions, functionaries, and financial resources in many states in India. This masses the spirit of decentralized democracy and hampers rural development programmes as well. In fact, it still remains a rubber stamp third tier of Indian federalism (Tremblay, 2001). Financial paucity is the biggest problem faced by the PRIs. If PRIs are to work as prime mechanism of development, they have to be given proper financial aid, especially in a global world. However, the situation is not so bad that it does not give us any ray of hope. Certain villages in India are growing exceptionally well. Hiware Bazar, located in the District of Ahmednagar, in Maharashtra, has transformed from a place fraught with issues to possibly the richest village in India. The sole reason for this fairy-tale change is one man called Popatrao Pawar. He banned all addictive substances to minimize expense and encouraged the villagers to invest in rainwater harvesting, etc. There are a record 60 millionaires in the village and barely any poor. From 168 below poverty line families in 1995, Hiware Bazar now has just three. The villagers continue to strive to see the day when not one person is poor. Mawlynnong, a small village in Meghalaya, was awarded the prestigious tag of 'Cleanest Village in Asia' in 2003 by Discover India Magazine. Located at about 90 kilometres from Shillong, the village offers a skywalk that can be taken as you explore it. According to visitors, you cannot find a single cigarette butt or a plastic bag lying around there.8 Ankapoor is located in the District of Nizamabad in the state of Telangana. Ankapoor has been globally recognized as a "model agricultural village" for its achievements in introducing modern technologies in agriculture while ensuring the participation of all sections of the village community, particularly women. Organizations like the Indian Council for Agricultural Research (ICAR), International Rice Research Institute (IRRI), Manila and International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) have formally commended the developments in agriculture in the village. Kumbalangi is essentially a fishing hamlet that has developed as a unique rural tourist destination in Kerala's Ernakulam district. The Kumbalangi Integrated Tourism Village Project was launched in 2004, focusing on eco-tourism, while offering tourists a glimpse of the rich and rustic life of the Indian countryside. The important attractions in Kumbalangi include organic farm produce used to prepare meals for tourists, toddy tapping, and crab farming. To keep the village clean and serve its energy needs, households are also provided with subsidies for setting up mini biogas plants in their households. These villages in different parts of our country are guiding posts and give hope and optimism to work in the direction of holistic rural development.

1.3 Detail study (Socio economic, physical, demographic and infrastructure details) of Ideal village / Smart Village with photograph

Punsari is located approximately 80 kilometres away from the state capital of Gandhinagar in Gujarat. It has had phenomenal success in the past decade under the leadership of a visionary and missionary Sarpanch (village headman) Mr. Himanshu Patel (who served as the Sarpanch from 2006 to 2016). The village has received several awards from the state as well as national government for its outstanding achievements and has become extremely popular across the country. This was the most important reason that motivated the author to visit and study this model village personally, to understand and explore how this transformation was made possible. The village has 23 communities with a population of 6000, including only 350 people living below the poverty line. Most of the people in the village are dependent on agriculture and milk production for livelihood.

Infrastructure Development: The most important concern in rural development is to provide basic amenities to each person living in the rural area. Punsari stands out in this regard as it has constructed a reverse osmosis plant and since then provided house-to-house piped connections to supply chlorinated water. It also has its own 66 KVA substation for electricity generation and 100 per cent coverage of all streets with LED streetlights. A public address system with 120 waterproof speakers for announcing information and spreading messages has been another striking feature of this village. The village headperson uses this public announcement system to share what he thinks, plans, and is doing at the gram Panchayat. The entire village has been put under CCTV surveillance, which has helped to bring down crime rate to almost zero per cent. Each household has a personalised lavatory and the whole village has a well-designed drainage and storm water disposal system. Atal Express is a free bus service available for commutation to all the villagers. Punsari is the first fully Wi-Fi-covered village in India. There are also plans to do GIS mapping for the better implementation of many government schemes. Some of the popular national banks and their ATM centres are now available as well.

Education: Education for all and free for all is the mantra this village has aspired to adopt. Punsari has five primary schools and four secondary schools. The class rooms in these schools are fully equipped with CCTV cameras, LED screens used for teaching, mineral water plants, separate toilets for girls and boys, computer labs, and well-stocked libraries. MidMeals programme of the central government has been successfully implemented. Availability of these basic amenities within the premises of schools has also helped to reduce the dropout rate to zero.

Health, Sanitation & Women Empowerment: Punsari has a 24/7 primary health centre equipped with a pharmacy and a library. It also has a 24/7 maternity ward to encourage institutional deliveries in the village. In fact, the village has been successful in achieving the goal of 100% institutional deliveries. It has also been able to materialise the objective of 100% immunization and zero per cent infant and maternal mortality rate. The waste collection system offers door-to-door collection service. The street polluters are heavily fined. There are 109 women self-help groups in the village, which has helped and changed the lives of more than 1200 women involved in them. They provide vocational training in order to make women self-reliant.

Democratic Governance: A team of 22 full-time and 47 part-time employees along with the elected officials of the gram Panchayat under the leadership of village headperson run this local unit. The village has developed an effective mechanism to redress grievances through a toll-free number. A complaint register is maintained in order to ensure timely grievance redress. A co-ordination committee involving elected representatives and government officials works tirelessly to achieve the goals of good governance.

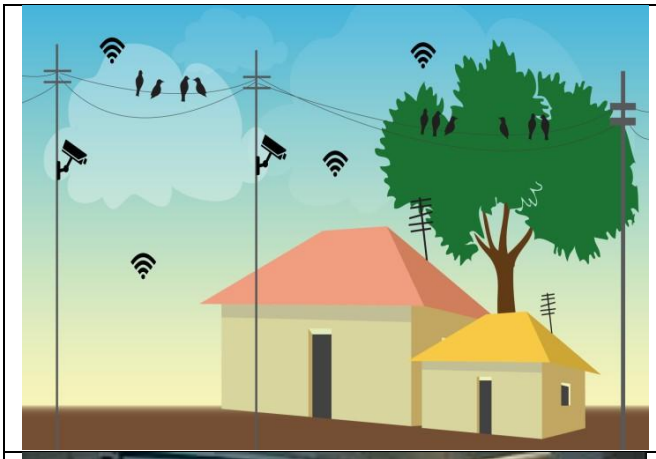








FIGURE-3 GLIMPSE OF IDEAL VILLAGE PHOTOGRAPHS OF PUNSARI VILLAGE

1.4 SWOT analysis of Ideal village / Smart Village

Punsari model village definitely has an excellent record in terms of fewer people living below poverty line, availability of schools, water facilities, free Wi-Fi facility, roads, proper solid waste management etc. The village has proved itself on important development indicators like health, education, social services, women empowerment, which have already been discussed in the previous section. However, during the field wok the author observed that mere physical indicators of development are at times misleading. A model village is not necessarily an ideal village. An ideal village in author's opinion is the one that has been able to transcend social inequalities, reduce subordination of women, develop true community spirit, and work tirelessly to respect and recognize constitutional values. Villages in India are notorious for the caste divide, communal tensions, social injustices, and, at times, instances of violence. Punsari has performed exceptionally well in providing basic amenities, reducing inequalities among different social groups, and improving some major social indicators of development. However, it has yet to accomplish its goal of becoming an ideal village where every citizen hailing from different socio-economic background has a voice and choice. This was observed by the author while interacting with the current Punsari village headwoman. Interaction with her has revealed certain issues that are conveniently overlooked under the grand saga of village development. These are discussed in the following paragraph.

Sunanda Patel, current village headwoman, hails from the dominant caste called Chawdhary Patel. Interestingly but not surprisingly, Himanshu Patel also comes from the same caste group. Ms Patel did not have any experience in governance and was never involved in any political activity, yet she was fully supported and backed by Himanshu Patel (former village headman) so that she could be successfully instituted as the Sarpanch of Punsari Village. At the time of rural local body election in 2016, the post of village headperson was reserved for a female candidate (according to the provisions of the 73rd Constitutional Amendment Act). Himanshu Patel had to step down, but he wanted to institute a woman from his own caste group. Hence, it was necessary to prevent women from other caste groups from winning the election in the village. However, the fact was that women from other caste groups also stood for election. In order to prevent these other (read lower caste) women from becoming the village headperson, Himanshu Patel not only mobilised his resources but also the influence that he had earned in the past ten years. This was a strategic decision taken by this previous headman to enable him to continue his influence on village politics. Therefore, Ms Sunanda Patel was supported and eventually won. The author asked this new puppet-like female Sarpanch about her future plans – what strategies she would adopt to implement her plans, etc. The answers were imprecise and inefficient. In fact, within few minutes after the interview began, her husband joined her in the office and made sure that Ms Patel answered as per a pre-determined design. She was blowing the trumpet of development achieved by Himanshu Patel and could not say anything concrete about her plans and programmes. This interview has reinforced the fact that (in most cases barring few exceptions) a woman merely plays a role of a rubber stamp and real governance is in the hands of dominant village men. It also exposes the way rural democratic institutions are actually working in India (cf. Kumar, 2006). Another important fault line found in this village is that the Gram Sabha (village assembly) meetings are not conducted on regular basis. Article 243(b) defines the Gram Sabha as "a body consisting of persons registered in the electoral rolls relating to a village comprised within the area of the Panchayat at the village level". Gram Sabha is an integral part of the Gandhian concept of village Swaraj (rural self-government).

The objective of Gram Sabha is to enable each and every voter in a village to participate in decision-making at the local level. It is a constitutional body consisting of all persons registered in the electoral rolls of the village Panchayat. It provides a political forum to people in the village where they can meet and discuss their common problems, and consequently, understand the needs and aspirations of the community. Thus, the Gram Sabha is expected to be an epitome of participatory, deliberative, and direct democracy. It is the body that should provide valuable inputs to the Gram Panchayat to lead local government effectively. The Gram Sabha is also to act as a watchdog in the interest of village communities by monitoring the functioning of the

Gram Panchayat. However, the effectiveness of Gram Sabha has been marred by issues like social exclusion, dangerous information gap, political apathy on part of villagers, dependency syndrome, and political culture of patronage. Furthermore, Joshi (2017) stresses low participation in Gram Sabha meetings and irregular and informal ways of its conduct as some of the major concerns at the grass roots. These field observations gleaned from the model village Punsari help us understand the fact that the physical development of a village does not necessarily promise change in its social environment.

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

Future plans: After successfully serving for two terms as village headman, Himanshu Patel stepped down from the post since this time it was reserved for a female candidate. He now wants to focus on preparing a team of young local level leaders who are not only from his own state but from across the country. He has already networked with a thousand such young village headmen from different corners of India, cutting across party ideologies. The aim of such a group is to share experiences of rural development among themselves. Nonetheless, what is important to note here is that Himanshu Patel does not intend to replicate the model of Punsari in other parts of the country. He rather believes that every village should be a unique example rooted in its own ecology and environment. He has been appointed programme officer to overlook the implementation of Nandgram project which is based on a PPP model. Vedanta Company is contributing 1000 crore rupees under its CSR initiative. The proposed programme focuses on nutrition of infants and children and FIGUREhts against under and malnutrition in India.

1.6 Benefits of the visits of Ideal village / Smart Village

In context of Vishwakarma Yojana Project, the study of ideal / smart village strengthens the thinking process about how the allocated should be developed. One may think for the allocated villages in respect of Punsari Village:

- To trigger processes which lead to a holistic development of the identified Gram Panchayats
- To substantially improve the standard of living and quality of life of all section of the population through -
    - Improved basic amenities
    - Higher productivity
    - Enhanced human development
    - Better livelihood opportunity
    - Reduced disparities
    - Access to right and entitlements
    - Wider social mobilization
    - Enriched social capital
- To generate models of local level development and effective local government which can motivate and inspire neighboring Gram Panchayats to learn and adapt
- To nurture the identified Adarsh Grams as schools of local development to train other gram Panchayat

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

As the team members studied more regarding the missing necessities of our allocated village the team members come up with some facilities which are available in smart and ideal village respectively, so rather than writing all that stuff let me add a table which shows the main difference/gap between our allocated, smart and ideal village

Facility	Ideal village (Sanosara)	Smart village (Amargadh)	Allocated village (Songadh)
PHC	Yes	Yes	Yes
Aanganwadi	Yes	Yes	Yes
Primary school	Yes	Yes	Yes
Secondary school	Yes	No	No
High sec. school	Yes	No	No
College	Yes	Yes	No
Sheltered Bus stop	Yes	No	No
Public Toilet	Yes	Yes	No
Public library	Yes	No	Yes
Street Lightning	Adequate	Not Adequate	Not Adequate

TABLE-2 COMPARISON OF VARIOUS FACILITIES IN IDEAL, SMART AND ALLOCATED VILLAGES RESPECTIVELY

So from above there are some positive and negative points, out of which the 'NO' means that the allocated village is lacking by some essential infrastructure facilities, whereas our smart village is also lacking some infrastructure facilities but our opted smart village has a Advantage of having a medical college and a large hospital named as "Amargadh Tuberculosis Hospital" famously known as "Jithri Hospital' among locals and district citizens.

Ideal village has huge advantage of having a nationwide famous agricultural university "Lokbharti", which has students from diverse parts of the country for graduation and post-graduation courses.

So our village is located at the famous pilgrimage site for Jain Religion origin at Palitana. Our village is located on state highway but still is lacking some essential and has not achieved full potential of its development. In regards to Vishwakarma Project, the team members will try our best to gap those facilities.

Chapter – 2: Literature Review – (Civil & Electrical Concept)

2.1 Introduction: Urban & Rural village concept

As per the Census of India (2011) document, the term 'urban' means constituents of urban area, which are Statutory Town (ST), Census Town (CT) and Outgrowths; while the term 'rural' means all the area other than urban area and whose basic unit is a revenue village. The urban village as an entity exists only as a concept. Administratively, it merges with the urban ward as soon it gets notified, but has starkly different characteristics from the rest of the ward. The rural-urban conflicts are strongly manifested here. Recently in Bhavnagar City, Adhewada Village has been merged in Bhavnagar Municipal Corporation and divided into 2 separate wards. Before few years, Sidsar Village – another village of Bhavnagar Taluka – was merged under the administrative boundary of Bhavnagar Municipal Corporation.

In the wake of current planning mechanisms, most of the urban villages have the pattern of development that emerges in these areas is haphazard and chaotic. Uncontrolled invasion of non-compatible land-uses and elimination of traditional interrelationships by outside and superfluous forces leads to the disintegration of the communities. As a consequence of economic and speculative forces unleashed on villages in the periphery of the metropolis, massive transformation in their physical form and socio-cultural setup takes place.

In the above context, it has been observed in Ahmedabad, before and after its involvement under Smart City Mission, some villages have experienced population growth rates of up to 700 per cent in a decade. The village is confronted with a forced upsurge of deleterious activities, but it lacks any mechanisms to control them earlier. Though, urban villages (just like Bavla in case of Ahmedabad) provide economic advantages such as cheap land prices and inexpensive housing to the service classes in the nearby metro city, their social and physical environment undergoes gradual upgradation. The land and property prices have evolved even in village Dholka, after Ahmedabad has been named in Smart City Mission !

At the country level, as an example of New Delhi, the journey for the rural village begins the day it is notified by the Municipal Corporation of Delhi (MCD) for acquisition. Panchayats are superseded and the Delhi Development Authority acquires the land for development works. The MCD deals with the supply of infrastructural facilities and once the development work is complete, the urban village is transferred to this body for maintenance and upkeep. The entire process may take anything between 15 to 20 years -- a fairly long period for a village to lie without coordinated administration. It is during this transition stage that maximum speculative development happens in the villages. Lack of land-use regulations give birth to several illegal colonies and absence of control over pollution norms result in small-scale polluting factories taking root. Some such as *Mundka* village in north Delhi emerge as the worst hit. Here environmentally hazardous activities such as the recycling of hospital waste and plastic waste thrive. Following the government's ban on polluting industries, several of them continue to quietly operate behind closed doors. As the city sleeps, these units come alive.

In vision of a Civil Engineer and in context of town planning and regional planning, any particular patch of land – ranging from a small area to a town/city – should be planned and grown in controlled fashion. After naming the team under allocated village as part of Vishwakarma Yojana Project (VIII Phase), the team has made up its mind with the generalized goals like identifying problems to be addressed based on priority, lowering the migration from rural to urban centers, providing better living conditions in rural area along with visualization of the planned & controlled progressive growth of an allocated village after a decade or two.

2.2 Importance of the Rural development

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

Today, rural development still remains the core of the overall development of the country. It has become more than two-thirds of the country's people is dependent on agriculture for their livelihood and one-third of rural India is still below the poverty line. Therefore, it is important for the government to be productive and provide enough facility to upgrade their standard of living.

Rural development is a complete term that concentrates on the action taken for the development of rural areas, which improve the village economy. However, few areas that demand more focused attention and new initiatives are.

- Education
- Public Health and Sanitation
- Women Empowerment
- Infrastructure Development (e.g. electricity, irrigation, etc.)
- Facilities for agriculture extension and research
- Availability of Credit
- Employment opportunity

Rural development is important not only for the majority of the population residing in a rural area but the growth of rural activities is necessary to stimulate the speed of overall economic expansion of the nation. Rural development is pretended to be noticeable importance in the country today than in the olden days in the process of the evolution of the nation. It is a strategy trying to obtain improved rural creation and productivity, higher socio-economic equality, and ambition, stability in social and economic development.

The primitive task is to decrease the famine roughly about 70 percent of the rural population, implement sufficient and healthy food. Later, serve fair equipment of clothing and footwear, a clean environment and house, medical attention, recreational provision, education, transport, and communication.

2.3 Ancient Villages / Different Definition of: Rural Urban Villages

In the following content, various definitions of 'urban village' have been presented to know how the term has various horizon ranging from local level to international level and also in context of various research scholars as well as universities:

(1) As mentioned in topic no. 2.1, the urban village as an entity exists only as a concept. Administratively, it merges with the urban ward as soon it gets notified, but has starkly different characteristics from the rest of the ward. The rural-urban conflicts are strongly manifested here.

(2) As per the definition given by Gaigongmei Gangmei, "*Urban village typically would mean a well-planned set-up with a village-concept of being fairly self-sufficient and not having the need to travel*

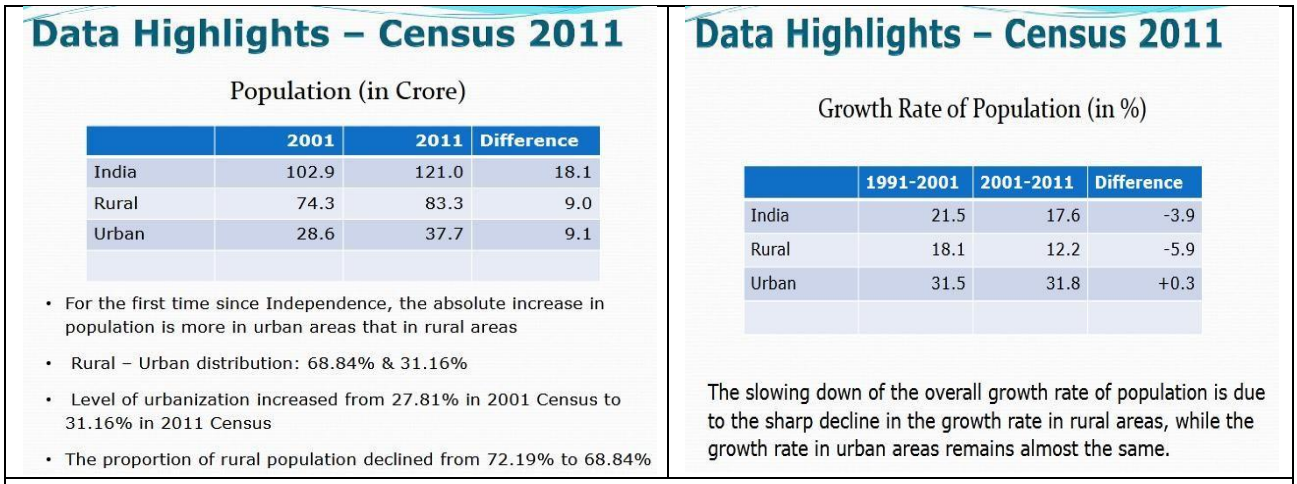
long distances to get daily things done. What is most important, perhaps, is that it's intended to tackle the problem of increasing population in cities."

(3) As stated in topic no. 2.1 and observed by Mr. Kapil Chaudhary – Urban Planner and Director of Spatial Designs that "*The Delhi urban villages have some of these salient features, especially mixed-use zoning. What has become more apparent, thought, is how each urban village differs from each other.*"

(4) In urban planning and design, "*An urban village is an urban development typically characterized by medium-density housing, mixed use zoning, good public transit and an emphasis on pedestrianization and public space.*"

(5) In July 2002, Biddulph M., *et. al.*, stated the concept of 'urban village' and provided its use in cases like (a) To investigate the variety of values and meanings ascribed to developments informed by the urban village concept, on the part of all those individuals involved, (b) To assess the extent to which the urban village as a lived experience accords with the intentions and perceptions of those who promote and use it, (c) To assess the extent to which principles of development accord with user aspirations.

(6) In context of Mr. E. Christopher Mare, Doctoral Researcher of Village Design Institute, Fielding Graduate University (2006), has mentioned the concept of 'urban village' in context of a briefing sheet – practiced in U.K. – as "*An urban village is a concept of settlement which is small enough to create a community in the truest sense of the word – a group of people who support each other, but big enough to maintain a reasonable cross section of facilities.*" Within the same report, the researcher mentioned one of the key characteristics of an urban village as "Each Urban Village is planned and developed through a Master Plan, backed by a series of codes, and an environmental action plan covering how the environmental impact of the village is to be managed and minimized."



Data Highlights – Census 2011

Population (in Crore)

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

- For the first time since Independence, the absolute increase in population is more in urban areas that in rural areas
- Rural – Urban distribution: 68.84% & 31.16%
- Level of urbanization increased from 27.81% in 2001 Census to 31.16% in 2011 Census
- The proportion of rural population declined from 72.19% to 68.84%

Data Highlights – Census 2011

Growth Rate of Population (in %)

	1991-2001	2001-2011	Difference
India	21.5	17.6	-3.9
Rural	18.1	12.2	-5.9
Urban	31.5	31.8	+0.3

The slowing down of the overall growth rate of population is due to the sharp decline in the growth rate in rural areas, while the growth rate in urban areas remains almost the same.

Source: https://censusindia.gov.in/2011-prov-results/paper2/data_files/india/Rural_Urban_2011.pdf

TABLE-3 DATA HIGHLIGHTHS

On the other way, the concept of 'rural village' is very clear and specific in terms of the synonymous words' conjunction in the form of 'rural' and 'village'. There is very thin difference between the same. The team, based on the background of various colleagues and discussion with elders as well as faculties, identifies the difference in a way that when a person uses the term 'village' that means the location will have specific revenue boundary, agriculture as its main economy and has limited mix-zoning in land use; while when a person uses the term 'rural' that means it adds a sense of imaginary comparison in context of urban area and may comprise single or multiple villages who have either mix-zoning type of land use as well as agriculture

and small scale industries as their major economy drivers.

One famous newspaper "The Hindustan Times" published an opinion type article with the headline as "India needs a rural centric development model" (24th July, 2020) stating in context of migration activities observed during the COVID-19 situation in India. It also revealed the fact that India is the second largest country in terms of numbers of migrant workers, while the first is China. The article concluded with the statement as "To convert the 'crisis into an opportunity', this is the alarming time for India to identify and implement rurban development models as well as rural centric development models."

Further, in an article of Retd. Prof. Vijay Kumar Sarabu, Warangal, India, who has published nearly 100 publications, has mentioned in his 'Way forward article' in October-2018 that "*Government should go for appraisal of various rural development schemes and programmes in order to uplift rural areas. Rural entrepreneurship finds it difficult to take off is due to lack of capital accumulation, risk taking and innovation. The rural development programs should combine infrastructure development, education, health services, investment in agriculture and the promotion of rural non-farm activities in which women and rural population can engage themselves. Rural development and rural entrepreneurship is the way of converting developing country into developed nation.*"

As a concluding approach of this topic, the following chart can be referred for urban and rural villages' origin, evolution and their present perspective for respective development in context of case study of San Joes City of California:

FIGURE-4 THE EVOLUTION OFURBAN VILLAGES

2.4 Scenario: Rural / Urban village of India population Growth

As per the article published in Down To Earth's *print edition (dated 16-31 October, 2019,) entitled as "Census 2021: India's Urban-Rural Conundrum", it is mentioned that if one is g*oing by census definition, a habitation is declared urba, if it has a minimum population of 5,000; at least 75 per cent of the male working population is engaged in non-agricultural pursuits; and population density is at least 400 people per sq km. Such habitations are called Census Towns.

For the first time in history, the Census 2011 reported a decline in the population growth rate of rural India. However, at that time India was still predominantly rural, with the urban population being just 30 per cent. Between Census 2001 and Census 2011, the number of Census Towns increased from 1,362 to 3,894. This indicates that people in rural areas are quitting farming or joining non-farm livelihoods. Another concern is that these non-farm jobs are mostly in urban areas. In recent years, these urban employment sources have not been able to meet the surging job demands due to the exodus from agriculture. As the latest economic data points out, manufacturing, construction and other related sectors have not been able to generate employment as they used to earlier. All these sectors are experiencing slowdown.

This leaves us with that big conundrum: the team members urbanise and celebrate it as a sure shot path to prosperity, but urbanisation doesn't provide basic livelihood to people who have migrated from rural areas. The trend that can be observed from past 5 to 6 decades is also presented below:

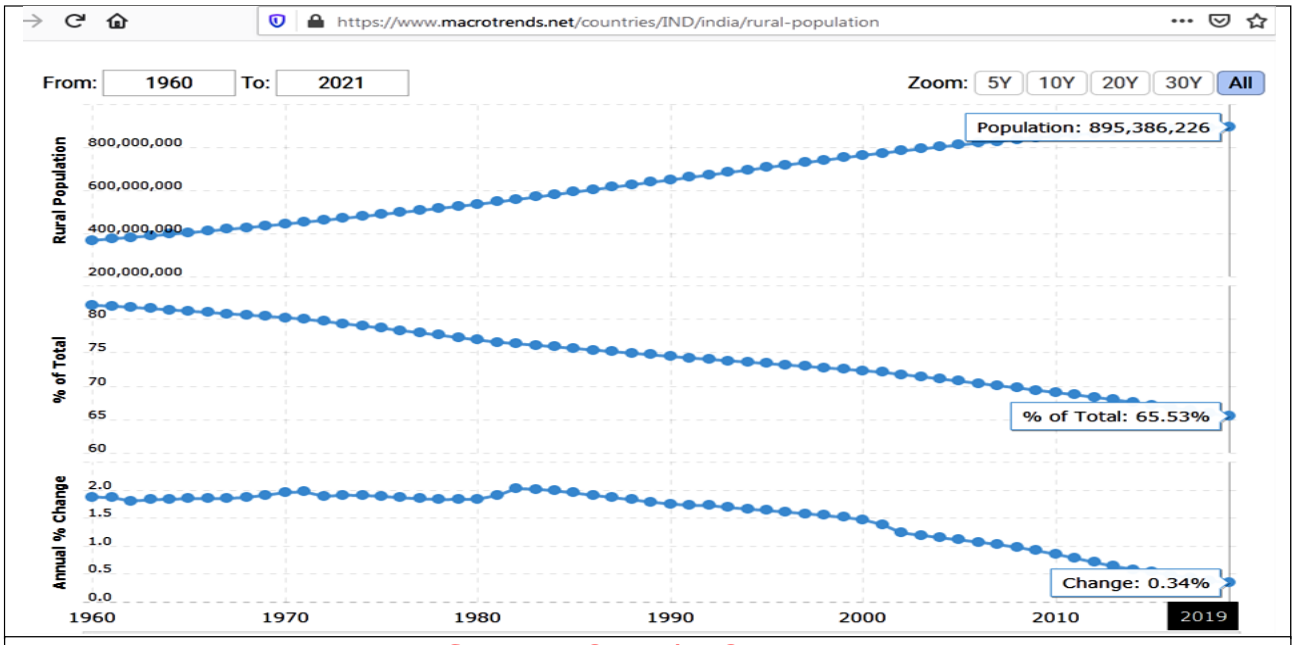


FIGURE-5 POPULATION TREND

With the above latest article details, the team hereby wants to present some glimpse of Population Census of 2011 – Population – Growth – Variation, with the reference of "Rural – Urban Distribution of Population in India – Census 2011", by Dr. C. Chandramouli, Registrar General & Censor Commissioner of India – year 2011, which are as follows:

- Out of the total of 1210.2 million population in India, the size of Rural population is 833.1 million (or 68.84% of the Total Population).

- Urban population 377.1 million (or 31.16%) ; Increase in Rural areas: 90.4 million ; Increase in Urban areas: 91.0 million
- During 2001-11 the growth of Rural Population has been 12.18%
- Growth in Rural Population in India is steadily declining since 1991
- General decline in Rural Growth Rate among all 3 categories during the last decade 2001-11
- Whereas Non-EAG (Empowered Action Group) States have shown decline in growth since 1971-81, the EAG States (i.e. Rajasthan, Uttar Pradesh, Uttarakhand, Bihar, Jharkhand, Madhya Pradesh, Chhatisgarh and Orissa) have declined only during the last decade.
- Growth in Rural Areas in Non-EAG States during 2001-11 has sharply declined to 5.71%.
- There has been a spurt in growth of population in Urban areas in the country, which could be due to: Migration, Natural increase and inclusion of new area under 'urban'.

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

As per details from Census 2011, Gujarat has population of 6.04 Crores, an increase from FIGUREure of 5.07 Crore in 2001 census. Total population of Gujarat as per 2011 census is 60,439,692 of which male and female are 31,491,260 and 28,948,432 respectively. In 2001, total population was 50,671,017 in which males were 26,385,577 while females were 24,285,440. The total population growth in this decade was 19.28 percent while in previous decade it was 22.48 percent. The population of Gujarat forms 4.99 percent of India in 2011. In 2001, the FIGUREure was 4.93 percent. Recently as per Gujarat census data, 83.92% houses are owned while 13.54% were rented. In all, 65.95% couples in Gujarat lived in single family. In 2011, 57.87% of Uttar Pradesh population had access to Banking and Non-Banking Finance Corporation. Only 3.13% of Uttar Pradesh population had internet facility which is likely to improve in 2021 due to Jio. 6.10% of family in Uttar Pradesh owned car while 34.14% owned two wheelers. In few months the team members will also get details of election data for Gujarat.

Out of total population of Gujarat, 42.60% people live in urban regions. The total FIGUREure of population living in urban areas is 25,745,083 of which 13,692,101 are males and while remaining 12,052,982 are females. The urban population in the last 10 years has increased by 42.60 percent. Sex Ratio in urban regions of Gujarat was 880 females per 1000 males. For child (0-6) sex ratio the FIGUREure for urban region stood at 852 girls per 1000 boys. Total children (0-6 age) living in urban areas of Gujarat were 2,952,359. Of total population in urban region, 11.47 % were children (0-6). Average Literacy rate in Gujarat for Urban regions was 86.31 percent in which males were 90.98% literate while female literacy stood at 70.26%. Total literates in urban region of Gujarat were 19,672,516.

Description	Rural	Urban
Population (%)	57.40 %	42.60 %
Total Population	34,694,609	25,745,083
Male Population	17,799,159	13,692,101
Female Population	16,895,450	12,052,982
Population Growth	9.31 %	36.00 %
Sex Ratio	949	880
Child Sex Ratio (0-6)	914	852
Child Population (0-6)	4,824,903	2,952,359
Child Percentage (0-6)	13.91 %	11.47 %
Literates	21,420,842	19,672,516

Description	Rural	Urban
Average Literacy	71.71 %	86.31 %
Male Literacy	81.61 %	90.98 %
Female Literacy	57.78 %	70.26 %

Table-4 POPULATION DETAILS

Data on Rural & Urban Areas
Figures at a Glance
GUJARAT

	2001	2011
No. of Districts	25	26
No. of Sub-Districts	226	225
No. of Towns	242	348
No. of Statutory	168	195
No. of Census Towns	74	153
No. of Villages	18,539	18,225

Percentage of Urban Population	
2001	2011
37.36	42.58

		Total	Rural	Urban
Population	**Persons**	60,383,628	34,670,817	25,712,811
	Males	31,482,282	17,802,975	13,679,307
	Females	28,901,346	16,867,842	12,033,504

DECADAL Population GROWTH 2001-2011		**Absolute**			**Percentage**		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	9,712,611	2,930,050	6,782,561	19.17	9.23	35.83
	Males	5,096,705	1,485,204	3,611,501	19.32	9.10	35.87
	Females	4,615,906	1,444,846	3,171,060	19.01	9.37	35.78
SEX RATIO (females per 1000 males)		918	947	880			
Population IN THE AGE GROUP 0-6		**Absolute**			**Percentage to Total Population**		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	7,494,176	4,676,249	2,817,927	12.41	13.49	10.96
	Males	3,974,286	2,452,807	1,521,479	12.62	13.78	11.12
	Females	3,519,890	2,223,442	1,296,448	12.18	13.18	10.77
CHILD SEX RATIO (0-6 years) (females per 1000 males)		886	906	852			
LITERATES		**Absolute**			**Literacy Rate**		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	41,948,677	21,896,928	20,051,749	79.31	73.00	87.58
	Males	23,995,500	12,756,737	11,238,763	87.23	83.10	92.44
	Females	17,953,177	9,140,191	8,812,986	70.73	62.41	82.08

TABLE-5 DATA ON RURAL AND URBAN AREAS

2.6 Rural Development Issues - Concerns - Measures

The development of rural India is grim and scaling up more in coming days. The reason behind is that more fund is pumping for development at urban then rural and hence, migration is steadily increasing every year after Independence towards cities. Under SGSY programmes, some of the challenges identified by Chandra Dass (2004) are given below so as to overcome them:

1. There should be a regular follow-up of development of skills, maintenance of accounts, enhancement of productivity, marketing, selling etc.
2. Proper identification of local needs and demand-based trades to be encouraged.

3. Enterprises with a sustainable outlook, from the entrepreneur's point of view rather than from the stakeholder's point of view, should be evolved.
4. Ranking of areas of training for rural people to be done with sincerity. It includes agriculture, animal husbandry, handicrafts, food and paddy processing.
5. Very practical oriented syllabus for training is to be designed.
6. The trainers should have integrated outlook and must emphasis on practical training.
7. District level Marketing Information Centre (MIC) to be established.
8. Promoting opportunity for marketing outside their locality.
9. Quality of low-cost products with enhanced capacity of artisans to face global threat.
10. Code of conduct, value and moral education workshops for both stakeholders and beneficiaries need to be conducted.
11. Enhancing skills and knowledge programmes should also cover stakeholders and Panchayati Raj Institute (PRI) representatives.
12. Encouragement and special thrust required for PRIs and officials.
13. Opportunities for experiential learning, attending training and exposure visit for stakeholders and rural entrepreneurs should be increased in proportion to the increasing number of target groups.

In context of the above challenges, Mr. Vasava B., researcher from Veer Narmad University, Gujarat, has identified some of the practical suggestions and measures based on his experience while working with several rural area and NGOs like developmental, activist who are educating, making awareness and implementing projects at rural levels for the holistic development of all strata of class and caste, which are as follows:

1. Involvement Beneficiaries from the Beginning till End.
2. Planning to be done at Micro to Macro levels.
3. Creating Ownership of Project Work & Assets.
4. Educating Beneficiaries about the Project Proposal(s) through PRA Exercise.
5. Recruiting Committed, Honest and Trustworthy Local Personnel for Implementation of Project Activities.
6. High lighting major activities done by VOs/NGOs/Departments at Public place(s).
7. Avoiding shifting/transferring committed and hardworking staff till project work is completed.
8. Panchyati Raj Institutions' members should be paid salary/honorarium against their work –which will reduce malpractices and corruption.
9. Promoting Social Audit among all Stakeholders.
10. Strengthening Local Bodies like PRIs, Village Institutions, SHGs, VOs, etc.

Further, the researcher concluded with the statements that without giving proper exposure, training to all stakeholders and not having commitment, transparency, openness and honesty with beneficiaries it will be more challenges for development in rural India. But there is nothing is impossible for good things, yes, there may be lots of hurdles but when people's participation is there it will be achievable. If the team members have to reduce overcrowded cities then holistic approach is necessary for rural development; otherwise it will be wasting of money, energy, resources and many more. Strategies can be decided once the ground reality is understood in a proper manner and as per the situation, any strategy can be decided as per the community and their ideology, their past records and so on. Here it is given real example which cannot be

possible everywhere, but everything is shown to beneficiaries, their participation is there from the beginning would lead towards sustainable development with less hazards.

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

Various infrastructure guidelines have been tabulated here for the provisions of different infrastructure facilities in context of Urban Development Plans Formulation and Implementation (UDPFI) guidelines.

Facilities	Planning Commission/UDPFI Norms
	Social Infrastructure Facilities
Education	
Aanganwadi	Each or Per 2500 population
Primary School	Each Per 2500 population
Secondary School	Per 7,500 population
Higher Secondary School	Per 15,000 Population
College	Per 125,000 Population
Tech. Training Institute	Per 100000 Population
Agriculture Research Centre	Per 100000 Population
Health Facility	
Govt/Panchyat Dispensary or Sub PHC or Health Centre	Each Village
PHC & CHC	Per 20,000 population
Child Welfare and Maternity Home	Per 10,000 population
Hospital	Per 100000 Population
Public Latrines	1 for 50 families (if toilet is not there in home, especially for slum pockets &kuttcha house)
	Physical Infrastructure Facilities
Transportation	
Pucca Village Approach Road	Each village
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)
Drinking Water (Minimum 70 lpcd)	
Over Head Tank	1/3 of Total Demand
U/G Sump	2/3 of Total Demand
Drainage Network	
Open	
Cover	
Waste Management System	
Electricity Network	
	Socio- Cultural Infrastructure Facilities
Community Hall	Per 10000 Population
Public Library	Per 15000 Population
Cremation Ground	Per 20,000 population
Post Office	Per 10,000 population
Gram Panchayat Building	Each individual/group Panchayat
APMC	Per 100000 Population
Fire Station	Per 100000 Population
Public Garden	Per village
Police post	Per 40,000Population

TABLE-6 PROVISIONAL FACILITIES PER POPULATION

2.8 Other Projects / Schemes of Gujarat / Indian Government

The Government of Gujarat, having realised the importance of the all-inclusive rural development, has been constantly endeavoring to make rural life better. While it continues to do so, it has achieved fantastic results because of this sustained effort. The basis of Gujarat model of development is 'People's Participation', as it reflects in its pledge of 'Collective Efforts and Inclusive Growth'. The Rural Development stories emanating out of Gujarat show how the State Government has enabled people to uplift their livelihoods through this model.

Gujarat has effectively utilized the funding from Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), a momentous initiative towards pro-poor growth, to create sustainable and productive assets and in turn helped boosting the rural economy, protecting the environment, empowering rural women, reducing rural urban migration and fostering social equity among others.

'Mission Mangalam' is an award-winning venture aimed at poverty elimination and women empowerment. It aims at uplifting women belonging to the poor families by giving them enough support to enable them to utilize their skills and improve their conditions. The programme is implemented by Gujarat Livelihood Promotion Company.

Much of the area of this state remains arid with saline water which is unusable for the agricultural purpose. This area depends mainly on seasonal rain-water. Thus, to effectively manage and conserve rain-water, Watershed Management Programme was incorporated. It aims at promoting agriculture by eliminating the scarcity of water resource and in turn create employment opportunities for the rural families.

The state government recognizes the practical and social importance of one's own house and thus, Gujarat has been pro-active in the implementation of Indira Aawas Yojana, which provides pucca houses to the rural poor. With all this and more, the Government of Gujarat has been proactive in the amelioration of rural lives, and it aims at continuing its efforts with increased vigour.
But in above details, what may be the role of a student or academic institution, especially of a higher and / or technical education? The answer lies within the vision and mission of Vishwakarma Yojana Project under which the developmental work in villages that could be undertaken as per the need of the village in particular includes Physical infrastructure facilities (Water, Drainage, Road, Electricity, Solid waste Management, Storm Water Network, Telecommunication & Other), Social infrastructure facilities (Education, Health, Community Hall, Library, Recreation Facilities & other) and renewable energy (Rain water harvesting, Biogas plant, Solar Street lights & Other) for Sustainable development. Under the same scheme, the villages of “Rurban” area will be adopted by the engineering colleges under the Gujarat Technological University. The Engineering colleges would study the identified villages and make the recommendations on the application of technology to achieve integrated and comprehensive development, through project preparation and management.

Chapter – 3: Smart (Cities/ Village) Concept Idea and its Visit (Civil & Electrical Concept)

3.1 Introduction: Concepts, Definitions and Practices

There is no universally accepted definition of a smart city. It means different things to different people. The conceptualisation of Smart City, therefore, varies from city to city and country to country, depending on the level of development, willingness to change and reform, resources and aspirations of the city residents. A smart city would have a different connotation in India than, say, Europe. Even in India, there is no one way of defining a smart city.

In the approach of 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**.

Smart Cities Mission are city improvement (retrofitting), city renewal (redevelopment) and city extension (greenfield development) plus a Pan-city initiative in which Smart Solutions are applied covering larger parts of the city.

The smart city proposal of each shortlisted city is expected to encapsulate either a retrofitting or redevelopment or greenfield development model, or a mix thereof and a Pan-city feature with Smart Solution(s). It is important to note that pan-city is an additional feature to be provided. Since smart city is taking a compact area approach, it is necessary that all the city residents feel there is something in it for them also. Therefore, the additional requirement of some (at least one) city-wide smart solution has been put in the scheme to make it inclusive.

For North Eastern and Himalayan States, the area proposed to be developed will be one-half of what is prescribed for any of the alternative models - retrofitting, redevelopment or greenfield development.

Regarding the concept of 'Smart Village', Government of India's Ministry of Rural Development has already launched 'Shyama Prasad Mukherji Rurban Mission (SPMRM) and this National Rurban Mission has identified a term 'Rurban Village', which has been adopted as a concept of 'Smart Village' for the report preparation by the team.

Large parts of rural areas in the country are not stand-alone settlements but part of a cluster of settlements, which are relatively proximate to each other. These clusters typically illustrate potential for growth, have economic drivers and derive locational and competitive advantages. Hence, making a case for concerted policy directives for such clusters, these clusters once developed can then be classified as 'Rurban'. Hence, taking cognizance of this, the advantages of clusters, both from an economic view point as well as to optimize benefits of infrastructure provision, the Mission aims at development of 300 Rurban clusters, in the next five years. These clusters would be strengthened with the required amenities, for which it is proposed that resources be mobilized through convergence of various schemes of the Government, over and above which a Critical Gap Funding (CGF) would be provided under this Mission, for focused development of these clusters.

Mission's Vision

The National Rurban Mission (NRuM) follows the vision of "Development of a cluster of villages that preserve and nurture 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".

basic services, and create well planned Rurban clusters.

Mission's Outcome

The larger outcomes envisaged under this Mission are: (i) Bridging the rural-urban divide-viz: economic, technological and those related to facilities and services, (ii) Stimulating local economic development with emphasis on reduction of poverty and unemployment in rural areas, (iii) Spreading development in the region, (iv) Attracting investment in rural areas.

3.2 Vision-Goals, Standards and Performance Measurement Indicators

Accordingly, the purpose of the Smart Cities Mission is to drive economic growth and improve the quality of life of people by enabling local area development and harnessing technology, especially technology that leads to Smart outcomes. Area based development will transform existing areas (retrofit and redevelop), including slums, into better planned ones, thereby improving liveability of the whole City. New areas (greenfield) will be developed around cities in order to accommodate the expanding population in urban areas. Application of Smart Solutions will enable cities to use technology, information and data to improve infrastructure and services. Comprehensive development in this way will improve quality of life, create employment and enhance incomes for all, especially the poor and the disadvantaged, leading to inclusive Cities.

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Culture, Government of India M.. *National Mission on Cultural Mapping And Roadmap*. Ministry of Culture, 2017.

Heritage City Development and Augmentation Yojana (HRIDAY). New Delhi, India: Ministry of Urban Development, Govt. of India, 2014.

Guidelines for Swachh Bharat Mission (SBM). New Delhi, India: Ministry of Urban Development, Govt. of India, 2014.

AMRUT Mission Statement and Guidelines In *AMRUT Mission Guidelines*. New Delhi, India: Ministry of Urban Development, Govt. of India, 2015.

Smart City Mission Statement and Guidelines In *Smart Cities Mission Guidelines*. New Delhi, India: Ministry of Urban Development, Govt. of India, 2015.

Each aspiring city competes for selection as a smart city in what is called a 'City Challenge'. There are two stages in the selection process. After the number has been indicated to the respective Chief Secretaries, as outlined in para 8 above, the State/UT will undertake the following steps/stages:

Stage 1 of the competition: Shortlisting of cities by States

The State/UT begins with shortlisting the potential smart cities on the basis of conditions precedent and scoring criteria and in accordance with the total number allocated to it. The first stage of the competition will be intra-state, in which cities in the State will compete on the conditions precedent and the scoring criteria laid out. These conditions

precedent have to be met by the potential cities to succeed in the first round of competition and the highest scoring potential smart cities will be shortlisted and recommended to participate in Stage 2 of the Challenge.

The cities emerging successful in the first round of competition will be sent by the State/UT as the recommended shortlist of smart cities to MoUD by the stipulated date (to be indicated in the letter to Chief Secretaries).

Stage 2 of the competition: **The Challenge round for selection**

In the second stage of the competition, each of the potential 100 smart cities prepare their proposals for participation in the 'City Challenge'. This is a crucial stage as each city's Smart City Proposal (SCP) is expected to contain the model chosen, whether retrofitting or redevelopment or greenfield development or a mix thereof, and additionally include a Pan-City dimension with Smart Solutions. The SCP will also outline the consultations held with the city residents and other stakeholders, how the aspirations are matched with the vision contained in the SCP and importantly, what is the proposal for financing of the smart city plan including the revenue model to attract private participation. An evaluation criteria for the SCPs has been worked out by MoUD based on professional advice and this should act as guidance to the cities for preparing their proposal. The criteria and the documents to be sent with the application are also framed under Smart City Mission.

By a stipulated date, to be indicated by MoUD to the States/UTs, proposals will be submitted to MoUD for all these 100 cities. These will be evaluated by a Committee involving a panel of national and international experts, organizations and institutions. The winners of the first round of Challenge will be announced by MoUD. Thereafter, while the winning cities start taking action on making their city smart, those who do not get selected will start work on improving their SCPs for consideration in the second round. Depending on the nature of the SCPs and outcomes of the first round of the Challenge, the MoUD may decide to provide handholding assistance to the potential Smart Cities to upgrade their proposals before starting the second round.

While in context of 'Smart Village' or 'Rurban Village' and for effective planning and development of rural areas, efficient use of rural land and investment for various activities like housing, physical and social infrastructure, transportation, etc. has to be made. This warrants that natural resources particularly rural land is used in an efficient and equitable manner. For the promotion of integrated and inclusive rural development, spatial planning becomes imperative. Hence, in the year 2019, the "Guidelines for Model Land Uses, Development Controls, and Service Level Benchmarks with Appropriate Enforcement Mechanisms for Rurban Clusters" were prepared and submitted to The Ministry of Rural Development by School of Planning and Architecture, New Delhi. Along with the report, the following three detailed reports have been published as an open source on the website platform by the Ministry of Rural Development.

While, the framework and policy guidelines for the Smart City is as follows:

Different steps in the selection of Smart cities are given below.

