

“Study and Development of Ahirwadi as Smart Village”

P. S. Patil¹, R. C. Thombare², S. R. Patil³, S. S. Patil⁴, S. V. Patil⁵, S. V. Rokade⁶, N. S. Pawar⁷, A. K. Patil