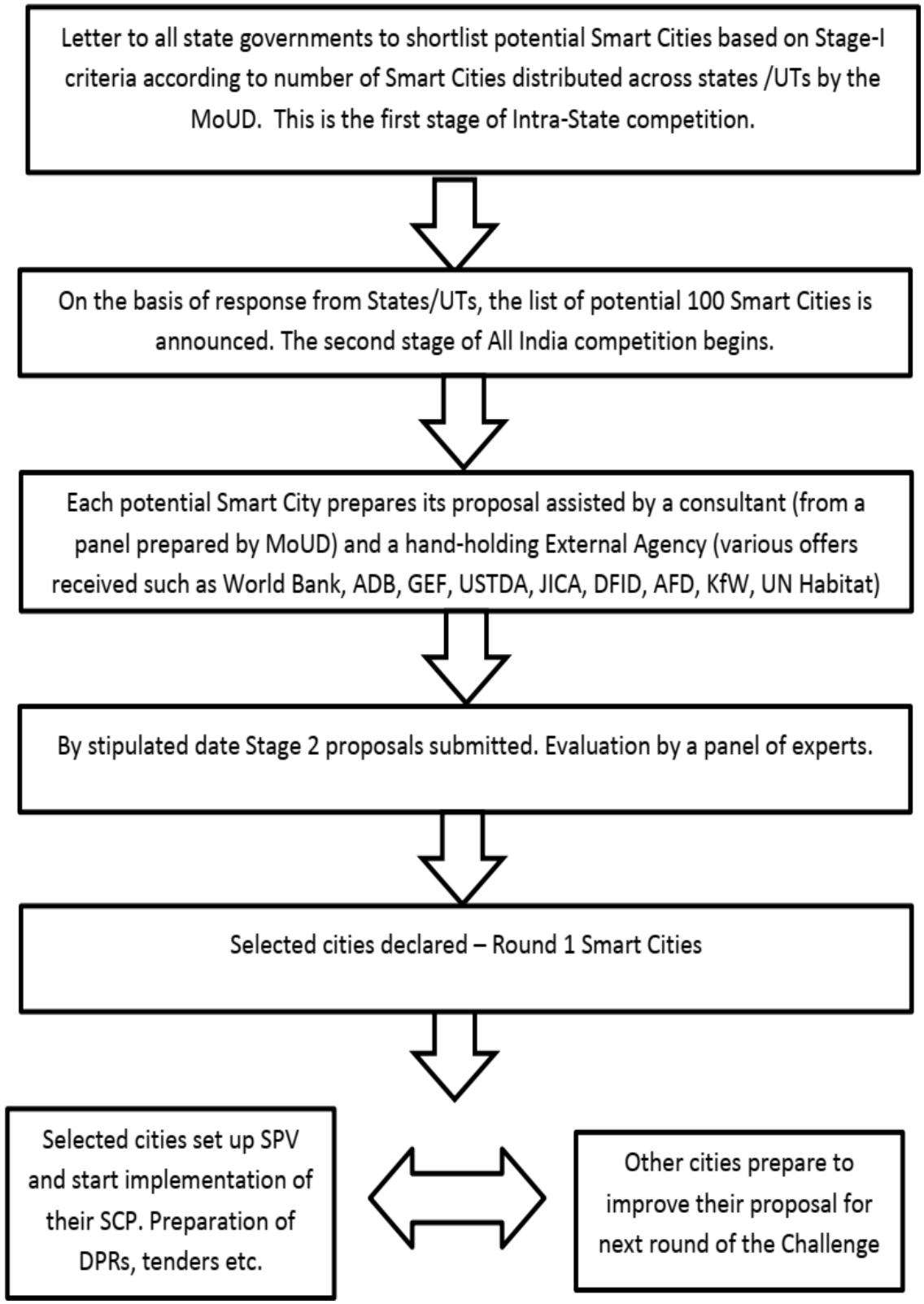

FIGURE-6: DIFFERENT STEPS FOR SELECTING SMART CITIES

3.3 Technological Options

The strategic components of area-based development in the Smart Cities Mission are city improvement (retrofitting), city renewal (redevelopment) and city extension (greenfield development) plus a Pan-city initiative in which Smart Solutions are applied covering larger parts of the city. Below are given the divisions of the three models of Area-based smart city development:

- ***Retrofitting*** will introduce planning in an existing built-up area to achieve smart city objectives, along with other objectives, to make the existing area more efficient and liveable. In retrofitting, an area consisting of more than 500 acres will be identified by the city in consultation with citizens. Depending on the existing level of infrastructure services in the identified area and the vision of the residents, the cities will prepare a strategy to become smart. Since existing structures are largely to remain intact in this model, it is expected that more intensive infrastructure service levels and a large number of smart applications will be packed into the retrofitted smart city. This strategy may also be completed in a shorter time frame, leading to its replication in another part of the city.
- ***Redevelopment*** will effect a replacement of the existing built-up environment and enable co-creation of a new layout with enhanced infrastructure using mixed land use and increased density. Redevelopment envisages an area of more than 50 acres, identified by Urban Local Bodies (ULBs) in consultation with citizens. For instance, a new layout plan of the identified area will be prepared with mixed land-use, higher FSI and high ground coverage. Two examples of the redevelopment model are the Saifee Burhani Upliftment Project in Mumbai (also called the Bhendi Bazaar Project) and the redevelopment of East Kidwai Nagar in New Delhi being undertaken by the National Building Construction Corporation.
- ***Greenfield development*** will introduce most of the Smart Solutions in a previously vacant area (more than 250 acres) using innovative planning, plan financing and plan implementation tools (e.g. land pooling/ land reconstitution) with provision for affordable housing, especially for the poor. Greenfield developments are required around cities in order to address the needs of the expanding population. One well known example is the GIFT City in Gujarat. Unlike retrofitting and redevelopment, greenfield developments could be located either within the limits of the ULB or within the limits of the local Urban Development Authority (UDA).
- ***Pan-city development*** envisages application of selected Smart Solutions to the existing city-wide infrastructure. Application of Smart Solutions will involve the use of technology, information and data to make infrastructure and services better. For example, applying Smart Solutions in the transport sector (intelligent traffic management system) and reducing average commute time or cost of citizens will have positive effects on productivity and quality of life of citizens. Another example can be waste water recycling and smart metering which can make a huge contribution to better water management in the city.

3.4 Road Map and Safe Guards

In context of 'Smart Village' or 'Rurban Village' and for effective planning and development of rural areas, efficient use of rural land and investment for various activities like housing, physical and social infrastructure, transportation, etc. has to be made. This warrants that natural resources particularly rural land is used in an efficient and equitable manner. For the promotion of integrated and inclusive rural

development, spatial planning becomes imperative. Hence, in the year 2019, the "Guidelines for Model Land Uses, Development Controls, and Service Level Benchmarks with Appropriate Enforcement Mechanisms for Rurban Clusters" were prepared and submitted to The Ministry of Rural Development by School of Planning and Architecture, New Delhi. Along with the report, the following three detailed reports have been published as an open source on the website platform by the Ministry of Rural Development.

Rurban Mission was implemented in 50 towns of Gujarat in 2011. The aim was to bridge the rural-urban divide and achieve balanced socio-economic development. Various yojanas like E-gram Vishvagram Yojana, Tirth Gram Yojana, Nirmal Gujarat, Swachha Gram Swasth Gram Yojana, Jamin Sampadan Yojana, Gram Mitra Yojana, Sardar Patel Awas Yojana were integrated to form Rurban schemes. As way forward, the various suggestions received in each of these included: (1) Encouraging public private partnership in physical and social infrastructure development etc., (2) Alliance of GSWC with spot exchanges, (3) Collaborations with NGOs, (4) Capacity building and skill development initiatives.

For the smart cities, The implementation of the Mission at the City level will be done by a Special Purpose Vehicle (SPV) created for the purpose. The SPV will plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate the Smart City development projects. Each Smart City will have a SPV which will be headed by a full time CEO and have nominees of Central Government, State Government and ULB on its Board. The States/ULBs shall ensure that, (a) a dedicated and substantial revenue stream is made available to the SPV so as to make it self-sustainable and could evolve its own credit worthiness for raising additional resources from the market and (b) Government contribution for Smart City is used only to create infrastructure that has public benefit outcomes. The execution of projects may be done through joint ventures, subsidiaries, public-private partnership (PPP), turnkey contracts, etc. suitably dovetailed with revenue streams.

The SPV will be a limited company incorporated under the Companies Act, 2013 at the city-level, in which the State/UT and the ULB will be the promoters having 50:50 equity shareholding. The private sector or financial institutions could be considered for taking equity stake in the SPV, provided the shareholding pattern of 50:50 of the State/UT and the ULB is maintained and the State/UT and the ULB together have majority shareholding and control of the SPV.

Funds provided by the Government of India in the Smart Cities Mission to the SPV will be in the form of tied grant and kept in a separate Grant Fund. These funds will be utilized only for the purposes for which the grants have been given and subject to the conditions laid down by the MoUD.

The State Government and the ULB will determine the paid up capital requirements of the SPV commensurate with the size of the project, commercial financing required and the financing modalities. To enable the building up of the equity base of the SPV and to enable ULBs to contribute their share of the equity capital, GoI grants will be permitted to be utilized as ULBs share of equity capital in the SPV, subject to the conditions given in Annexure 5. Initially, to ensure a minimum capital base for the SPV, the paid up capital of the SPV should be such that the ULB's share is at least equal to Rs.100 crore with an option to increase it to the full amount of the first instalment of Funds provided by GoI (Rs.194 crore). With a matching equity contribution by State/ULB, the initial paid up capital of the SPV will thus be Rs. 200 crore (Rs. 100 crore of GoI contribution and Rs. 100 crore of State/UT share). Since the initial GoI contribution is Rs.194 crore, along with the matching contribution of the State Government, the initial paid up capital can go up to Rs.384 crore at the option of the SPV. The paid up capital may be enhanced in the subsequent years as per project requirements, with the provision mentioned above ensuring that ULB is enabled to match its shareholding in the SPV with that of the State/UT.

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After selection of the cities in Stage II of the Challenge, the process of implementation will start with the setting up of the SPV. As already stated, it is proposed to give complete flexibility to the SPV to implement and manage the Smart City project and the State/ULB will undertake measures. The SPV may appoint Project Management Consultants (PMC) for designing, developing, managing and implementing area-based projects. SPVs may take assistance from any of the empanelled consulting firms in the list prepared by MoUD and the handholding agencies. For procurement of goods and services, transparent and fair procedures as prescribed under the State/ULB financial rules may be followed. Model frameworks as developed by MoUD may also be used for Smart City projects.

3.5 Issues & Challenges

Issues in 'Smart Cities'

- Poor urban spatial planning is evident in the city with residential and industrial areas developed without adequate supporting infrastructure such as public open spaces, education, healthcare and adequate road network etc.
- Proliferation of informal sector- both residential/commercial, large number of slums with every third resident in city is a slum dweller.
- More growth in private owned vehicles has resulted in traffic increase & congestion along with deteriorating air quality.
- Public transport sector within few cities of Gujarat is yet poor.
- High cost of water.
- Weak environmental resilience and waste management, nearly 50% of population have access to sewerage network and a few percentages of roads have storm water drainage.
- Tremendous potential for enhanced opportunities in youth-oriented education, skill development and commercial avenues.
- Entrepreneurial city with a culture focused on work and business; has heterogeneous & cosmopolitan population.
- Larger and increasing number of internet users in the state is suitably poised to enter a new era of economic and digital vibrancy by specializing in respective and quaternary sectors.
- Development/Investments under Super Corridor, IT Park, Medcity, nearby Industrial areas are expected to provide employment to the people in upcoming years.

Issues in 'Rurban Village'

	Desirable Component	Existing Situation
1	Skill Development training Linked to Economic Activities	Existing skills in the GP (Handicraft/Handloom/Industrial etc) Skilled members at the household level
2	Agri-services and Processing	Detail the existing Agri services and processing industries present in the cluster.
3	Digital Literacy	Detail the existing levels in terms of core IT infrastructure as well as general digital literacy levels at the HH and Village level.
4	24x7 Piped Water Supply	Existing levels of water supply at the household level.
5	Sanitation	Coverage of Individual Toilets in the GP at the household level.
6	Solid and Liquid Waste Management	Existing arrangement for solid and liquid waste management at the Household/Village and Cluster level.
7	Access to Village Streets with Drains	Existing coverage of village streets and drains.
8	Village Street Lights	Coverage of existing GP streets with street lights.
9	Health	Access to clinics and health centres at the household and village level.
10	Up gradation of primary, secondary and higher secondary schools.	Existing nos of primary, secondary and higher secondary schools in the cluster and existing conditions.
11	Inter village roads connectivity	Connectivity between GPs within the cluster with roads and public transport
12	Citizen Service Centres	Existing no. of citizen service centres at the GP level.
13	Public transport	Existing levels of availability w.r.t. Public Transport facilities both intra and inter GP
14	LPG Gas Connections	Access to LPG connections at the household level (No of household with LPG connections).

Source: Respective Scheme Data Base/GP records/census of India/other reliable source.

TABLE-7: COMPARISON BETWEEN DESIRABLE COMPONENT AND EXISTING CONDITION

Challenges in 'Smart Cities'

- Unchecked growth of slums along with unplanned/haphazard development shall continue to pose greatest threat to city's rational growth and quality of life, which is receding.
- Slums are spread across various cities in varying degrees of squatter, have made delivery of services to urban poor difficult, negatively affecting the general visage of the city.
- Environmental degradation in various cities in general and contamination of natural drainage paths in particular coupled with inadequate public green/open spaces pose threat for the cities.
- Traffic congestion, rapid increase in private vehicles and lack of adequate multi-modal public transport options, unless mitigated shall continue to degrade air quality adversely impacting public health and increased commute times.

Challenges in 'Rurban Village'

A		B	C	D= C-B
Desirable Component		Existing Situation	Desired Levels	Gaps/Need
1	Skill Development training Linked to Economic Activities	Existing skills in the villages. (Handicraft/Handloom/Industrial etc) No of skilled members at the HH level.	At-least 70 percent household with one beneficiary in each household.	Identification of training needs in terms of sector and no of people to be trained with age profiling.
2	Agri-services and Processing	Detail the existing Agri services and processing industries present in the cluster. (Including storage infrastructure).		Identification of support to any agri based service/industry/ storage infrastructure.
3	Digital Literacy	Detail the existing levels in terms of core IT infrastructure as well as general digital literacy levels at the HH and Village level.	At least one e-literate person in every household.	Identification of no of people to be digitally literate in the cluster.
4	24x7 Piped Water Supply	Existing levels of water supply at the household level.	70 liters per capita per day (lpcd) of safe drinking water for every households throughout the year.	Identification of Augmentation needs at the household level and type of augmentation- source/ transmission/distribution.
5	Sanitation	Coverage of Individual Toilets in the villages at the household level.	100% HH with Individual Household Latrines.	Identification of no of households to be covered with individual latrines.
6	Solid and Liquid Waste Management	Existing arrangement for solid and liquid waste management at the Household/ Village and Cluster level.	Collection at HH level Treatment at Cluster Level.	Identification of SWM facilities at collection/transportation/ treatment.
7	Access to Village Streets with Drains	Existing coverage of village streets and drains.	All village streets to be covered with drains.	Identification of length of streets yet to be covered with drains.
8	Village Street Lights	Coverage of village streets with lights.	All village streets to be covered with street lights as per norms.	Identification of no of street lights to be provided.
9	Health	Access to clinics and health centres at the household and village level.	Access to Health infrastructure as per norms.	Identification of need for Mobile Health Units.
10	Up gradation of primary, secondary and higher secondary schools	Existing nos of primary, secondary and higher secondary schools in the cluster and existing conditions.	Ensuring primary and secondary school within a reasonable distance from all households along with facilities of Drinking water provisions, Toilet blocks (separate for boys and girls) and adequate class rooms.	Identification of upgradation needs/new facilities in the primary and secondary schools.
11	Inter village roads connectivity	Connectivity between villages within the cluster with roads and public transport	Ensure connectivity between all villages.	Identification of need for new connectivity between villages.
12	Citizen Service Centres	Existing no. of citizen service centres at the village level.	One ICT enabled front end Common Service Centre (CSC) per 2 to 3 villages.	Identification of no of CSCs required for the cluster.
13	Public transport	Existing levels of availability w.r.t. Public Transport facilities both intra and inter village.	Public transport to block from each village.	Need for additional facilities to improve public transport access to each village.
14	LPG Gas Connections	Access to LPG connections at the household level.	One LPG retail outlet per village or per 1800 households.	Need for additional retail outlets in the cluster.

TABLE-8: GAP ANALYSIS OF EXISTING SITUATION AND DESIRED CONDITION

3.6 Smart Infrastructure - Intelligent Traffic Management

This can be understood with real life example in the form of success story. The success story of Smart City Ahmedabad Development Limited (SCADL) in transforming their manually operated bus transit system into a smart transportation system has to serve as the best example. Smart City Ahmedabad Development Limited (SCADL) partnered with NEC to build a transportation system that reflects a smart city.

A smart city is the one where everything from menial routines to tourist activities is effortless and having an intelligent transport management system truly aids this. The key is to have systematic processes and smart technologies in each part of the transportation. For example, the SCADL's smart transportation system took care of different aspects of the problem like - the lack of a strict schedule, the inconsistent and un-secure payment options, lack of tracking options for the vehicles, inefficient routing, etc.
Each of these aspects of the problem was assessed and an easy solution was set in place. The Automated Fare Collection Service (AFCS) facilitated the easy cashless payment option via prepaid RuPay card or smartphone for the passengers, while the Automatic Vehicle Location System (AVLS) allowed them to get the current location and other information of the bus, in real time. The Vehicle Planning Schedule and Dispatch System (VPSD) provided a revamped and optimized schedule for the buses and the Depot Management System (DMS) helped with the allocation and optimization of the crew and the overall bus operations. In addition to this, Passenger Information System (PIS) provided real-time bus information via mobile app, website, and in-station boards to enable passengers to plan their route and estimate waiting and arrival times.

This successful implementation of the intelligent transport management system stands testament to what the future can hold. This smart transportation system was successfully launched in 2017 and has played a monumental role in citing Ahmadabad as a smart city. This success story stands as an inspiration to India's smart city dream. It proves that with proper processes that optimally utilize the power of IoT and data analyzing technology, building 100 smart cities is not farfetched. But it makes another thing much clearer - having an intelligent transport management system is the heart of making this dream a reality.

3.7 Cyber Security or any other concept

India’s digitalisation roadmap is expected to catapult its digital economy to 1 trillion USD by 2025. India is witnessing an unforeseen digital transformation, and at the same time, a rapid rate of urbanisation. The Government of India’s 100 Smart Cities Mission blends these digitalisation and urbanisation waves, and endeavours to accomplish urban renewal through a Pan-City Smart Solutions initiative, and technology-enabled ‘city improvement (retrofitting), city renewal (redevelopment) and city extension (greenfield development)’. While the smart city initiative focuses on sustainable development of our cities and harnessing digital technologies for integrated citizen service delivery, it demands a strong focus on cyber security. It is imperative for stakeholders to review and make efforts towards ensuring the safety, security and privacy of citizens and enhancing our cities’ capability to mitigate cyber security risks.

Recognising cyber security as a key priority, the Ministry of Housing and Urban Affairs (MoHUA) published the ‘Cyber Security Framework for Smart Cities’ on 20 May 2016 and issued an advisory to all smart cities to drive conformance to this framework.

This report on ‘Creating cyber secure smart cities’, jointly developed by DSCI and PwC, is an attempt to reinforce the attention that smart city administrators need to give to cyber security in all their projects while incorporating smart solutions. The report acknowledges that cyber security is the combined responsibility of

various stakeholders. With a fine blend of global and Indian instances, this report serves as a preliminary guide for smart city stakeholders to understand the risks and steps that need to be taken to enhance the cyber security posture of smart cities.

3.8 Retrofitting – Redevelopment – Greenfield Development District Cooling

The strategic components of area-based development in the Smart Cities Mission are city improvement (retrofitting), city renewal (redevelopment) and city extension (greenfield development) plus a Pan-city initiative in which Smart Solutions are applied covering larger parts of the city. Below are given the divisions of the three models of Area-based smart city development:

- ***Retrofitting*** will introduce planning in an existing built-up area to achieve smart city objectives, along with other objectives, to make the existing area more efficient and liveable. In retrofitting, an area consisting of more than 500 acres will be identified by the city in consultation with citizens. Depending on the existing level of infrastructure services in the identified area and the vision of the residents, the cities will prepare a strategy to become smart. Since existing structures are largely to remain intact in this model, it is expected that more intensive infrastructure service levels and a large number of smart applications will be packed into the retrofitted smart city. This strategy may also be completed in a shorter time frame, leading to its replication in another part of the city.
- ***Redevelopment*** will effect a replacement of the existing built-up environment and enable co-creation of a new layout with enhanced infrastructure using mixed land use and increased density. Redevelopment envisages an area of more than 50 acres, identified by Urban Local Bodies (ULBs) in consultation with citizens. For instance, a new layout plan of the identified area will be prepared with mixed land-use, higher FSI and high ground coverage. Two examples of the redevelopment model are the Saifee Burhani Upliftment Project in Mumbai (also called the Bhendi Bazaar Project) and the redevelopment of East Kidwai Nagar in New Delhi being undertaken by the National Building Construction Corporation.
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3.9 Strategic Options for Fast Development

From ideation to implementation at various levels, the monitoring can work as a key medium and hence it can be suggested to have 3 levels of committees i.e. National level, State level and City level, as detailed below:

National Level: An Apex Committee (AC), headed by the Secretary, MoUD and comprising representatives of related Ministries and organisations will approve the Proposals for Smart Cities Mission, monitor their progress and release funds. This Committee will meet periodically, as considered necessary.

State Level: There shall be a State level High Powered Steering Committee (HPSC) chaired by the Chief Secretary, which would steer the Mission Programme in its entirety. The HPSC will have representatives of State Government departments. The Mayor and Municipal Commissioner of the ULB relating to the Smart

City would be represented in the HPSC. There would also be a State Mission Director who will be an officer not below the rank of Secretary to the State Government, nominated by the State Government. The State Mission Director will function as the Member-Secretary of the State HPSC.

City Level: A Smart City Advisory Forum will be established at the city level for all 100 Smart Cities to advise and enable collaboration among various stakeholders and will include the District Collector, MP, MLA, Mayor, CEO of SPV, local youths, technical experts, and at least one member from the respective area.

The implementation of the Mission at the City level will be done by a Special Purpose Vehicle (SPV) created for the purpose. The SPV will plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate the Smart City development projects. Each smart city will have a SPV which will be headed by a full time CEO and have nominees of Central Government, State Government and ULB on its Board. The States/ULBs shall ensure that, (a) a dedicated and substantial revenue stream is made available to the SPV so as to make it self-sustainable and could evolve its own credit worthiness for raising additional resources from the market and (b) Government contribution for Smart City is used only to create infrastructure that has public benefit outcomes. The execution of projects may be done through joint ventures, subsidiaries, public-private partnership (PPP), turnkey contracts, etc suitably dovetailed with revenue streams.

3.10 India's Urban Water and Sanitation Challenges and Role of Indigenous Technologies

The problem of access to safe drinking water and sanitation facilities in urban areas of India is a major concern. There is a need to reuse treated wastewater in order to meet the current and future demands for water.

The consistent increase in the rate of growth of India's population has also led to the increase in demand for water, particularly in the urban areas where the rate of increase is highler compared to rural areas. In 2001, urban population was 285 million and assuming water supply of 135 litres per capita per day, the domestic water demand is estimated at around 38,475 million litres per day (MLD), whereas as in 2011 urban population was 377 million with a domestic water demand of 50,895 MLD. It shows that growth in urban population leads to additional water demand of 12,420 MLD in urban areas. The water supply of 135 litres per capita per day (LPCD) as a service level benchmark should be given for domestic water use in urban local bodies. However, currently as per Central Public Health and Environmental Engineering Organisation (CPHEEO), an average water supply in urban local bodies is 69.25 LPCD. This indicates that there is a vast gap between the demand and supply of water in urban areas of India.

The problem of access to safe drinking water and sanitation facilities in urban areas of India is also a major concern. It is estimated that by 2050, half of India's population will be living in urban areas and will face acute water problems. At present, 163 million people do not have access to safe drinking-water and 210 million people lack access to improved basic sanitation in India. In urban areas, 96% have access to an improved water source and 54% to improved sanitation. Whereas in rural areas, which accounts for 72% of India's population lives, only 84% have access to safe water and only 21% for sanitation. In addition, there is a lack of wastewater treatment facilities to treat the wastewater of a growing population. There is a need to reuse treated wastewater in order to meet the current and future demands for water.

The prevention of pollution of water sources is extremely critical in order to continue to supply water of quality standards. Available data suggests that pollution levels have increased in surface water as well as

groundwater. More than 100 million people in urban areas exposed to poor water quality. The a lack of sufficient infrastructure, services and funds to support water and wastewater treatment facilities required for an urban area further exacerbates the problem. Moreover, the drainage and solid waste collection services are not adequate in most of the urban areas. The systems are either poorly planned and designed, or operated without inadequate maintenance. Use of natural capacities of soil and vegetation (green infrastructure) can be applied to absorb and treat waste water. Natural systems are found to be more cost-effective and require low building, labour and maintenance costs.

The time has come to have a retrospect view on the water use and misuse to take serious actions that will lead towards sustainable urban water management. Sustaining healthy environments in the urbanized world of the 21st century represents a major challenge for human settlements, development and management. Again, flexible and innovative solutions are needed to cope with sudden and substantial changes in water demand for people and their associated economic activities.

In order to meet the future urban water challenges, there needs to be a shift in the way the team members manage urban water systems. An Integrated Urban Water Management approach must be adopted which involves managing freshwater, wastewater, and storm water, using an urban area as the unit of management. The approach encompasses various aspects of water management, including environmental, economic, technical, political, as well as social impacts and implications. The international convention has the broad aim of facilitating water for all in a safe and sustainable way, thereby aiming to achieve SDG 6.

This event will provide a platform to highlight current and future water related issues and recognize good water governance practices and solutions through discussions among water experts from various fields such as academics, research, policy, industry and civic society.

3.11 Initiatives in village development by local self-government

Different ministries of the government of India formulate various development schemes not to raise the profit but to maximise the welfare of the people. Some schemes like National Rural Livelihood Mission, MGNREGA, Bharat Nirman etc. are made by the government for rural development of India. Some important facts related to the various rural development schemes are mentioned below for the aspirants of some prestigious exams like IAS/PCS/SSC/CDS/Banking etc.

1. Deen Dayal Upadhyay Grameen Kaushal Yojna
2. Roshni: Skill Development Scheme for Tribals
3. Swachchh Bharat Mission
4. Sansad Adarsh Gram Yojna
5. Heritage Development and Augmentation Yojna (HRIDAY)
6. Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)
7. National Rural Livelihood Mission
8. Pradhan Mantri Gram Sadak Yojna
9. Training to Rural Youth for Self Employment (TRYSEM)
10. Antyodaya Anna Yojna (AAY)
11. Village Grain Bank Scheme

12. National Rural Health Mission
13. Aam Aadmi Bima Yojna
14. Kutir Jyoti Programme
15. Sarva Siksha Abhiyan

TABLE-9: SCHEMES FOR VILLLAGES

3.12 Smart Initiatives by District Municipal Corporation

The Bombay Provincial Municipal Corporation (BPMC) Act (1949) is the governing act for the Ahmedabad and Surat Municipal Corporations, while Bhavnagar Municipal Corporation was constituted under the Gujarat Municipalities Act (1963). Because of these acts, and the constitutional amendments, the municipal corporations have been relatively financially autonomous bodies. It becomes the responsibility of the local bodies (Municipal Corporation/ Urban Development Authority/ Municipality) to provide for the services of water supply and distribution, sewerage collection and treatment, solid waste collection and disposal, and Urban transportation including roads, flyovers, by passes, bus and/ or rail network for urban transportation.

The Bhavnagar Municipal Corporation has maintained the transparency and developed contact medium through digital medium in the form of website and mobile based application. An illustration of various services is given as part of screenshot from BMC's website.

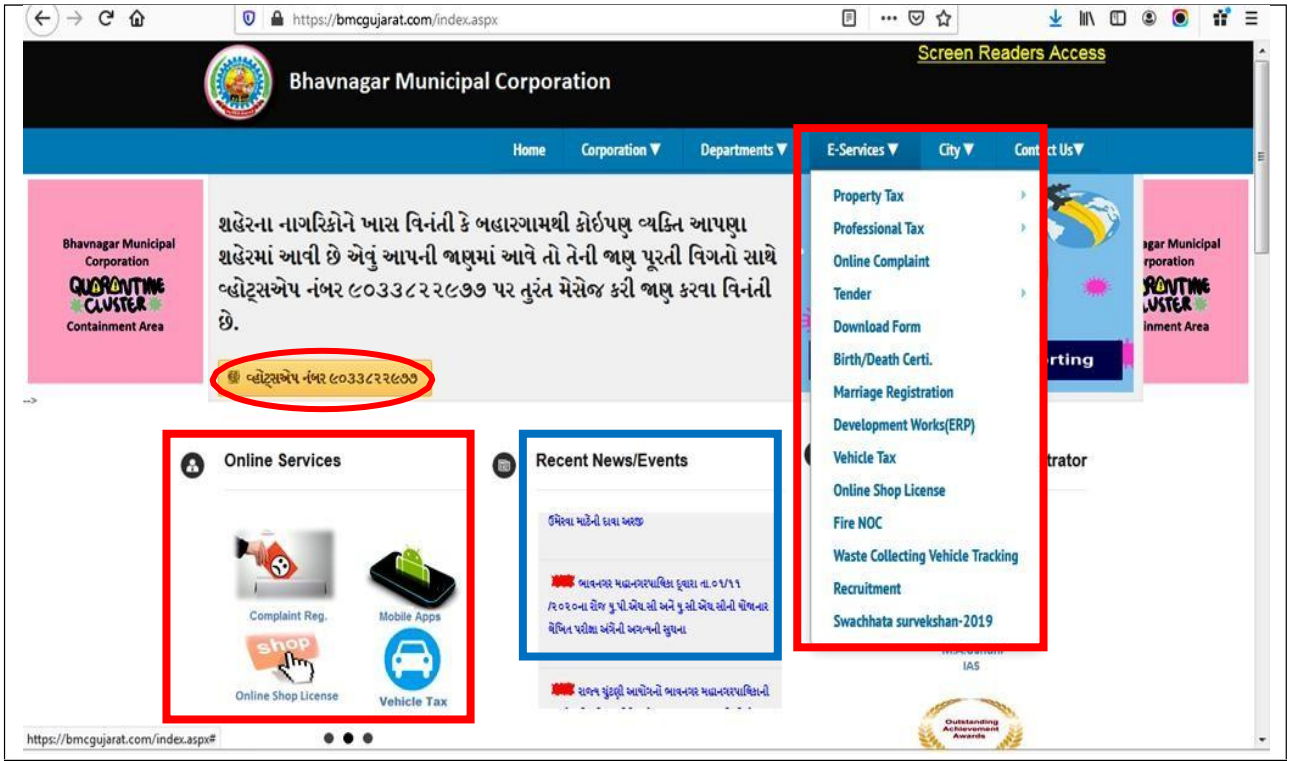


FIGURE-7: BHAVNAGAR MUNICIPAL CORPORATION WEBSITES'S SCREENSHOT

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

There is no any project either at present or under pipeline contributed working by Government / NGO / Other as part of Digital Country Concept either in Bhavnagar City or District.

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

Worldwide Initiatives for Smart Villages:

Smart Village initiative: new thinking for off-grid communities worldwide and IEEE Smart Village: Empowering off-grid communities are both worldwide active and striving to meet the SDG 2030, especially goal 7, Affordable and Clean Energy. The first one promotes access to sustainable energy as a main catalyst for the development of good education and healthcare systems, access to clean water, sanitation, economic growth, enhanced security, gender equality, etc. The most important vision of the Initiative is to apply more holistic and integrated approaches to enable the access to the energy in the rural contexts, while connecting/involving governments, developmental and private sector in the process. The component most emphasized is how to connect renewable sources of energy with ICT. The activities of the Initiative are taking place in six large regions, namely East Africa, West Africa, South Asia, South-East Asia, South America, and Central America, Caribbean, Mexico—the so-called developing world with limited possibilities to access (educational, electrical, economic and other) infrastructure. To find the most suitable solutions, there is a wide range of professionals working on the field and otherwise: villagers, NGOs, development organizations, entrepreneurs, policy makers, engineers, and experts from the field of humanities. Their search for solutions is encompassing and, based on long-term research, analyzing local and regional circumstances, identifying cross-cutting issues and proposing suitable solutions. More than 30 workshops have been organized where more than thousand stakeholders from 70 countries have presented their views and evidence. By now, the majority of their activities were funded by Cambridge Malaysian Education and Development Trust and Malaysian Commonwealth Studies Centre.

Similarly, the IEEE Smart Village initiative is aiming to promote off-grid communities through education and the creation of sustainable businesses in the energy sector. The initiative was originally established as a Community Solutions Initiative (2009) and took over the current name in 2014. The activities are spread worldwide, by now serving more than 50,000 people, living in 34 villages, mostly located in African continent (e.g., Benin, Cameroon, Kenya, Malawi, Namibia, Nigeria, South Sudan, Zambia), but also in Haiti and India. Its main financing mechanism is fundraising. Besides the development of energy-smart villages mentioned before, the main products of the initiative's efforts are a SunBlazer II—a mobile solar-based power base station and Learning beyond the Light Bulb—a nine-month program of remote study that enables the exchange of practices of all communities in order to create the mutual benefit, and equips the students with knowledge on different development models and other skills and knowledge needed for the fieldwork.

One of the most propulsive worldwide programs is the CIGAR research program on Climate Change, Agriculture and Food Security (CCAFS) that started in 2011. The program is funded by the CIGAR fund and different donors (e.g., Australia, Irish Aid, Netherlands, New Zealand, Switzerland, Thailand, UK Aid, US Aid, the EU, and the International Fund for Agricultural Development). Within its framework, the concept of Climate Smart Villages is being developed and put into practice in different parts of the world, whereas the ones with the most climate-related difficulties are chosen (West and East Africa, Latin America, South and Southeast Asia). This is an ever evolving program where different stakeholders (researchers, politicians, framers, local residents) are collaborating in order to find the most productivity enhancing and smart solutions considering the local conditions. Their solutions are based on smart technologies and services, designed in collaboration with local people, and aim at lessening the climate footprint from the perspective of the developing agricultural activities, while not reducing their benefits for the given community. The program is claimed to be very successful, as there is more than 30 existing climate-Smart Villages all over the globe. More importantly, the villages are on a good track to being sustainable in the long term as the program aims to train the local people and not providing locals with the external teachers on the long-term basis. Within this objective, an important role is also played by women. One of the other practical outputs of the program is, for example, the CCAFS Climate Analogues Tool for making rain and climate predictions, developed to help smaller farmers make decisions based on accurate information.

Initiatives, Operation and Implementation in India

Perhaps one of the most extensive and most recent attempts of smart transformation development is India. Firstly, urbanization of India is increasing rapidly as never before. According to the predictions of the United Nations, by 2050, almost 814 million of Indian people will live in towns and cities, which is twice as many as today. Secondly, in 2015, the Government of India, Ministry of Urban Development launched a nationwide program Smart city mission. The aim of the Mission is the comprehensive development of (physical, institutional, social, economic) infrastructure, and thus improvement of the quality of life and to attract people and investments. The governmental mission covers 100 cities, selected in the "City Challenge" process, but also recognizes that there is no single definition of the Smart City that would encompass important factors for all the different cases and therefore aims to set the examples that could be replicated in various regions and cities within the country.

Thirdly, a Smart City initiative was supplemented by the Indian Smart Villages Initiative aimed at harnessing the benefits of ICT for the people living in the rural sites. Despite the urbanization processes, in India, around 67% of population still lives in the rural areas, but rural-urban migrations are posing big problems in India. For example, according to the estimates of Indian Ministry of Statistics and Programme Implementation, in years 2009/2010 more than 60% of the male rural-urban migrations was due to employment related reasons. Agriculture only has a minor part in the Indian economy (e.g., around 17%), compared to the services sector that is flourishing (almost 54%). As it has been stated by Srivatsa, to somehow maintain the "equilibrium" between the urban and rural areas, the smart development of both has to be parallel and simultaneous. In this way, the large migration from rural to urban areas can be limited or even stagnate. It is anticipated that carefully designed Smart Villages will provide a basic framework for local people to enhance their participation on a local level and to improve their economic, social and living conditions and thus make their community stronger and more flexible for the challenges of the outside world. Within the "Digital India" plans, Indian government envisages that, by the year 2019, 250,000 Indian villages will have access to the internet and telecommunications networks. Therefore, there is a need to design and develop villages that have established good endo- and exogenous connections, e.g., they have good connections to the outside world, but, at the same time they maintain their independence in providing employment and services. To summarize, in the Indian case, two approaches are used as being complementary, Smart Villages serving as engines to Smart Cities' economic growth, by producing services and goods for rural but also for wider (inter)national markets. Unfortunately, there is no synthesis on how many Smart Villages has already been developed/ established in India, there are only some fragmented lists

and websites dedicated to specific villages, which makes it difficult to keep up with the numbers.
A closer look at the initiatives working at the worldwide level presented above enables us to make some very broad conclusions. Looking at the main objectives and activities taking place within their frameworks, but also regarding some other reports and models, the energy sector lies at the core of dealing with sustainable and smart community development. Even though the focus on sustainable energy supply is not explicitly in the forefront of the global developmental initiatives, it is implicitly involved within other objectives, such as lessening the climate footprint of agricultural practices. As it will become more evident in the next sub-chapter, a closer look at the European practices reveals also that focus areas of global initiatives have different social and economic conditions and therefore propose different solutions adapted to needs of the communities. Whereas global initiatives are primarily focusing on the areas with the lack of basic infrastructure (electricity, water supply, internet access, etc.), the European initiatives are working in the areas with basic infrastructure already provided and are therefore addressing different challenges of smart and sustainable development through products and services with social, economic, and environmental benefits.

3.15 Visit of Selected Smart Village for the Vishwakarma Yojana Project

Our opted smart village is Amargadh. Amargadh village is situated in Teshil Sihor, District Bhavnagar and in State of Gujarat India. Village has population of 4178 as per census data of 2011, in which male population is 2113 and female population is 2065. Total geographical area of Amargadh village is 1499.07 Hectares. Population density of Amargadh is 3 persons per Hectares. Total number of house hold in village is 749.

the team members visited Amargadh on 6th November 2020, the team members interected with some dwellers and our main interaction was with Hon.Talati shree of Amargadh Virbhadrasinh Rathore. the team members get some information regarding main absent facilities as well as main advantages of the village.

Census Data of Village Amargadh, Teshil Sihor, District Bhavnagar, India --Census 2011

Population	Area (Ha)	Density (P/Ha)	Sex Ratio	Literacy
4178	1499.07	3	977	76.24%

Gram Panchayat name of the Amargadh village is AMARGADH. CD Block name is Sihor and Teshil/Taluk or sub-district is Sihor. Data Reference year is 2009 of Census 2011. Sub District HQ Name is Sihor and Sub District HQ Distance is 9 Km from the village. District Head Quarter name is Bhavnagar and it's distance from the village is 33km. Nearest Town of the Amargadh village is Sihor and nearest town distance is 9 km. Pincode of Amargadh village is 364210. As per census 2011 village code of village Amargadh is 516362.

Demographics Population of Village Amargadh, Teshil Sihor, District Bhavnagar

Total Population	Male Population	Female Population
4178	2113	2065

Sex Ratio of Amargadh Village -Census 2011

As per the Census Data 2011 there are 977 Females per 1000 males out of 4178 total population of village. There are 932 girls per 1000 boys under 6 years of age in the village.

Literacy of Amargadh Village

Out of total population total 2776 people in Amargadh Village are literate, among them 1626 are male and

1150 are female in the village. Total literacy rate of Amargadh is 76.24%, for male literacy is 88.61% and for female literacy rate is 63.68%.

Description	Census 2011 Data	Description	Census 2011 Data
Village Name	Amargadh	Total Person Literates	2776
Teshil Name	Sihor	Total Male Literates	1626
District Name	Bhavnagar	Total Male Literates	1150
State Name	Gujarat	Total Person Illiterates	1402
Total Population	4178	Total Male Illiterates	487
Total Area	1499 (Hectares)	Total Male Illiterates	915
Total No of House Holds	749	Scheduled Cast Persons	712
Total Male Population	2113	Scheduled Cast Males	361
Total Female Population	2065	Scheduled Cast Females	351
0-6 Age group Total Population	537	Scheduled Tribe Persons	0
0-6 Age group Male Population	278	Scheduled Tribe Males	6
0-6 Age group Female Population	259	Scheduled Tribe Females	0

TABLE -10: AMARGADH VILLAGE CENSUS 2011 DATA CENSUS 2011

Workers profile of Amargadh Village

Total working population of Amargadh is 1530 which are either main or marginal workers. Total workers in the village are 1530 out of which 1207 are male and 323 are female. Total main workers are 1376 out of which female main workers are 1120 and male main workers are 256. Total marginal workers of village are 154.

Criteria	Total	Male	Female
Total Workers	1530	1207	323
Main Workers	1376	1120	256
Main Workers Cultivators	162	153	9
Agriculture Labourer	512	365	147
Household Industries	9	8	1
Other Workers	693	594	99
Marginal Workers	154	87	67
Non Working Persons	2648	906	1742

TABLE-11: AMARGADH WORKING POPULATION ---CENSUS 2011

Description	Data
Village Name	Amargadh
Gram Panchayat Name	AMARGADH
CD Block Name	Sihor
Teshil Name	Sihor
Reference Year	2009
Sub District HQ Name	Sihor
Sub District HQ Distance	9 Km
District HQ Name	Bhavnagar
District HQ Distance	33 Km
Nearest Town	Sihor
Nearest Town Distance	9 Km
Pincode	364210

TABLE-12: AMARGADH VILLAGE DATA ---CENSUS 2011

Description Type	Commodities
Agricultural Commodities (First)	COTTON
Manufacturers Commodities (First)	N/A
Agricultural Commodities (Second)	GROUND NUT
Agricultural Commodities (Third)	PEARLMILLET/BAJRA

TABLE-13: AMARGADH MANUFACTURERS AND AGRICULTURAL COMMODITIES DATA

Specialty/Key facility of our opted smart village (Amargadh):

Amargadh has a very famous hospital among locals named as “Amargadh (Jithri) Tuberculosis Hospital”. People from various local districts, towns and villages come here for their treatment and also dwellers of Bhavnagar also came here for diagnosis. This hospital in Amargadh has a medical college associated with it. This is the Main/Key facility of this village Also Amargadh is situated at the state highway

Amargadh Village MAP

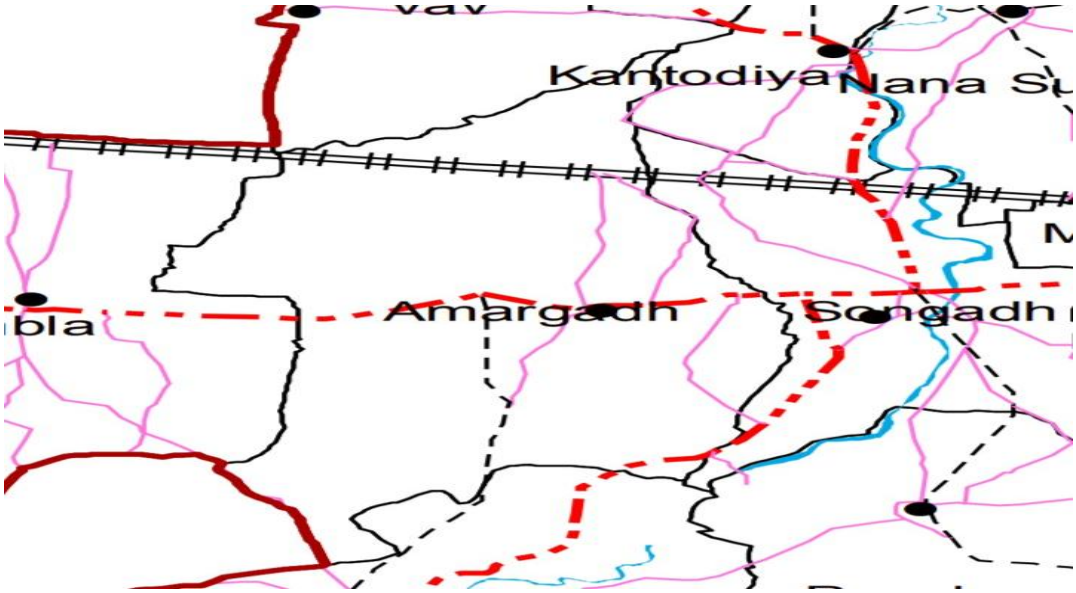


FIGURE-8: AMARGADH VILLAGE MAP

FIGURE-9: AMARGADH VILLAGE SATTELITE MAP

Chapter - 4: Introduction about Songadh Village

4.1 Introduction

This chapter describes a brief introduction to the study justification, the purpose of this project, approach and study framework indicating the data collection process and the work done. As part of the village segment course field work module, conducting survey of Songadh village located in Gujarat state district of Bhavnagar. Known facilities existing and lacking in the village from the study and data collection and made an attempt to properly develop the village.

4.1.1. About Songadh Village

Songadh is a town positioned in Sihor Block of Bhavnagar district in Gujarat. Located in urban area of Bhavnagar district of Gujarat, it is one among the 1 towns of Sihor Block of Bhavnagar district. According to the administration records, the town number of Songadh is 516414. The town has 1252 houses.

According to Census 2011, Songadh's population is 6027. Out of this, 3110 are males while the females count 2917 here. This town has 680 children in the age group of 0-6 years. Out of this 376 are boys and 304 are girls.

4.1.2. Study justification/ need of the study

The necessity of the study of the village is to identify the facility which are existing and which are lacking in the village and then it can be concluded that which in more useful and needed for the village dweller. Urbanization is a strategy design to approach the infrastructure facility towards the village and provide the basic facility to village dwellers.

Needs of the study:

- To reduce migration rate to the village.
- To increase economic ratio of village to village.
- Implementation of village infrastructure projects
- Redefine the role of government, NGOs and local organizations.

4.1.3 Study Area

Songadh is a Village in Sihor Taluka in Bhavnagar District of Gujarat State, India. It is located 28 km towards west from District head quarters Bhavnagar. 7 km from it's nearby town sihor. 216 km from State capital Gandhinagar. Songadh Pin code is 364250 and postal head office is Songadh.

4.1.4. Objectives of the study

- Basic Physical Infrastructure should be the priority focus and be provided.
- Basic Social Infrastructure 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.
- Identification of sanitation facilities that need improvement.
- Electricity connections like street lighting that is energy efficient and eco-friendly.

- Refurbishing of village lakes, water tanks and wells, construction of rain water harvesting structures for sustainable Development.
- Development of socio culture facilities like community hall, public library, recreational activities and repairing of existing amenities.
- Repair & maintenance of Existing Infrastructure.
- To reduce migration rate to the village activities and repairing of existing amenities.
- Repair & maintenance of Existing Infrastructure.
- To reduce migration rate to the village.

4.1.5. Scope of the Study

- In Songadh Village many people commute from village to other city for job, business, employment etc. From guideline of Vishwakarma Yojana Phase VIII the team members will study about village and carry out various surveys from village.
- In the village the team members will conduct techno- economic survey and collect all information from village such as Socio-cultural infrastructure, sustainable infrastructure etc.
- According to survey the team members will know about their problems, existing condition, requirement of facilities etc. From this the team members can carry out gap analysis as per census 2011 and also the future action plan to village. From all the information the team members will try to provide best work for village development as per guideline of smart village development.
- the team members will provide many design report and maintenance work for village for better efficient usage.

4.1.6 Methodology for development of your village

Firstly, the team members studied what are various objectives and the need of the Vishwakarma Yojana. Then the team members completed our Literature Review that includes the basic definitions of rural area, urban area, Rurbanisation, Sustainable development etc. Gap analysis is done using the collected data and various suggestions made by us on the development of the village and based on this suggestions the team members will design proposed facilities in the village according to the need and population of the village.

4.1.7 Available Methodology for development of related to Civil/Electrical

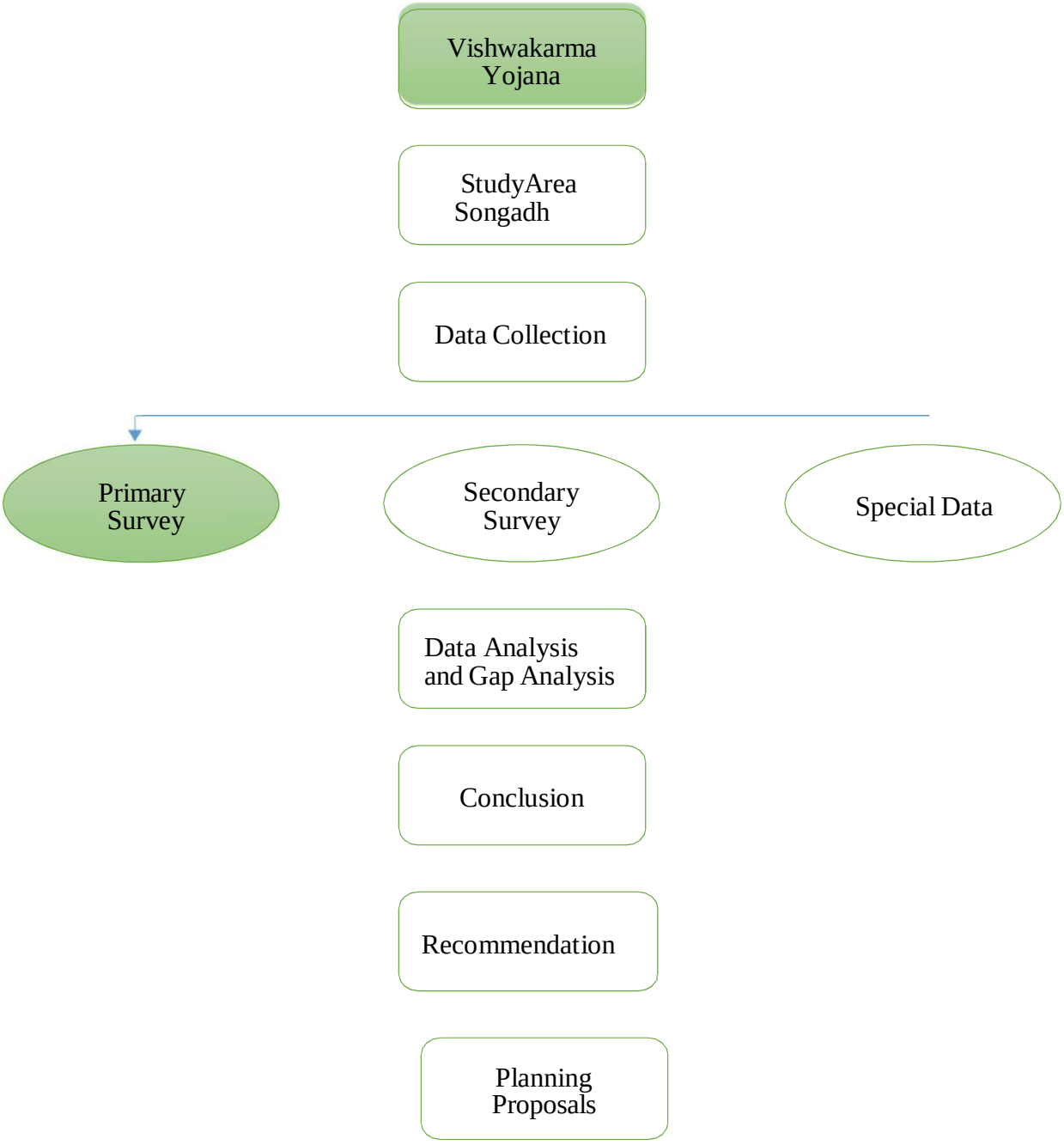


FIGURE-10: METHODOLOGY OF SONGADH

4.2. Study Area Profile of Songadh

4.2.1 Study area location

Songadh is a Village in Sihor Taluka in Bhavnagar District of Gujarat State, India. It is located 28 km towards west from District head quarters Bhavnagar and 216 km from the State capital Gandhinagar.

Songadh Pin code is 364250 and postal head office is Songadh.

4.2.2. Base Location Map, Land Map, gram Tal Map

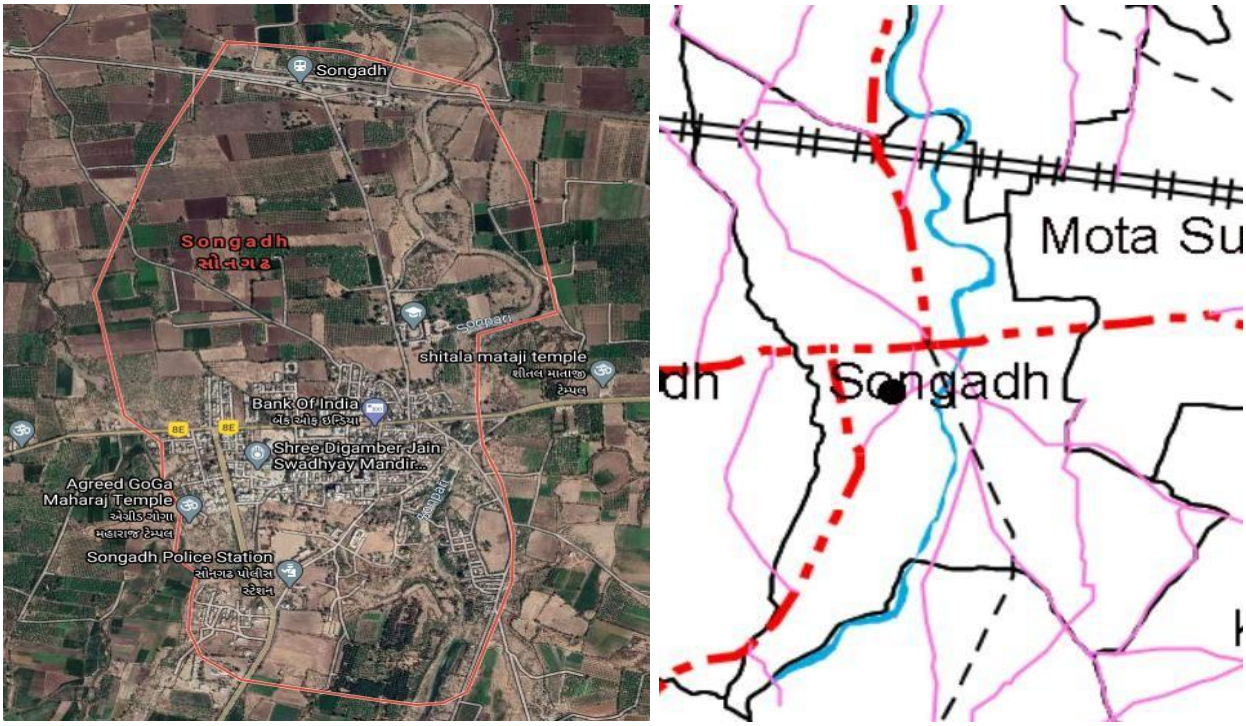


FIGURE-11: STUDY AREA (SONGADH)

4.2.3. Physical & Demographical Growth

- Mota Surka (3 km) , Karkoliya (3 km), Valavad (4 km), Nana Surka (5 km), Pipaliya (5 km) are the nearby Villages to Songadh.
- Songadh is surrounded by Umrala Taluka towards North , Vallabhipur Taluka towards North, Palitana Taluka towards South , Bhavnagar Taluka towards East Sihor , Palitana , Bhavnagar, Talaja are the nearby Cities to Songadh.

According to Census 2011, Songadh's population is 6027. Out of this, 3110 are males while the females count 2917 here. This town has 680 children in the age group of 0-6 years. Out of this 376 are boys and 304 are girls.

Literacy rate in Songadh town is 70%. 4258 out of total 6027 population is literate here. Among males the literacy rate is 76% as 2388 males out of total 3110 are educated however female literacy rate is 64% as 1870 out of total 2917 females are literate in this Town.

The dark portion is that illiteracy rate of Songadh town is 29%. Here 1769 out of total 6027 people are illiterate. Male illiteracy rate here is 23% as 722 males out of total 3110 are uneducated. Among the females the illiteracy rate is 35% and 1047 out of total 2917 females are illiterate in this town.

4.2.4 Economic Profile / Banks

Majority of the population is engaged in agriculture followed by service. Songadh has 52% (942) population engaged in either main or marginal works. 54% male and 49% female population are working population. 51% of total male population is main (full time) workers and 2% are marginal (part time) workers. For women 36% of total female population is main and 13% are marginal workers, there is no bank available at this village right now.

4.2.5 Actual Problem faced by Villagers and smart solution

- Villagers are facing problems in many areas like transportation connectivity issue the village is connected to the nearby town with state highway but is lacking the terminal facility.
- There is no Public toilet and bath present in village.
- There is not any kind of college, iti or vocational training institute present in the village.
- Village is lacking the sports complex.
- The village is located near the most holiest site of pilgrimage for jains “Palitana” so the pilgrimage traffic is high but there is not any facility of shelter home in the village.
- The village is also lacking facility of properly constructed and maintained vegetables market.

So to fulfill some of the above problems faced by the villagers the team members have proposed some infrastructural designs under a banner of vishwakarma project.

4.2.6 Social scenario - Preservation of traditions, Festivals, Cuisine

Here Hindus as well as Muslims and Jains live, so all the major festivals are celebrated here. As many people migrated to Surat for jobs they come here every year to enjoy Diwali at their home. Local Kathiawar cuisine is famous here. There is also one mosque and a Muslim cemetery located here. Shree Digamber Jain Swadhyay Mandir complex in Songadh itself. It has five digamber temples inspired by the late Pujya Kanji Swami. Simander Bhagwan is the main deity together with Mahavir Bhagwan and Adinath Bhagwan. There is also a 38 foot tall Bahubali Bhagwan and jambu sweep under construction. A must see international level art gallery also within the complex.

4.2.7 Migration Reasons / Trends

There are some reasons behind migration from this village.

- Enough jobs are not available in village
- Due to Diamond industry rise, trend became to migrate Surat for workmanship.
- Agricultural revenue is not sufficient.
- Amenities are not available like healthcare, Higher education and proper job, etc.

These are the major reasons and trends for migration.

4.3. Data Collection Songadh Photograph/Graphs/Charts/Table

4.3.1. Describe Methods for data collection

In Vishwakarma Yojana the team members are collecting the data and analyzing it using appropriate method.

The methodology of the total work process as shown below: -

- The whole work is done after detailed study & appropriate guidance in Songadh village.
- All data & analysis are made as per formats & appropriate study methods.
- The whole project is made as per the requirement of Songadh Village.
- In this project, it has been conducted Problem identification, Problem involution, Infrastructure feasibility Study & Design preparation 'for solving them.

4.3.2. Primary survey details

Songadh village is located in Sihor Taluka of Bhavnagar district in Gujarat. It is located 10 Km towards South west from district headquarters Bhavnagar.

4.3.3 Average size of the House

In Songadh, approximate ratio of the houses is 70% house Pukka and 30% kutcha and the average bungalow type houses are more preferable to build by the dwellers.

4.3.4 No of human being in one house

There are 1252 households in the village and an average 5 persons live in every family.

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

Materials like Cement, Marble, Steel Reinforcement, Sand, Aggregate can be purchased from nerby town Sihor which is 10km away from Songadh.

Most of the houses have been constructed of RCC frames. There are very few Kuccha Homes made of Bricks and Stones in the Village. The ratio of kuccha to Pukka House is 30:70.

4.3.6 Geographical Details:

The relief feature reflects that the maximum height in the region is 154 meters above M.S.L. near Sanosara village of Songadh taluka and the minimum elevation is 89 meters in the north of Palitana town. The general slope of the region is towards east and it is drained by Kharod River. Part of Sihor taluka of the region is undulating and covered with mixed forests. The geology of the region is formed of Alluvium, blown sand etc., and Deccan Trap and Trap dykes formation sand it has Orthents-Ochrepts and Usterts-Ochrepts types of soils cover.

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

According to Census 2011, Songadh's population is 6027. Out of this, 3110 are males while the females count 2917 here. This town has 680 children in the age group of 0-6 years. Out of this 376 are boys and 304 are girls. The village Songadh currently doesn't have any Schedule Tribe (ST) population.

Most of the people are using AADHAR card for identification processes. Other proofs such as Driving License, Voter ID etc are used.

4.3.8 Occupational Detail - Occupation wise Details / Majority business

Songadh has 52% (942) population engaged in either main or marginal works. 54% male and 49% female population are working population. 51% of total male population are main (full time) workers and 2% are marginal (part time) workers. For women 36% of total female population are main and 13% are marginal workers

4.3.9 Agricultural Details / Organic Farming / Fishery

Still today a large fraction of the people of Songadh village is moletely dependent upon agricultureal activities and especially cultivation and farming. The major crops which are grown in this are are Cotton, Magfali And Jamrukh (fruit)

4.3.10 Physical Infrastructure Facilities - Manufacturing HUB / Ware Houses

There is presence of some small scale manufacturing and industrial units in the village like rubber, tyre factories, some rolling mills, and some small cotton industries.

4.3.11 Tourism development available in the village for attracting the tourist

Shree Digamber Jain Swadhyay Mandir complex in Songadh itself. It has five digamber temples inspired by the late Pujya Kanji Swami. Simander Bhagwan is the main deity together with Mahavir Bhagwan and Adinath Bhagwan. There is also a 38 foot tall Bahubali Bhagwan and jambu sweep under construction. A must see international level art gallery also within the complex.

4.4 Infrastructure Details (With Exiting Village Photograph)

4.4.1 Drinking Water

Main source of drinking water Shetrunjey Dam near Palitana, and also tanks available for storage, tap water facility inducted at most houses.

4.4.2 Drainage Network / Sanitation Facilities

Drainage is available with the closed drainage system. Most of them are in adequate condition.

4.4.3 Transportation & Road Network

Songadh is located on Bhavnagar Rajkot road which is a state highway. Bus as well as transport facilities like chhakda, Auto-rickshaw, are available to reach the village. There is no fully furnished construction of bus stop in the village. The approach road of village is Bituminous, while the internal roads are pucca.

4.4.4 Housing condition

Both kutchha and pucca houses are found in Songadh Village. Approximate ratios of kutcha and pucca houses are 30:70. Housing conditions are improved from past. Most of houses have bath-toilet facility and electricity.

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

- Primary School
- Panchayat Bhavan
- Anganwadi

- Library
- Primary health centre
- Four anganwadis are available in Songadh village.

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

Existing condition of the buildings at village are good and well maintained as most of them are newly constructed like Gram Panchayat building and Model School.

4.4.7 Technology Mobile/ WiFi / Internet Usage Details

Most of the adults use mobile phones. There are no Wifi towers in the village. Clear information regarding internet usage is not available. There are some Cybercafes in the Village. Gram Panchayat is having WiFi connection.

4.4.8 Sports Activity as Gram Panchayat

No such activities are observed in the village.

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

The assembly polling is done at School and Panchayat Office. Birth and Death Records are kept in Gram Panchayat itself. There is not any public garden or playground type facility is available in the village. Village is near to Palitana which is having some recreational facilities.

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

No any others facilities for this Songath village.

4.4.11 Any other details

There is a small water body available in the centre of village where cattle are cleaned.this village is known for communal harmony.

4.6 Existing Institution like - Village Administration – Detail Profile

4.6.1 Bachat Mandali

Bachat Mandali is a kind of organization in which villagers invest their money. Bachat Mandali provides facilities almost similar to bank. Villagers can invest their money in Bachat Mandali and withdraw whenever they want.

4.6.2 Dudh Mandali

Dudh Mandali in a kind of organization in village's people all milk is collect in the village and after its distributed various milk refinery Dudh mandali is available in this village.

4.6.3 Mahila forum

Mahila Mandalas are voluntary service organizations which work for the betterment of the women in the villages of India.

4.6.4 Plantation for the Air Pollution

This village are normal compositions of external air by volume an approximately as follow Nitrogen 78.1%, Oxygen 20.94%, and Carbon dioxide 0.06%.

4.6.5 Rain Water Harvesting - Waste Water Recycling

No Rainwater harvesting system available in Songadh village.

4.6.6 Agricultural Development

Understanding agricultural and rural development can create jobs and livelihoods for small farmers and the landless, whiles producing food and raw materials for the urban economy by Songadh village is also good option.

4.6.7 Any other

Nil

Chapter – 5: Technical Options with Case Studies

5.1 Concept (Civil)

5.1.1 Advance sustainable construction techniques / Practices and Quantity

Advanced construction technologies are commonly described as including (amongst many others) advanced forms of:

1. Cladding systems.
2. Construction plant.
3. Prefabrication and preassembly.
4. Site investigations and surveying.
5. Sub structure works.
6. Water engineering.
7. Temporary works.
8. Modern methods of construction.
9. Modular construction.
10. Off site manufacturing.
11. Smart technology.
12. 3D printing.
13. Materials.
14. Building information modeling

5.1.2 Soil Liquefaction

A Phenomenon whereby a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress, usually earthquake shaking or other sudden change in stress condition, causing it to behave like a liquid" is called Soil Liquefaction

There are two types of soil liquefaction.

1) Flow liquefaction

2) Cyclic Mobility

How does Soil Liquefaction Work?

The soil is a mixture of soil particles that stay connected together. These particles naturally rest upon each other due to gravity and form grids based on its properties. Each particle produces its own contact force by the surrounding particle. These contact forces together hold all the individual soil particles in their place. Soil liquefaction occurs due to sudden and rapid load on the soil particle. The sudden water pressure leads to soil losing its cohesive strength. Once the soil loses its cohesion, it gets softened, weak and loses its solid properties that are converted to liquid properties.

What is the importance of Soil Liquefaction?

Earthquakes or seismic events cause number of disturbances in the ground which can harm or damage the structural stability which could turn fatal. Liquefaction causes a sudden movement shift that is out of sync with the rest of the structure. This might cause several structural damages to the property leading to casualties. Liquefaction in saturated soils generates a quicksand effect. This phenomenon occurs during liquefaction when the building or the foundation gets pulled into the diluted soil causing it to lean and eventually collapse. Construction of buildings near water bodies use retaining walls which are heavily dependent on the strength and stiffness of the soil. Once the soil gets liquefied, the retaining wall collapses which could cause landslides

Effects of Liquefaction on Buildings

Buckling of Piles: Pile foundations are embedded deep into the ground because of the soil support. But if the soil is not strong, the foundations buckle which lead to collapsing of the structure.

Spreading of ground: The soil starts to move in a downward direction due to the liquefaction. Slopes starting from an angle of 3 degrees are prone to lateral spreading.

The effects of soil liquefaction on the built environment can be extremely damaging. Buildings whose foundations stand directly on the sand, which liquefies, will experience a sudden loss of support. Where a thin crust of non-liquefied soil exists between building foundation and the liquefied soil, a 'punching shear' type foundation failure may occur. The irregular settlement of ground may also break underground utility lines. The upward pressure applied by the movement of liquefied soil through the crust layer can crack weak foundation slabs and enter buildings through service ducts, and may allow water to damage the building contents and electrical services.

Bridges and large buildings constructed on pile foundations may lose support from the adjacent soil and buckle or come to rest at a tilt after the earthquake induced shaking.

Case study

Soil Liquefaction during the Tohoku earthquake in Japan that occurred on 11 March 2011

During the infamous 2011 earthquake off the Pacific coast of Tohoku, Japan the liquefaction occurred over hundreds of miles. Most of the structures in the affected areas were tilted and sank into the sediments, even while they remained intact. The shifts in soil destroyed water, sewer, and gas pipelines, crippling the utilities and infrastructure. With such a long-lasting earthquake, the structures continued to sink and tilt as the shaking continued for several minutes. The younger sediments, and especially the buildings constructed on the new landfill ground, were much more vulnerable (Ashford, 2011). Liquefaction caused significant damage to the Tokyo Bay coast which was located far away from the epicenter. More than 70% of Urayasu City suffered because of Liquefaction. The town was built on a land filled area in the 1960s. Soil tests later revealed that the soil in Urayasu shows less resistance to Liquefaction.

Soil Liquefaction zones in Guwahati, India

Guwahati falls under the seismic zone V as per IS 1893, considered as one of the most active seismic region in the world. This means that Guwahati is at the risk if an earthquake having 8 or a higher magnitude strikes. Guwahati is India's biggest city that falls in zone 5. Recent developments have led to more construction and a rise in population. An earthquake measuring 8.1 scale that originated in Shillong on the 12th June 1897, started a liquefaction process in the whole Brahmaputra plain. This led to floods around the plains and plateau. In the plains, water gradually reduced and formed lakes and ponds. The earthquake led to massive destruction of property and houses. Embankments started sinking under the liquid soil. This phenomenon occurred again in 1950.

Methods to reduce damage due to soil Liquefaction:

1) *By avoiding construction on saturated soils*

Soil study must be conducted before construction to check whether the soil is durable for construction. Soil mapping must be made mandatory.

2) *Liquefaction-proof structural system*

3) *Improving Soil Conditions*

Methods to mitigate soil liquefaction have been designed to improve soil strength and quality. Methods such as Vibro compaction, dynamic compaction, and use of vibro stone columns are preferable.

The most common way of preventing the occurrence of liquefaction are foundation soil improvement methods. One type of improvement is to replace the susceptible soil with the appropriate amount of gravel.

A more favourable form of the granulometric soil curve in a narrower location is obtained in this way. Since saturation with water is one of the main factors affecting the occurrence of liquefaction, vertical gravel drains are often used for faster water drainage due to their permeability. Stone columns are one of the best methods of reducing the liquefaction potential. Because they are performed by vibration, they increase the compactness of the foundation soil on one side, and because of their water permeability, they also allow faster water drainage. Also, there are chemical soil stabilization methods using cement, but they are not used as much because they are not as profitable.

Determining the liquefaction potential

In order to estimate the occurrence of liquefaction at a location during a strong earthquake, it is necessary to investigate the location and make a geotechnical report that should contain the following data:

- Position of the location
- Granulometric composition of the soil on location (presence of soil particles susceptible to liquefaction) Soil compaction on location

- The degree of saturation with water Seismic activity zone of location
- Existing data on previous occurrences of liquefaction on location

5.1.3 Sustainable Sanitation

What is sustainable sanitation?

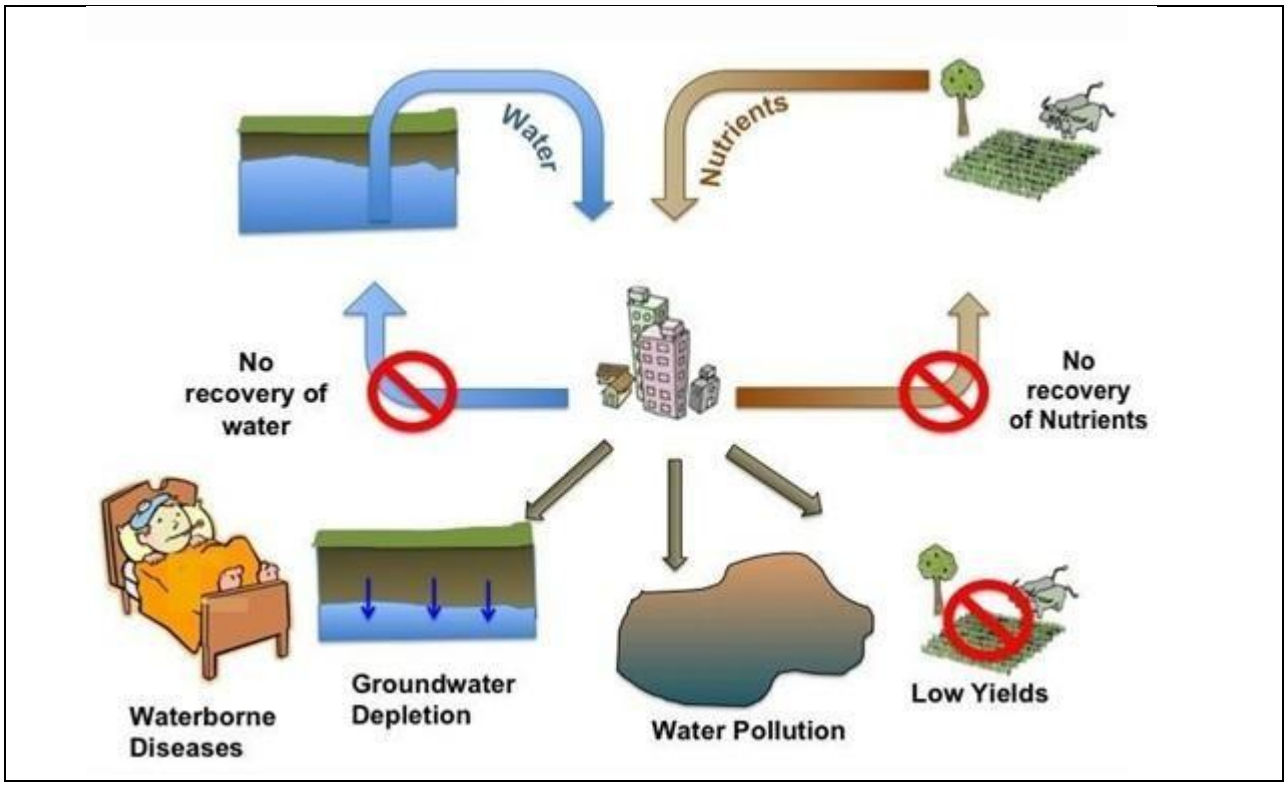


FIGURE-12: SUSTAINABLE SANITATION

Conventional approaches to wastewater management that regard wastewater as a waste, and often are dysfunctional, have serious drawbacks. (Source: CONRADIN 2010).

Sustainable sanitation aims at overcoming these drawbacks. It is not a certain technology, but an approach with certain underlying principles. There are a number of technologies (see for instance sanitation systems) that can be used to make sanitation and wastewater management more sustainable. The term "sustainable sanitation" in principle denominates the same as ecological sanitation, though the latter has a stronger focus on source separation.

The first and foremost principle is probably the one to recognise that excreta and wastewater are not a waste, but a valuable resource that can be reused and recycled. This is actually — to speak in a simplified way — the very basis of sustainability: to use resources wisely and without impairing the possibilities of future generations to meet their own needs.

Sustainable sanitation can be defined more precisely (adapted from SUSANA 2008):

The main objective of any sanitation system is to protect and promote human health by providing a clean environment and breaking the cycle of disease. In order to be sustainable a sanitation system has to do this, and additionally be economically viable, socially acceptable, and technically and institutionally appropriate, and it should also protect the environment and the natural resources. This implies the following criteria:

- **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 (both liquid, solid and gaseous).
- **Technology and operation:** A sustainable sanitation system utilises 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 arising 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, fertiliser, 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.

Most sanitation systems have been designed with these aspects in mind, but in practice they are failing far too often because some of the criteria are not met. In fact, there is probably no system that is absolutely sustainable. The concept of sustainability is more of a direction rather than a stage to reach. Nevertheless, it is crucial, that sanitation systems are evaluated carefully with regard to all dimensions of sustainability. Since there is no one-for-all sanitation solution, which fulfils the sustainability criteria in different circumstances to the same extent, this system evaluation will depend on the local framework and has to take into consideration existing environmental, technical, socio-cultural and economic conditions.

Taking into consideration the entire range of sustainability criteria, it is important to observe some basic principles when planning and implementing a sanitation system. These were already developed some years ago by a group of experts and were endorsed by the members of the **Water Supply and Sanitation Collaborative Council** as the "Bellagio Principles for **Sustainable Sanitation**" during its 5th Global Forum

in November 2000 (EAWAG/SANDEC & WSSCC 2000):

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

To summarise, sustainable sanitation is a simple approach: the most basic principle is that it considers wastewater and excreta not as a waste, but as a resource, that sanitation has to be socially acceptable and should be as economically viable as possible. There is no "one-fits-all" approach, much rather, the most adequate solution has to be found from case to case, considering climatic conditions, water availability, agricultural practices, socio-cultural preferences, affordability, safety, and technical prerequisites — just to name a few.

5.1.4 Transport Infrastructure / system

Traditional transportation infrastructure construction and maintenance throughout the world are not only expensive but is also consuming 5.6×10^{20} J/year (560 EJ/year) fossil fuel which indeed is dangerous of a cliché when discussing about climate. To mitigate this issue, better infrastructure transportation planning needs to be achieved, in which environmental sustainability and climate adaptation has been confirmed to create more resilient and vibrant communities. Interestingly, **invisible infrastructure transportation** technology proposed in this chapter, for urban infrastructure transportation system, implicated by electromagnetic system and superconducting magnets, will thus be the emergent technology in modern science. It is because the technology is cheaper, and it will run by repulsive force and attractive force at the levitated (flying) stage while it runs on maglev system and will run by air (wind energy) while it is on nonlevitated area without consuming fossil fuel. Indeed, the maglev infrastructure transportation system would be the innovative technology ever to console infrastructure, transportation, energy, and global warming crisis.

5.1.5 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 farmings 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.

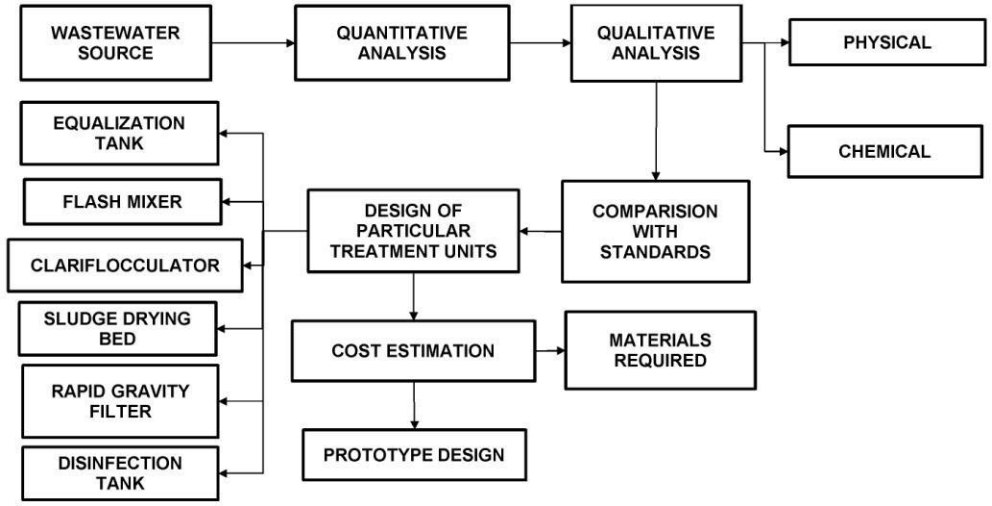
5.1.6 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure

Corrosion Mechanism, Prevention & Repair Measures of RCC Structure Though concrete is quite strong mechanically, it is highly susceptible to chemical attack and thus structure gets damaged and even fail unless some preventive measures are adopted to counteract this and thereby increasing the durability of structure.

Prevention of RCC structure from Corrosion

- To minimize the chances of development of corrosion of steel in concrete, the following preventive measures may be taken.
- Cleaning the reinforcement with wire-brush to remove the rust scales before placing of concrete Maintaining a high degree of workmanship
- Proper structural design with due provision of cover
- Avoiding heavily congested reinforcement especially at the intersection of beams and columns. Providing cathodes protection to the reinforcement by some suitable method
- Using stone pebbles in place of badly made cover blocks Providing surface coatings with paints, tars, asphalts, etc Using the correct water-cement ratio.

5.1.7 Design Of Sewage Treatment Unit(Rapid Gravity Filter)



Design of Rapid Gravity Filter

INPUT

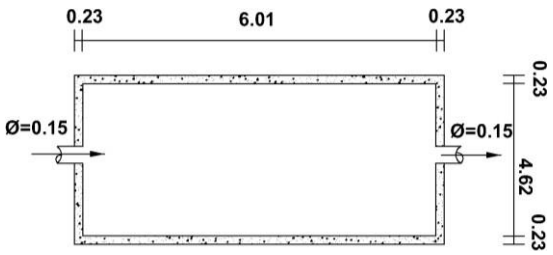
Flow		50	m^3/d
Rate of filtration		0.075	$m^3/m^2/h$
No of bed		1	nos
Flow per bed		2.083	m^3/h

CALCULATION

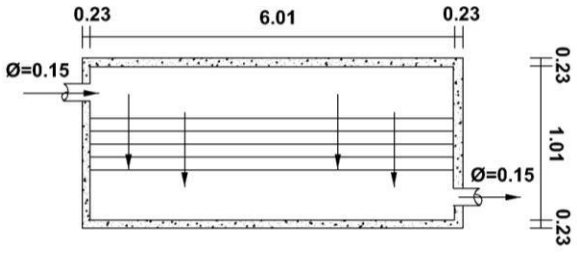
Area of bed	Flow/Rate of Filtration	27.78	m^2
Assume, L:W	1.3 :1		
Width (W)	Sqrt(SA/ratio)	4.62	m
Length (L)		6.01	m
Ratio L:W		1.3	
	This is to the range of 1.11 to 1.66		
a) Sand			
Provide depth of sand as		3	cm
Effective size 0.5 mm		0.03	m
Uniformity coefficient 1.5			
d10 size		0.5	mm
d60 size		0.75	mm
b) Gravel			
Depth of gravel		0.45	m
Size of gravel at top		2 to 5	mm
size of gravel at bottom		50	mm
c) Depth of water			
Depth of water above sand surface		0.03	m
Free board		0.3	m
Provide extra depth		0.2	m
Total depth of filter box		1.01	m
d) Under drain system			
Provide 2 sections per filter bed			
Area of filter per bed		27.78	m^2
Under drain section		27.78	m^2

e) Backwashing of filters				
Rate of backwash			9	lit/m^2
Rate of air wash			12	lit/m^2
f) Inlet pipe for each filter bed				
Inlet flow per bed			50	m^3/day
For 20% overload (Q)		20%	60	m^3/day
For velocity of flow of			1	m/s
Surface area	Q/v		0.00069	m^2
Diameter of pipe (d)	sqrt(4*SA/3.14)		0.030	m
			29.74	mm
	Assume		15	cm
			0.15	m
g) Filter water outlet pipe per section of filter bed				
Outlet per section			50	m^3/day
For 20% overload (Q)		20%	60	m^3/day
For velocity of flow of			1	m/s
Surface area	Q/v		0.00069	m^2
Diameter of pipe (d)	sqrt(4*SA/3.14)		0.030	m
			29.74	mm
	Assume		15	cm
			0.15	m
Vol of bed	L*B*H		28.06	m^3
RESULT				
Flow	**Q**		**50**	**m^3/d**
No of bed	**nos**		**1**	
Flow per bed	**Qnet**		**2.08**	**m^3/h**
Area of bed	**A(bed)**		**27.8**	**m^2**
Width	**B**		**4.62**	**m**
Length	**L**		**6.01**	**m**
Provide depth of sand as	**Hs**		**3**	**cm**
Depth of gravel	**Hg**		**0.45**	**m**
Depth of water above sand surface			**0.03**	**m**
Total depth of filter box	**H**		**1.01**	**m**
Vol of bed	**Vol**		**28.06**	**m^3**
Diameter of pipe	**d**		**0.15**	**m**

TABLE-14,15: DESIGN OF SEWAGE TREATMENT UNIT



Plan



Cross-section

Chapter - 6: Swachh Bharat Abhiyan

6.1 Swatchhta needed in allocated village - Existing Situation with photograph

"Cleanliness is Godliness" is the mantra of Mahatma Gandhiji, Father of Nation. He demonstrated, propagated and insisted for individual and community cleanliness throughout his life. Following his footprints, Swachh bharat Mission campaign achieved encouraging results. This vision will be translated into action by bringing in community participation for clean toilets and integrated waste management to make Gujarat open defecation free, zero waste, dust free, plastic free and green. The objectives of the Swachh Bharat Mission are:

- To bring improvement in general quality of life in Urban and Rural areas.
- Encouraging sustainable sanitation facilities through creating awareness and health education, giving inspiration to communities and Panchayati Raj Institutions.
- Encouraging affordable and proper technology for ecological life and sustainable sanitation.
- The schools which are not covered under Sarva Siksha Abiyan be covered, to provide Anganwadi centers of rural area with proper sanitation and health facilities and provide active engagement about health education and sanitation facilities to students.
- Focusing on solid and liquid waste in Urban and Rural areas for entire cleanliness, develop environmental sanitation system being arranged by community.

When the team members visited Songadh for the purpose of preliminary survey and to gather the necessary information, the team members observed moderate cleanliness in the village. The main reason behind it was a improperly maintained system of cleanliness. The village gets periodic sweeping but the garbage and rubbish which gets collected is not handled and dumped to a particular site or in other words the absence of a propped dumping site results in scattering of the rubbish around the village.
Still comparatively the village was excellently clean. The villagers and the leadership of the village are they selves were very aware about maintaining clean environment.
And as per our opinion for improving cleanliness in the village, providing a proper dumping site and assuring periodic handling or transferring of the garbage would be more than sufficient for the village.

6.2 Guidelines - Implementation in allocated village with Photograph

The general features of Swachh Bharat Mission are given below:

- Implementation and monitoring at State level by Swachh Bharat Mission.
- Phase-wise implementation of block wise programme from 2014-15 to 2018-19.
- Determination of "Zero waste" policy in the State.
- Formation and implementing of "Public Health Bye-Laws for all cities.
- Sanitation for all
- Formation of task force for supervision of programme for all cities at City Level.
- Free health check-up of sanitation and drainage employees twice in a year.
- Planning of eco-friendly crematorium in the Municipalities.
- Ratings of cities for cleanliness to inter cities, cleanliness competition and prizes.
- Financial / technical assistance to Local Self Government bodies, training and capacity building.
- Intensive sanitation drive for first 3 Months.

- Public awareness and public participation.
- Bring about an improvement in the general quality of life in the urban areas.
- Accelerate sanitation coverage in urban areas.
- Generate felt demand for sanitation facilities though awareness creation and health education.
- Cover schools/ Anganwasis in urban areas with sanitation facilities and promote hygiene education and sanitary habits among students.
- Encourage cost effective and appropriate technologies in sanitation.
- Eliminate open defection to minimize risk of contamination of drinking water sources and food.
- Convert dry latrines to pour flush latrines, and eliminate manual scavenging practice, wherever in existence in urban areas.

In context of above features and under Swachh Bharat Mission, following guidelines have been framed by Government of India. The guidelines are with hyperlink, so that the successors in Vishwakarma Yojana can get an advantage of directly referring the guidelines and can find the report worth reading:

No.	Title
1	Swachh Bharat Mission - Urban Guidelines
2	G.R. Pay & Use Toilet
3	G.R. Individual Toilet
4	G.R. Pay & Use Block
5	Gujarat State Urban Solid Waste Management and Sanitation Policy-2018
6	Solid Waste Management Rules 2016
7	Plastic Waste Management Rules 2016
8	Gujarat Waste Energy Policy 2016
9	Construction and Demolition Rules 2016
10	Advisory on decentralised composting
11	Bulk Waste Generator Book
12	C&D Waste Ready Reckoner
13	Waste to Wealth
14	GR Of Kailashdam
15	UD AND UHD GR DATED-20.01.2015 FOE 'OPEN DEFECATION FREE TOWNS'

Table-16: GUIDELINES OF GOVERNMENT OF INDIA REGARDING SWACHH BHARAT MISSION

In context of the program for awareness in villagers about swachchhata (cleanliness) our village has carried the swachchhata drive hosted by the Panchayata members and other villagers.

the team members observed that people feels enthusiastic regarding cleanliness especially for their neighboring areas.

6.3 Activities Done by Students for allocated village with Photograph

Because of prevailing pandemic situations of COVID-19, the team members were unable to practice any activities in the allocated village, but the team has observed various points and can recommend following practices either to be initiated or continued to be carried forward by the villagers:

- ✓ Elimination of open defecation
- ✓ Eradication of Manual Scavenging
- ✓ Adoption of Modern and Scientific methods for Solid Waste Management
- ✓ Make people aware about behavioral change regarding healthy sanitation practices including for the cases of household toilets, public toilets and communal toilet facilities
- ✓ Spreading generate awareness about sanitation and its linkage with public health
- ✓ Capacity Augmentation for local bodies to create an enabling environment for private sectors (if any)
- ✓ Comprehensive Sanitation Planning, implementation and monitoring

Chapter-7: Village condition due to Covid-19

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

The nation-wide lockdown imposed in India from March 25 to May 31, 2020 following the breakout of the COVID-19 pandemic affected rural India in diverse ways. This was only to be expected given the great variation in production systems and socio-economic conditions in villages across agro-ecological zones. However, the impact is differential across socio-economic classes and regions of the country, which are observed and narrated by the researchers T.S. Modak, S. Baksi and D. Johnson, which are presented below:

1. The impact on harvesting operations in the irrigated villages was limited, mainly because of the easy availability, and widespread use of combine harvesters in most of the surveyed villages. While it is too early to conclude, one can argue that the use of machines for various agricultural operations has received a thrust under the current crisis. In rainfed villages, being the lean agricultural season, the opportunities for farm employment were already restricted.

2. The major impact on agriculture, however, was in terms of access to marketing channels, and price received for the produce. In villages of Punjab and Kerala, there was active intervention by respective State governments to ensure procurement at fair prices. Such institutional mechanisms were absent in other States. The local market channel of sale through small traders and merchants had collapsed, and gravely impacted poor peasants for whom these traders were the main channel. Restricted mobility hindered access to regulated markets even for richer capitalist farmers. The disruption of the supply chain has led to a slump in the local farm harvest prices for most agricultural produce. Producers of perishable goods, particularly vegetables, were severely affected. Among them, the worst hit were poor peasants, without any access to storage facilities or procurement centers.

3. While agricultural operations were not affected much in the irrigated villages, a tendency seemingly encouraged by the lockdown is an expanded use of family labour among smaller landowners. The tendency to use family and exchange labour among poor peasants implies that the scope of agricultural wage work was lower for manual workers during the lockdown.

4. Non-agricultural work, which was crucial in the lean agricultural season, had completely collapsed. In the complete absence of non-farm employment, workers, and even artisans, were being forced to seek employment in agriculture. The reduced mobility due to the lockdown also implied that workers who otherwise regularly migrated for work were now competing for agricultural employment. As a consequence, a downward pressure on rural wage-rates was already beginning to be felt. The Covid-19 lockdown has broken down the complementary relationship between agricultural and non-agricultural work, where the surplus labour from the former was usually absorbed by the latter.

5. Despite income flows drying up for all socio-economic classes to varying degrees, the immediate impact was most severely felt by manual workers and poor peasants who did not have any savings. With meagre cash in hand, no home produce for consumption, and lack of employment, the class of manual workers were

certainly the worst affected. In addition, a major blow to the class of manual workers, and poor peasants has been the complete breakdown in receipt of remittances. The combination of low levels of income, ineffective public distribution systems, and negligible income-support had serious implications for subsistence of these households, leading to increased indebtedness especially from informal sources. The class of landlord and capitalist farmer was the least impacted by the lockdown. Better access to storage facilities and regulated markets implied that their farm incomes were relatively protected. Also, they had sufficient cash in hand and food stocks for daily household consumption.

To sum up, the Covid-19 lockdown has worsened the already prevalent distress in the Indian countryside especially for manual worker and poor peasant households. There is also a fear that if the lockdown restrictions are prolonged, crop production in the kharif season will be severely affected. Government intervention is critical to maintain a basic level of household consumption and to resume normal agricultural production.

The allocated village for the team has not been proven as a difference maker than the other and in context of above mentioned situations. Below are the steps taken in the allocated village:
In context of the covid-19 situation our allocated village remained mostly unaffected. The headman showed good approach and sealed the boundaries of village but yes it is also true that as the state highway passes trough Songadh it is not possible to completely seal the village. And the dwellers of the village showed even better approach by following all kinds of government guidelines, but after all a village is a village and hence some villagers also did not followed restrictions and the government and gathered in groups, but as the village was sealed so by the grace of god they were unaffected.
The accurate data regarding the total positive cases in this village is unavailable as the concerned authority count and merge the total number of positive cases with the total cases occurring in the Bhavnagar district.
The covid-19 testing facility was not available in the village till October. The people are randomly tested and if they found positive then they were transferred to the city hospital of Bhavnagar.

7.2 Activities Done by Students for allocated village with Photograph

Because of prevailing pandemic situations of COVID-19, the team members were unable to practice any activities in the allocated village, but the team has observed various points and can recommend following practices either to be initiated or continued to be carried forward by the villagers to FIGUREht against COVID-19:

- ✓ Making the villagers aware about initial preparedness through following common and specific guidelines levied by Central and State Governments time by time.
- ✓ Identifying the possibilities of development of screening facilities either at village entrance or common entrance point of either Taluka or nearby region.
- ✓ Tracing the contacts or migrants in the village.
- ✓ Testing to treatment facilities and centers in the village.
- ✓ Identifying manpower augmentation and training
- ✓ Suggesting various locations for temporary shelter homes either for isolation or for quarantine.
- ✓ Analysing post COVID-19 effects on agriculture, industry, employment and per capita income at village level.
- ✓ Simplifying administration, health-care and other local mercantile / industrial processes and strategies.

- ✓ Encouraging health workers, school teachers and aanganwadi people.

7.3 Any other steps taken by the students / villagers

As mentioned earlier, the team members found themselves unable to carry out any activities or steps because of COVID-19 Pandemic situation, but based on the village visit, following points can be suggested either as simultaneous or parallel to points suggested in above topic no. 7.2:

- ✓ Continuous contact between Gram Panchayat and District Level Control Room or Task Force for getting latest guidelines, practices and steps taken for FIGUREhting against COVID-19 Pandemic situations.
- ✓ Continuing the practice of social distancing, wearing masks and consulting health care units without shying.
- ✓ Distribution of food, fruit, dairy products, grain, vegetables, oils, petroleum products, etc. should be observed so that neither scarcity nor rush can be observed.
- ✓ Inter-village and intra-village active cases movements as well as rural to urban to and fro migration should be observed and recorded so that contact tracing can be practiced effectively.
- ✓ Awareness to governance through social media and digital platform should be practiced, which may lead less movement for various purposes.
- ✓ Making villagers aware and educated have become must, even if they are vaccinated in nearby future.

CHAPTER - :8 SUSTAINABLE DESIGN PLANNING PROPOSAL

8.1 Design proposal

Planning, survey, observation and brief write up about the existing design are as following:-
The following infrastructure are very good in condition. Some are newly constructed
Good condition ;-

- PHC
- Primary school
- Anganwadi
- Library
- Panchayat bhavan
- Wi-Fi system

In this way the team members approach this design. Might be it can improve the economic and social level of village.

8.1.1 COMMERCE & ARTS COLLAGE BUILDING

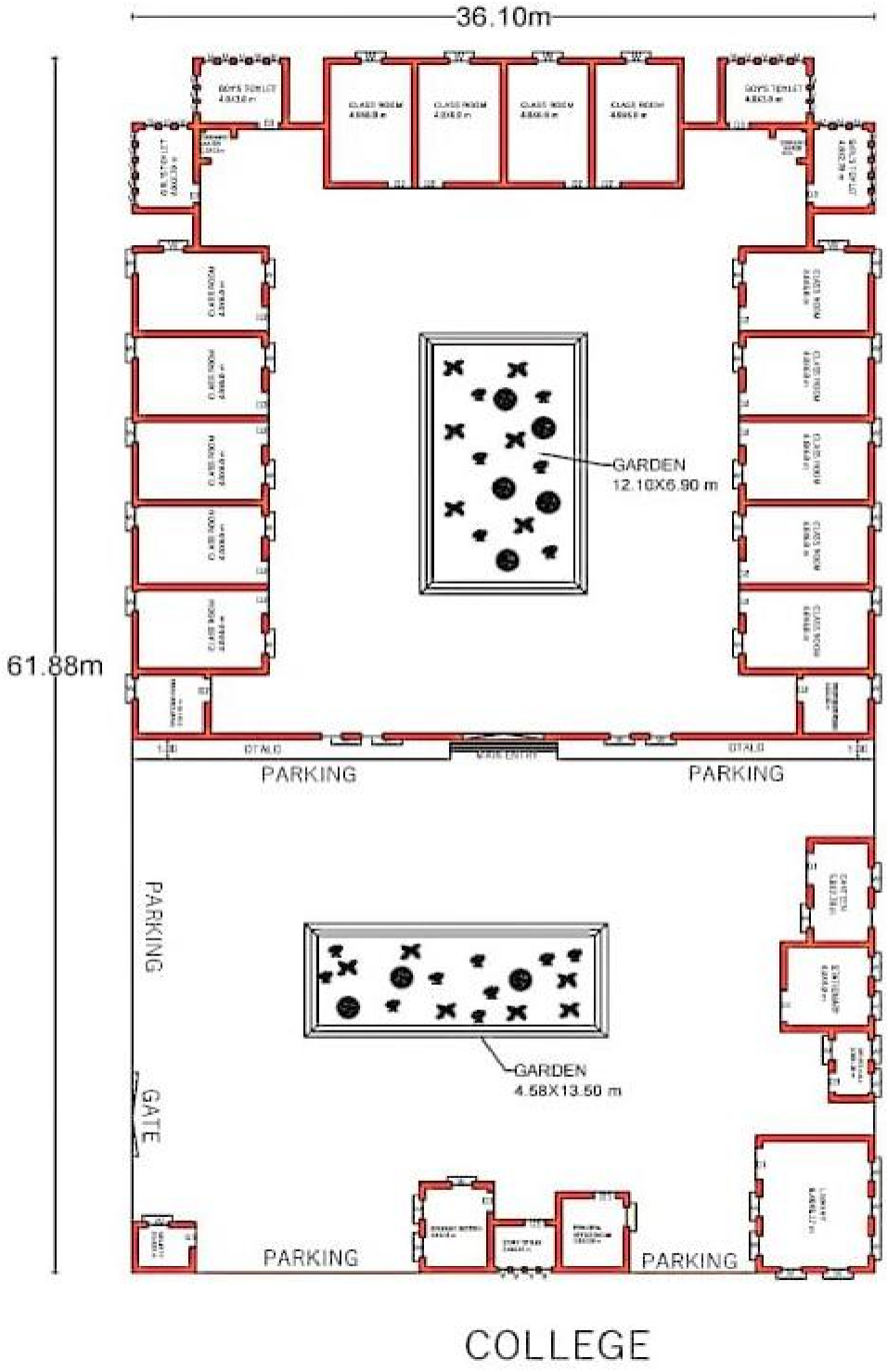


FIGURE-13: PLAN OF COLLEGE BUILDING

3D LAYOUT OF COLLAGE BUILDING

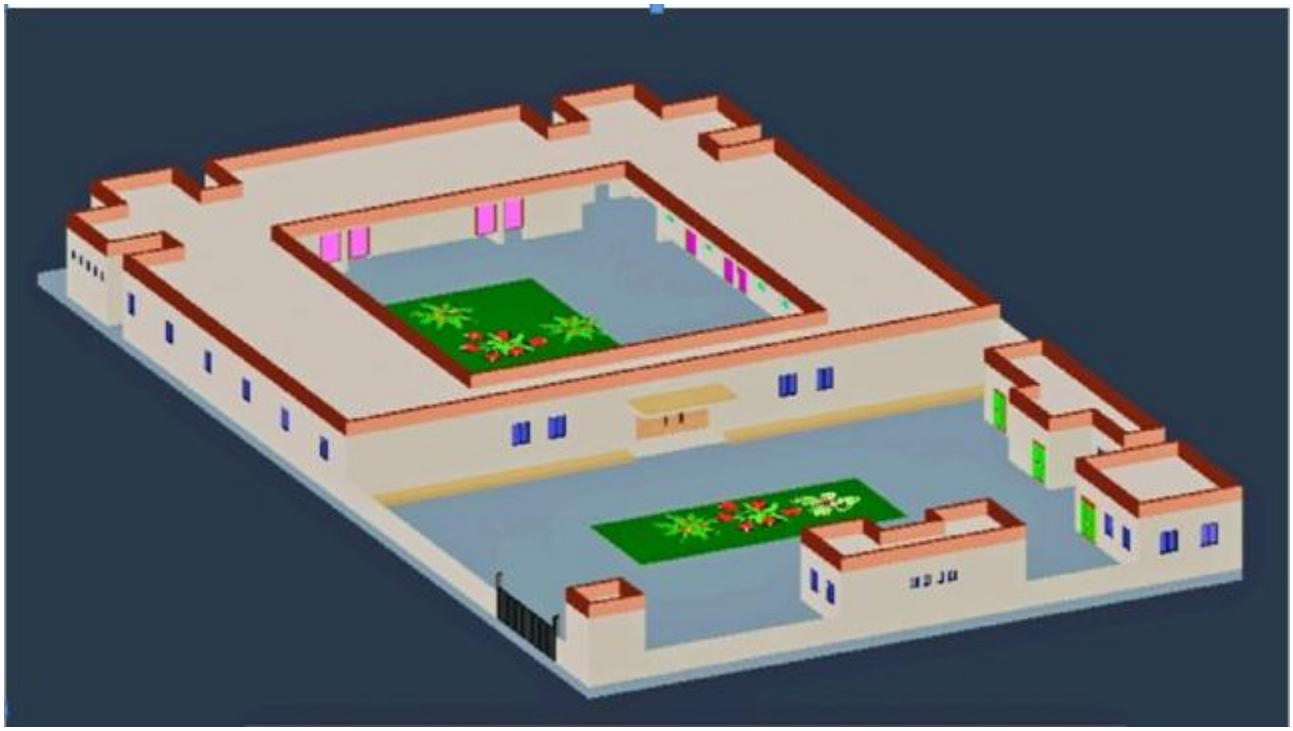


FIGURE-14: 3D LAYOUTS OF COLLEGE BUILDING

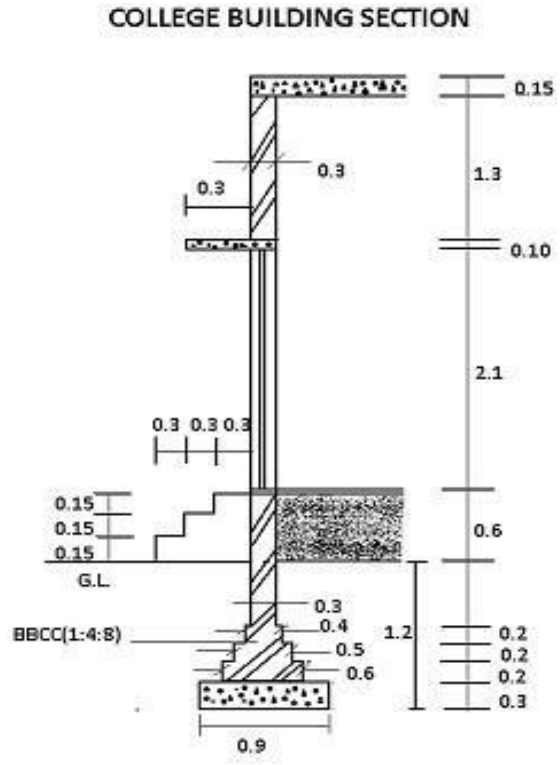


FIGURE-15: SECTION OF COLLEGE BUILDING

MEASURENMENT SHEET OF COLLAGE BUILDING						
ITEM NO.	**ITEM DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**
1.	**EARTH EXCAVATION WORK FOR FOUNDATION** TOTAL LENGTH OF C.L = 499.62 TOTAL NO. OF JUNTION = 61 L = 472.17 M	1	472.17	0.9	1.2	**510 M^3**
2.	**B.B.C.C. (1:4:8) FOR FOUNDATION WORK**	1	472.17	0.9	0.3	**127.50 M^3**
3.	**BRICK MASONARY UP TO PLINTH IN C.M. (1:6)** (A) FIRST STEP (B) SECOND STEP (C) THIRD STEP (D) FOURTH STEP (WALL) UP TO PLINTH • **FOR STEPS** 1st STEP 2nd STEP 3rd STEP	1 1 1 1 1 1 1	481.32 484.37 487.42 490.47 4 4 4	0.6 0.5 0.4 0.3 0.9 0.6 0.3	0.2 0.2 0.2 0.3 0.15 0.15 0.15 **TOTAL**	57.76 48.44 39.00 132.43 0.54 0.36 0.18 **= 278.71 M^3**
4.	**BRICK MASONARY WORK ABOVE PLINTH LEVEL AND UP TO SLAB LEVEL**	1 3	490.47 1.6	0.3 0.3	3.5 2.1	515 M^3 3.02

MEASURENMENT SHEET OF COLLAGE BUILDING						
ITEM NO.	**ITEM DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**
	DEDUCTION					
	D1	16	1.2	0.3	2.1	16.13
	D2	9	1	0.3	2.1	5.67
	D3	52	1	0.3	1.2	18.72
	W					= 43.54 M3
					TOTAL	= **471.46 M^3**
5.	**RCC, SLAB, LINTELS**					
	SLAB	1	SLAB AREA = 667.68 M2	---	---	100.15 M3
	LINTELS OVER DOORS					
	D1	3	2	0.18	0.1	0.48
	D2 & D3	25	1.5	0.18	0.1	3.00
	LINTELS OVER WINDOW					
	W	52	1.5	0.18	0.1	6.24
					TOTAL	**= 109.87 M^3**
6.	**EARTH FILLING**	1	AREA OF EARTH FILLING= 667.68 M2	---	0.55	**367.22 M^3**
7.	**SMOOTH PLASTERING INSIDE & OUTSIDE**	2	499.62	---	3.5	3497.34
	DEDUCTION					
	D1	3	1.6	---	2.1	10.08
	D2	16	1.2	---	2.1	40.32
	D3	9	1	---	2.1	18.90
	W	52	1	---	1.2	62.40
					TOTAL	= 132.42 M3
						= 3364.92M^3

Table – 17: MEASUREMENT sheet of COLLEGE BUILDING

ABSTRACT SHEET FOR COLLEGE BUILDING					
ITEM NO.	**ITEM NAME**	**QUANTITY**	**RATE**	**PER**	**AMOUNT**
1.	EXCAVATION FOR FOUNDATION	510.00	85	CUB.M	**43,350**
2.	B.B.C.C. (1:4:8)	127.50	2700	CUB.M	**3,44,250**
3.	BRICK MASONARY UPTO PLINTH	278.71	3200	CUB.M	**8,91,872**
4.	BRICK MASONARY ABOVE PLINTH	471.46	3500	CUB.M	**16,50,510**
5.	RCC, SLAB, LINTELS, & CHAJJA	109.87	8800	CUB.M	**9,66,856**
6.	EARTH FILLING	367.22	50	CUB.M	**18,361**
7.	**INSIDE & OUTSIDE SMOOTH PLASTERING**	3364.92	150	SQ.M	**5,04,738**
				TOTAL	**= 44,195,371**

Table – 18: Abstract sheet of COLLEGE BUILDING

8.1.2 DESIGN OF SEPTIC TANK :

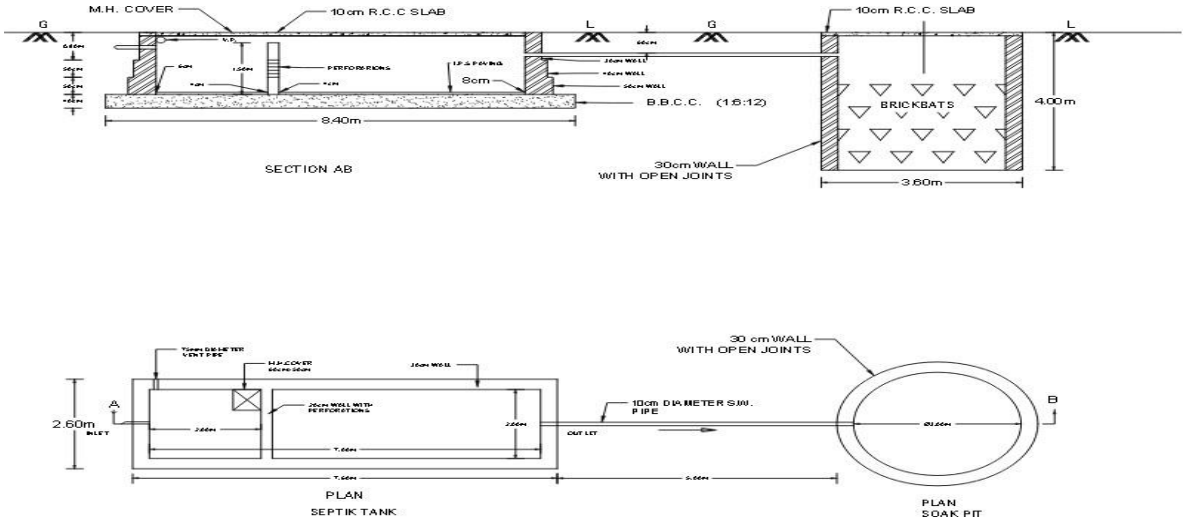


FIGURE-16: SEPTIC TANK PLAN AND ELEVATION

3D LAYOUT OF SEPTIC TANK :

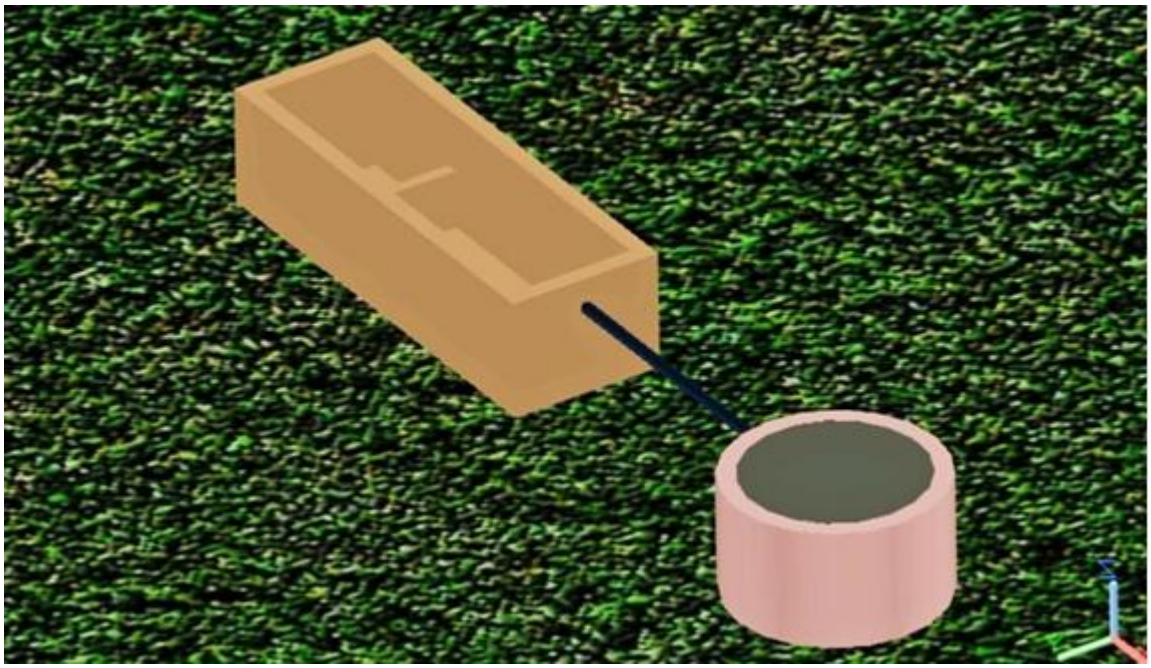


FIGURE-17: 3D LAYOUTS OF SEPTIC TANK

MEASUREMENT SHEET OF SEPTIC TANK						
ITEM NO.	**ITEM DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**
1.	**EXCAVATION OF FOUNDATION** (A) UP TO 1.5 m DEPTH FOR SEPTICTANK : • **FOR SEPTIC TANK** L = 8.40 m B = 3.4 m • **FOR SOAK PIT :** (B) FROM 1.5 m TO 3.0 m DEPTH • **FOR SEPTIK TANK:** H=0.98 m • **FOR SOAK PIT:** (C) FOR DEPTH MORE THAN 3.0 • **FOR SOAK PIT**: H = 1.0 m	 1 1 1 1 1	 8.4 0.785 8.4 0.785 0.785	 3.4 (3.6)2 3.4 (3.6)2 (3.6)2	 1.5 1.5 **TOTAL** 0.98 1.5 **TOTAL** 1.5	 42.84 15.27 **= 58.11 M^3** 27.99 15.27 **=43.26 M^3** 10.18 **M^3**
2.	**FOUNDATION CONCRETE B.B.C.C. (1:6:12) FOR SEPTIK TANK:**	1	0.785	(3.6)2	1.0	**10.18 M^3**

3.	**FOR WALLS OF SEPTIK TANK: FIRST CLASS BRICK WORK IN C.M.(1:6)**					
	LONG WALLS :	2	8.0	0.5	0.5	4.0
	FIRST STEP : L =8.0 m	2	7.8	0.4	0.5	3.12
		2	7.6	0.3	0.98	4.47
	SECOND STEP:L = 7.8					
	THIRD STEP : L = 7.6 m					
	H= 0.98 m	2	2	0.5	0.5	1.0
		2	2	0.4	0.5	0.8
	SHORT WALLS :	2	2	0.3	0.98	1.18
	FIRST STEP : L =2 m					
	SECOND STEP : L = 2 m				**TOTAL**	**= 14.57 M^3**
	THIRD STEP : L = 2 m					
4.	**OPEN JOINTS MASONARY OF SOAK PIT**					
	H = 3.9	1	0.78	3.96	3.90	12.13
	BAFFLE WALL OF SEPTIK TANK	1	2.0	1.5	1.5	0.6
					TOTAL	**= 12.73 M^3**
5.	**BRICKBATS IN SOAK PIT**	1	0.785	(3.0)2	3.40	**24.03 M^3**
	H = 3.4 m					
6.	**RCC SLAB (10 cm)**					
	• **FOR SEPTIC TANK :**	1	7.6	2.6	0.1	1.98
	• **FOR SOAK PIT :**	1	0.785	(3.6)2	0.1	1.02
		1	0.5	0.6	0.1	-0.03
	DEDUCTION FOR MANHOLE COVER				**NET QUANTITY**	**= 2.97 M^3**

7.	**I.P.S. FLOORING AT THE BOTTOM SEPTIC TANK**					
	(A) LEFT PART, AVERAGE	1	2.0	2.0	---	4.0 M^2
	THICKNESS = 5 cm	1	4.8	2.0	---	9.6 M^2
	(B) RIGHT PART, AVERAGE THICKNESS =6cm					
8.	**12 mm THICK PLASTER (1:4) INSIDE THE SEPTIC TANK**					
	LONG WALLS :	2	7.0	---	1.98	27.72
	H = 1.98 m	2	2.0	---	1.98	7.92
	SHORT WALLS :	1	7.0	2.0	---	14.0
	BELOW THE SLAB	1	0.785	(3.0)2	---	7.07
	BELOW THE SLAB OF SOAK PIT				**TOTAL**	**= 56.71 M^2**
	DEDUCTION	2	---	0.2	1.5	0.6
	ENDS OF BAFFLE WALL	1	0.5	0.6	---	0.30
	MANHOLE COVER				**NET QUANTITY**	-0.90 M^2 **= 55.81 M^2**
9.	**C.I. STEPS**	3	---	---	---	**3 NOS.**
10.	**MANHOLE COVER (WEIGHT UP TO 0.50 QUINTAL)**	1	---	---	---	**1 NOS.**
11.	**100 mm DIAMETER S.W. PIPE**					
	OUTLET PIPE :					
	L = 5.6 m	1	5.6	---	---	5.6
	INLET PIPE :					
	L = 2.4 m (ASSUME)	1	2.4	---	---	2.4
					TOTAL	**= 8.0 r.m**
12.	**75 mm DIAMETER C.I. VENT PIPE ASSUME LENGTH**	1	12.0	---	---	**12 r.m**

TABLE-19: MEASUREMENT SHEET OF SEPTIC TANK

TABLE ABSTRACT SHEET FOR SEPTIC TANK					
NO.	**ITEM**	**QUANTITY**	**RATE**	**PER Rs.**	**AMOUNT Rs.**
1.	**EXCAVATION FOR FOUNDATION :** • UP TO 1.5 m DEPTH • FROM 1.5 m TO 3.0 m DEPTH • MORE THAN 3.0m DEPTH	58.11 m3 43.26 m3 10.18 m3	85.0 100.0 150.0	M^3 M^3 M^3	**4939.5** **4326** **1527**
2.	**FOUNDATION CONCRETE B.B.C.C.(1:6:12)**	11.42 m3	2000.0	M^3	**22840**
3.	**FIRST CLASS BRICK MASONARY IN C.M. (1:6) FOR THE WALLS OF SEPTIC TANK**	14.57 m3	3200.0	M^3	**46624**
4.	**OPEN JOINTS MASONARY OF SOAK PIT**	12.73 m3	1500.0	M^3	**19095**
5.	**BRICK BATS IN SOAK PIT**	24.03 m3	800.0	M^3	**19224**
6.	**RCC SLAB (INCLUDING REINFORCEMENT)**	2.97 m3	8800.0	M^3	**26136**
7.	**I.P.S. AT THE BOTTOM OF THE SEPTIK TANK** (A) AVERAGE 5 cm THICK (B) AVERAGE 6 cm THICK	4.0 m3 9.6 m3	250.0 300.0	M^2 M^2	**1000** **2880**
8.	**12 mm THICK PLASTER (1:4) INSIDE THE**	55.81 m2	150.0	M^2	**8372**

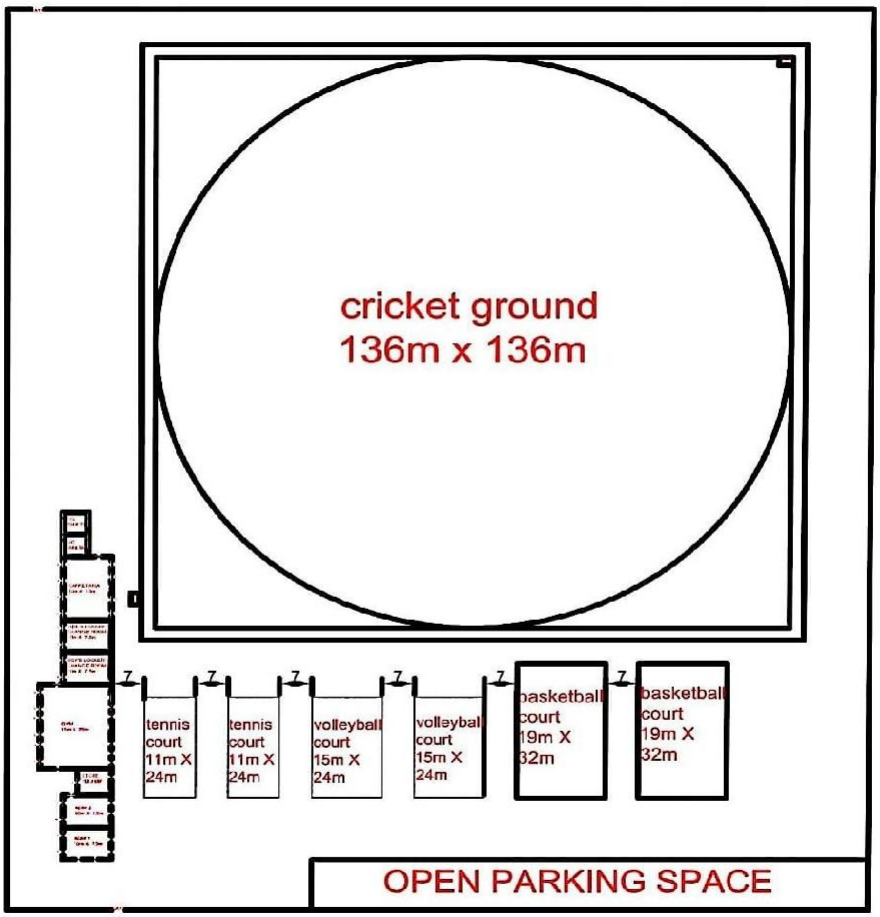
	SEPTIC TANK				
9.	**C.I. STEPS**	3 nos	300.0	No.	**900.00**
10.	**MANHOLE COVER SIZE 50 cm * 60 cm**	1 nos	450.0	No.	**450.0**
11.	**100 mm DIA. S.W. PIPE**	8 r.m.	130.0	r.m.	**1040.0**
12.	**75 mm DIA. C.I. VENT PIPE**	12 r.m.	300.0	r.m.	**3600.0**

TOTAL = Rs. 1,62,954
ADD 5% FOR

CONTINGENCIES Rs. 8148 **GRAND TOTAL Rs 1,771,102 = ~ SAY Rs. 1,771,10**

TABLE-20: ABSTRACT SHEET OF SEPTIC TANK

8.1.3 DESIGN OF SPORTS COMPEX



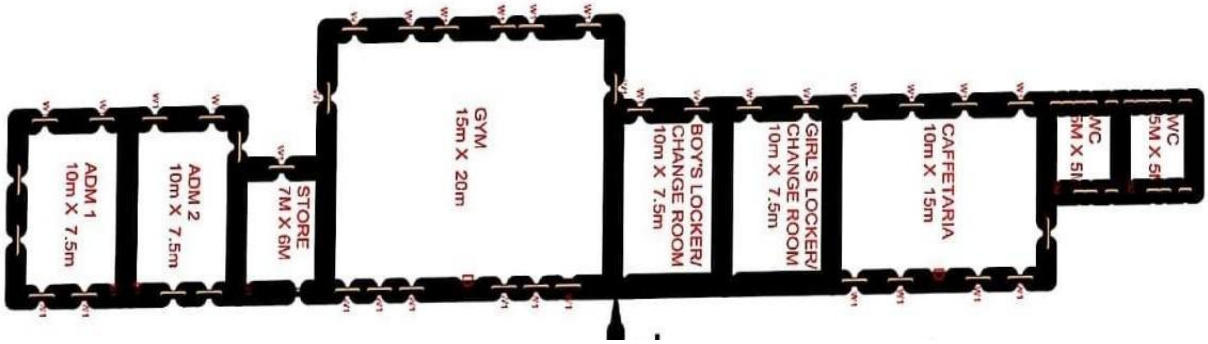


FIGURE-18: SPORTS COMPLEX PLAN

3D LAYOUT OF SPORTS COMPEX

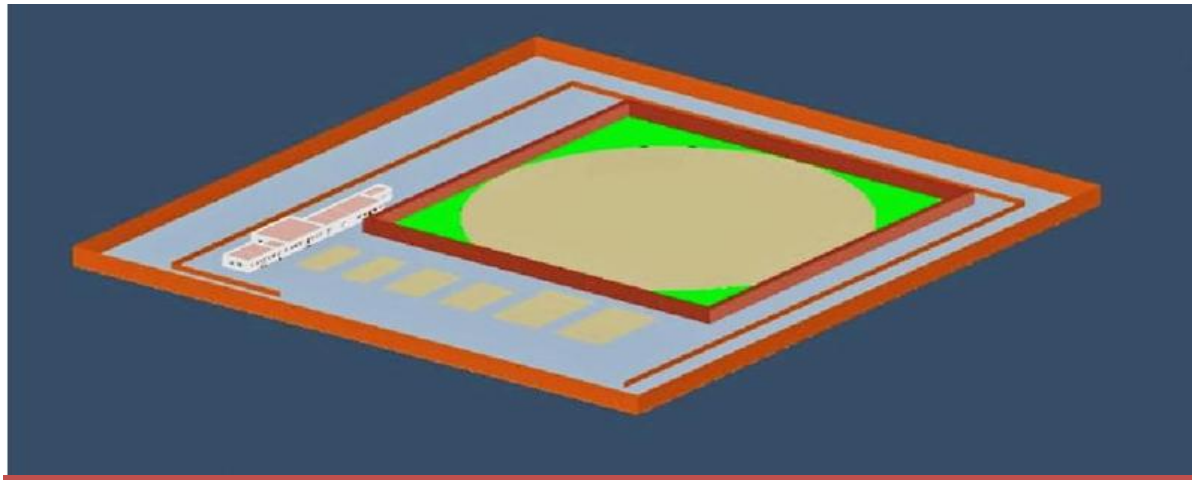


FIGURE-19: SPORTS COMPLEX 3D LAYOUTS

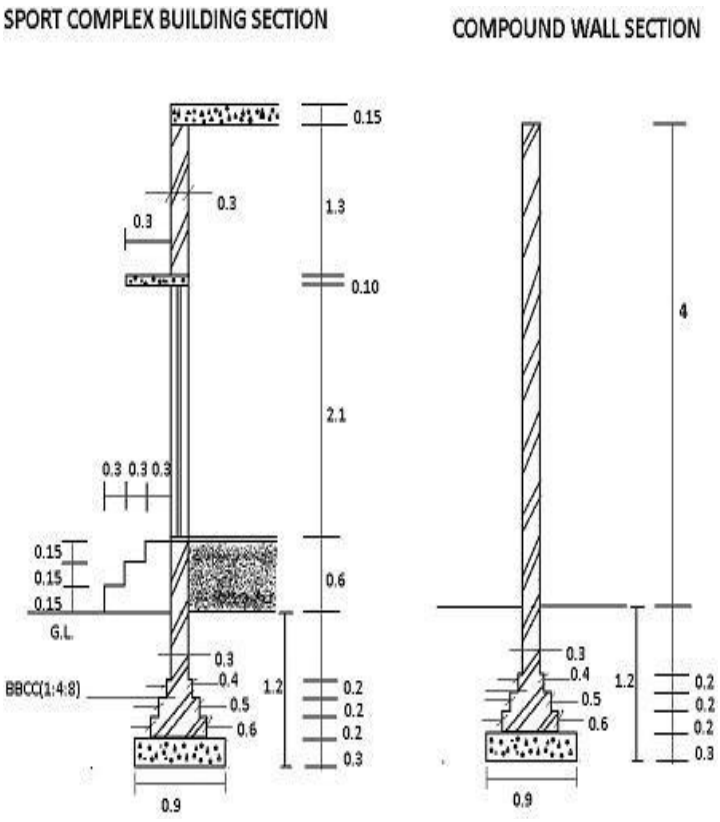


FIGURE-20: SECTION OF SPORTS COMPLEX

MEASUREMENT SHEET OF SPORTS COMPLEX						
ITEM NO.	**ITEM DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**
1.	**EXCAVATION WORK FOR FOUNDATION** TOTAL LENGTH OF C.L = 259.1 M TOTAL NO. OF JUNTION = 16 L = 251.9 M	1	251.90	0.9	1.2	**272.05 M3**
2.	**B.B.C.C. (1:4:8) FOR FOUNDATION WORK**	1	251.90	0.9	0.3	**68.01 M3**
3.	**BRICK MASONARY UP TO PLINTH IN C.M. (1:6)** (E) FIRST STEP (F) SECOND STEP (G) THIRD STEP (H) FOURTH STEP • **FOR STEPS** 1st STEP 2nd STEP 3rd STEP	 1 1 1 1 1 1	 254.30 255.10 255.90 256.70 9 9 9	 0.6 0.5 0.4 0.3 0.9 0.6 0.3	 0.2 0.2 0.2 0.85 0.15 0.15 0.15 **TOTAL**	 30.52 25.51 20.47 65.46 1.22 0.81 0.41 **= 144.40 M3**
4.	**BRICK MASONARY WORK ABOVE PLINTH LEVEL AND UP TO SLAB LEVEL** **DEDUCTION** D1 D2 D3 W1	1 2 5 2 40	256.70 1.5 1.2 1 1	0.3 0.3 0.3 0.3 0.3	3.5 2.1 2.1 2.1 1.2 **TOTAL**	269.54 M3 1.89 3.78 1.26 14.4 = 21.33 M3 = **248.21 M3**

5.	**RCC, SLAB, LINTELS**					
	SLAB	1	5.6	10.75	0.15	9.03
		1	10.6	30.90	0.15	49.13
		1	15.6	20.30	0.15	47.05
		1	10.6	22.20	0.15	35.78
	LINTELS OVER DOORS					
	D1					
	D2	2	1.8	0.3	0.1	0.11
	D3	5	1.5	0.3	0.1	0.23
	W1	2	1.2	0.3	0.1	0.07
		40	1.2	0.3	0.1	1.44
					TOTAL	**= 142.84M3**
6.	**EARTH FILLING**	1	5.6	10.75	0.55	33.11
		1	10.6	30.90	0.55	180.15
		1	15.6	20.30	0.55	174.17
		1	10.6	22.20	0.55	129.43
					TOTAL	**= 516.86 M3**
7.	**SMOOTH PLASTERING INSIDE & OUTSIDE**	2	259.10	---	3.5	1813.70
	DEDUCTION					
	D	2	1.5	---	2.1	6.30
	D2	5	1.2	---	2.1	12.60
	D3	2	1	---	2.1	4.20
	W	40	1	---	1.2	48.00
					TOTAL	**= 1742.60 M2**
8.	**EXCAVATION FOR FOUNDATION WORK FROM COMPOUND WALL:** • TOTAL C.L = 800 M • TOTAL NO. OF JUNCTION = 0	1	800	0.9	1.2	**864 M3**
9.	**B.B.C.C. FOR FOUNDATION OF COMPOUND WALL (1:4:8)**	1	800	0.9	0.3	216 M3

10.	**TOTAL BRICK MASONARY WORK FOR COMPOUND WALL**					
	1. BELOW G.L.	1	800	0.6	0.2	96.00
	• 1st STEP	1	800	0.5	0.2	80.00
	• 2nd STEP	1	800	0.4	0.2	64.00
	• 3rd STEP	1	800	0.3	0.3	72.00
	• 4th STEP					
	2. ABOVE G.L.	1	800	0.3	4	960
	• DEDUCTION FOR GATE	2	4	0.3	4	9.60
					TOTAL	**= 1262.4 M2**
11.	**SMOOTH PLASTERING FOR INSIDE & OUTSIDE FOR COMPOUND WALL**	2	800	---	4	6400
	• DEDUCTION FOR GATE	2	4	---	4	32
					TOTAL	= 6368 M2
12.	**CRICKET GROUND**	1	136	136	---	**18496 M2**
13.	**TENNIS COURT**	2	11	24	---	**528 M2**
14.	**VOLLEYBALL COURT**	2	15	24	---	**720 M2**
15.	**BASKETBALL COURT**	2	19	32	---	**1216 M2**

TABLE–21: MEASUREMENT SHEET OF SPORTS COMPLEX

ABSTRACT SHEET FOR SPORTS COMPLEX					
ITEM NO.	**ITEM NAME**	**QUANTITY**	**RATE**	**PER**	**AMOUNT**
1.	**EXCAVATION FOR FOUNDATION**	510	85	CUB.M	**43,350**
2.	**B.B.C.C. (1:4:8) FOR FOUNDATION**	68.01	2700	CUB.M	**1,83,627**
3.	**BRICK MASONARY UPTO PLINTH LEVEL**	144.40	3200	CUB.M	**4,62,080**
4.	**BRICK MASONARY UPTO SLAB LEVEL ABOVE PLINTH LEVEL**	248.21	3500	CUB.M	**8,68,735**
5.	**RCC WORK (SLAB & LINTELS)**	142.84	8800	CUB.M	**12,56,992**
6.	**EARTHFILLING**	516.86	50	CUB.M	**25,843**
7.	**SMOOTH PLASTERING INSIDE & OUTSIDE**	1742.60	150	SQ.M	**2,61,390**
8.	**EXCAVATION FOR FOUNDATION OF COMPOUND WALL**	864	85	CUB.M	**73,440**
9.	**B.B.C.C. (1:4:8) FOR COMPOUND WALL FOUNDATION**	216	2700	CUB.M	**5,83,200**
10.	**TOTAL BRICK MASONARY WORKFOR COMPOUND WALL**	1262.40	3500	CUB.M	**44,18,400**
11.	**SMOOTH PLASTERING FORINNER & OUTER FACE OF COMPOUND WALL**	6368	150	SQ.M	**9,55,200**
12.	**CRICKET GROUND**	18496	10	SQ.M	**1,84,960**
13.	**TENNIS COURT**	528	75	SQ.M	**39,600**
14.	**VOLLEYBALL COURT**	720	10	SQ.M	**7,200**
15.	**BASKETBALL GROUND**	1216	100	SQ.M	**1,21,600**

TOTAL COST = 9,485,617/- Rs

Table–22: Abstract sheet of SPORTS COMPLEX

8.1.4 SONGATH BUS STAND

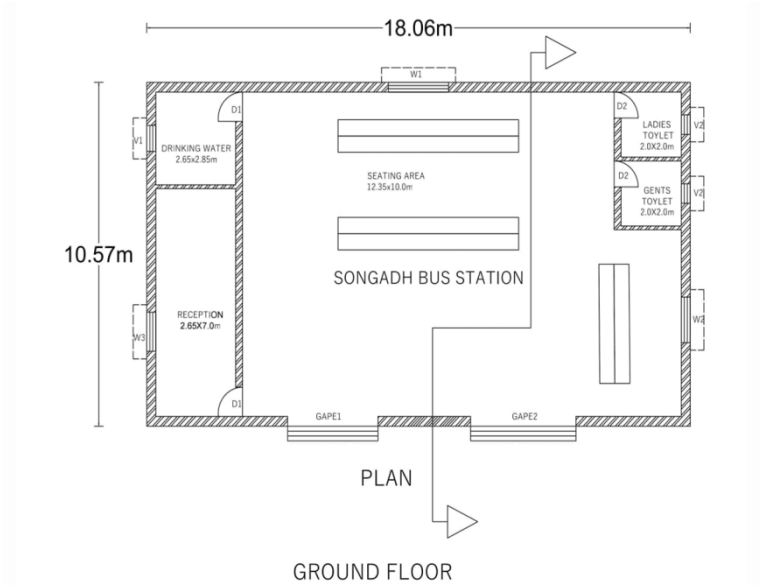


FIGURE-21: SONGATH BUS STAND PLAN

- **3D LAYOUT OF BUS STAND BUS STAND**

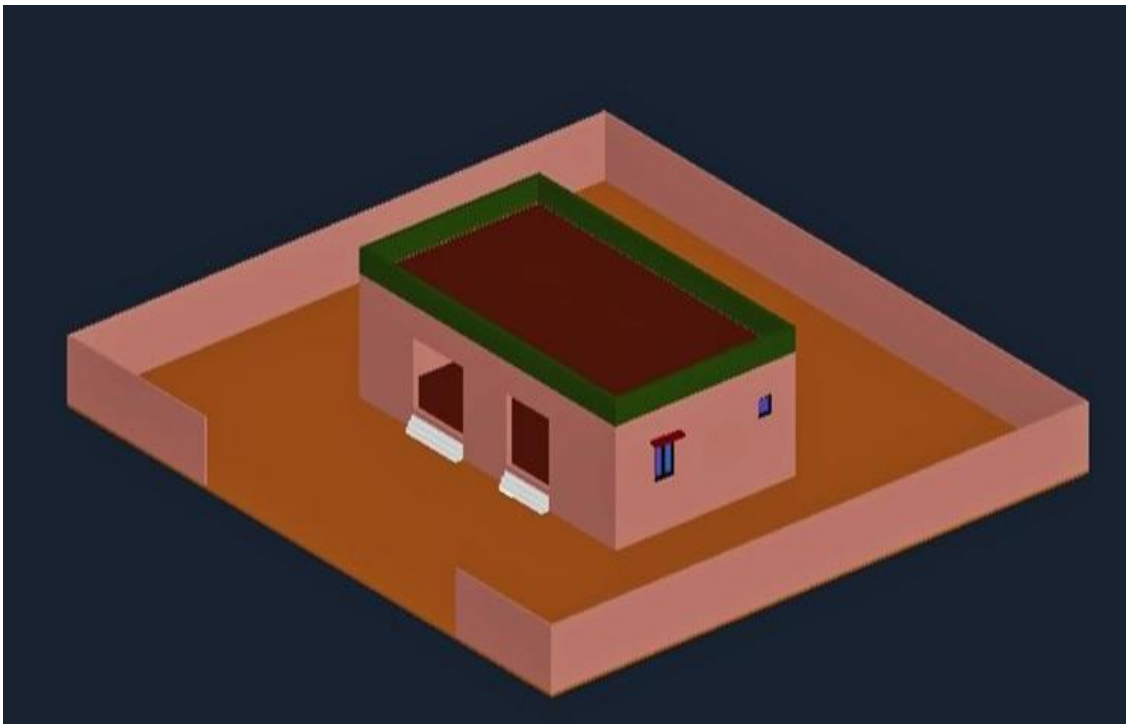


FIGURE-22: 3D LAYOUTS OF SONGADH BUS STAND

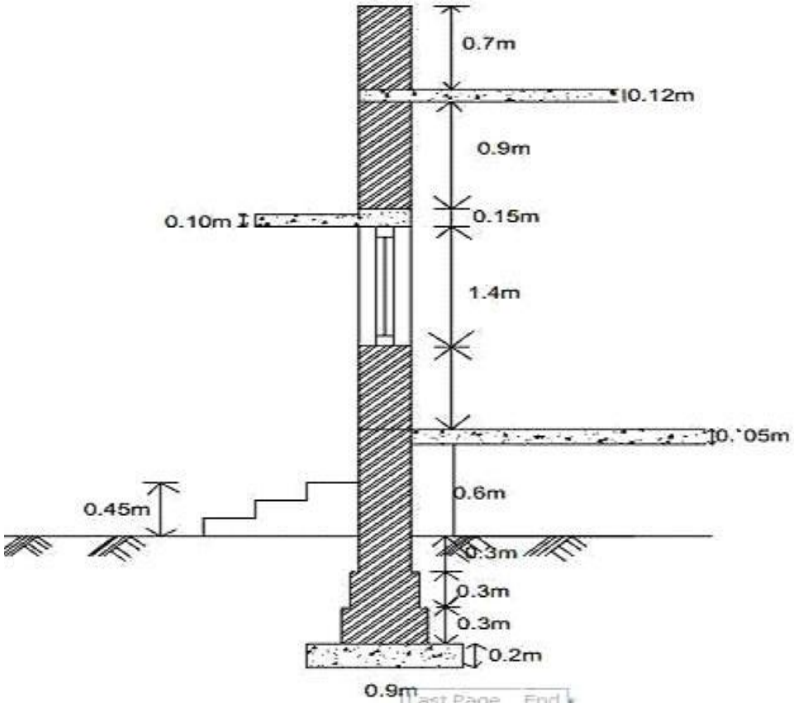


FIGURE-23: SECTION OF SONGATH BUS STAND

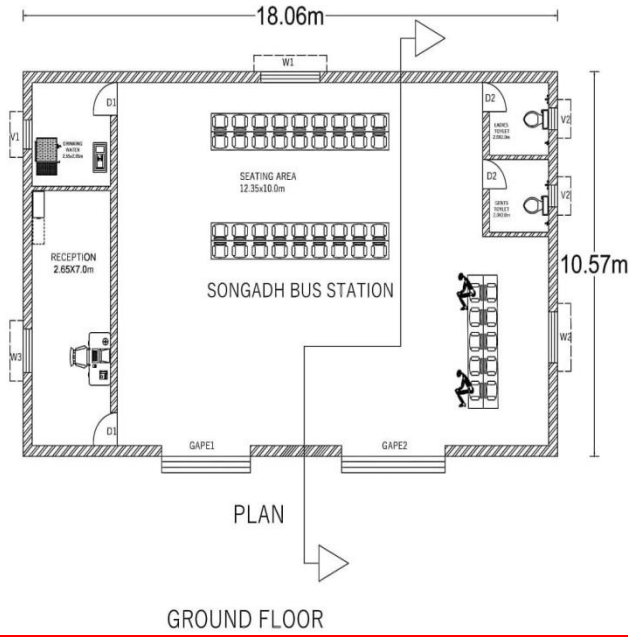


FIGURE-24: FURNITURE OF SONGATH BUS STAND

MEASUREMENT SHEET OF BUS STAND						
ITEN NO.	**ITEM DESCRIPTION**	**NO.**	**L**	**B**	**H**	**QUANTITY**
1.	**EXCAVATION FOR BUS STAND IN SOFT SOIL**					
	(1) LONG WALL	2	16.35	0.9	1.1	32.37
	(2) SHORT WALL	2	9.4	0.9	1.1	18.61
					TOTAL	**= 50.98 M^3**
2.	**B.B.C.C. (1:4:8)**					
	(1) LONG WALL	2	16.35	0.9	0.2	5.88
	(2) SHORT WALL	2	9.4	0.9	0.2	3.38
					TOTAL	**= 9.26 M^3**
3.	**BRICK MASONARY UP TO PLINTH**					
	(1) LONG WALL					
	• STEP 1	2	15.95	0.5	0.3	4.785
	• STEP 2	2	15.85	0.4	0.3	3.80
	• STEP 3	2	15.75	0.3	0.85	8.03
	(2) SHORT WALL					
	• STEP 1	2	9.8	0.5	0.3	2.94
	• STEP 2	2	9.9	0.4	0.3	2.376
	• STEP 3	2	10	0.3	0.85	5.1
					TOTAL	**= 27.031 M^3**
4.	**BRICK MASONARY ABOVE PLINTH**					

	(1) LONG WALL (2) SHORT WALL **DEDUCTION = 6.556 M3**	2 2	0.3 0.3	3 3	15.75 10 **TOTAL 46.35-6.556**	28.35 18 **= 46.35 M^3 = 39.80 M^3**
5.	**R.C.C. SLAB, LINTEL, CHAJJA** (1) SLAB (2) CHAJJA (3) LINTEL ---	1 W1 = 6 W2 = 1	15.75 1.8 1.5 ---	10.6 0.6 0.6 ---	0.12 0.10 0.10 --- **TOTAL**	20 0.648 0.09 0.82 M3 **= 21.56 M^3**
6.	**EARTH FILLING**	1	15.15	10	0.55	**= 83.32 M^3**
7.	**INTERNAL SMOOTH PLASTER** (1) LONG WALL (2) SHORT WALL (3) CEILING DEDUCTION	2 2 1 ---	15.15 10 15.15 ---	--- --- 10 ---	3 3 --- --- **TOTAL 302.4 – 9.55**	90.9 60.00 151.5 9.55 **= 302.4 M^3 = 292.85 M^3**
8.	**OUTER PLASTER**					

	(1) LONG WALL (2) SHORT WALL (3) DEDUCTION	2 2 ---	15.75 10.6 ---	--- --- ---	3.1 3.1 --- **163 - 9.55**	97.65 65.72 9.55 **= 153.52 M^3**

TABLE–23: MEASUREMENT SHEET OF BUS STAND

Item Name	Quantity	Rate	Per	Amount
Excavation for Bus stand	50.98	85	m^3	4333.3
BBCC (1:4:8)	9.26	2700	m^3	25002
Brick masonry up to plinth	27.031	3200	m^3	86499.2
Brick masonry above plinth	39.80	3500	m^3	139300
R.C.C Slab, lintel ,chajja	21.56	8800	m^2	189728
Earth filling	83.32	50	m^3	4166
Internal smooth plaster	292.85	150	m^2	43927.5
Outer plaster	153.82	150	m^2	23073
Total cost of Bus stand = 516029 Rs				

TABLE–24: ABSTRACT SHEET OF BUS STAND

8.1.5 DESIGN OF SHELTER HOME

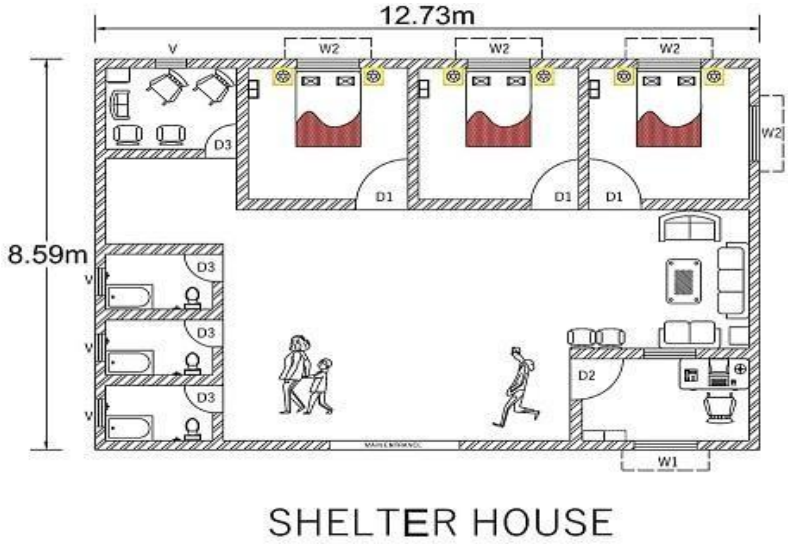


FIGURE-25: SHELTER HOME PLAN WITH FURNITURE

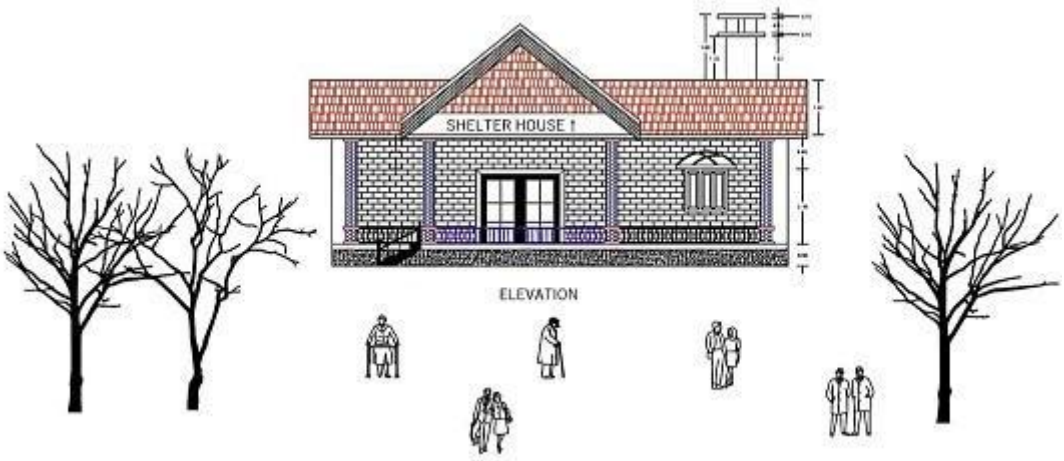


FIGURE-26:SHELTER HOME ELEVATION

9 3D LAYOUT OF SHELTER HOME

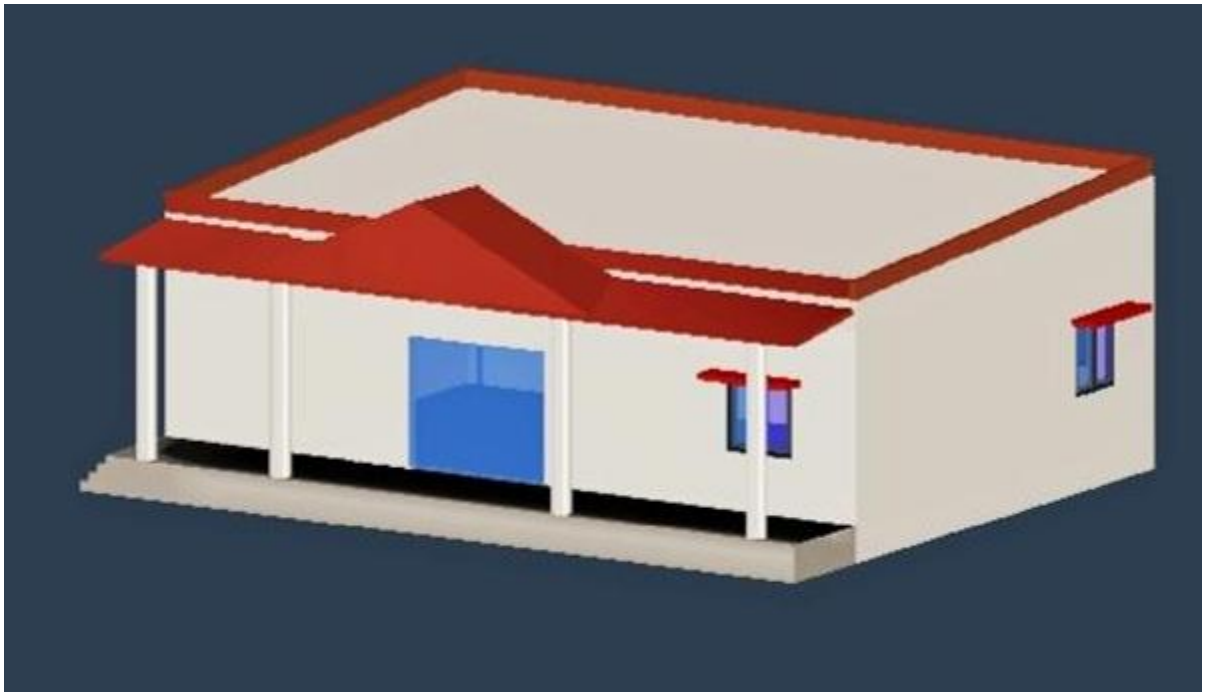


FIGURE-27: SHELTER HOME 3D LAYOUTS

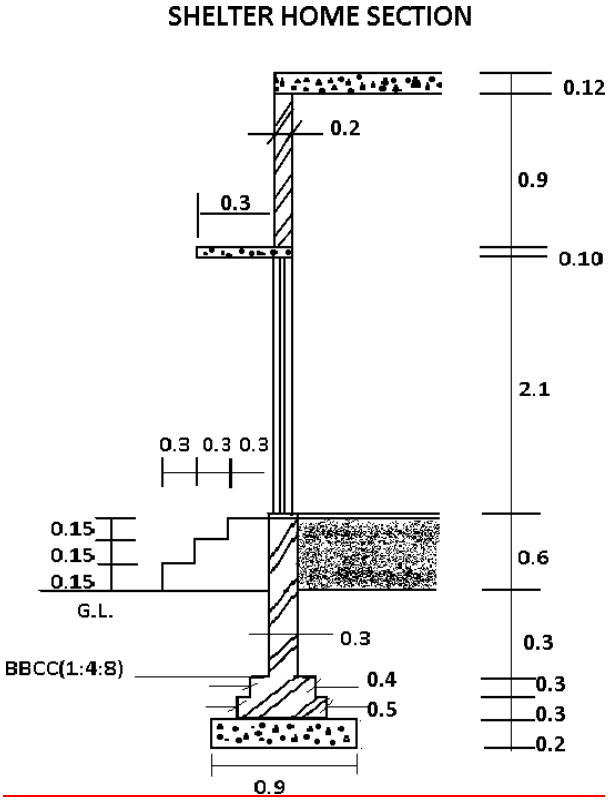


FIGURE-28: SECTION OF SHELTER HOME

MEASURENMENT SHEET OF SHELTER HOME						
ITEM NO.	**ITEM DESRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**
1.	**TOTAL EARTH WORK IN EXCAVATION FOR FOUNDATION** TOTAL LENGTH OF CENTRE LINE = 77.46 m NO. OF JUNCTIONS = 16 L = 70.26 m	1	70.26	0.9	1.10	**69.56 M^3**
2.	**BBCC (1:4:8) FOR FOUNDATION**	1	70.26	0.9	0.2	**12.65 M^3**
3.	**BRICK MASONRY UPTO PLINTH IN C.M. (1:6)** SUB-STUCTURE FIRST STEP : L=73.46 m SECOND STEP : L=77.26m THIRD STEP : L=75.06 m ABOVE G.L. FIRST STEP SECOND STEP THIRD STEP (FOR STAIRS MAIN ENTRANCE = 1.5 m)	1 1 1 1 1 1	73.46 77.26 75.06 1.5 1.5 1.5	0.5 0.4 0.3 0.9 0.6 0.3	0.3 0.3 0.85 0.15 0.15 0.15 **TOTAL**	11.02 M^3 9.27 M^3 19.14 M^3 0.20 M^3 0.14 M^3 0.07 M^3 **= 39.48 M^3**
4.	**BRICK MASONARY WORK ABOVE**					

	PLINTH LEVEL UP TO SLAB LEVEL L = 77.444 m	1	77.444	0.2	3	46.47 m3
		1	1.5	0.2	2.1	0.63 m3
	DEDUCTION	3	1.2	0.2	2.1	1.51 m3
	FOR DOOR &	1	1	0.2	2.1	0.42 m3
	WINDOWS	4	0.9	0.2	2.1	1.51 m3
	D	1	1	0.2	1.2	0.20 m3
	D1	4	1.2	0.2	1.2	1.15 m3`
	D2					
	D3				**TOTAL DEDUCTION**	**= 5.46 m3**
	W1					
	W2				**TOTAL**	**= 41.01 m3**
5.	**RCC, SLAB,LINTEL**					
		1	12.73	8.59	0.12	13.12 m3
	SLAB	5	1.5	0.6	0.1	0.45 m3
	LINTELS OVER WINDOWS	1	1.8	0.6	0.1	0.11 m3
	LINTELS OVER DOORS				**TOTAL**	**= 13.68 m3**
6.	**EARTH FILLING**	1	12.73	8.59	0.55	**60.14 m3**
7.	**PLASTERING INSIDE & OUTSIDE**	2	77.46	---	5	774.6 m2
	DEDUCTION					
	FOR DOORS &	1	1.5	---	2.1	3.15 m2
	WINDOWS	3	1.2	---	2.1	7.56 m2
	D	1	1	---	2.1	2.1 m2
	D1	4	0.9	---	2.1	7.56 m2
	D2	1	1	---	1.2	1.2 m2
	D3	4	1.2	---	1.2	5.76 m2
	W1					
	W2				**TOTAL**	**= 747.27 m2**

TABLE–25: MEASUREMENT SHEET OF SHELTER HOME

ABSTRACT SHEET OF SHELTER HOME					
SR NO.	**ITEM NAME**	**QUANTITY**	**RATE**	**PER**	**AMOUNT**
1.	**EXCAVATION FOR SHELTER HOME**	69.56	85	CUB.M	**5,913 /-**
2.	**B.B.C.C (1:4:8) FOR FOUNDATION**	12.65	2700	CUB.M	**34,155 /-**
3.	**BRICkmASONARY UPTO PLINTH LEVEL**	39.48	3200	CUB.M	**1,26,336 /-**
4.	**BRICK MASONARY UPTO SLAB AND ABOVE PLINTH**	41.06	3500	CUB.M	**1,43,710 /-**
5.	**RCC,SLAB,LINTEL,CHHAJJA**	13.68	8800	CUB.M	**1,20,384 /-**
6.	**EARTH FILLING**	60.14	50	CUB.M	**3,007 /-**
7.	**INNER AND OUTER PLASTER**	747.25	150	SQ.M **TOTAL**	**1,12,091 /-** **= 5,45,596 /-**

TABLE-26: ABSTRACT SHEET OF SHELTER HOME

8.1.6 AGRICULTURE MARKET BUILDING

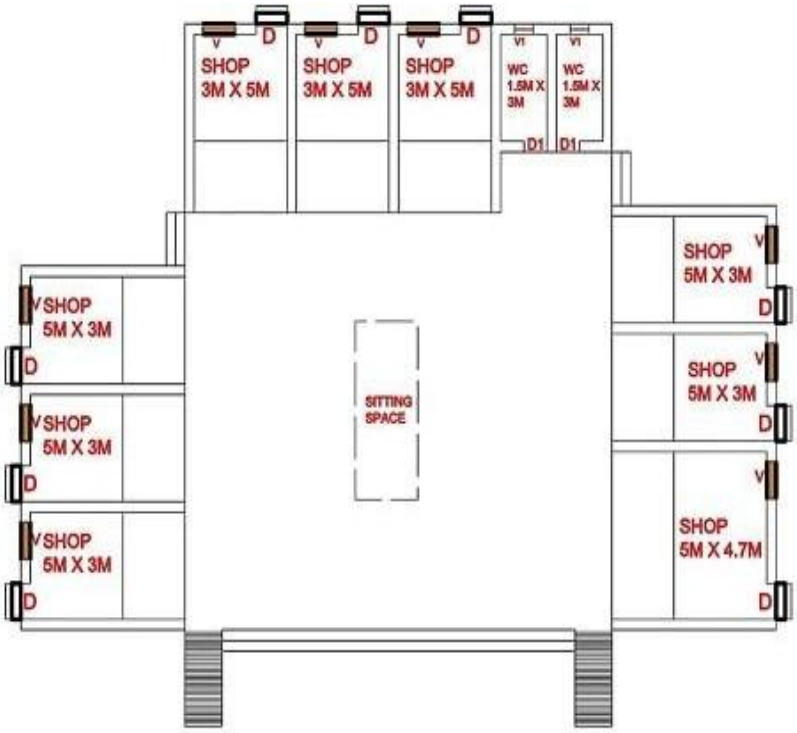


FIGURE-29: AGRICULTURE MARKET BUILDING PLAN

- 3D LAYOUT OF AGRICULTURE MARKET BUILDING

FIGURE-30: 3D LAYOUTS OF AGRICULTURAL MARKET BUILDING

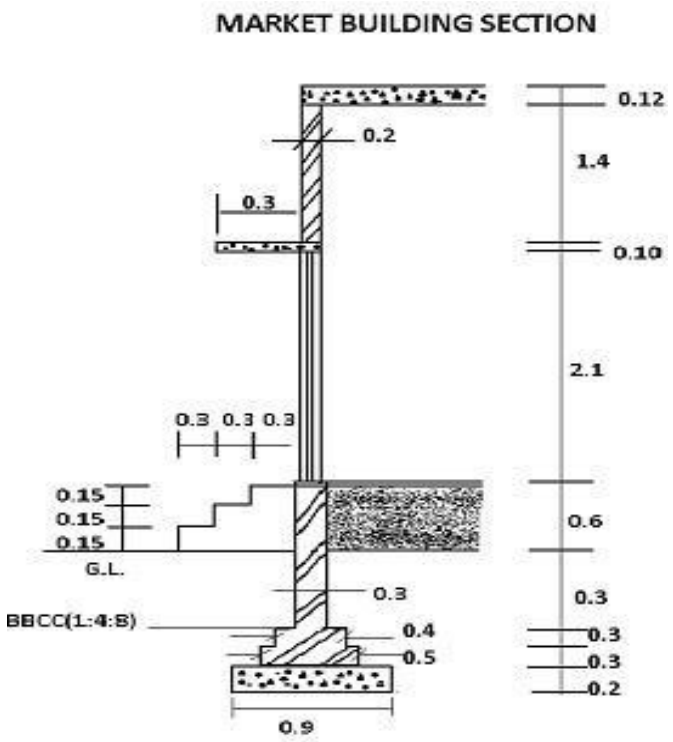


FIGURE-31: SECTION OF AGRICULTURE MARKET BUILDING

MEASURENMENT SHEET OF AGRICULTURE MARKET						
ITEM NO.	**ITEM DESRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**
1.	**TOTAL EARTH WORK IN EXCAVATION FOR FOUNDATION** TOTAL LENGTH OF CENTRE LINE = 106.70 m NO. OF JUNCTIONS = 10 L = 102.20 m	1	102.20	0.9	1.10	**101.18 M^3**
2.	**BBCC (1:4:8) FOR FOUNDATION**	1	102.2	0.9	0.2	**18.40 M^3**
3.	**BRICK MASONRY UPTO PLINTH IN C.M. (1:6)** SUB-STUCTURE FIRST STEP : L=104.20 m SECOND STEP :L=104.70m THIRD STEP : L=105.20 m ABOVE G.L. FIRST STEP SECOND STEP THIRD STEP (FOR STEPS L = OPENING = 12 m)	1 1 1 1 1 1	104.2 104.7 105.20 12 12 12	0.5 0.4 0.3 0.9 0.6 0.3	0.3 0.3 0.85 0.15 0.15 0.15 **TOTAL**	15.63 M^3 12.56 M^3 26.83 M^3 1.62 m3 1.08 m3 0.54 m3 **= 58.26 m3**
4.	**BRICK MASONARY WORK ABOVE**					

	PLINTH LEVEL UP TO SLAB LEVEL L = 105.7 m	1	105.7	0.2	4.5	95.13 **M^3**
	DEDUCTION					
	FOR DOOR &	9	1	0.2	2.1	3.78 **M^3**
	WINDOWS	2	0.9	0.2	2.1	0.76 **M^3**
	D	9	1	0.2	0.5	0.9 **M^3**
	D1	2	0.6	0.2	0.5	0.12 **M^3**
	V					
	V1				**TOTAL DEDUCTION**	**= 5.56 M^3**
					TOTAL	**= 89.57 M^3**
5.	**RCC, SLAB,LINTEL**					
		1	13.8	5.3	0.12	8.78 **M^3**
	SLAB	1	19.1	11.9	0.12	27.27 **M^3**
		1	5.3	10.2	0.12	6.49 **M^3**
		1	12	1	0.12	1.44 **M^3**
		9	1	0.6	0.10	0.54 **M^3**
	LINTELS OVER DOORS				**TOTAL**	**= 45.06 M^3**
6.	**EARTH FILLING**	1	13.8	5.3	0.55	**40.23 M^3**
		1	19.1	11.9	0.55	**125.01 M^3**
		1	5.3	10.2	0.55	**29.73 M^3**
					TOTAL	**= 194.96 M^3**
7.	**PLASTERING INSIDE & OUTSIDE**	2	77.46	---	5	387.3 **M^3**
	DEDUCTION					
		9	1	---	2.1	18.9 **M^3**
	D	2	0.9	---	2.1	3.78 **M^3**
	D1	9	1	---	0.5	4.5 **M^3**
	V	2	0.6	---	0.5	
	V1					

					TOTAL	**= 932.52 M^3**

TABLE–27: MEASUREMENT SHEET OF AGRICULTURE MARKET

ABSTRACT SHEET OF AGRICULTURE MARKET					
SR NO.	**ITEM NAME**	**QUANTITY**	**RATE**	**PER**	**AMOUNT**
1.	**EXCAVATION FOR EGRICULTURE MARKET**	101.18	85	CUB.M	**8,600 /-**
2.	**B.B.C.C (1:4:8) FOR FOUNDATION**	18.40	2700	CUB.M	**49,680 /-**
3.	**BRICkmASONARY WORK UPTO PLINTH LEVEL**	58.26	3200	CUB.M	**1,86,432 /-**
4.	**BRICK MASONARY WORK ABOVE PLINTH LEVEL**	89.57	3500	CUB.M	**3,13,495 /-**
5.	**RCC,SLAB,LINTELS**	45.06	8800	CUB.M	**3,96,528 /-**
6.	**EARTH FILLING**	194.96	50	CUB.M	**9,748 /-**
7.	**INNER AND OUTER PLASTER**	932.52	150	SQ.M **TOTAL**	**1,39,878 /-** **= 11,54,041 /-**

Table–28: Abstract sheet AGRICULTURE MARKET

Chapter - 9: Proposing designs for Future Development of the Village for the PART-II Design

- **Our proposed designs for this semester(Part-I):**

1. College building
2. Bus stand
3. Septic tank
4. Vegetable market
5. Shelter home
6. Sports complex

- **In next semester the team members would like to design following facilities for the Songath village(Part-II):**

1. Secondary school building
2. Recreation centre
3. Rain water harvesting system
4. Public toilet/bath(Pay and use)
5. Defense training centre
6. Science centre/Museum/Similar building

Chapter - 10: Conclusion of the Entire Village Activities of the Project

The project work started with the basic data collection, survey work and it progressed through meeting with headman, Talati-cum-Mantrishri and Principal of the existing school. The gap analysis was later framed and 6 various design problems were identified. The proposed solutions are framed in such a way that the village can enhance the overall physical, social and educational conditions of villagers and can promise the sustainable growth of the village in context to the Bhavnagar City, in which the village falls.

The concluding remarks of the project in the form of team details, problem definition and designed solutions are as follows:

Village and Team Details					
Village name:	**Team details:**	**(1) Enrollment No.:**	170210106010	**(1) Name**	MOIN M. PANCHA
Songadh		**(2) Enrollment No.:**	170210106027	**(2) Name**	DHARMESH N. MAKWANA

Problem Definition and Design Details			
Sr. No.	**Problem Definition**	**Capacity (mention unit)**	**Estimated cost (in Rs.)**
Design - 1	College building	560 Nos. Of Students	44,195,371
Design - 2	Septic Tank	150 Nos. of persons	1,77,110
Design - 3	Sports Complex	7 Nos. of sports	9,485,617
Design - 4	Bus Stand	191 sq.m. plinth area	516,029
Design - 5	Shelter Home	15 persons	545,596
Design - 6	Agriculture Market	9 Nos. of shops	1,154,041

TABLE-29: DESIGN CONCLUSION TABLE

It is truly believed by the project team that if the above mentioned design solutions are implemented then the village can replicate the basic facilities of nearby city and be able to lessen the migration from the village to nearest or other cities. The growth of the village can be enhanced and the prosperity as well as living conditions of the people can be well-furnished in a controlled way, such that it can fulfill the dream of father of our nation, Shri Mohandas Karamchand Gandhiji that "*The true India lives in the village.*"

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20. Smart Villages: Revitalising Rural Services. *EU Rural Rev*. 2018. Available online: https://enrd.ec.europa.eu/sites/enrd/files/enrd_publications/publi-enrd-rr-26-2018-en.pdf
21. Smart Villages: Comprehensive Review of Initiatives and Practices, Veronika Zavratnik, Andrej Kos and Emilija Stojmenova Duh, MDP 2018. Available online: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiqzZOv0tztAhUryzgGHXI9DXcQFjAKegQIIhAC&url=https%3A%2F%2Fwww.mdpi.com%2F2071-1050%2F10%2F7%2F2559%2Fpdf&usg=AOvVaw2pOen-yfYH2qOhWBJ4ucvr
22. Mainstreaming Smart Village In Rural Development: A Framework For Analysis And Policy by National Institute of Rural Development and Panchayati Raj (NIRDPR), [2018] Available online: http://nirdpr.org.in/nird_docs/tps/DG_Smart-Village-9-2-18.pdf

- **Other resources**

Village profile Songadh
Village profile Amargadh
Village profile Sanosara

- **Other Websites**

www.villageinfo.in
www.onefienine.com
www.wikipedia.com
www.wikivillage.com
www.mapsofindia.com
www.soki.in

Chapter - 12: Annexure attachment

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:	SANOSARA
Name of Taluka:	SIHOR
Name of District:	BHAVNAGAR
Name of Institute:	GOVERNMENT ENGINEERING COLLEGE, BHAVNAGAR
Nodal Officer Name & Contact Detail:	Prof. C.A. GAJJAR cagcivilbvn@gmail.com
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	(i) TALATI CUM MANTRI (ii) PANCHAYAT MEMBER (iii) VILLAGE DWELLER
Date of Survey:	

1. Demographical Detail:

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	–	–	–	–
ii)	2011	9340	4788	4552	1205

2. Geographical Detail:

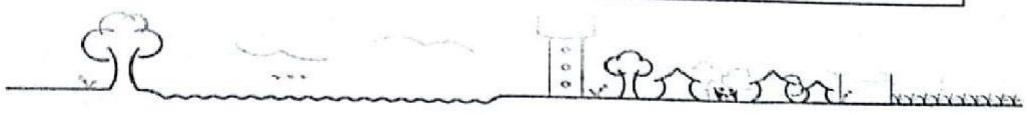
Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	2471.24
	Forest Area (In hect.)	0
	Agricultural Land Area (In hect.)	1748
	Residential Area (In hect.)	16.17
	Other Area (In hect.)	— 707.07
	Water bodies	—
	Nearest Town with Distance:	SIHOR (22 km)

3. **Occupational Details:**

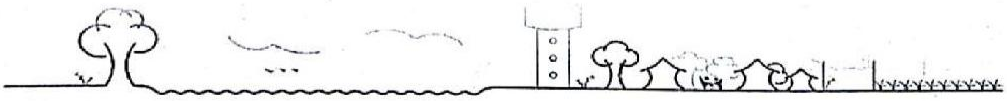
Name of Three Major Occupation groups in Village	1. AGRICULTURE
	2. DIAMOND INDUSTRY
	3. LABOUR WORK

4. **Physical Infrastructure Facilities:**

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated) • RO Water • Well (Covered/ Uncovered) • Hand pumps • Tube well/ Borehole • River/ Canal/ Spring/ Lake/ Pond		YES YES	 NO No	
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	YES		2,40,000 Seven And 2000 lit.
	Underground Sump	Capacity:		NO	
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)		YES		
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ ~~Open~~	Closed			
	If Open than Pucca / Kutcheha	—	—	N —	—
	Whether drain water is discharged directly in to Water bodies/ Sewer plants		YES		
Suggestions if any:					



E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road		YES		
	Main road		YES		BlocK
	Internal streets		YES		
	Nearest NH/SH/MDR/ODR Dist. in kms.		0 Km		
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)			NO	3Km
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)		YES		0Km
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)		YES		
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)		YES		
	Power supply for Domestic Use		YES		
	Power supply for Agricultural Use		YES		
	Power supply for Commercial Use		YES		
	Road/ Street Lights		YES		



	Electrification in Government Buildings/ Schools/ Hospitals		YES		
	Renewable Energy Source Facilities (Y/ N)			—	
	LED Facilities			—	
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.			—	
	Location Condition			—	
	Community Toilet (With bath/ without bath facilities)			—	
	Solid & liquid waste Disposal system available		YES		
	Any facility for Waste collection from road		YES		
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (~~Stream/River/ Canal~~/ Well/ Tube well/ Other)	NO canal - on stable well			
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	90 %. 10 %.	YES		

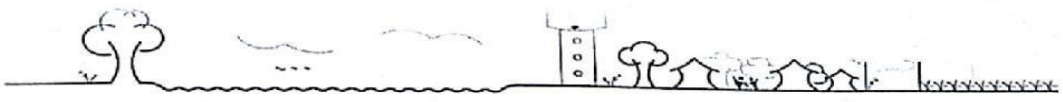
5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks

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

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

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



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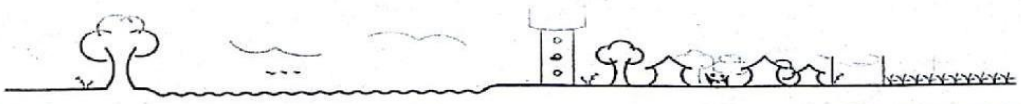
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	-	YES		
	Public Garden Location: Condition:		YES		
	Village Pond Location: Condition:			—	
	Recreation Center Location: Condition:	-	YES		
	Cinema/ Video Hall Location: Condition:			—	
	Assembly Polling Station Location: Condition:		YES		
	Birth & Death Registration Office Location: Condition:	-	YES		
If any of the above Facility is not available in village than approx. distance from village: .....kms.					
Suggestions if any:					
N.	**Other Facilities**				
	Post-office		YES		
	Telecommunication Network/ STD booth		YES		



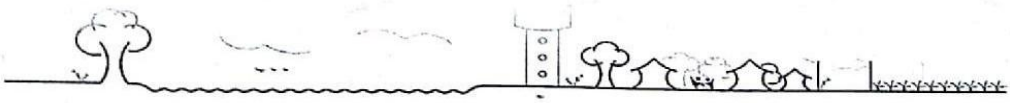
	General Market		YES		
	Shops (Public Distribution System)		YES		
	Panchayat Building		YES		
	Pharmacy/Medical Shop		YES		
	Bank & ATM Facility		YES		
	Agriculture Co-operative Society		YES		
	Milk Co-operative Soc.		YES		
	Small Scale Industries			—	
	Internet Cafes/ Common Service Center/Wi Fi		YES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

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

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
O.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	conventional Energy			
P.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System			—	
Q.	Any Other				

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	



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

8. **Additional Information/ Requirement:**

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities(School Building, Health Center, Panchayat Building, Public Toilets & any other)	-	
2.	Additional Information/ Requirement		

9. **Smart Village Proposal Design**

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Rural waters scheme & waters distribution facilities		

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

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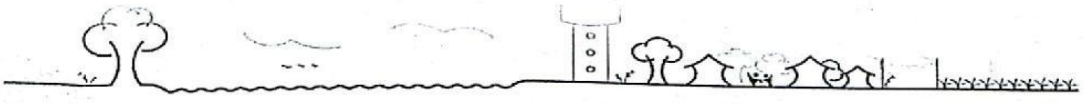
સોનગઢ ગ્રામ પંચાયત



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

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

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

Name of District:	BHAVNAGAR
Name of Taluka:	SIHOR
Name of Village:	AMARGADH
Name of Institute:	GOVERNMENT ENGINEERING COLLEGE BHAVNAGAR.
Nodal Officer Name & Contact Detail:	PROF. C.A. GAJJAR cagajjarbvm@gmail.com
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Member OF Gram Panchayat
Date of Survey:	–

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	-	-	-	-
2.	2011	4178	2113	2065	749

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1499 – 30 - 30
2.	Forest Area (In hect.)	–
3.	Agricultural Land Area (In hect.)	973 - 67 - 59
4.	Residential Area (In hect.)	78 - 66 - 35
5.	Other Area (In hect.)	235 - 0 - 0
6.	Distance to the nearest railway station (in kilometers):	3.5 Km

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7.	Name of Nearest Town with Distance:	SIHOR (10 km)
8.	Distance to the nearest bus station (in kilometers):	0 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.	Agriculture
	2.	Private business
	3.	labours

Major crops grown in the village:	1.	Lemon
	2.	cotton
	3.	Wheat

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

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

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Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Suggestions if any:					
B.	Water Tank Facility				
	Overhead Tank	Capacity:		NO	
	Underground Sump	Capacity:		NO.	
Suggestions if any:					
C.	The Type of Drainage Facility				
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET			YES NO NO	
Suggestions if any:					
D.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road		YES		
	Main road		YES		
	Internal streets		YES		
	Nearest NH/SH/MDR/ODR Dist. in kms.		0 KM		0km
Suggestions if any:					
E.	Transport Facility				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)		3.5km		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)		0KM		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)		YES		
Suggestions if any:					
F.	Electricity Distribution				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)		YES		

3

	Power supply for Domestic Use		YES		
	Power supply for Agricultural Use		YES		
	Power supply for Commercial Use		YES		
	Road/ Street Lights			NO	
	Electrification in Government Buildings/ Schools/ Hospitals		YES		
	Renewable Energy Source Facilities (Y/ N)			NO	
	LED Facilities			NO	
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	(2)	YES		
	Location Condition		YES		
	Community Toilet (With bath/ without bath facilities)		YES		
	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	NO	–	–	–
	STREAM/RIVER		–		
	CANAL	(2)		–	–
	WELL	–	YES	–	–
	TUBE WELL				
	OTHER (SPECIFY)				
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	35·1. → Kutchhy 65·1. → Puccy			

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Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

V. SOCIAL INFRASTRUCTURAL FACILITIES:

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

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Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Suggestions if any:

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

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

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office			YES	
	Telecommunication Network/ STD booth			YES	
	General Market				NO. (2 KM)
	Shops (Public Distribution System)			YES	
	Panchayat Building			YES	
	Pharmacy/Medical Shop			YES	
	Bank & ATM Facility	Good		YES	
	Agriculture Co-operative Society			YES	
	Milk Co-operative Soc.			YES	
	Small Scale Industries			YES	diamond block
	Internet Cafes/ Common Service Center/Wi Fi			YES	
	Youth Club				NO.
	Mahila Mandal			YES	

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Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

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

Suggestions if any:

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

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks

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Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other	 Yes Yes	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING .....Per week..... FOGGING.....No..... 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 ?	Solid waste management Street light	

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

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

તલાટી કમ મંત્રી
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12.3 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:	BHAVNAGAR
Name of Taluka:	SIHOR
Name of Village:	SONGADH
Name of Institute:	GEC BHAVNAGAR
Nodal Officer Name & Contact Detail:	PROF. C.A. GAJJAR cagcivil bvn@gmail.com
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	i) TALATI CUM MANTRI ii) PANCHAYAT MEMBER iii)
Date of Survey:	

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	-	-	-	-
2.	2011	6301	3316	2985	1050

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1975.58
2.	Forest Area (In hect.)	0
3.	Agricultural Land Area (In hect.)	1505
4.	Residential Area (In hect.)	22.67
5.	Other Area (In hect.)	- 501.58
6.	Distance to the nearest railway station (in kilometers):	1-3 KM

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

7.	Name of Nearest Town with Distance:	SIHOR (7 Km)
8.	Distance to the nearest bus station (in kilometers):	0.5 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.	Labour
	2.	Agriculture
	3.	Jobs

Major crops grown in the village:	1.	Lemon
	2.	Cotton
	3.	Gnawy

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

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

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Other(Specify)Lake/ Pond	Achalya Mahadev talaN	YES		
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	YES		1,50,000/-
	Underground Sump	Capacity:	YES.		3,00,000/-
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		YES		WBM
	Main road			-	kachhee
	Internal streets		YES		BLOCK
	Nearest NH/SH/MDR/ODR Dist. in kms.				0 km
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)		YES		1-5km
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)		YES		0.5km
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)		YES		0.5km
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)		YES		More than 6 hrs

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	Power supply for Domestic Use		YES		
	Power supply for Agricultural Use			—	
	Power supply for Commercial Use		YES		
	Road/ Street Lights		YES		
	Electrification in Government Buildings/ Schools/ Hospitals		YES		
	Renewable Energy Source Facilities (Y/ N)			—	
	LED Facilities		YES		
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.			—	
	Location Condition		YES		
	Community Toilet (With bath/ without bath facilities)			—	
	Solid & liquid waste Disposal system available			—	
	Any facility for Waste collection from road			—	
Suggestions if any:					
II.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL. OTHER (SPECIFY)				
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	60 % → Pucca 40 % → Kutchha			

4

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi) Sub-Centre PHC BLOCK PHC CHC/RH District/ Govt. Hospital Govt. Dispensary Private Clinic Private Hospital/ Nursing Home AYUSH Health Facility sonography /ultrasound facility		YES	—	Post master accessibility
	If any of the above Facility is not available in village than approx. distance from village: ...9.....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group		YES		
	Primary School		YES		0.5km
	Secondary school			—	0.5km
	Higher sec. School			—	0.5km
	ITI college/ vocational Training Center			—	
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities			—	

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If any of the above Facility is not available in village than approx. distance from village: 0.5..kms.

Suggestions if any:

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

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

Suggestions if any:

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

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

Suggestions if any:

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

7

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

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VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other	Primary School PHC Gram Panchayat	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING .....5..... FOGGING.....No..... 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 ?	Solid waste management	

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

સરપંચશ્રી
સોનગઢ ગ્રામ પંચાયત

9

Scanned with CamScanner

12.4 Gap Analysis of the Allocated Village

VILLAGE GAP Analysis

Village Facilities	Planning Commission/UDPFI Norms	Village Name: SONGADH Population: 6301 Existing	Required as per Norms	Smart Village / Cities / Heritage/ Future Projection Design	Gap
Social Infrastructure Facilities					
Education					
Anganwadi	Each Per 2500 population	1	1.54		-0.54
Primary School	Each Per 2500 population	1	1.54		-0.54
Secondary School	Per 7,500 population	0	1		-1
Higher Secondary School	Per 15,000 Population	0	1		-1
College	Per 125,000 Population	0	1		-1
Tech. Training Institute	Per 100000 Population	0	1		-1
Agriculture Research Centre	Per 100000 Population	0	1		-1
Skill Development Center	Per 100000 Population	0	1		-1
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	1	1		0
Multispeciality Hospital	Per 100000 Population	0	1		-1
Public Latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets & kutcha house)	0	19.78		19.78
Physical Infrastructure Facilities					
Transportation		**Adequate**	**Inadequate**		
Pucca Village Approach Road	Each village	✓			
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)		✓		
Drinking Water (Minimum 70 lpcd)		✓			
Over Head Tank	1/3 of Total Demand		✓		
U/G Sump	2/3 of Total Demand		✓		
Drainage Network - Open		✓			
Drainage Network - Cover		✓			
Waste Management System			✓		
Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	0	1		-1
Public Library	Per 15000 Population	1	1		0
Cremation Ground	Per 20,000 population	0	1		-1
Post Office	Per 10,000 population	1	1		0
Gram Panchayat Building	Each individual/group panchayat	1	0		1
APMC	Per 100000 Population	0	0		0
Fire Station	Per 100000 Population	0	0		0
Public Garden	Per village	0	1		-1
Police post	Per 40,000Population	1	0		-1
Shopping Mall		0	0		-1
Electrical Design					
Electricity Network		**Adequate**	**Inadequate**		
		✓			

Village Facilities	Planning	Village Name: SONGADH			
	Commission/UDPFI	Population: 6301			
	Norms	Existing	Required as per Norms	Smart Village / Cities / Heritage/ Future Projection Design	Gap
Any Smart Village Facility					
Technology					
		ESR cap	0		
		Sump cap	0		
		Lat	0		

Table-30: Gap analysis table

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

Table-31: Summary Of Designs In Tabular Form

Sr. no.	Village Name	Discipline	Phase - I	Phase - II
1.	**Shampara**	Civil	Rain Water Harvesting System	Village Bank
			Septic tank	Washing Ghat with Circulatory tank
			Primary Health Centre	Agricultural Product Market Building
			Community hall	Library
			Vegetable Market	Skill Training Institute
			Recreational Centre	Lake front for tourism development point
2.	**Songadh**	Civil	College Building	Secondary School Building
			Design of Septic Tank	Recreation center
			Design of Sports Complex	Rainwater harvesting system
			Bus Stand	Public Toilets & Baths
			Design of Shelter Home	Defence training center
			Agriculture Market Building	Science center/Museum/Similar building
3.	**Valukad**	Civil	Public Library	Vegetable Market building
			Public Bath & Toilet	RCC road
			Public Bus-Stand	Street Light network expantion
			Public Storage Building	Sports complex
			Public Hostel	Community hall
			Public Shelter Home	Lake front for tourism development point
4.	**Kalatalav**	Civil	Public Toilets & Baths	Rain water harvesting system
			Anganwadi	Under ground water sump

			Primary & Secondary School	Elevated storage resorvoire
			Vegetable Market	Water supply distribution system
			Bank	Slill training institure
			Street Light	Zinga production and storage building
5.	**Dharuka**	Civil	Sustainable Design RCC Road	Post office
			Storage Building	Retaining & flood protection wall
			Rainwater Harvesting	Bituminous road
			Water Supply Storage and Distribution	Washing Ghat with Circulatory tank
			Sewerage System in Mafanagar of Dharuka	Primery health center
			Recreation Centre	Defence training center
6.	**Bambhaniya**	Civil	Public Health Center	Bus stop
			Community Hall	Village Bank
			Street Light	Secondary School Building
			Drainage system	Vegetable Market building
			Elevated Service Reservoir	Recreation center
			RCC Road	Post office
7.	**Morchand**	Civil	Anganwadi Building	Bus stop
			Agricultural Product Market Building	RCC road
			Secondary School Building	Street Light network expantion
			Hostel Building	Sports complex
			Bank Building	Public Toilets & Baths
			Library Building	Community hall

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

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

<table>
<tr>
<td> 
Lokbharti vigyan bhavan</td>
<td> 
Street view of village</td>
</tr>
<tr>
<td> 
PHC of sanosara</td>
<td> 
Electricity sub-division</td>
</tr>
<tr>
<td> 
From lokbharti sanosara</td>
<td> 
From lokbharti sanosara</td>
</tr>
<tr>
<td colspan="2">FIGURE-32: PHOTOGRAPHS FROM IDEAL VILLAGE SANOSARA</td>
</tr>
</table>

Gurukul school, songadh

Street view of village

Railway station songadh

Railway station songadh

Railway station songadh

Police station songadh

Jain Mandir songadh

Jain Mandir songadh

Figure-35:Photographs from allotted village songadh

Jithri hospital amargadh

Jithri hospital amargadh

FIGURE-34:PHOTOGRAPHS FROM SMART VILLAGE AMARGADH

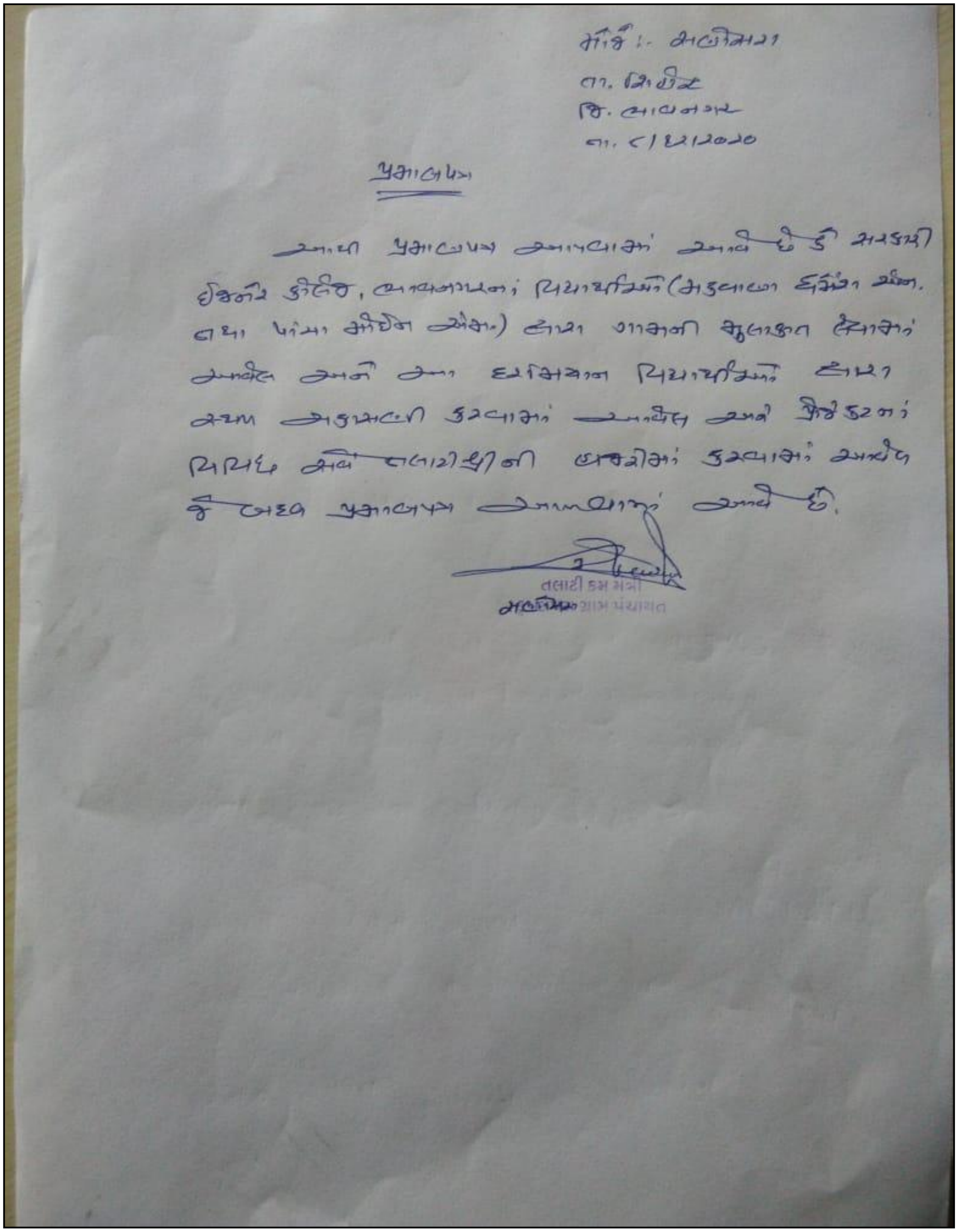
12.8 Village Interaction with sarpanch Report with the photograph

FIGURE-35:PHOTOGRAPHS WITH SARPANCH SHREE

By following and respecting the Govt.'s COVID-19 Guidelines, On the date of 6th NOV. 2020 at songadh gram panchayat office we have carried out the **Techno Economic Survey** with **sarpanch shree sondhabhai, talati shree hiteshbhai, other panchayat members** and **village dwellers** were remained present to give their feedback.

Every minute detail was given by sarpanch shree and talati shree and our overall experience was very pleasant and comfortable.

12.9 Sarpanch Letter giving information about the village development



મોજે :- માલપરા
તા. સિહોર
જિ. ભાવનગર
તા. 8/12/2020

પ્રમાણપત્ર

આથી પ્રમાણપત્ર આપવામાં આવે છે કે સરકારી એન્જીનીયરીંગ કોલેજ, ભાવનગરના વિદ્યાર્થીઓ (મકવાણા દર્શના એમ. તથા પંડ્યા ઋત્વિજ એમ.) દ્વારા ગામની મુલાકાત લેવામાં આવેલ અને આ દરમિયાન વિદ્યાર્થીઓ દ્વારા [illegible] અનુમતિ કરવામાં આવેલ અને પ્રોજેક્ટનાં સરપંચ અને તલાટીશ્રીની હાજરીમાં કરવામાં આવેલ જે બદલ પ્રમાણપત્ર આપવામાં આવે છે.

તલાટી કમ મંત્રી
માલપરા ગ્રામ પંચાયત

FIGURE-36: CERTIFICATE ISSUED BY SARPANCH AND TALATI SHREE OF IDEAL VILLAGE SANOSARA

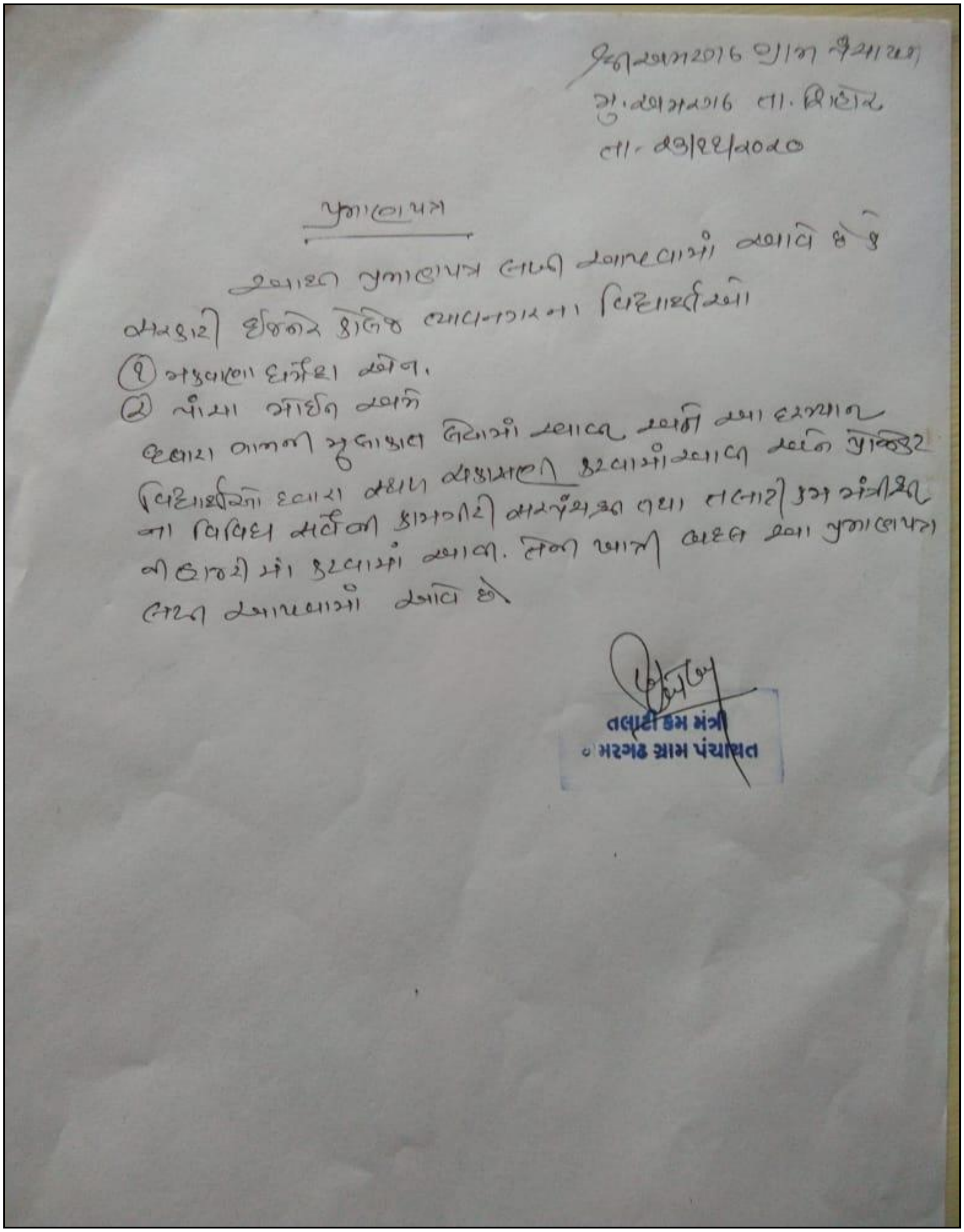
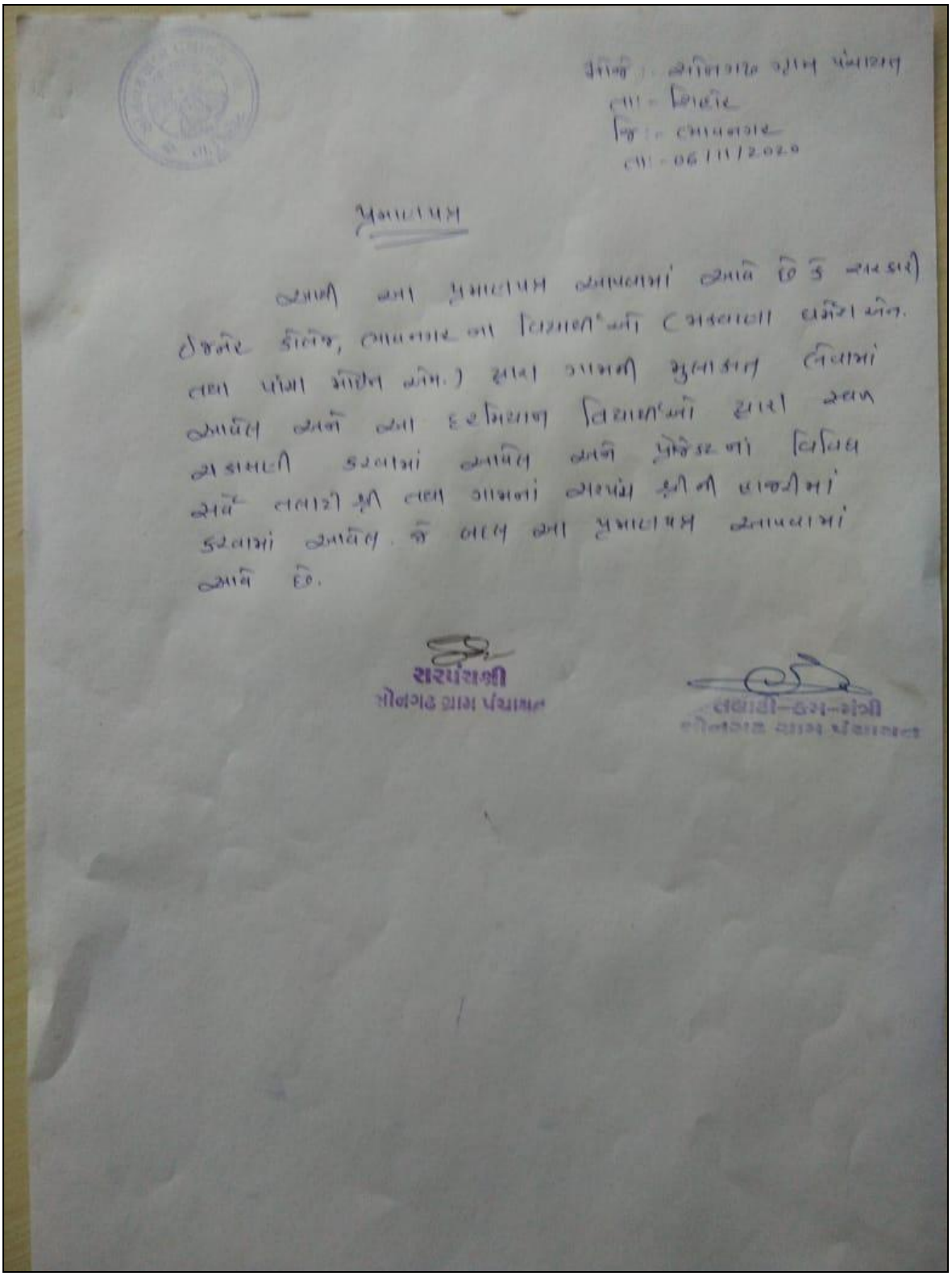


FIGURE-37: CERTIFICATE ISSUED BY SARPANCH AND TALATI SHREE OF SMART VILLAGE AMARGADH



પ્રમાણપત્ર

આથી આ પ્રમાણપત્ર આપવામાં આવે છે કે સરકારી એન્જીનેરીંગ કોલેજ, ભાવનગર ના વિદ્યાર્થીઓ દ્વારા ગામની મુલાકાત દરમ્યાન આવેલ અમો આ ઇજનેરી વિદ્યાર્થીઓ દ્વારા સ્વચ્છ ભારત અભિયાન કરવામાં આવેલ અને પ્રોજેક્ટ નો વિષય અંગે તલાટી શ્રી તથા ગામનાં સરપંચ શ્રી ની હાજરીમાં કરવામાં આવેલ. જે બાબત આ પ્રમાણપત્ર આપવામાં આવે છે.

સરપંચશ્રી
સોનગઢ ગ્રામ પંચાયત

તલાટી-કમ-મંત્રી
સોનગઢ ગ્રામ પંચાયત

FIGURE-38: CERTIFICATE ISSUED BY SARPANCH AND TALATI SHREE OF ALLOCATED VILLAGE SONGADH

Chapter-13: From the Chapter- 9 future designs of the aspects

13.1 Design Proposals

13.1.1 Design of recreation centre:

- **Layout of recreation centre**

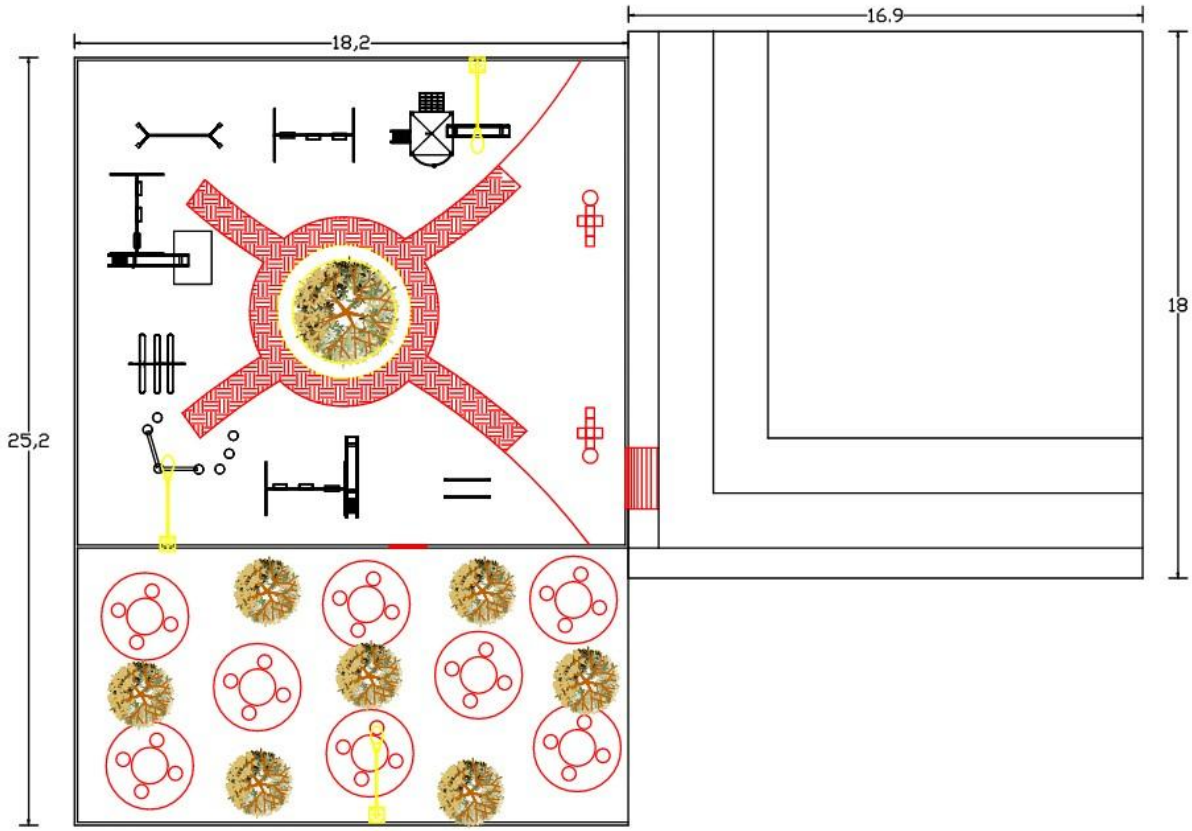


FIGURE -39: LAYOUT OF RECREATION CENTRE

3D layout of recreation centre

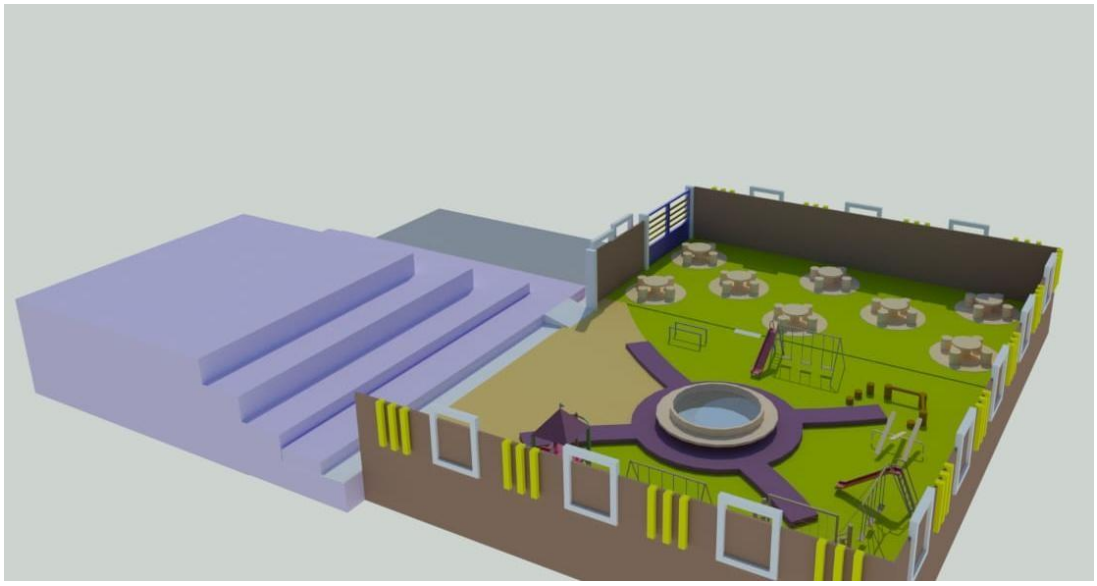


FIGURE-40: 3D LAYOUT OF RECREATION CENTRE

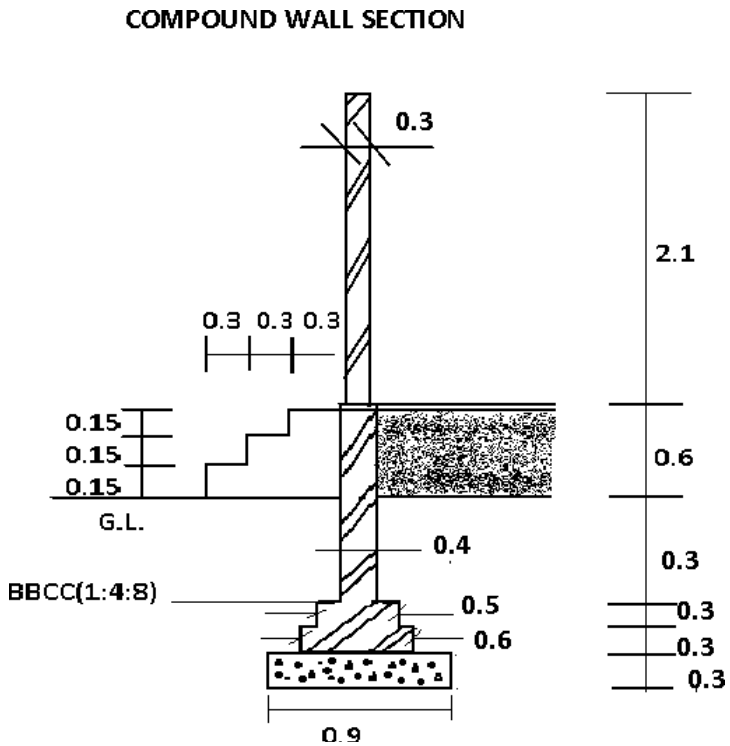


FIGURE-41: COMPOUNDWALL SECTION

MEASUREMENT SHEET OF RECREATION CENTRE						
ITEM NO.	**ITEM DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**
1.	**EXCAVATION WORK FOR FOUNDATION** TOTAL LENGTH OF C.L = 67.60 M TOTAL NO. OF JUNTION = 0 L = 67.60 M	1	67.60	0.9	1.2	**73 M3**
2.	**B.B.C.C. (1:4:8) FOR FOUNDATION WORK**	1	67.60	0.9	0.3	**18.25 M3**
3.	**BRICK MASONARY UP TO PLINTH IN C.M. (1:6)** (I) FIRST STEP (J) SECOND STEP (K) THIRD STEP • **FOR STEPS** 1st STEP 2nd STEP 3rd STEP	1 1 1 1 1 1	67.60 67.60 67.60 3 3 3	0.6 0.5 0.4 0.9 0.6 0.3	0.3 0.3 0.3 0.20 0.20 0.20 **TOTAL**	30.52 25.51 20.47 0.54 0.36 0.18 **= 77.58 M3**
4.	**BRICK MASONARY WORK ABOVE PLINTH LEVEL AND UP TO SLAB LEVEL** **DEDUCTION** ENTRANCE	1 1	67.60 3	0.3 0.3	2.1 2.1 **TOTAL**	42.59 M3 1.89 = **40.70 M3**
5.	**EARTH FILLING**	1	25.20	18.2	0.55	252.2

6.	**SMOOTH PLASTERING INSIDE & OUTSIDE**	2	67.60	---	2.1	283.92
	DEDUCTION					
	ENTRANCE	2	3	---	2.1	12.60
					TOTAL	**= 271.32 M2**
7.	**GARDENING (PER AREA)**	1	25.20	18.2	---	**458.64 M2**

TABLE–32: MEASUREMENT SHEET OF RECREATION CENTRE

ABSTRACT SHEET FOR RECREATION CENTRE					
ITEM NO.	**ITEM NAME**	**QUANTITY**	**RATE**	**PER**	**AMOUNT**
1.	**EXCAVATION FOR FOUNDATION**	73	85	CUB.M	**6,205**
2.	**B.B.C.C. (1:4:8) FOR FOUNDATION**	18.25	2700	CUB.M	**49,275**
3.	**BRICK MASONARY UPTO PLINTH LEVEL**	77.58	3200	CUB.M	**248,256**
4.	**BRICK MASONARY UPTO SLAB LEVEL ABOVE PLINTH LEVEL**	40.70	3500	CUB.M	**142,450**
5.	**EARTHFILLING**	252.2	50	CUB.M	**12,610**
6.	**SMOOTH PLASTERING INSIDE & OUTSIDE**	271.32	150	SQ.M	**40,698**
7.	**GARDENING PER AREA**	458.64	500	SQ.M	**229,320**
8.	**FOUNTAIN**	1	50,000	UNIT	**50,000**
9.	**SWINGS**	7	15,000	UNIT	**105,000**
11.	**SITTINGS / TABLES**	8	5,000	UNIT	**40,000**

TOTAL COST = 923,814 /- Rs

TABLE–33: ABSTRACT SHEET OF RECREATION CENTRE

13.1.2 Design of Public Toilet/Bath

Layout of public toilet:

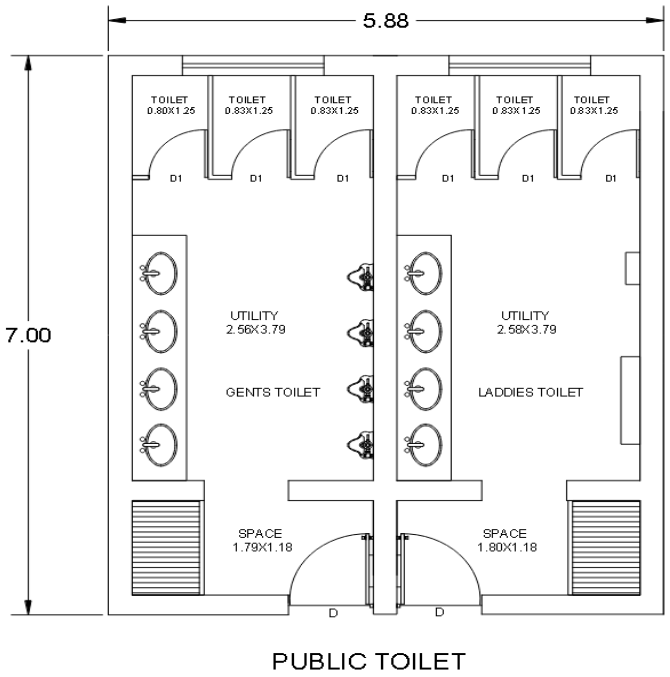


FIGURE -42: LAYOUT OF PUBLIC TOILET

3D layout of public toilet

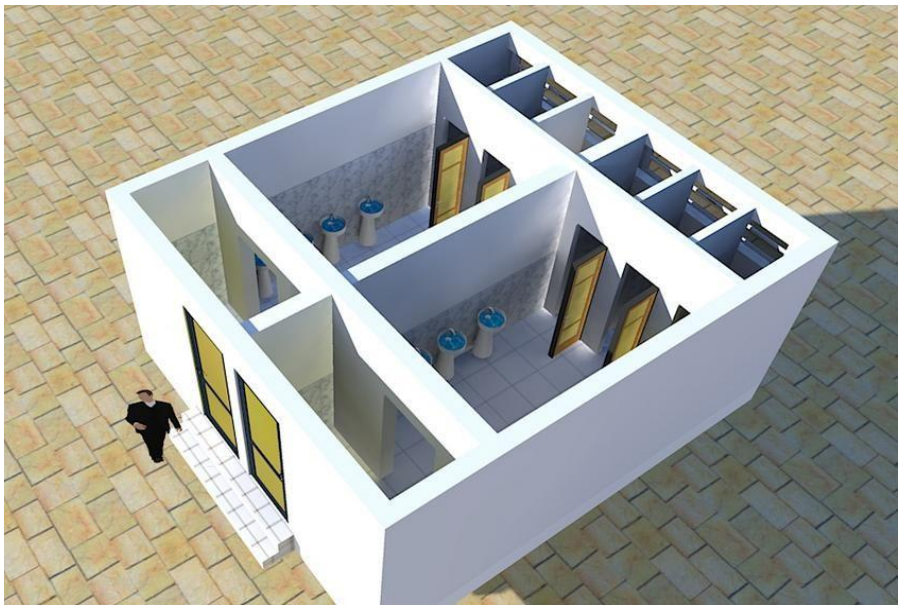


FIGURE -43: 3D LAYOUT OF PUBLIC TOILET

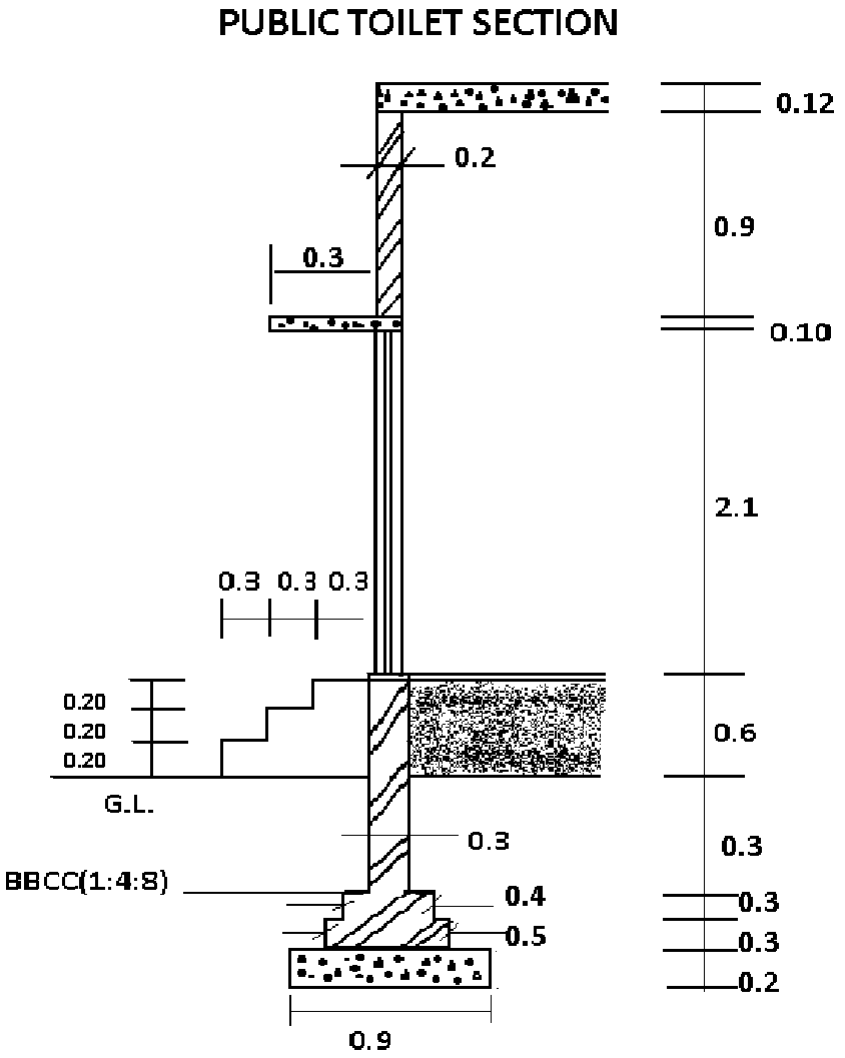


FIGURE -44: SECTION OF PUBLIC TOILET

MEASURENMENT SHEET OF PUBLIC TOILET						
ITEM NO.	**ITEM DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**
1.	**EARTH EXCAVATION WORK FOR FOUNDATION** TOTAL LENGTH OF C.L = 36.84 TOTAL NO. OF JUNTION = 6 L = 34.14 M	1	34.14	0.9	1.1	**33.80 M^3**
2.	**B.B.C.C. (1:4:8) FOR FOUNDATION WORK**	1	34.14	0.9	0.2	**6.15 M^3**
3.	**BRICK MASONARY UP TO PLINTH IN C.M. (1:6)** • FIRST STEP • SECOND STEP • THIRD STEP (WALL) UP TO PLINTH • **FOR STEPS** 1st STEP 2nd STEP 3rd STEP	1 1 1 1 1 1	35.34 35.64 35.94 2.3 2.3 2.3	0.5 0.4 0.3 0.9 0.6 0.3	0.3 0.3 0.3 0.20 0.20 0.20 **TOTAL**	5.30 4.27 3.23 0.41 0.28 0.14 **= 13.63 M^3**
4.	**BRICK MASONARY WORK ABOVE PLINTH LEVEL AND UP TO SLAB LEVEL** **BRICK MASONARY FOR**	1	36.24	0.2	3.1	**22.47 M^3**
			10.38	0.1	2.1	2.18

MEASURENMENT SHEET OF PUBLIC TOILET						
ITEM NO.	**ITEM DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**
	PARTITION WALLS					
	DEDUCTION					
	D	4	1	0.2	2.1	1.68
	D1	6	0.8	0.1	2.1	1
					TOTAL	= **21.97M^3**
5.	**RCC, SLAB, LINTELS**					
	SLAB	1	SLAB AREA = 41.16 M2	---	0.12	4.94 M3
	LINTELS OVER DOORS					
	D	4	1.3	0.2	0.1	0.1
					TOTAL	**= 5.04 M^3**
6.	**EARTH FILLING**	1	AREA OF EARTH FILLING= 41.16 M2	---	0.55	**22.64 M^3**
7.	**SMOOTH PLASTERING INSIDE & OUTSIDE**	2	36.24	---	3.1	224.69
	FOR PARTITION WALLS	2	10.38	---	2.1	43.60
	DEDUCTION	4	1	0.20	2.1	1.68
	D	6	0.80	0.10	2.1	1
	D1					

MEASURENMENT SHEET OF PUBLIC TOILET						
ITEM NO.	**ITEM DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**
					TOTAL	**= 265.61M^3**

TABLE–34: MEASUREMENT SHEET OF PUBLIC TOILET

ABSTRACT SHEET FOR COLLEGE BUILDING					
ITEM NO.	**ITEM NAME**	**QUANTITY**	**RATE**	**PER**	**AMOUNT**
1.	EXCAVATION FOR FOUNDATION	**33.80**	85	CUB.M	**2,873**
2.	B.B.C.C. (1:4:8)	**6.15**	2700	CUB.M	**16,605**
3.	BRICK MASONARY UPTO PLINTH	**22.47**	3200	CUB.M	**71,904**
4.	BRICK MASONARY ABOVE PLINTH	**21.97**	3500	CUB.M	**97,895**
5.	RCC, SLAB, LINTELS, & CHAJJA	**5.04**	8800	CUB.M	**44,352**
6.	EARTH FILLING	**22.64**	50	CUB.M	**1,132**
7.	INSIDE & OUTSIDE SMOOTH PLASTERING	**265.61**	150	SQ.M	**39,841**
				TOTAL	**= 274,602**

TABLE – 35: ABSTRACT SHEET OF PUBLIC TOILET

13.1.3 Design of Museum Building

Layout of Museum Building

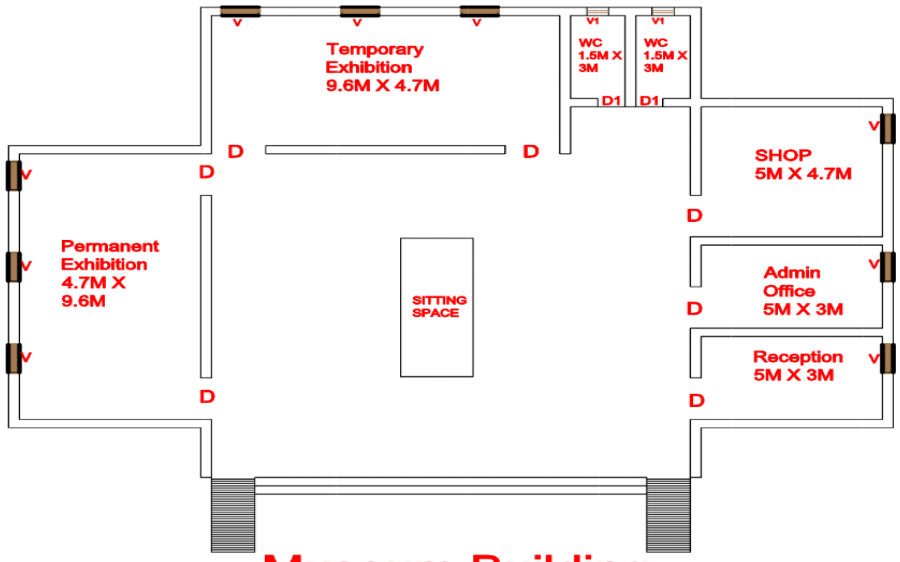


FIGURE -45: LAYOUT OF MUSEUM BUILDING

3D Layout of Museum Building

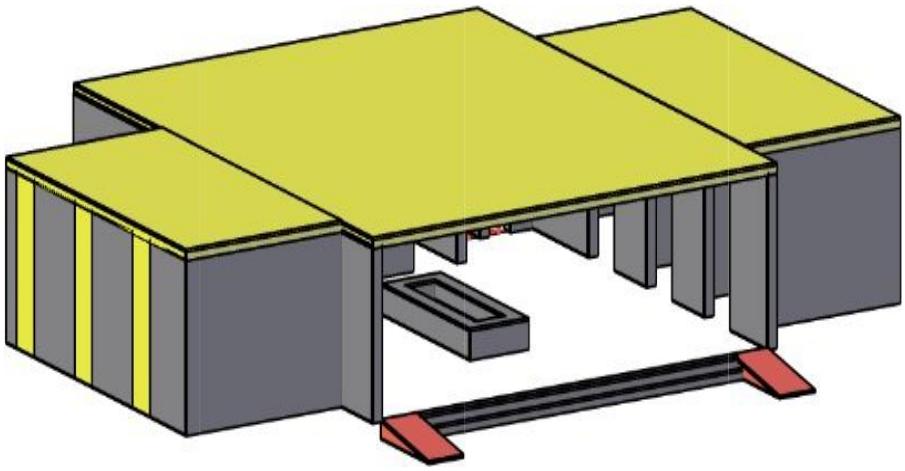


FIGURE -46: 3D LAYOUT OF MUSEUM BUILDING

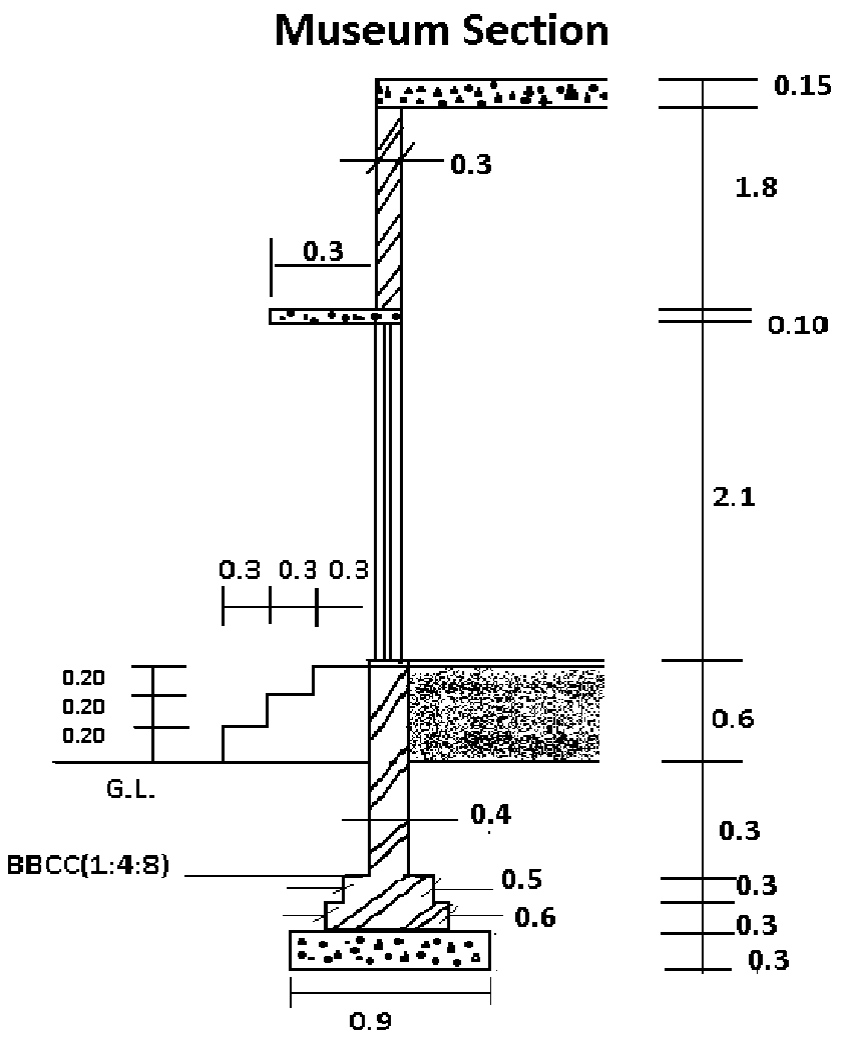


FIGURE -47: SECTION OF MUSEUM BUILDING

MEASURENMENT SHEET OF MUSEUM BUILDING						
ITEM NO.	**ITEM DESRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**
1.	**TOTAL EARTH WORK IN EXCAVATION FOR FOUNDATION** TOTAL LENGTH OF CENTRE LINE = 120.10 m NO. OF JUNCTIONS = 13 L = 114.25 m	1	114.25	0.9	1.2	**123.39 M^3**
2.	**BBCC (1:4:8) FOR FOUNDATION**	1	114.25	0.9	0.3	**30.85 M^3**
3.	**BRICK MASONRY UPTO PLINTH IN C.M. (1:6)** **SUB-STUCTURE**					
	FIRST STEP	1	116.20	0.6	0.3	20.92 **M^3**
	SECOND STEP	1	116.85	0.5	0.3	17.53 **M^3**
	THIRD STEP	1	117.50	0.4	0.85	39.95 **M^3**
	ABOVE G.L. FIRST STEP					
	SECOND STEP	1	12	0.9	0.20	2.16 m3
	THIRD STEP	1	12	0.6	0.20	1.44 m3
	(FOR STEPS L = OPENING = 12 m)	1	12	0.3	0.20	0.72 m3
					TOTAL	**= 82.72 m3**
4.	**BRICK MASONARY WORK ABOVE PLINTH LEVEL UP TO SLAB LEVEL**	1	118.15	0.3	4	141.78 **M^3**

	DEDUCTION FOR DOOR & WINDOWS D D1 V	7 2 9	1 0.9 1	0.3 0.3 0.3	2.1 2.1 0.5 **TOTAL**	4.41 **M^3** 1.13 **M^3** 1.35 **M^3** **= 134.89 M^3**
5.	**RCC, SLAB,LINTEL** SLAB LINTELS OVER DOORS	 1 1 1 9	 13.8 5.3 5.3 1.3	 16.2 10.2 11.9 0.3	 0.12 0.12 0.12 0.10 **TOTAL**	 26.83 **M^3** 6.49 **M^3** 7.57 **M^3** 0.35 **M^3** **= 41.24 M^3**
6.	**EARTH FILLING**	1 1 1	13.8 5.3 5.3	16.2 10.2 11.9	0.55 0.55 0.55 **TOTAL**	**122.96 M^3** **29.73 M^3** **34.69 M^3** **= 187.38 M^3**
7.	**PLASTERING INSIDE & OUTSIDE** DEDUCTION D D1 V	2 9 2 9	120.10 1 0.9 1	--- --- --- ---	4 2.1 2.1 0.5 **TOTAL**	960.80 **M^2** 18.9 **M^2** 3.78 **M^2** 4.5 **M^2** **= 987.98 M^2**

TABLE–36: MEASUREMENT SHEET OF MUSEUM BUILDING

ABSTRACT SHEET OF AGRICULTURE MARKET					
SR NO.	**ITEM NAME**	**QUANTITY**	**RATE**	**PER**	**AMOUNT**
1.	**TOTAL EARTH WORK IN EXCAVATION FOR FOUNDATION**	**123.39**	85	CUB.M	**10,488 /-**
2.	**B.B.C.C (1:4:8) FOR FOUNDATION**	**30.85**	2700	CUB.M	**83,295/-**
3.	**BRICK MASONARY WORK UPTO PLINTH LEVEL**	**82.72**	3200	CUB.M	**264,704/-**
4.	**BRICK MASONARY WORK ABOVE PLINTH LEVEL**	**134.89**	3500	CUB.M	**472,115/-**
5.	**RCC,SLAB,LINTELS**	**41.24**	8800	CUB.M	**362,912/-**
6.	**EARTH FILLING**	**187.38**	50	CUB.M	**9,369/-**
7.	**INNER AND OUTER PLASTER**	**987.98**	150	SQ.M **TOTAL**	**148,197/-** **= 1,434,375/-**

TABLE–37: ABSTRACT SHEET OF MUSEUM BUILDING

13.1.4 Design of Defense Training Centre

Layout of Defense training centre

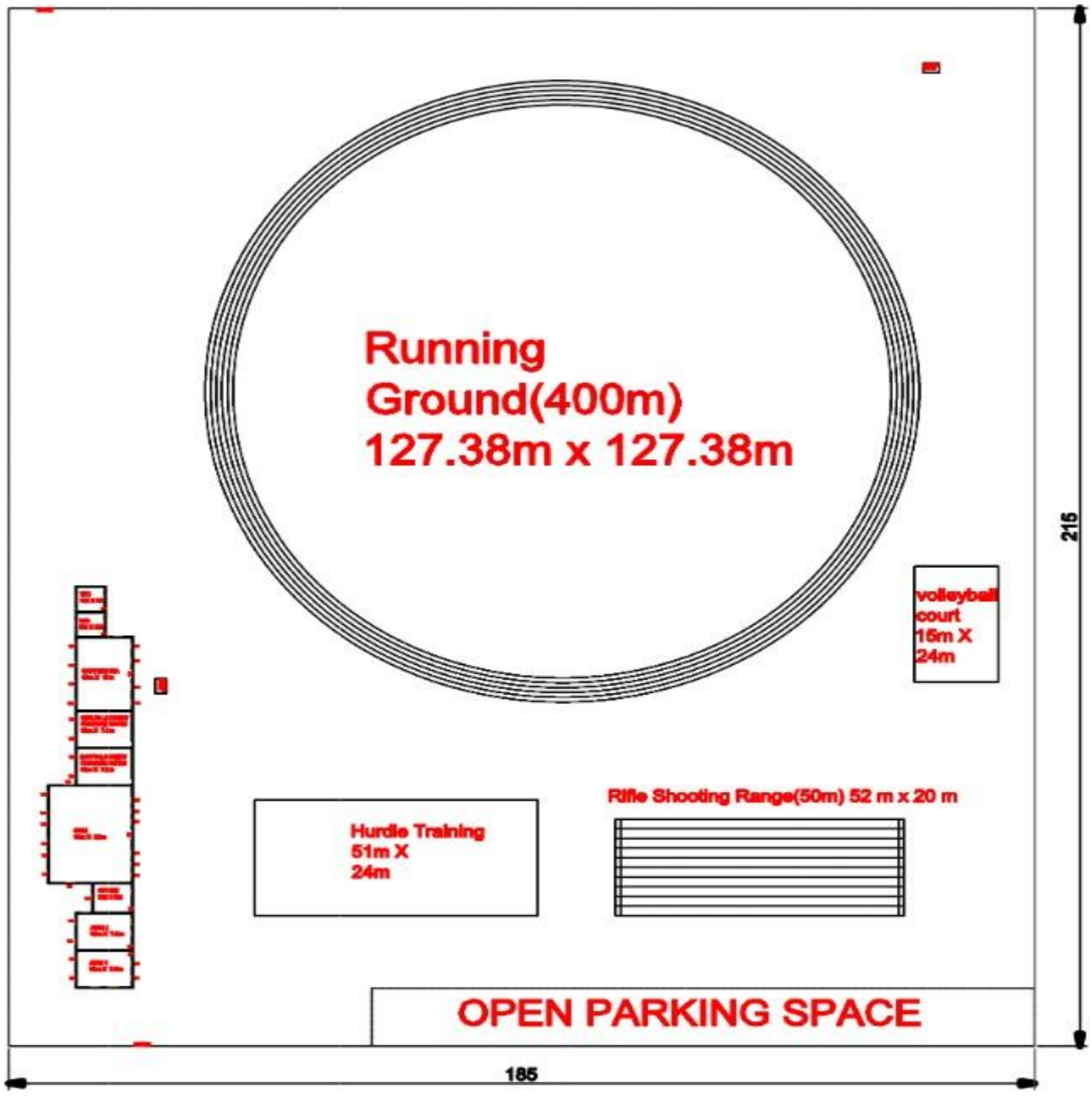


FIGURE -48: LAYOUT OF DEFENSE TRAINING CENTRE

3D Layout of Defense training centre

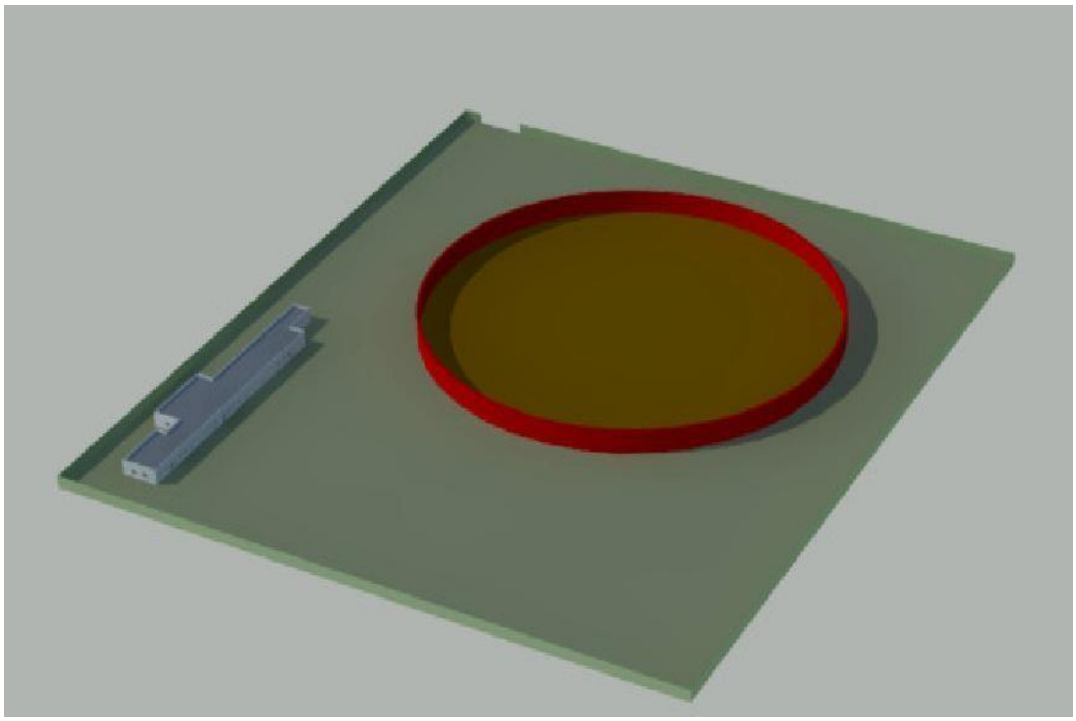


FIGURE -49: 3D LAYOUT OF DEFENSE TRAINING CENTRE

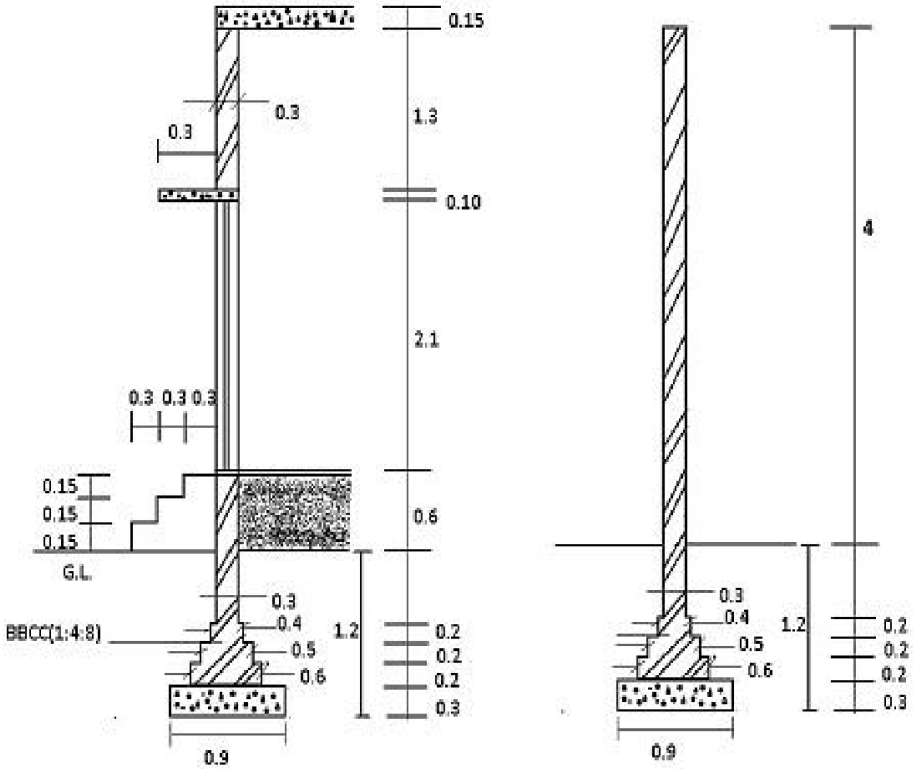


IMAGE-50: SECTION OF DEFENSE TRAINING CENTRE (BUILDING + COMPOUND WALL)

MEASUREMENT SHEET OF DEFENSE TRAINING CENTRE						
ITEM NO.	**ITEM DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**
1.	**EXCAVATION WORK FOR FOUNDATION** TOTAL LENGTH OF C.L = 259.1 M TOTAL NO. OF JUNTION = 16 L = 251.9 M	1	251.90	0.9	1.2	**272.05 M3**
2.	**B.B.C.C. (1:4:8) FOR FOUNDATION WORK**	1	251.90	0.9	0.3	**68.01 M3**
3.	**BRICK MASONARY UP TO PLINTH IN C.M. (1:6)** (L) FIRST STEP (M) SECOND STEP (N) THIRD STEP (O) FOURTH STEP • **FOR STEPS** 1st STEP 2nd STEP 3rd STEP	1 1 1 1 1 1 1 9 9 9	254.30 0 255.10 0 255.90 0 256.70 0	0.6 0.5 0.4 0.3 0.9 0.6 0.3	0.2 0.2 0.2 0.85 0.15 0.15 0.15 **TOTAL**	30.52 25.51 20.47 65.46 1.22 0.81 0.41 **= 144.40 M3**
4.	**BRICK MASONARY WORK ABOVE PLINTH LEVEL AND UP TO SLAB LEVEL** **DEDUCTION** D1 D2 D3 W1	1 2 5 2	256.70 1.5 1.2	0.3 0.3 0.3 0.3	3.5 2.1 2.1 2.1	269.54 M3 1.89 3.78 1.26
		40	1 1	0.3	1.2	14.51 = 21.33 M3

					TOTAL	= **248.21 M3**
5.	**RCC, SLAB, LINTELS**					
	SLAB	1	5.6	10.75	0.15	9.03
		1	10.6	5	0.15	49.13
		1	15.6	30.90	0.15	47.05
		1	10.6	0	0.15	35.78
				20.30		
	LINTELS OVER DOORS			0		
	D1			22.20		
	D2	2	1.8	0	0.1	0.11
	D3	5	1.5		0.1	0.23
	W1	2	1.2		0.1	0.07
		40	1.2		0.1	1.44
				0.3		
				0.3	**TOTAL**	**= 142.84M3**
				0.3		
				0.3		
6.	**EARTH FILLING**	1	5.6	10.75	0.55	33.11
		1	10.6	5	0.55	180.15
		1	15.6	30.90	0.55	174.17
		1	10.6	0	0.55	129.43
				20.30		
				0	**TOTAL**	**= 516.86 M3**
				22.20		
				0		
7.	**SMOOTH PLASTERING INSIDE & OUTSIDE**	2	259.10	---	3.5	1813.70
	DEDUCTION					
	D	2		---	2.1	6.30
	D2	5	1.5	---	2.1	12.60
	D3	2	1.2	---	2.1	4.20
	W	40	1 1	---	1.2	48.00
					TOTAL	**= 1742.60 M2**
8.	**EXCAVATION FOR FOUNDATION WORK FROM COMPOUND WALL:**					
	• TOTAL C.L = 800 M					

	• TOTAL NO. OF JUNCTION = 0	1	800	0.9	1.2	**864 M3**
9.	**B.B.C.C. FOR FOUNDATION OF COMPOUND WALL (1:4:8)**	1	800	0.9	0.3	216 M3
10.	**TOTAL BRICK MASONARY WORK FOR COMPOUND WALL**					
	3. BELOW G.L.	1	800	0.6	0.2	96.00
	• 1st STEP	1	800	0.5	0.2	80.00
	• 2nd STEP	1	800	0.4	0.2	64.00
	• 3rd STEP	1	800	0.3	0.3	72.00
	• 4th STEP					
	4. ABOVE G.L.	1	800	0.3	4	960
	• DEDUCTION FOR GATE	2	4	0.3	4	9.60
					TOTAL	**= 1262.4 M2**
11.	**SMOOTH PLASTERING FOR INSIDE & OUTSIDE FOR COMPOUND WALL**	2	800	---	4	6400
	• DEDUCTION FOR GATE	2	4	---	4	32
					TOTAL	= 6368 M2
12.	**RUNNNING TRACK**	1	400	---	---	**400 M**
13.	**RIFLE SHOOTING RANGE**	1	50	---	---	**50 M**

TABLE–38: MEASUREMENT SHEET OF DEFENSE TRAINING CENTRE

ABSTRACT SHEET FOR SPORTS COMPLEX					
ITEM NO.	**ITEM NAME**	**QUANTITY**	**RATE**	**PER**	**AMOUNT**
1.	**EXCAVATION FOR FOUNDATION**	510	85	CUB.M	**43,350**
2.	**B.B.C.C. (1:4:8) FOR FOUNDATION**	68.01	2700	CUB.M	**1,83,627**
3.	**BRICK MASONARY UPTO PLINTH LEVEL**	144.40	3200	CUB.M	**4,62,080**
4.	**BRICK MASONARY UPTO SLAB LEVEL ABOVE PLINTH LEVEL**	248.21	3500	CUB.M	**8,68,735**
5.	**RCC WORK (SLAB & LINTELS)**	142.84	8800	CUB.M	**12,56,992**
6.	**EARTHFILLING**	516.86	50	CUB.M	**25,843**
7.	**SMOOTH PLASTERING INSIDE & OUTSIDE**	1742.60	150	SQ.M	**2,61,390**
8.	**EXCAVATION FOR FOUNDATION OF COMPOUND WALL**	864	85	CUB.M	**73,440**
9.	**B.B.C.C. (1:4:8) FOR COMPOUND WALL FOUNDATION**	216	2700	CUB.M	**5,83,200**
10.	**TOTAL BRICK MASONARY WORK FOR COMPOUND WALL**	1262.40	3500	CUB.M	**44,18,400**
11.	**SMOOTH PLASTERING FOR INNER & OUTER FACE OF COMPOUND WALL**	6368	150	SQ.M	**9,55,200**
12.	**RUNNNING TRACK**	400	200	M	**80,000**
13.	**RIFLE SHOOTING RANGE**	50	1000	M	**50,000**

TOTAL COST = 9,262,257 /- Rs

TABLE–39: ABSTRACT SHEET OF DEFENSE TRAINING CENTRE

13.1.5 Design of Higher-Secondary School Building

Layout of school Building

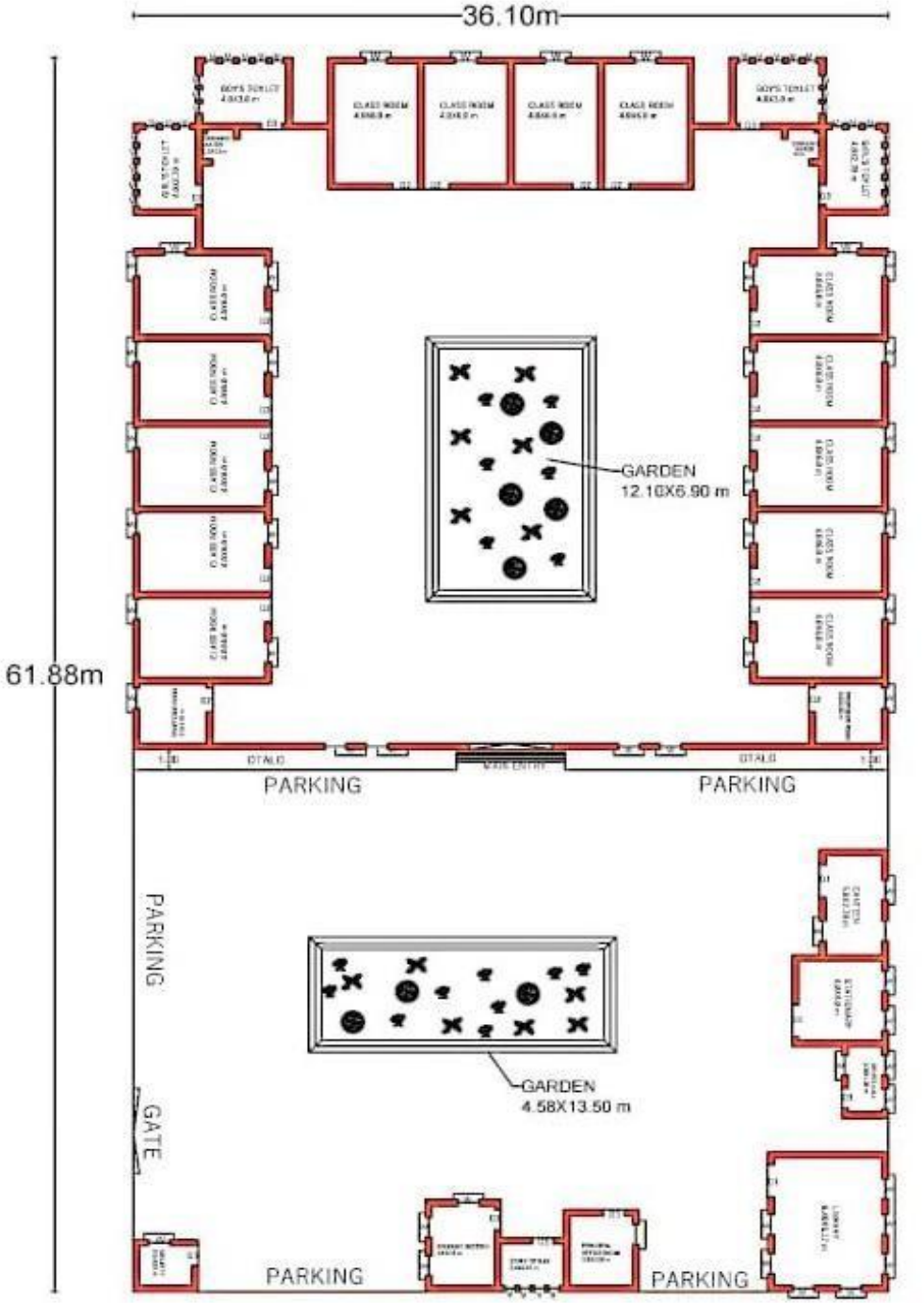


FIGURE -51: DESIGN LAYOUT OF SCHOOL BUILDING

3D Layout of school Building

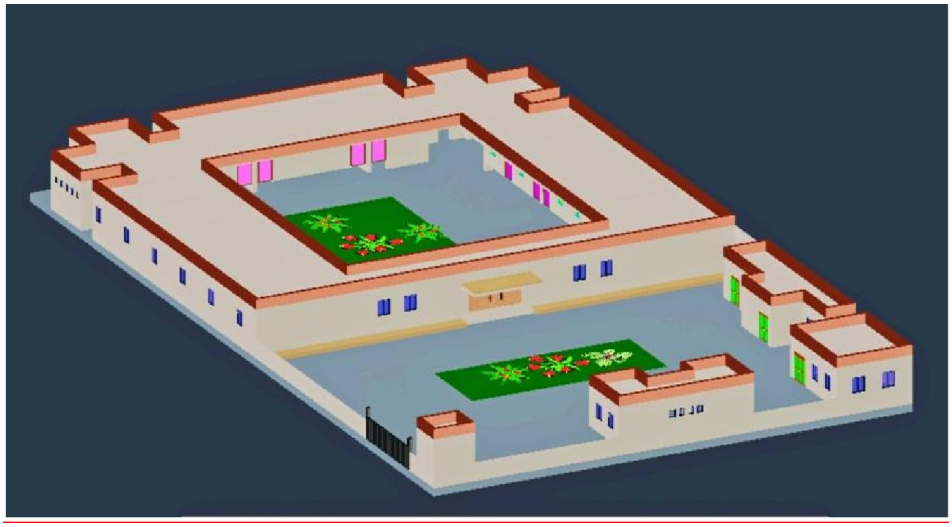


FIGURE -52: 3D LAYOUT OF SCHOOL BUILDING

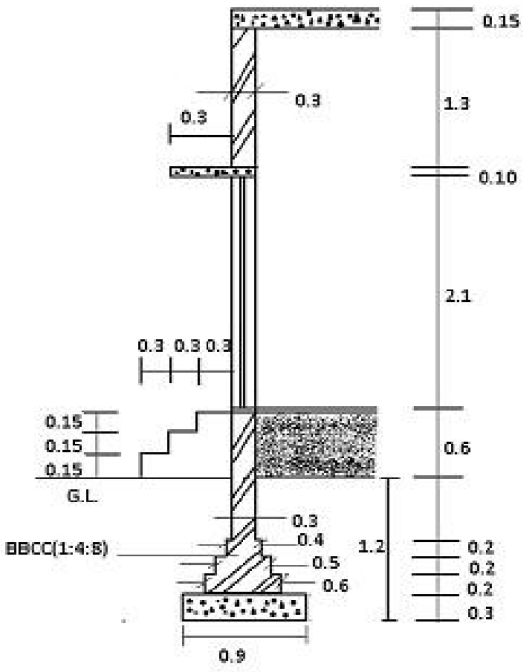


FIGURE -53: SECTION OF SCHOOL BUILDING

MEASURENMENT SHEET OF SCHOOL BUILDING						
ITEM NO.	**ITEM DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**
1.	**EARTH EXCAVATION WORK FOR FOUNDATION** TOTAL LENGTH OF C.L = 499.62 TOTAL NO. OF JUNTION = 61 L = 472.17 M	1	472.17	0.9	1.2	**510 M^3**
2.	**B.B.C.C. (1:4:8) FOR FOUNDATION WORK**	1	472.17	0.9	0.3	**127.50 M^3**
3.	**BRICK MASONARY UP TO PLINTH IN C.M. (1:6)**	1	481.32	0.6	0.2	57.76
	(P) FIRST STEP	1	484.37	0.5	0.2	48.44
	(Q) SECOND STEP	1	487.42	0.4	0.2	39.00
	(R) THIRD STEP	1	490.47	0.3	0.3	132.43
	(S) FOURTH STEP (WALL) UP TO PLINTH	1	4	0.9	0.15	0.54
		1	4	0.6	0.15	0.36
	• **FOR STEPS**	1	4	0.3	0.15	0.18
	1st STEP					
	2nd STEP					
	3rd STEP				**TOTAL**	**= 278.71 M^3**
4.	**BRICK MASONARY WORK ABOVE PLINTH LEVEL AND UP TO SLAB LEVEL**	1	490.47	0.3	3.5	515 M^3
	DEDUCTION					
	D1	3	1.6	0.3	3.1	3.02

MEASURENMENT SHEET OF SCHOOL BUILDING						
ITEM NO.	**ITEM DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**
	D2 D3 W	16 9 52	1.2 1 1	0.3 0.3 0.3	2.1 2.1 1.2 **TOTAL**	16.13 5.67 18.72 = 43.54 M3 = **471.46 M^3**
5.	**RCC, SLAB, LINTELS** **SLAB** **LINTELS OVER DOORS** D1 D2 & D3 **LINTELS OVER WINDOW** W	1 3 25 52	SLAB AREA = 667.68 M2 2 1.5 1.5	--- 0.18 0.18 0.18	--- 0.1 0.1 0.1 **TOTAL**	100.15 M3 0.48 3.00 6.24 **= 109.87 M^3**
6.	**EARTH FILLING**	1	AREA OF EARTH FILLING= 667.68 M2	---	0.55	**367.22 M^3**
7.	**SMOOTH PLASTERING INSIDE & OUTSIDE** **DEDUCTION** D1 D2 D3 W	2 3 16 9 52	499.62 1.6 1.2 1 1	--- --- --- --- ---	3.5 2.1 2.1 2.1 1.2 **TOTAL**	3497.34 10.08 40.32 18.90 62.40 = 132.42 M3 **= 3364.92M^3**

TABLE-40: MEASUREMENT SHEET OF SCHOOL BILDING

ABSTRACT SHEET OF SCHOOL BUILDING					
ITEM NO.	**ITEM NAME**	**QUANTITY**	**RATE**	**PER**	**AMOUNT**
1.	EXCAVATION FOR FOUNDATION	510.00	85	CUB.M	**43,350**
2.	B.B.C.C. (1:4:8)	127.50	2700	CUB.M	**3,44,250**
3.	BRICK MASONARY UPTO PLINTH	278.71	3200	CUB.M	**8,91,872**
4.	BRICK MASONARY ABOVE PLINTH	471.46	3500	CUB.M	**16,50,510**
5.	RCC, SLAB, LINTELS, & CHAJJA	109.87	8800	CUB.M	**9,66,856**
6.	EARTH FILLING	367.22	50	CUB.M	**18,361**
7.	**INSIDE & OUTSIDE SMOOTH PLASTERING**	3364.92	150	SQ.M	**5,04,738**

TOTAL =

44,195,371

TABLE-41: ABSTRACT SHEET OF SCHOOL BILDING

13.1.6 Design Of Rain Water Harvesting

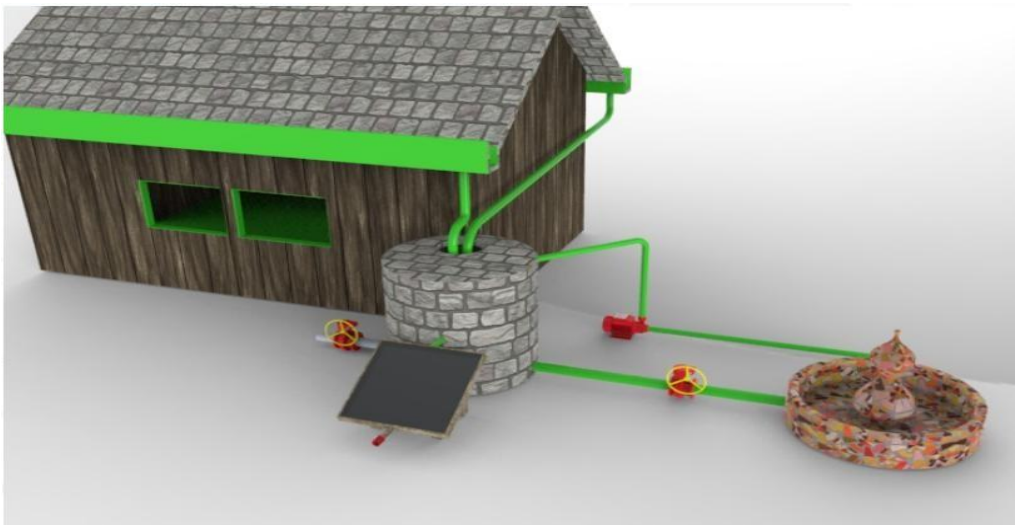
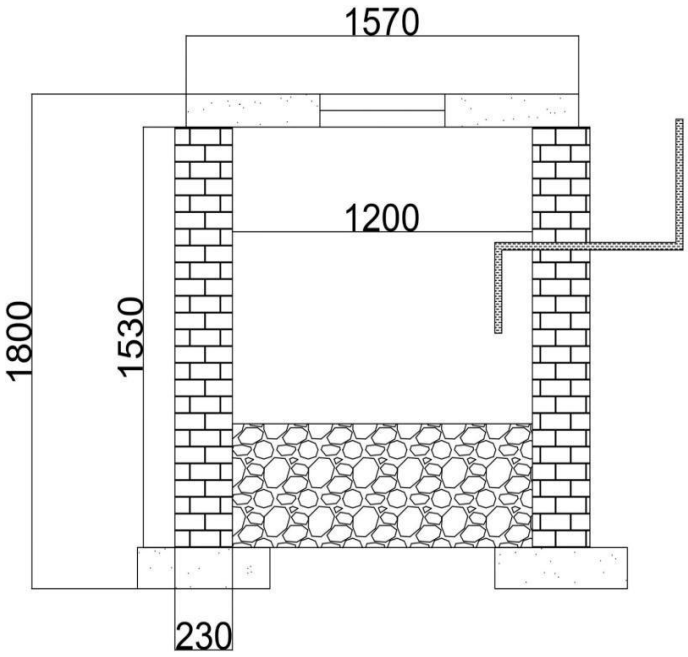


FIGURE -54: MODEL OF RAIN WATER HARVESTING



ALL DIMENSIONS ARE IN MM

FIGURE -55: TANK OF RAIN WATER HARVESTI

MEASURENMENT SHEET OF RAINWATER HARVESTING SYSTEM							
ITEM NO.	**ITEM DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**	**REMARKS**
1.	EXCAVATION FOR FOUNDATION IN DENSE OR HARD SOIL UP TO 1.5M DEPTH INCLUDING SORTING OUT, STACKING OF USEFUL MATERIALS AND DISPOSING OF THE EXCAVATED STUFF UP TO ANY LEAD.	1	3.02	3.02	1.8	**5.44 M^3**	D=1.96
2.	PROVIDING AND LAYING CEMENT CONCRETE 1: 4: 8 (1 CEMENT: 4 COARSE SAND: 8 GRADED STONE AGGREGATE 20 MM NOMINAL SIZE) AND CURING COMPLETE EXCLUDING COST OF FORMWORK IN FOUNDATION & PLINTH	1	4.5	0.53	0.15	0.36	D=1.43 BELOW FOUNDATION WALL
3.	BRICK WORK USING COMMON BURNT CLAY BUILDING BRICK HAVING CRUSHING STRENGTH NOT LESS THAN 35 KG/SQ. CM. IN FOUNDATION AND PLINTH IN CEMENT MORTAR 1:6 (1 CEMENT: 6 FINE SAND) BRICK MASONRY UP TO PLINTH (B) CONVENTIONAL	1	4.5	0.23	1.53	1.58	D=1.43
4.	FILLING OF BROKEN BRICKS	1	1.15	1.2	0.45	0.51	D=1.2

MEASURENMENT SHEET OF RAINWATER HARVESTING SYSTEM							
ITEM NO.	**ITEM DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**	**REMARKS**
	FILTER MEDIA WITH SAND						
5.	PROVIDING & LAYING ORDINARY CEMENT CONCRETE 1:2:4 (1 CEMENT :2 COARSE SAND:4 GRADED STONE AGGREGATES) AND FINISHING SMOOTH WITH CURING ETC. COMPLETE INCLUDING SMOOTH WITH CURING ETC. COMPLETE INCLUDING THE COST OF FORMWORK BUT EXCLUDING THE COST OF REINFORCE-MENT FOR REINFORCED CONCRETE WORK IN RCC SLABS HAVING THICKNESS MORE THAN 10 CM AND UPTO 13CM THICKNESS. R.A. DEDUCTION MANHOLE	1 1	1.93 0.6	1.93 0.5	0.12 0.12 **TOTAL=**	0.23 0.036 0.2	D=1.57
6.	C.I. MAN HOLE COVER SIZ 0.6X0.6 M	1	---	---	---	---	---
7.	PROVIDING & FIXING HAND PUMP.	1	---	---	---	---	---
8.	VALVE OF 75MM DIA. P.V.C. PIPE FILTRATION	5	---	---	---	---	---
9.	CHAMBER	1	---	---	---	---	---

MEASURENMENT SHEET OF RAINWATER HARVESTING SYSTEM							
ITEM NO.	**ITEM DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**	**REMARKS**
10.	UNDERGROUND PERCOLATION WELL TO RECHARGE WATER AS PER APPROVED DRAWING	1	---	---	---	---	---

TABLE-42: MEASUREMENT SHEET OF RAIN WATER HARVESTING

ABSTRACT SHEET OF RAIN WATER HARVESTING					
ITEM NO.	**ITEM NAME**	**QUANTITY**	**RATE**	**PER**	**AMOUNT**
1.	EXCAVATION FOR FOUNDATION IN DENSE OR HARD SOIL UP TO 1.5M DEPTH INCLUDING SORTING OUT,STACKING OF USEFUL MATERIALS ANDDISPOSING OF THE EXCAVATED STUFF UP TO ANY LEAD	5.44	86.72	CMT	**471.75**
2.	PROVIDING AND LAYING CEMENT CONCRETE 1: 4 : 8 (1 CEMENT : 4COURSE SAND : 8 GRADED STONE AGGREGATE 20 MM NOMINAL SIZE)AND CURING COMPLETE EXCLUDING COST OF FORMWORK IN FOUNDATION & PLINTH	0.36	3197.26	CMT	**1151.01**
3.	BRICK WORK USING COMMON BURNT CLAY BUILDING BRICK HAVING CRUSHING STRENGTH NOT LESS THAN 35 KG/SQ. CM. IN FOUNDATION AND PLINTH IN CEMENT MORTAR 1:6 (1 CEMENT: 6 FINE SAND) BRICK MASONRY UP TO PLINTH (B) CONVENTIONAL	1.58	2954.25	CMT	**4667.71**
4.	FILLING OF BROKEN BRICKS FILTER MEDIA WITH SAND	0.51	900	CUB.M	**459**
5.	PROVIDING & LAYING ORDINARYCEMENT CONCRETE 1:2:4 (1CEMENT :2 COARSE SAND:4 GRADED STONE AGGREGATES) AND FINISHING SMOOTH WITH CURING ETC. COMPLETE INCLUDING SMOOTHWITH CURING ETC. COMPLETE INCLUDING THE COST OF FORMWORKBUT EXCLUDING THE COST OF REINFORCEMENT FOR REINFORCED CONCRETE WORK IN RCC SLABS	1.57	5590.08	CMT	**8776**

	HAVING THICKNESS MORE THAN 10 CM AND UP TO 13CM THICKNESS. R.A.				
6.	C.I. MAN HOLE COVER SIZE 0.6X0.6 M	1	500	UNIT	**500**
7.	PROVIDING & FIXING HANDPUMP	1	600	UNIT	**600**
8.	VALVE OF 75MM DIA.P.V.C. PIPE	5	250	UNIT	**1250**
9.	FILTRATION CHAMBER OF SIZE0.6X0.75 MX .45M	1	4000	UNIT	**4000**
10.	UNDERGROUND PERCOLATION WELL TO RECHARGE WATER AS PER APPROVED DRAWING	1	7000	UNIT	**7000**

TOTAL = 28,875

TABLE-43: ABSTRACT SHEET OF RAIN WATER HARVESTING SYSTEM

13.2 Reason for Students Recommending this Design

Sr. No.	Proposed Design	Reason for Recommending this Design
1.	Recreation Centre	• Village is lacking recreation centre • As per their population there should be a recreation centre • There are many aged persons and children for whom this recreation centre is needed
2.	Public Toilet	• Village has not any public toilet • Public toilet is very essentially needed for the village
3.	Museum Building	• Village is having a heritage background • Village is situated near to holiest place for jains "Palitana"
4.	Defense Training Centre	• Large number of students from that village are preparing for defense examinations • Students from nearby villages will also get benefited by this centre
5.	School Building	• There is no government higher-secondary school building in the village
6.	Rain Water Harvesting	• It is a very useful water conservation system that every village must have

TABLE-44: REASON BEHIND DESING RECOMMENDATION

13.3 About designs Suggestions / Benefit of the villagers

Sr. No.	Proposed Design	Benefit of the villagers
1.	Recreation Centre	• Villagers can get a place to go around on weekends • Overall environment of the village will get prosperous • Children and aged persons will get a place to go
2.	Public Toilet	• Open defecation will get reduced • Overall prosperity of the village • Hygiene will get increased • Less chances of spread of diseases
3.	Museum Building	• Village will become an attraction for tourists • Economy of the village will get boosted • Heritage will get preserved • People will become more interested in history
4.	Defense Training Centre	• Students from the village will get a place to prepare for defense examinations • Unemployment will get reduced
5.	School Building	• Students will get a chance to study while remaining in their hometown • Student dropping out studying will get reduced • Girl education will get promoted
6.	Rain Water Harvesting	• Result in water conservation • Water will get saved

TABLE-45: BENEFIT TO VILLAGERS

Chapter–14: Technical Options with Case Studies

14.1 Civil Engineering

14.1.1 Advanced Earthquake Resistant

Earthquake Resistance of Buildings in Japan

If you are thinking of buying or building a home in Japan but are concerned about earthquakes, take heart—compared to other countries, the collapse ratio of buildings due to a powerful earthquake is said to be extremely low in Japan.

When an earthquake does occur, the risk to your home depends on many different factors such as the ground itself, the shape of the land, and building density among others. Fortunately, all buildings in Japan are required to have an earthquake-resistant structure, which means that new construction can only be approved through rigorous compliance with earthquake-proof standards set by law.

These strict standards, as well as information about advanced technology used in earthquake-proof buildings in Japan and throughout Tokyo that cater to them, will be outlined in this article. Following that is a basic risk-assessment of the Tokyo area to help keep you informed.

Regulations for Earthquake-proof Buildings in Japan by Generation

To make all structures as earthquake-resistant as possible, the Building Standard Act has been—and always will be—strictly reviewed every time the country experiences a large earthquake. For that reason, Japanese buildings can be divided into different "generations," depending on when they were constructed. As of now, every building falls under the "2nd generation" or below, where everything before that simply refers to buildings constructed prior to 1971. Below is a chart that summarizes the timeline of events that have led to the earthquake-proofing of buildings in Japan.

1971	2nd generation After the earthquake off the shore of Tokachi in 1968, the standard fortie-hoops of RC, or reinforced concrete structure, was tightened.
1981	3rd generation Following the disaster caused by the earthquake off the shore of MiyagiPrefecture in 1978, the Building Standard Act was revised and the New Anti-seismic Design Code came into effect.* The new standard focuses not only on preventing the collapse of buildings during earthquakes, but also on how to secure the safety of the

	people inside them. According to the Old Standard, buildings were expected to resist an earthquake of JMA seismic scale 5 The New standard mandates that buildings are able to resist an earthquake of JMA seismic scale upper 6 or higher * The New Anti-seismic Design Standard has been applied to all buildings requesting approval of construction as of June 1st, 1981.
1995	After the Hanshin-Awaji earthquake in 1995, the Act for Promotion of Renovation for Earthquake-Resistant Structures (a regulation that promotes the structural strengthening of existing earthquake-resistant buildings in Japan) came into effect. It required the earthquake resistance level of buildings larger than a certain size to be assessed and their structures renovated in accordance with the higher earthquake proof performance level set out by the New Anti-seismic Design Standard.
2000	4th Generation The Building Standard Act was revised in order to improve the safety of wooden buildings and to clarify anti-seismic performance level, specifications and building foundation forms. Ground investigations became virtually mandatory.
2009	The Licensed Architect Act was revised as a result of a falsification of structural information that was discovered in 2005. The new law required all buildings larger than a certain standard of size to be structurally designed by a 1st class registered architect.

TABLE-46: REGULATIONS OF EQ PROOF BUILDINGS IN JAPAN

Most of the buildings that collapsed in the Hanshin-Awaji earthquake in 1995 were built before the New Anti-Seismic Design Standard came in effect. As can be seen above, standards for earthquake resistant buildings in Tokyo and Japan at large have been tightened with each new revision of the law. These changes are to be expected, as the country has always pushed for increasing and improving the earthquake-proofing of buildings. Of course, a successful policy requires more than just passing laws. It requires actual physical changes in structure to make buildings safer. Below is a basic outline of various types of building structures and the types of materials used therein.

Types of Building Structures and Materials

When it comes to building structures, there are basically 4 types of materials used: wood, steel, reinforced concrete, and steel-reinforced concrete. This information is mandated by law to be included whenever you are planning to rent or buy a new home in Japan.

Wooden Structure	Wood is the main material used in these buildings. With that structure, posts and beams serve as the core parts of a given building. Many detached houses in Japan are made of wood.
Steel Structure (S)	This refers to buildings primarily using steel materials in their framework. Steel structures are especially suitable for large buildings.
Reinforced Concrete Structure (RC)	Building frameworks outfitted with RC (Reinforced Concrete) structure utilize concrete with iron reinforcing bars inside. RC structure takes advantage of both reinforcing bars as well as a steel frame. With Reinforced Concrete structure, steel-made “reinforcing bars” with tolerance against stretching forces, strengthen the “concrete” which resists the compressive forces of the building’s weight.
Steel Reinforced Concrete Structure (SRC)	Along with iron frames, buildings with this framework primarily employ concrete with iron reinforcing bars inside. This structure, often referred as “SRC structure,” utilizes both steel and reinforced concrete. Iron poles and beams, which are further supported by iron reinforcing bars, are later filled with concrete. This structure is often applied for high-rise buildings because it provides excellent seismic resistance and is also solid and durable.

TABLE-47: TYPES OF BUILDING STRUCTURES AND MATERIALS

Level of Earthquake Resistance in Japan According to Building Structure

Of course, both inner and outer material structure is crucial to the makeup of earthquake-proof buildings in Japan and elsewhere. But did you know that the level of earthquake resistance is can vary depending on their foundations? Earthquake-proofing technology has evolved so much that the things that you cannot see—from the flooring deep beneath your feet to how the walls are designed to move during an earthquake—can make all the difference for safety.

Earthquake Resistant Structure	This is the most common structure for detached houses in Japan. All buildings built after 1981 must conform to the New Anti-seismic Structure Standard requiring buildings to have an earthquake resistance structure. Seismic resistance structure allows main building structures, namely, posts, walls and floors, to absorb seismic motions. Buildings can be divided into Rigid Structure (constructed rigidly in order to prevent collapse) and Flexible Structure (the main structural parts of which bow flexibly in order to spread the force of seismic motions).
Damping Structure	In order to minimize seismic motion, damping walls that absorb seismic energy are constructed within the building. Damping structures can be divided into the Active type, which uses energy such as electricity and the Passive type, which uses physical forces. Compared to earthquake resistant structure, damping structure can reduce seismic intensity by 70-80%. Rental Properties with Damping Structure (Tokyo)
Seismic Isolation Structure	Commonly used for high-rise buildings as part of their foundation, this structure places quake-absorbing devices (isolators) such as laminated rubber that blocks seismic motions from reaching the building. Quake-absorbing devices include laminated rubber, lead, springs, dampers, ball bearings, etc. Furthermore, newly-invented construction methods use a combination of these materials. Seismic isolation structure can reduce seismic intensity down anywhere from ⅓ to ⅕ (less than half) when compared to earthquake resistant structure. Rental Properties with Seismic Isolation Structure (Tokyo)

TABLE-48:LEVEL OF EQ RESISTANCE

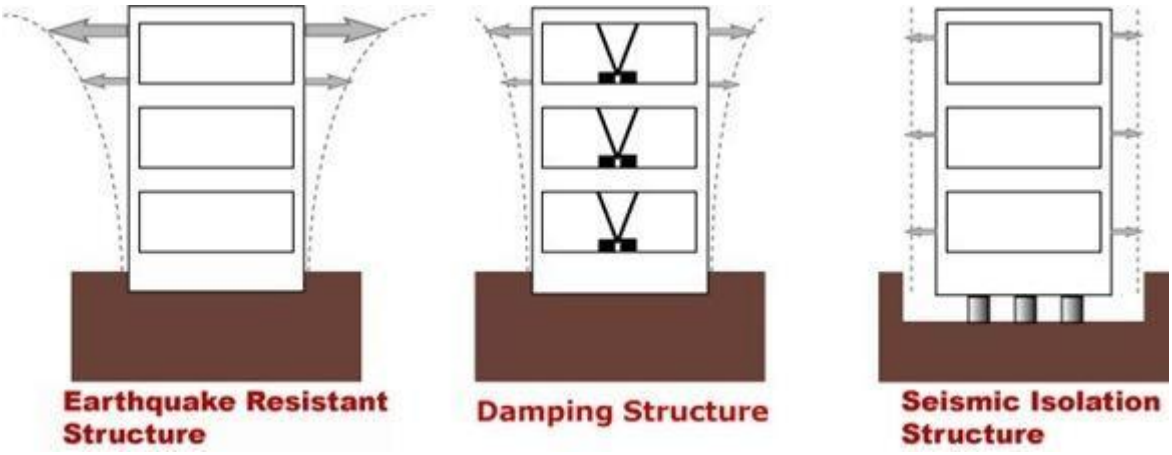


FIGURE-56: TYPES OF STRUCTURE

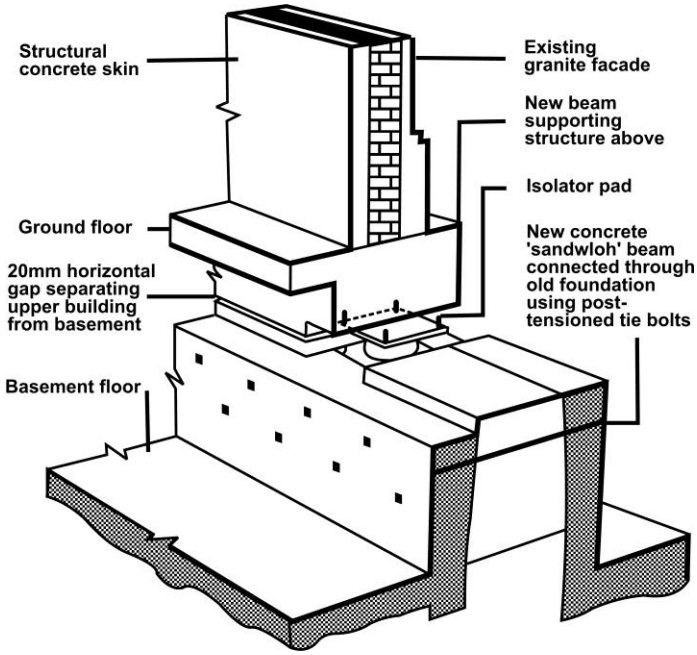
Generally, apartment and office buildings with damping or seismic isolation structures are more secure against earthquakes compared to those with more basic anti-seismic structures.

14.1.2 Seismic Retrofitting of Buildings

Seismic Retrofitting of RC Building by SeismicBase Isolation

Source	Passive Control of Structures for Seismic Loads *Ian G Buckle* 12th World Conference on Earthquake Engineering, 2000 Latest Advances in Seismic Isolation *William H. Robinson* Eleventh World Conference on Earthquake Engineering Retrofitting of Historical Building by Seismic Base Isolations *Sarvesh Kr. Jain and S.K. Thakkar* Workshop on Earthquake Disaster Preparedness, Roorkee
Typical Features of the Buildings	• Name of Buildings – New Zealand Parliament Houseand Library, both are historical buildings • Year of Construction –1899 and 1922 respectively • Lateral Load Resisting Systems – Seismically vulnerable un-reinforced masonry
Retrofitting Techniques Employed	• Seismic isolation chosen over conventional strengthening techniques to maintain the historic fabric of the building • The isolation system comprises 145 lead-rubber bearings, 230 high-damping rubber bearings and 42 sliders. • Installation of the isolators required strengthening of basement walls and columns, and the provision of floor diaphragms. • The retrofit involves re-piling the building with lead rubber bearings and rubber bearing in the supports, as well as cutting a seismic gap in the 500mm thick concrete wall. • Figure 9 shows the strengthening of foundation walls below NZ parliament House and location of isolators.
Expected Performance	• The effect of the isolation is calculated as increasing the fundamental period from a value of 0.45 seconds to 2.5 seconds • During an earthquake the building will be able to move in any direction on a horizontal plane up to distance of 300mm. • The total cost for the restoration and seismic retrofit of these two buildings was approximately US$90 million.

TABLE-49:SEISMIC RETROFITTING BY BASE ISOLATION



Strengthening of foundation walls below NZ Parliament House andlocation of isolators

FIGURE-57: BASE ISOLATION CASE STUDY

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

- # Rapid Construction by China

China has also enter in this category with the concept of rapid construction and established a record for construction of 30 storey hotel building for Ark Hotel in just 15 days under the Builders of the Board Group Corporation. During, the 15 days has been created not just a building with prefabricated panels in-build services piping systems and completely ready for operation and Breakfast-the workers, communications and even furniture in all rooms. Ark Hotel skyscraper height of 30 floors has an area of 17 thousand square metres. By using the most advanced energy saving technologies, the building will consume about 5 times less resources than the other similar facilities it. And this indicator will meet high-tech cleaning system, controlled by a computer. Despite the apparent unreliability quickly erected structures of a skyscraper, he relies on the amplitude of the earthquake to withstand upto 9 on the Richter scale [10].

Fig.12 Overview of the rapid constructed 30 storey hotel building construction process (Sources; A Chinese Miracle 30-storey hotel in 15 days...http://thefabweb.com/16814/a-chinese-miracle-30-storey-hotel-in-15-days)

FIGURE-58: RAPID CONSTRUCTION OF 30 STOREY BUILDING

Smart Materials are introduced by different company of material. Now focused on Hanson Building Products [11] Off- site manufacturing utilizing technically advanced prefabrication processes for better build quality and efficiency.The products have been designed and developed to maximize the benefits of off-site manufacturing processes in the controlled environments of purpose built factories, whilst minimizing the need for on-site involvement that is subject to the unpredictability of both the weather and the availability of skilled labour. Some impressive products are:

Wonder-wall: Wonder wall cladding system combines all the advantages of modern prefabrication with

all the appeal of traditional appearance. It can be installed faster than traditionally built masonry to a higher level of quality and is suitable for use as a durable, decorative and thermal insulating finish to external vertical walls.

Lock Clad: Terracotta cladding system with high quality clay sigma tiles. The system comprises of sigma clay tiles, sigma aluminum support rails and clips. The primary support structure and the sigma rails can be fully installed before tiling commences. Installation is fast and simple and can be effected in any direction and sequence. Lock Cladsigma is designed to be fixed to most substrates – including masonry, concrete, steel and timber frame systems and lightweight walling panels.

Glued Brick Work: Developed several years ago in Europe, The technique relies on joints which are formed using an adhesive or glue mortar, that have a high percentage of cement, very fine inert additives and specially formulated polymers. The adhesive is applied by using specially developed hand-held pumped nozzles that usually dispensetwo parallel beads of material along the horizontal bed joints and on perpends prior to the bricks being laid.

Concrete Block panels: prefabricated thin joint dense concrete block panels for easy and fast working on site. The panels offer the mechanical advantages of strength, sound insulation and fire resistance, even as minimizing wastage. They are suitable for use on ground and first-floor levels and because of their weight and high load bearing capacity, are equally suited to multi- storey construction.

Hollow Core: It is for suspended floors with clear spans upto 13 metres, particularly where a clear spanning durable deck is required. With clear, unsupported spans of up to 13 metres, they can be used on masonry, steel or concrete structures, offering benefits of fast erection and the provision of an immediate working platform.

Twin Wall: Using prefabricated panels comprising two slabs connected by means of casting lattice girders to form a single unit into which concrete is poured on site. Twin Wall is a fully flexible walling system that combines the speed and quality of precast concrete with the structural and waterproof integrity of a continuously poured in situ concrete structure.

14.1.4 Engineering Aspects Of Soil mechanics - Environmental Impact Assessment

What is Soil Mechanics?

Soil mechanics is a discipline of civil engineering that predicts the soil performance characteristics utilizing the engineering techniques of dynamics, fluid mechanics, and other technologies. Soil mechanics includes the study of soil composition, strength, consolidation, and the use of hydraulic principles to deal with issues concerning sediments and other deposits. Soil mechanics is one of the major sciences for resolving problems related to geology and geophysical engineering. Soil mechanics studies are very important for civil engineers because based on the findings of soil mechanics studies, engineering structures are constructed. The type of construction, type of equipment to be used, type of foundation, support material, and many other aspects of construction works are largely affected by the soil mechanics studies. Basically we study about soil formation modes, physical and chemical properties of soil, dynamic loading of soils, permeability, consolidation, etc. In the subsequent sections of this article, we will discuss in detail about major aspects of soil mechanics studies.

Formation of Soils

Soil is a combination of minerals and organic elements that are in solid, gaseous, and aqueous form. Soil consists of particle layers that are different from the original materials in their physical, mineralogical, and chemical properties because of the interactions between the atmosphere and hydrosphere and other reasons. The particles of the soil are created from broken rocks that have been changed due to the chemical and environmental effects, including weather and erosion. Particles of soil are filled loosely, creating a soil formation that consists of pore spaces. Studying soil formation modes is important because it helps in determining properties of soil. Cohesiveness, adhesiveness, acidity of soil, and other related factors can easily be determined by knowing about the type of soil w have to deal with. We cannot draw any concrete conclusions merely by conducting soil studies but we surely can narrow our research parameters by studying the basic characteristics of soil like color, texture, and nature of soil.

Basic Characteristics of Soils

Soil consists of different phases of solid, liquid, and gas and its characteristics depend on the interacting behavior of these phases, and on the stress applied. The solid phase includes clay, non-clay minerals, and organic matter. These elements are categorized by their size as clay, sand, and gravel. The liquid phase is composed of water that contains organic compounds available from chemical spills, wastes, and ground water, while the gas phase is normally air. The size, form, chemical properties, compressibility, and load carrying capability of the soil particles are determined by soil mineralogy, which is a science related with the chemistry, structure, and physical properties of minerals. The structure of a soil depends upon the arrangement of particles, particle groups, pore spaces, and the composition. These basic characteristics determine the type of structure to be built and what external support measures, if any, has to be taken to make the structure last long and bear the effects of earthquake, water seepage, and other external factors.

Consolidation of soils is also an important factor that needs to be studied to make strong and durable structures. Consolidation is a procedure according to which the volume of soils is reduced, by the application of a stress due to which the soil particles are packed together firmly, thereby decreasing the volume. With the removal of the stress, the soil will bounce back and recover some of the volume lost during the process of consolidation. While studying consolidation, the crucial factors to be analyzed are the rate of consolidation and the amount of consolidation. Another important factor is permeability of the soil. All the factors are closely associated with each other and they affect the overall design and construction process.

For instance, ff a structure is to be built on a soil with fine grains that have a low permeability, the flow of water through the soil voids will be less. Large water content in this soil may cause the structure to sink due to its weight. The process of consolidation in fine grained soils is slow. However, the extraction of pore water is simple in coarse grained soils since it moves freely within the region. The consolidation rate will be influenced by the soil history, nature of soil, and the load on the soil. Thus all the factors like water content permeability, consolidation, liquid limit are analyzed collectively.

Soil mechanics studies are used to determine lateral earth pressure, bearing capacity of soil, and conduct slope stability analysis. These studies always help a civil engineer to design and construct better structures and indirectly these studies help in risk mitigation too because if we know beforehand how the soil mass is going to behave, we can take precautionary measures at the time of construction itself.

What is Impact Assessment?

Impact assessments are carried out to assess the consequences of individual projects -- **Environmental Impact Assessment** -- or of policies and programmes -- **Strategic Environmental Assessment**.

Environmental Impact Assessment

Environmental Impact Assessment (EIA) is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.

UNEP defines Environmental Impact Assessment (EIA) as a tool used to identify the environmental, social and economic impacts of a project prior to decision-making. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-makers. By using EIA both environmental and economic benefits can be achieved, such as reduced cost and time of project implementation and design, avoided treatment/clean-up costs and impacts of laws and regulations.

Although legislation and practice vary around the world, the fundamental components of an EIA would necessarily involve the following stages:

a. **Screening** to determine which projects or developments require a full or partial impact assessment study;
b. **Scoping** to identify which potential impacts are relevant to assess (based on legislative requirements, international conventions, expert knowledge and public involvement), to identify alternative solutions that avoid, mitigate or compensate adverse impacts on biodiversity (including the option of not proceeding with the development, finding alternative designs or sites which avoid the impacts, incorporating safeguards in the design of the project, or providing compensation for adverse impacts), and finally to derive terms of reference for the impact assessment;
c. **Assessment and evaluation of impacts and development of alternatives**, to predict and identify the likely environmental impacts of a proposed project or development, including the detailed elaboration of alternatives;
d. **Reporting the Environmental Impact Statement (EIS) or EIA report**, including an environmental management plan (EMP), and a non-technical summary for the general audience.
e. **Review of the Environmental Impact Statement (EIS)**, based on the terms of reference (scoping) and public (including authority) participation.
f. **Decision-making** on whether to approve the project or not, and under what conditions; and
g. **Monitoring, compliance, enforcement and environmental auditing**. Monitor whether the predicted impacts and proposed mitigation measures occur as defined in the EMP. Verify the compliance of proponent with the EMP, to ensure that unpredicted impacts or failed mitigation measures are identified and addressed in a timely fashion.

Strategic Environmental Assessment

Sadler and Verheem (1996) define Strategic Environmental Assessment (SEA) as the formalized, systematic and comprehensive process of identifying and evaluating the environmental consequences of proposed policies, plans or programmes to ensure that they are fully included and appropriately addressed at the earliest possible stage of decision-making on a par with economic and social considerations.

Since this early definition the field of SEA has rapidly developed and expanded, and the number of definitions of SEA has multiplied accordingly. SEA, by its nature, covers a wider range of activities or a wider area and often over a longer time span than the environmental impact assessment of projects.

SEA might be applied to an entire sector (such as a national policy on energy for example) or to a geographical area (for example, in the context of a regional development scheme). SEA does not replace or reduce the need for project-level EIA (although in some cases it can), but it can help to streamline and focus the incorporation of environmental concerns (including biodiversity) into the decision-making process, often making project-level EIA a more effective process.

SEA is commonly described as being proactive and ‘sustainability driven’, whilst EIA is often described as being largely reactive.

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

Sustainable Wastewater Treatment Systems(2018–2019)

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Abstract:

An important part of the environmental degradation suffered by the planet is caused by the discharge of untreated or poorly treated wastewater. Industrial, urban, and agricultural waste water contain many different types of pollutants such as biodegradable and non biodegradable 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 efficiency, waste water 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 different 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, nano particle treatment, constructed wetlands, energy–water nexus, nutrient recovery, eco-friendly sorbents, and reverse osmosis.

Keywords:

- water treatment
- activated sludge
- modeling
- constructed wetland
- advanced oxidation techniques
- reverse osmosis
- sorbents

Historically, water scarcity has been a major problem in many regions of the world. However, accessibility to water of sufficient quality is becoming an increasingly serious problem, mainly due to the pollution of aquifers and coastal areas, climate change, and overpopulation. Natural waters, and to a greater extent, sewage, must be treated before use, reuse, or being discharged. There are many pollutants that compromise water quality, and affect both the human being and the natural environment. Some of the most important threats come from industrial wastewater due to the toxicity of heavy metals, persistent organic compounds, etc. However, urban wastewater, apparently easily treated by well-established methods for decades, is generating an increase in eutrophication events with direct consequences such as massive deaths of aquatic organisms, biodiversity reduction, red tides, etc. For example, the number of anoxic or sub-toxic zones in coastal waters has grown exponentially since 1960, with more than 400 hypoxic zones being reported

worldwide. The presence of pathogens (viruses, bacteria, and parasites) and their elimination remains an essential part in the treatment of wastewater. Hormonal disruptors are another of the many groups of pollutants that pose a health risk of unforeseeable consequences to humans and animals. These include a huge variety of substances including drugs, pesticides, additives of plastic products, bleaching agents, cleaning agents, etc.

The current environmental situation of the planet also requires that the methods of water treatment, like any other human activity, are sustainable, but what does sustainable mean? Many times, we think about environmental sustainability exclusively and forget that sustainability, as understood by the United Nations in its 17 Sustainable Development Goals, is much more than that, since it includes economics and ethical-social aspects such as gender equality or the eradication of poverty for all. Water treatment methods include a wide variety of techniques of a different nature, ranging from physical methods such as dissolved air flotation or membrane techniques to chemical methods such as the advanced oxidation techniques and the great variety of biological methods. Within this last group, the low-cost, decentralized, or ecological techniques such as lagoons, constructed wetlands, trickling filters, or bio discs have undergone a remarkable development. The objective of this Special Issue "Sustainable Wastewater Treatment Systems" has been to review the state-of-the-art of the latest advances in water management with a particular focus on sustainable methods of disinfection, grey water, constructed wetlands, ponds, membranes, reclaimed waste water reuse, etc. Many submissions have been received with significant contributions for the main topics of interest in our Special Issue. However, only 13 high-quality papers were accepted after strict andrigorous review. In particular, these accepted papers mainly focused on various perspectives such as innovative applications and research covering the removal of nano particles, constructed wetlands, microbial aspects of activated sludge, adaptation to climate change in water-energy coupling, nutrient recovery from wastewater, eco friendly sorbents, advanced oxidation processes, membrane technology, and modeling in reverse osmosis optimization. All of the accepted articles provide recent advances in the mostactive wastewater treatment research fields. Rizwan Khan, Muhammad Ali Inam, Saba Zam Zam,Muhammad Akram, Sookyo Shin, and Ick Tae Yeom explored the removal of CuO nanoparticlesfrom water by coagulation at different pH values and dissolved organic matter concentrations. The media pH significantly affected the coagulation efficiency of the nano particles. They observed that the simultaneous effect of coagulants and charge neutralization at pH 6–8 enhanced the removal of CuO nano particles. Their study suggests that coagulation is effective in removing the nanoparticlesfrom complex matrices in a wide pH range. Their findings provide insight into the coagulation and dissolution behavior of CuO nano particles during the water treatment process. In the field of activated sludge, Jin Xu, Peifang Wang, Yi Li, Lihua Niu, and Zhen Xing studied the effect of different organic carbon/N ratii and dissolved oxygen (DO) levels and observed that the best treatment performance was achieved with a COD (Chemical Oxygen Demand)/N ratio of 7:1 or the DO levels of2–2.5 mg/L. They observed evident microbial variance and changes in the richness and evenness of the microbial communities in the activated sludge. Their work provides valuable practical guidance for the operators of any wastewater treatment plant. Research in constructed wetlands is continuously expanding and this Special Issue could attract different remarkable manuscripts. The sustainable application of constructed wetlands calls for the use of alternative materials to be used as substrates. Agro-forest wastes such as palm mulch can be a suitable alternative to gravel and sand. Thus, Marina Carrasco-Acosta, Pilar Garcia-Jimenez, JoséAlberto Herrera-Melián, Néstor Peñate-Castellano,and Argimiro Rivero-Rosales studied the effect of plants on relevant aspects of constructed wetland performance such as pollutant removal, substrate clogging, and bacterial community structure inorganic-based vertical flow constructed wetlands. They observed that the presence of plants delayedthe clogging of the reactors and reduced the biodiversity of Enterococci andE. colias measured with terminal restriction fragment length polymorphism (T-RFLP) analysis. Nowadays, water-energy management optimization is a key issue, but the threat of the climate change can makeit imperative in the near future. Tuan-Viet Hoang, Pouya Ifaei, Kijeon Nam, Jouan Rashidi, SoonhoHwangbo,

Jong-Min Oh, and Chang Kyoo Yoo proposed the optimization of a hybrid renewable energysystem (HRES) coupled with a membrane bioreactor for the sustainable adaptation to climate change

Sustainability2020,12, 19403 of 5in Vietnam. The model-based HRES consisted of solar photovoltaic panels, wind turbines, and battery banks. The authors defined three scenarios, 101 sub-scenarios, and three management cases to optimize the system design. The results showed that the smallest environ-economic cost was obtained when 47%of the demand load of the membrane bioreactor was met using the HRES and the rest was supplied by the grid (Contribution 4). Another paper on constructed wetlands focused on the removal of heavy metals with the plant totora in the South American Altiplano region. Juan Blanco tested if the plant could be used in constructed wetlands treating mining wastewaters with high salinity and As andPb concentrations. He compared the chemical composition of the leaves, rhizomes, and roots andobserved that totora was a multi-hyperaccumulator for As, Fe, and Ni. These results, in addition with the plant's intrinsic high biomass production, slow decomposition, and usability as a raw material for local craftwork and industry, support the recommendation to use totora in wetlands to treat water polluted with heavy metals and/or with high salinity. Rizwan Khan, MuhammadAli Inam, Muhammad Mazhar Iqbal, Muhammad Shoaib, Du Ri Park, Kang Hoon Lee, Sookyo Shin,Sarfaraz Khan, and Ick Tae Yeom studied the influence of surfactant type in the removal of ZnOnanoparticles from natural waters by the coagulation–flocculation process. Anionic sodium dodecylsulfate (SDS) and nonionic nonylphenol ethoxylate (NPEO) were employed as model surfactants. Theadsorption of the nanoparticles, which was strongly pH-dependent, was studied with Freundlich andLangmuir models. The formation of mono-bilayer patches onto the nano particles was suggested. The cooperation of charge neutralization and adsorptive micellar flocculation might explain the coagulationmechanism. This study provides new insight into the behavior of ZnO nano particles and surfactantsin water treatment processes (Contribution 6). Nitrogen and phosphorus play a key role in food production but their environmental impact can be devastating when they are discharged in the natural watercourses. Jan Peter Van der Hoek, Rogier Duijff, and Otto Reinstra studied nitrogen recovery from wastewater. The current N-based fertilizers have many drawbacks since energy requirements are high and in the wastewater treatment, N is lost to the atmosphere as N2. The authors selected technologies for N recovery from wastewater considering four criteria: sustainability, the potential to recover N, the maturity of the technology, and the N concentration that can be handled by the technology. The most promising mature technologies that can be incorporated into existing waste water treatment plants include struvite precipitation, the treatment of digester reject water by air stripping, vacuum membrane filtration, hydrophobic membrane filtration, and treatment of air from thermal sludge drying. Higher nitrogen recovery (60%) could be achieved by separate urine collection, but a completely new infrastructure for wastewater collection and treatment would be necessary. Different technologies in parallel are required to reach sustainable solutions (Contribution 7). Shuang Xu,Weiguang Yu, Sen Liu, Congying Xu, Jihui Li, and Yucang Zhang explored the adsorption of hexavalentchromium on a low cost banana pseudostem biochar.
The biochar surface prepared at low temperature was rich in O-containing groups. The best results were obtained with the biochar prepared at 300◦Cwith a 125.44 mg/g maximum adsorption capacity. Pseudo-second-order kinetics and Langmuirmodel provided the best fit of the experimental data, indicating a monolayer chemi-adsorption. The adsorption of Cr(VI) was attributed to the reduction of Cr(VI) to Cr(III), ion exchange, and complexation(Contribution 8). Angela Gorgoglione and Vincenzo Torretta contributed with a revision of more than120 constructed wetland (CWs) case studies with the goal of providing a tool for researchers and decision-makers considering using this green technology. The authors claim that although CWs are considered to be environmental-friendly and low cost, their sustainable management still remains a challenge. The study provides sustainable solutions for the performance and applications of CWs by means of the discussion of key aspects such as macrophyte species, media type, water level, hydraulic cretention time, and hydraulic loading rate (Contribution 9). Additionally, very interesting research onthe use of the green waste coffee silverskin in water treatment was performed by Angela Malara, EmiliaPaone, Patrizia

Frontera, Lucio Bonaccorsi, Giuseppe Panzera, and Francesco Mauriello. These authors assessed it for its suitability in the removal of Cu, Zn, and Ni divalent ions from water. The application of the Langmuir and Freundlich models demonstrated a monolayer-type adsorption. The results

Sustainability2020,12, 19404 of 5support the use of coffee silverskin as a new low cost adsorbent for metals in wastewater (Contribution10). Reducing the effects of eutrophication on receiving waterbodies has many environmental, butalso economic benefits. This way, Ben Morelli, Sarah Cashman, Xin (Cissy) Ma, Jay Garland, JasonTurgeon, Lauren Fillmore, Diana Bless, and Michael Nye applied life cycle and life cost assessments to determine the environmental benefits of upgrading a small community conventional activated sludge treatment process. The authors introduced biological nutrient removal, and enhanced primary settling and anaerobic digestion (AD) with co-digestion of high strength organic waste. The upgraded system significantly reduced eutrophication impact, global climate change potential, and cumulative energy demand relative to the legacy system (Contribution 11). Water treatment methods of different nature can also be combined to provide particularly suitable technologies. Hyun-Hee Jang, Gyu-Tae Seo and Dae-Woon Jeong proposed a combination of nano filtration and ozone-hydrogen peroxide oxidation for the treatment of soy sauce waste. Currently, the application of ozone oxidation provides 34% color removal and 27% chemical oxygen demand reduction. The authors combined ozone with hydrogen peroxide and achieved color removal (52 %) and COD reduction (34 %) with the optimized method. When nano filtration was used as a pre-treatment, the method was remarkably improved since color removal was 98% and COD removal was 98%. Thus, the NF-H2O2/O3process is one of the best methods to treat soy sauce waste (Contribution 12). Finally, with the goal of reducing the power consumption of the desalination industry in Kuwait, Bader S. Al-Anzi and Ashly Thomas developed a one-dimensional analytical model of pressure retarded osmosis in a parallel flow configuration. The model has been developed to “size” an osmotically-driven membrane process mass exchanger given the operating conditions and desired performance. The model has been used to determine mass transfer units as a function of mass flow rate ratio, recovery ratio, concentration factors, effectiveness, etc. The actual water permeation to the brine stream was related by the introduction of a new dimensionless dilutionrate ratio and dilution rate, among others. A maximum power of 0.28 and 2.6 kJ can be produced by the system using seawater or treated wastewater effluent as the feed solution, respectively, which could help to reduce the power consumption of the desalination industry in Kuwait

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

Sr. No.	Proposed Design	Estimated Cost	Benefit Time period	Impact on Villagers/Society
1	**College Building**	44,195,371	Long term	• **Migration of students for higher studies will decrease** • **Students dropping out studying after higher secondary schooling will get reduced** • **Girl education will get improved because the college is situated in their locality** •
2	**Septic Tank**	1,771,10	Immediately	• **Hygiene of people will get increased** • **Lower lying areas will get covered under septic tank** • **Open drains will get eliminated** • **Less spread of diseases**
3	**Sports Complex**	9,485,617	Long term	• **Students from village and nearby villages will get more opportunities of sports** • **Health of youngsters will get improved** • **Overall well being will get promoted**
4	**Bus Stand**	516029	Immediately	• **The necessity of having a constructed and comfortable bus-stand will get fulfilled** • **Terminal facility will get improved** • **Overall impression of village will**

				get improved
5	**Shelter Home**	5,45,596	Within 1 year	• **Pilgrimage in village will increase** • **More travelers will visit village** • **Overall bust in the village economy** • **Guests of village will get a convenient place to stay**
6	**Market Building**	11,54,041	Within 1 year	• **Buying and selling of goods in village will increase** • **Bust in village economy** • **Less migration of villagers** • **Transportation cost for transporting goods for buying and selling will get saved**
7	**Recreation centre**	945066	Immediately	• **Villagers will get a place to visit at weekends** • **It will serve as a place where villagers can gather for some social activities** • **Overall impression of village will get improved** • **Villagers will get more stable social environment**
8	**Public Toilet**	274602	Immediately	• **Open defecation will get eliminated** • **Overall hygiene of villagers will get improved** • **Spread of diseases will get reduced** • **Overall impression of village will get improved**
9	**Museum Building**	1434375	Within 1 year	• **Tourists in village will increase** • **Heritage of village will get preserved** • **Overall bust in the village economy** • **More employment opportunities** • **People will start taking more**

				interest in knowing the history.
10	**Defense Training Centre**	9,262,257	Long term	• **Students from the village will get a place to prepare for defense examinations** • **Unemployment will get reduced**
11	**School Building**	44,195,371	Long term	• **Students will get a chance to study while remaining in their hometown** • **Student dropping out studying will get reduced** • **Girl education will get promoted**
12	**Rain Water Harvesting**	28,875	Immediately	• **Result in water conservation** • **Water will get saved**

TABLE-50: IMPACT ON VILLAGERS/SOCIETY

Chapter–16: Survey By Interviewing With Talati And Sarpanch

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

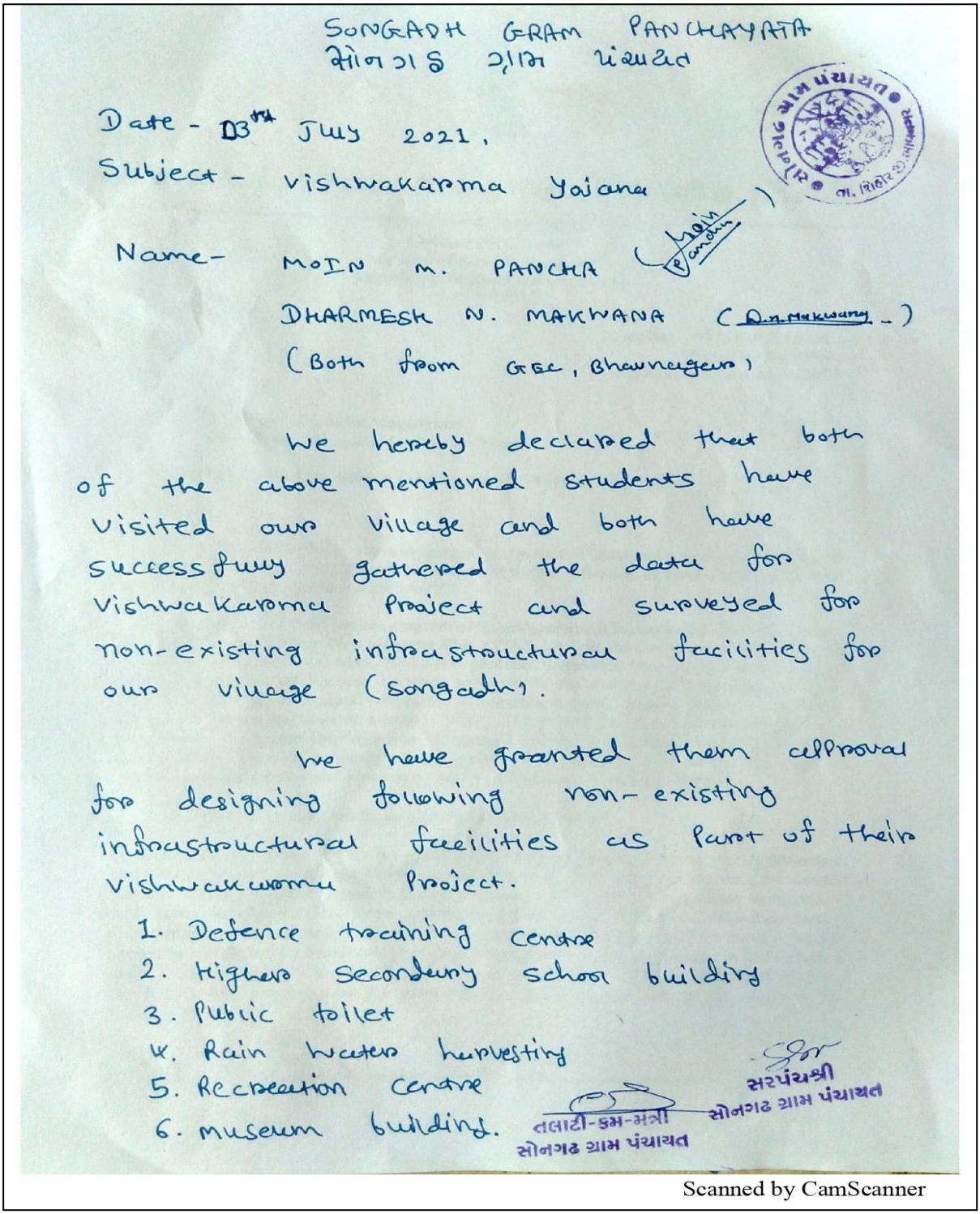
An approach towards "Rurbanisation for Village Development"

CHAPTER- 16

Sr.	Questios	Yes/ No	Remarks
1	What are the sources of income in village?	Yes	Farming Unskilled labor work Small businesses
2	What are the chances of employment in village?	Yes	Very less chances
3	What are the special technical facilities in village?	No	---
4	Is any debt on village dwellers?	No	---
5	Are village people getting agricultural help?	No	Very less
6	Is women health awareness Program organized in village?	No	---
7	Are women having opportunity to work and income?	Yes	Some industries provide work for women
8	Child girl education is appreciated in village?	Yes	---
9	Facility of vaccination to child is available in village?	Yes	---
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes	---
11	Women help line number information is provided to village people?	Yes	---

12	Is water scarcity in village? How many days per year?	No	Village is fully connected with piped water connections
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 invillage? Provide list with Male/female/girl/boy with age and type of disability and reason of disability.	No	---
18	Is village improvement is observed in comparative scenario from past to present?	Yes	Education and awareness is increased
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	---

TABLE-51:SURVEY WITH VILLAGE AUTHORITIES



SONGADH GRAM PANCHAYATA
સોનગઢ ગ્રામ પંચાયત

Date - 03rd July 2021.

Subject - Vishwakarma Yojana

Name- MOIN M. PANCHA

DHARMESH N. MAKWANA (D.N.Makwana)

(Both from GEC, Bhavnagar)

We hereby declared that both of the above mentioned students have visited our village and both have successfully gathered the data for Vishwakarma Project and surveyed for non-existing infrastructural facilities for our village (Songadh).

We have granted them approval for designing following non-existing infrastructural facilities as part of their Vishwakarma Project.

1. Defence training centre
2. Higher Secondary school building
3. Public toilet
4. Rain water harvesting
5. Recreation Centre
6. Museum building.

તલાટી-કમ-મંત્રી
સોનગઢ ગ્રામ પંચાયત

સરપંચશ્રી
સોનગઢ ગ્રામ પંચાયત

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FIGURE-59: LATTER ISSUED BY SARPANCH VALIDATING SURVEY

Chapter–17: Irrigation / Agriculture Activities And Agro Industry, Alternate Techniques And Solutions

Farming methods have evolved massively over the years, from basic, hand-held tools to the modern, sophisticated machinery we use today. Farmers are now embracing modernity, which has enabled them to achieve the highest potential in whichever farming activity they choose to undertake. Farming methods are increasingly becoming more refined, less manual, yields are increasing, and it's not uncommon to find beef poultry, beef cattle, and dairy cows on the same farm. But what is causing these changes? The answer is simple. Technology!

Technological advancements have permeated every industry across the world and agriculture is no exception. Nowadays, technology is significantly helping growers and farmers in several ways, including precise forecasting, data-driven decision making, and more. The changes have also resulted in a positive impact on the bottom line of most farmers and ultimately led to improved accesses to food products, at reasonable prices. Let's delve into the specific ways in which technology has revolutionized agriculture.

1. Online resources

The proliferation of internet technology has dramatically offered farmers unprecedented access to a wealth of valuable resources and tools to make farming easier. Notably, the internet has innumerable production and planning tools to help them forecast future crops.

Additionally, the World Wide Web provides several farming forums that let them exchange ideas seek advice and participate in insightful discussions. These forums offer robust support groups that can help farmers without ever setting foot on the farm.

2. GPS

A few decades ago, the idea of tractors driving themselves on the farm was implausible. However, the entry of GPS technology has completely changed everything. GPS provides precise location information at any point near or on the earth's surface. So, farming machines integrated with GPS receivers can recognize their position within the farm and adapt their operation to maximize their efficiency at that location.

Now, tractors equipped with GPS technology coupled with automatic steering systems are used to improve the placement of seeds on the farm, thereby reducing wastes and costs. Additionally, GPS guided drones are increasingly being used to perform tasks such as crop spraying, livestock monitoring and 3D mapping.

The applications of GPS are many and transcend their usage in tractors. For example, farmers can use a GPS receiver to detect preselected positions in a farm field for soil sample collection. The selected soil samples are then analyzed to generate a fertility map in a geographic information system (GIS). Using the map, farmers can accurately prescribe the quantity of fertilizer required for each sampled section of the farm field. After that, the farmer can use Variable-rate technology (VRT) fertilizer applicators to distribute the precise amount of fertilizers in the area.

3. Sensors

Sensors, like GPS technology, are increasingly being used by farmers to comprehend their crops at a micro level, reduce environmental impacts, and conserve resources. Most of the sensing technologies used in precision agriculture provide critical data that helps farmers to adapt their approaches to the changing environmental factors.

Location sensors use GPS satellites signals to ascertain longitude, latitude and altitude. To effectively triangulate a position, a farmer should have a minimum of three satellites. Optical sensors are also used in precision agriculture to aggregate and process plant color and soil reflectance data. More precisely, they are used to determine the organic matter, moisture content and clay content in the soil.

Generally, sensors can monitor everything from soil temperature to humidity levels in grain silos. Also, they can offer very critical knowledge of soil health. And importantly, sensor technology helps farmers to use their irrigation waters more efficiently, minimizing on wastage, and lowering costs.

4. Mobile devices

As technology improves every day, mobile technology also has advanced, as evidenced by the number of apps popping up. This development has significantly impacted every sphere of life with agriculture too benefiting from the progress.

The actual game changes have been mobile applications. They have altered the lives of farmers and agricultural field holders, for the better. Famers have access to several mobile apps that can help them to collect information on their field farms, check the weather, and receive relevant updates.

With farmers getting insightful details from mobile apps, they are smoothly transitioning from handling fields to creating farm maps and facilitating the use of drones. The software behind the apps put them in the drivers' seat when managing everything from strategy formulation to tracking progress.

5. Smart farming

When all the above technologies are merged, the resulting product will be a smart farming system, often referred to as precision agriculture. Smart farming involves the implementation of contemporary Information and Communication Technologies (ICT) into agriculture, resulting in what is referred to as the Third Green Revolution. The revolution is slowly taking over the agricultural sector through the joint application of ICT solutions such as the Internet of Things (IoT), GPS, robotics, sensors and actuators, Big Data, Unmanned Aerial Vehicles (UAVs, drones), precision equipment, plus much more.

Using irrigation as an example, we can demonstrate how different technologies are combined to offer smart farming. Before watering the farm field, a farmer can mount a sensor on an irrigator to assess the moisture level of the soil. The information obtained is then used to vary the quantity of water required.

Farmers can use drones to assess plant health and enable them to take any corrective measures, where applicable. Similarly, smart farming techniques allow farmers to monitor the individual needs of their animals better and regulate their nutrition correspondingly, thereby averting disease and improving their health.

Smart farming provides farmers with limitless potential to deliver a more sustainable and productive output based on field-generated data. Also, it gives farmers an added value through better and timely decision-making.

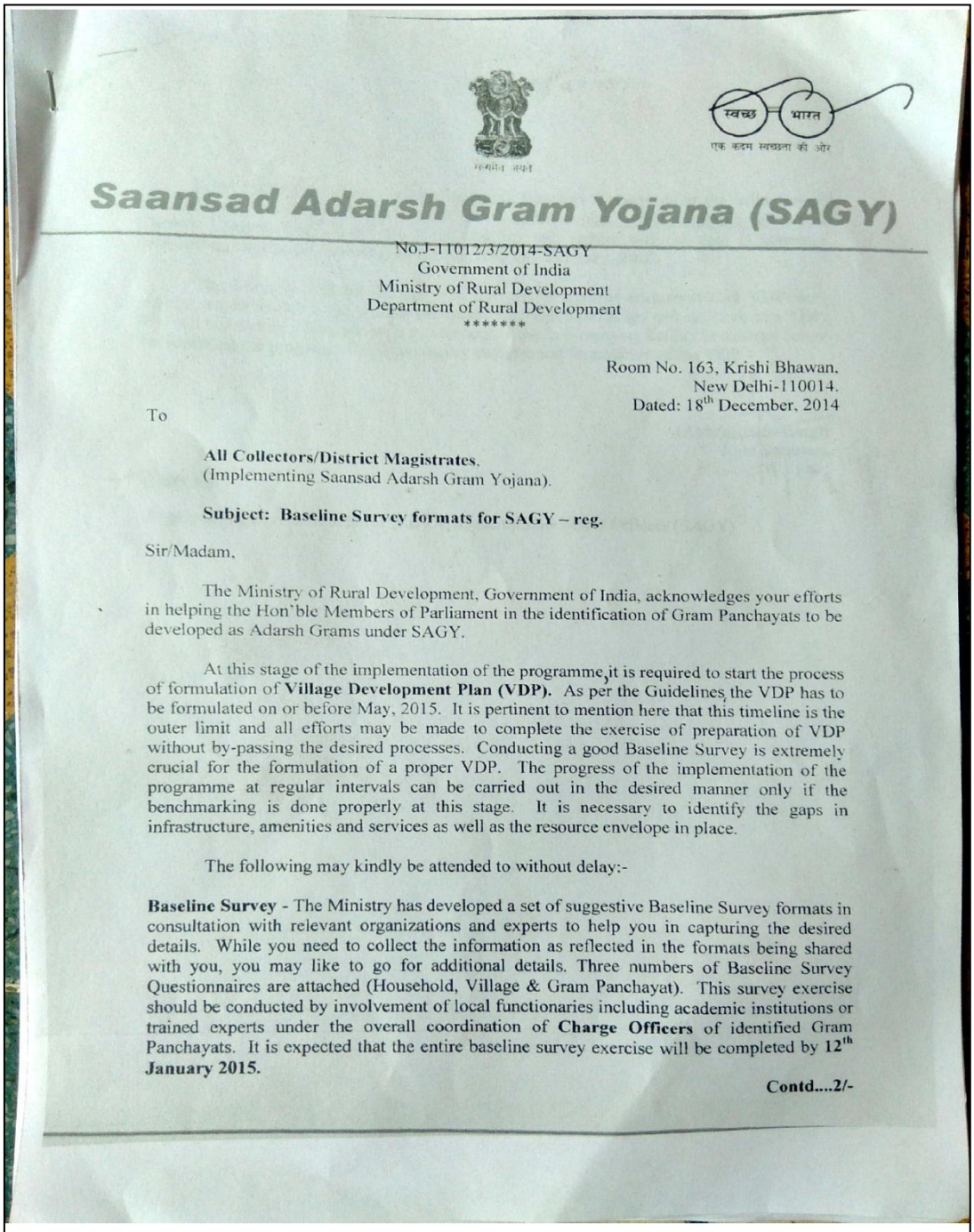
Undoubtedly, technology is significantly altering the way we live and work. The adoption of various technologies in agriculture has brought several disruptions in the industry, with specific emphasis on agricultural jobs. Increasingly, agricultural technician jobs are now on demand to cater to the needs of the changing times. Nonetheless, it is clear that technology has changed agriculture, for the better!

Chapter–18: Social Activities – Any Activates Planned By Students

We had carried out a small teaching program for the children of nearby village in which we taught them about how they can do basic functioning of computer

Chapter–19: Songadh Village SAGY Questionnaire Survey form with the Sarpanch Signature

FIGURE-60: SAGY QUESTIONNAIRE SURVEY FORM IMAGES



Saansad Adarsh Gram Yojana (SAGY)

No.J-11012/3/2014-SAGY
Government of India
Ministry of Rural Development
Department of Rural Development
****

Room No. 163, Krishi Bhawan,
New Delhi-110014.
Dated: 18th December, 2014

To

All Collectors/District Magistrates,
(Implementing Saansad Adarsh Gram Yojana).

Subject: Baseline Survey formats for SAGY – reg.

Sir/Madam,

The Ministry of Rural Development, Government of India, acknowledges your efforts in helping the Hon'ble Members of Parliament in the identification of Gram Panchayats to be developed as Adarsh Grams under SAGY.

At this stage of the implementation of the programme, it is required to start the process of formulation of **Village Development Plan (VDP).** As per the Guidelines, the VDP has to be formulated on or before May, 2015. It is pertinent to mention here that this timeline is the outer limit and all efforts may be made to complete the exercise of preparation of VDP without by-passing the desired processes. Conducting a good Baseline Survey is extremely crucial for the formulation of a proper VDP. The progress of the implementation of the programme at regular intervals can be carried out in the desired manner only if the benchmarking is done properly at this stage. It is necessary to identify the gaps in infrastructure, amenities and services as well as the resource envelope in place.

The following may kindly be attended to without delay:-

Baseline Survey - The Ministry has developed a set of suggestive Baseline Survey formats in consultation with relevant organizations and experts to help you in capturing the desired details. While you need to collect the information as reflected in the formats being shared with you, you may like to go for additional details. Three numbers of Baseline Survey Questionnaires are attached (Household, Village & Gram Panchayat). This survey exercise should be conducted by involvement of local functionaries including academic institutions or trained experts under the overall coordination of **Charge Officers** of identified Gram Panchayats. It is expected that the entire baseline survey exercise will be completed by **12th January 2015.**

Contd....2/-

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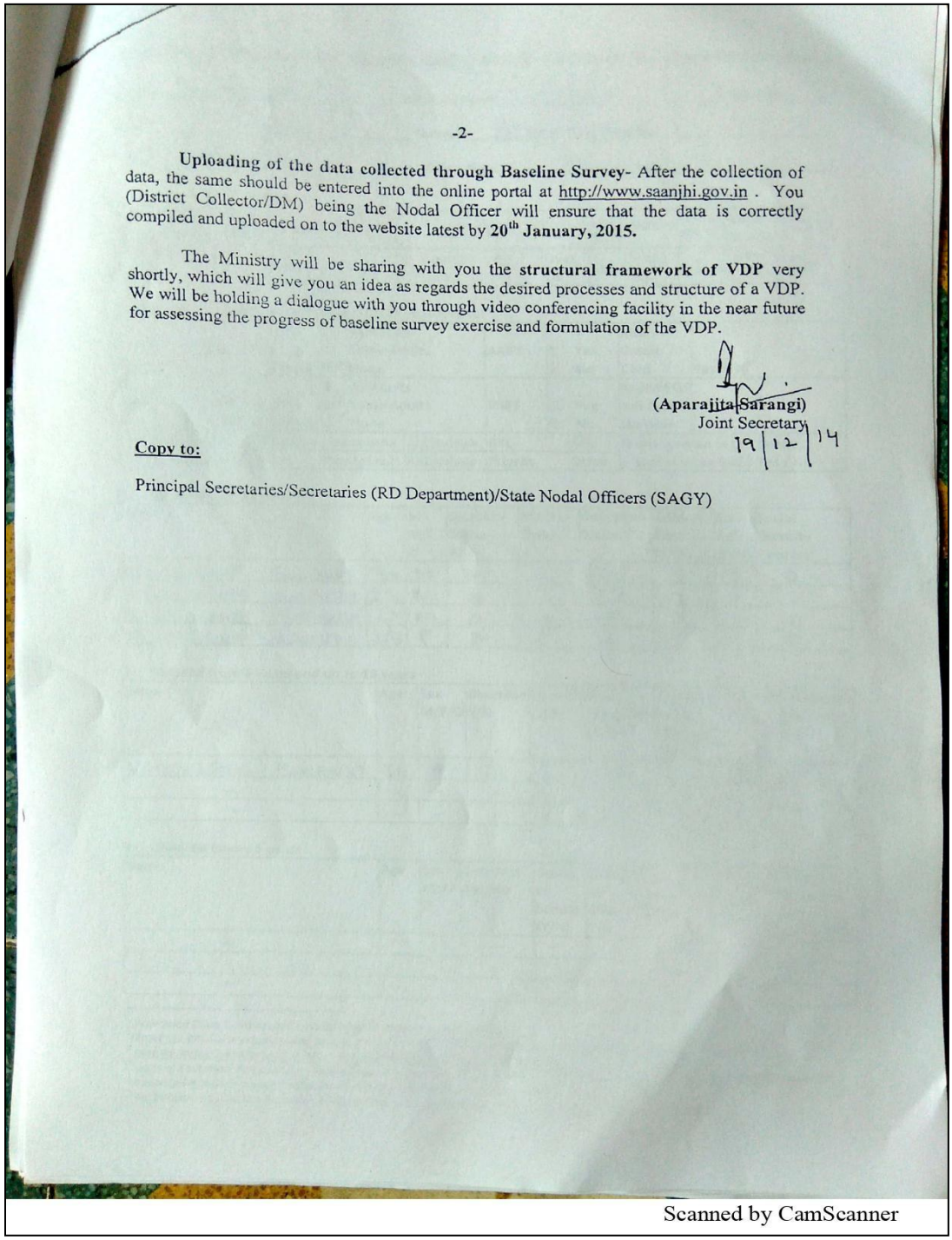

-2-

Uploading of the data collected through Baseline Survey- After the collection of data, the same should be entered into the online portal at http://www.saanjhi.gov.in . You (District Collector/DM) being the Nodal Officer will ensure that the data is correctly compiled and uploaded on to the website latest by **20th January, 2015.**

The Ministry will be sharing with you the **structural framework of VDP** very shortly, which will give you an idea as regards the desired processes and structure of a VDP. We will be holding a dialogue with you through video conferencing facility in the near future for assessing the progress of baseline survey exercise and formulation of the VDP.

(Aparajita Sarangi)
Joint Secretary
19/12/14

Copy to:

Principal Secretaries/Secretaries (RD Department)/State Nodal Officers (SAGY)

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SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Songadh Gram Panchayat: Songadh. Ward No. 9.

Block: — District: Bhavnagar.

State: Gujarat S Constituency: Bhavnagar

1. Family Identity and Size

Name of Head of Household	NALIN BHAI UKABHAI SOLANKI							Male/ Female	MALE
SECC Survey ID:	—	Family Size	5	Over 18	4	to 18	1	Under 6	0

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]	OBC	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]
NALIN BHAI SOLANKI	50	M	N	2	01	Y	Y	0
NILESH BHAI SOLANKI	23	M	N	1	07	Y	Y	0
YOGESH BHAI SOLANKI	20	M	N	1	07	Y	Y	0
JAYABEN SOLANKI	W8	F	N	2	01	Y	Y	0

3. Children from 6 years and up to 18 years

Name	Age	Sex M/F/O	Disability Y/N	Marital Code*	Level of Education: Code#	Going to School /College (Y/N)	Current Class	Computer Literate Y/N
KRISHA BEN SOLANKI	16	F	N	1	05	Y	12th	N
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—

4. Children below 6 years

Name	Age	Sex M/F/ O	Disability Yes/No	Going to School (Y/N)	Going to AWC Y/N	De-worming Done	Fully Immu-nised Y/N	Mother's Age at the time of Child's Birth
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—

[1] Scheduled Caste 1, Scheduled Tribe 2, Other Backward Castes 3, Other 4

[2] Enter the BPL Survey round being used in the Gram Panchayat for identification of BPL Families (e.g. 1997/2002/2011)

[3] *Marital Status: Not Married – 1, Married – 2, Widowed – 3, Divorced/Separated – 4*

[4] *Level of Education: Not Literate – 01, Literate – 02, Completed Class 5 - 03, Class 8th – 04, Class 10th-05, Class 12th-06, ITI Diploma-07, Graduate-08, Post Graduate/Professional – 09 (write the highest level applicable)*

[5] No Pension – 0, Old Age Pension – 1, Widow Pension – 2, Disability Pension – 3, Other Pension – 4 (mention)

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

5. Hand washing

	Always		Sometimes		Never
After use of Toilet	~~Soap~~	Other	Soap	Other	
Before Eating	Soap	~~Other~~	Soap	Other	

6. Use of Mosquito Net
Children: ~~Yes~~ / No Adults: ~~Yes~~ / No

7. Do members take Regular Physical Exercise

	Yoga	Games	Other Exercises
Adults	Yes / ~~No~~	Yes / ~~No~~	~~Yes~~ / No
Children	~~Yes~~ / No	~~Yes~~ / No	~~Yes~~ / No

8. Consumption of Tobacco

	Smoking	Chewing
Adults	—	—
Children	—	—

9. House & Homestead Data

Own House: ~~Yes~~ / No	No. of Rooms: 3
Type: Kutcha / Semi-~~Pucca~~ / Pucca	
Toilet: ~~Private~~ / Community / Open Defecation	
Drainage linked to House: ~~Covered~~ / Open / None	
Waste Collection System	Door Step / ~~Common~~ Point / No Collection System
Homestead Land: ~~Yes~~ / No	Kitchen Garden : Yes / ~~No~~
Compost Pit: Individual/ Group/ ~~None~~	Biogas Plant: Individual/ Group/ ~~None~~

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

Source of Water		Distance
Piped Water at Home	~~Yes~~ / No	
Community Water Tap	~~Yes~~ / No	
Hand Pump (Public / Private)	~~Yes~~ / No	
Open Well(Public / Private)	Yes / ~~No~~	
Other (mention):		

11. Source of Lighting and Power

Electricity Connection to Household: ~~Yes~~ / No
Lighting: Electricity/Kerosene/Solar Power
Mention if Any Other: _____
Cooking: ~~LPG~~/Biogas/Kerosene/Wood/Electricity
Mention if Any Other: _____
If cooking in Chullah: ~~Normal~~/ Smokeless

12. Landholding (Acres)

1. Total	—	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
Cotton	—	—
—	—	—
—	—	—

17. Livestock Numbers

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

18. What games do Children Play
VSUAL GULLY GAMES.

19. Do children play musical instrument (mention)
—

Schedule Filled By:
Principal Respondent: તલાટી-કમ-મંત્રી સોનગઢ ગ્રામ પંચાયત
Date of Survey: 3 July, 2021

સરપંચશ્રી
સોનગઢ ગ્રામ પંચાયત

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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: Songadh.

b. Block: —

c. District: Bhavnagar.

d. State: Gujarat

e. Lok Sabha Constituency: Bhavnagar.

f. Number of Wards in the Gram Panchayat: 1 to 12

g. Number of Villages in the Gram Panchayat: 0

h. Names of Villages:

—

Demographic Information

Number of Households 2,400. Total Population 6837 Male _____ Female _____

SC HHs — ST HHs — OBC HHs — Other HHs —

I. Access to Infrastructure / Facilities / Services

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
a.	ANM/ Health Sub Centre	N	8 KM
b.	Nearest Primary Health Centre (PHC)	Y	0 KM
c.	Nearest Community Health Centre (CHC)	N	8 KM
d.	Nearest Post Office	Y	0 KM.
e.	Nearest Bank Branch (Any)	Y	0 KM
f.	Nearest Bank with CBS Facility	Y	0 KM
g.	Nearest ATM	Y	0 KM
h.	Nearest Primary School	Y	0 KM
i.	Nearest Middle School	Y	0 KM
j.	Nearest Secondary School	Y	0 KM
k.	Nearest Higher Secondary School / +2 College	N.	8 KM
l.	Nearest Graduate College	N	8 KM
m	Nearest ITI / Polytechnic Centre	N	8 KM
n	Kisan Seva Kendra	N	8 KM

1

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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	8 KM
p	Nearest Agro Service Centre	N	8 KM
p	MSP based Government Procurement Centre	N	8 KM
q	Milk Cooperative /Collection Centre	Y	0 KM
r	Veterinary Care Centre	Y	0 KM
s	Ayurveda Centre	N	8 KM
t	E – Seva Kendra	Y	0 KM
u	Bus Stop	N	8 KM
v	Railway Station	Y	0 KM
w	Library	Y	0 KM
x	Common Service Centre	Y	0 KM

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 1. Public – Private ✓

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 5.

b. Number of villages without Angan Wadi Centres –

Names of such villages: –

c. Schools (Number)

Primary Private: W Primary Govt.: 1

Middle Private: W Middle Govt.: 1

Secondary Private: W Secondary Govt.: 1

Higher Secondary Private: W 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	–	–	YES	–	YES	–
b.	Kerosene	YES	–	–	YES	–	YES	–
c.	Other (mention)	–	–	–	–	–	–	–

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Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

IX. Parameters relating to Households & Institutions

		Number
a)	Number of eligible Households for pension (old age, widow, disability)	–
b)	Number of Households receiving pension (old age, widow, disability)	–
c)	Number of eligible Households who are not receiving pension	–
d)	Number of Households eligible for Ration Card	–
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	400-500
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	–
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)	Date of Survey
Vipin Panchal Dambusuriya	સરપંચશ્રી સોનગઢ ગ્રામ પંચાયત	તલાટી-કમ-મંત્રી સોનગઢ ગ્રામ પંચાયત	3rd July, 2021.

[2] The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

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Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

IX. Parameters relating to Households & Institutions

		Number
a)	Number of eligible Households for pension (old age, widow, disability)	–
b)	Number of Households receiving pension (old age, widow, disability)	–
c)	Number of eligible Households who are not receiving pension	–
d)	Number of Households eligible for Ration Card	–
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	400 - 500
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	–
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)	Date of Survey
Gram Panchayat	સરપંચશ્રી સોનગઢ ગ્રામ પંચાયત	તલાટી-કમ-મંત્રી સોનગઢ ગ્રામ પંચાયત	3rd July, 2021.

[2] The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

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SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

This questionnaire should be filled for each of the villages in the selected Gram Panchayat[1]

I. Basic Information

a. Village: SONGADH
b. Ward Number: 9 (GRAM PANCHAYATA)
c. Gram Panchayat: SONGADH GRAM
d. Block: –
e. District: BHAVNAGAR
f. State: GUJARAT
g. Lok Sabha Constituency: BHAVNAGAR RURAL
h. Number of Habitations / Hamlets in the Gram Panchayat: –
i. Names of Habitations / Hamlets:
–

Demographic Information

Number of Households 2,400 Total Population 6837 Male – Female –

SC HHs – ST HHs – OBC HHs – Other HHs –

II. Access to Infrastructure/Amenities etc.

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
a.	Nearest Primary School	Y	0 KM
b.	Nearest Middle School	Y	0 KM
c.	Nearest Secondary School	N	8 KM
d.	Kisan Seva Kendra	N	8 KM
e.	Milk Cooperative /Collection Centre	Y	0 KM
g.	Health Sub Centre	N	8 KM
h.	Bank	Y	0 KM
i.	ATM	Y	0 KM
j.	Bus Stop	N	8 KM
k.	Railway Station	Y	0 KM

[1] While filling this the surveyor must collect the information from the Ward Member/s and relevant government officials

1

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SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
l	Library	Y	0 KM
m	Common Service Centre	Y	0 KM
n	Veterinary Care Centre	N	8 KM

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

iii. Drinking Water Facilities
a.Piped Water Supply Coverage to Habitations:_____ *(~~1-All~~ 2-None 3-Some)*
If 3 mention the name of the habitations not covered:_____

b.Hand Pump Coverage in Habitations: _____ *(1-All ~~2-None~~ 3-Some)*
If 3 mention the name of the habitations not covered:_____

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

b. Coverage under Open Drains: _____(*1-All ~~2-None~~ 3-Some)*
If 3 mention the name of the habitations not covered:_____

c. Coverage under Doorstep Waste Collection: (*1-All ~~2-None~~ 3-Some)*
If 3 mention the name of the habitations not covered:_____

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

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

vi. Sports Facilities in the Village
a.Number of Play Grounds in the Village (minimum size 200 square meters): 1
b.Mini Stadium : N Yes(Y) /No (N)

vii. Education, ICDS
a. Number of Anganwadi Centres: 5
c. Schools (Number)
Primary Private: X Primary Govt.: 1
Middle Private: 4 Middle Govt.: 1
Secondary Private: 4 Secondary Govt.: 1
Higher Secondary Private: 4 Higher Secondary Govt: –

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SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

viii. Land Category		Area in Acres		Land Category	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land		d.	Pasture / Grazing Land	–	g.	Check Dam	4
b.	Irrigated Land	–	e.	Forests/ Plnatations	–	h.	Wells/Bore Wells	3
c.	Un-irrigated Land	–	f.	Other Common Land	–	I	Tanks /Ponds	1

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	400-500
2	Number of active Job Card holders who have completed 100 days of work	–
3	Number of shops selling alcohol	–
4	Number of BPL families	–
5	Number of landless households	–
6	Number of IAY beneficiaries	–
7	Number of FRA beneficiaries	–
8	Number of common sanitation complexes	–
9	Number of SHGs	–
10	Number of active SHGs	–
11	Existence of SHG Federation in the Village (Yes / No)	–
12	Number of Youth Clubs	–
13	Number of Bharat Nirman Volunteers	–

Name and Signature of Surveyor and Respondent'

Main Panchayat D.n.Makwana Surveyor	સરપંચશ્રી સોનગઢ ગ્રામ પંચાયત PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	તલાટી-કમ-મંત્રી સોનગઢ ગ્રામ પંચાયત Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	3rd July, 2021. Date of Survey

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Chapter–20: TDO-DDO-Collector email sending Soft copy attachment in the report

VISHWAKARMA YOJANA: VIII
AN APPROACH TOWARDS
RURBANIZATION Add label

Moin Pancha 1:56 pm
to ddo-bav, collector-bav@gujar...

From Moin Pancha • moinmahmad57250@gmail.com
To ddo-bav@gujarat.gov.in
collector-bav@gujarat.gov.in
Date 18 Aug 2021, 1:56 pm
See security details

Respected sir/Ma'am

We are the students of Government Engineering College Bhavnagar and we have done our project under the vishwakarma yojana as our final year project for B.tech. We are attaching the final report file with this mail for your reference. Thank you

DPR_SON...SE-VIII).pdf

Chapter–21: Comprehensive report for the entire village

During the entire Vishwakarma Project we focused on one thing and that was "Rurbanisation of village" Our sole goal was that. We surveyed and analyzed whole village on the basis of that goal and the proposed designs given by us is the result of that goal.

During this project we have learned a lot and we are here providing our work in form of our designs and in form of this report.

Sr. No.	Proposed Design	Estimated Cost	Impact on Villagers/Society
1	**College Building**	44,195,371	• **Migration of students for higherstudies will decrease** • **Students dropping out studying after higher secondary schoolingwill get reduced** • **Girl education will get improved because the college is situated intheir locality** •
2	**Septic Tank**	1,771,10	• **Hygiene of people will get increased** • **Lower lying areas will get covered under septic tank** • **Open drains will get eliminated** • **Less spread of diseases**
3	**Sports Complex**	9,485,617	• **Students from village and nearbyvillages will get more opportunities of sports** • **Health of youngsters will get improved** • **Overall well being will get promoted**

4	**Bus Stand**	516029	• **The necessity of having a constructed and comfortablebus-stand will get fulfilled** • **Terminal facility will get improved** • **Overall impression of village will**
5	**Shelter Home**	5,45,596	• **Pilgrimage in village will increase** • **More travelers will visit village** • **Overall bust in the villageeconomy** • **Guests of village will get a convenient place to stay**
6	**Market Building**	11,54,041	• **Buying and selling of goods invillage will increase** • **Bust in village economy** • **Less migration of villagers** • **Transportation cost for transporting goods for buying and selling will get saved**
7	**Recreation centre**	945066	• **Villagers will get a place to visit at weekends** • **It will serve as a place where villagers can gather for somesocial activities** • **Overall impression of village willget improved** • **Villagers will get more stablesocial environment**
8	**Public Toilet**	274602	• **Open defecation will get eliminated** • **Overall hygiene of villagers willget improved** • **Spread of diseases will getreduced** • **Overall impression of village willget improved**

9	**Museum Building**	1434375	• **Tourists in village will increase** • **Heritage of village will get preserved** • **Overall bust in the villageeconomy** • **More employment opportunities** • **People will start taking more**
10	**Defense Training Centre**	9,262,257	• **Students from the village will geta place to prepare for defense examinations** • **Unemployment will get reduced**
11	**School Building**	44,195,371	• **Students will get a chance to study while remaining in theirhometown** • **Student dropping out studyingwill get reduced** • **Girl education will get promoted**
12	**Rain Water Harvesting**	28,875	• **Result in water conservation** • **Water will get saved**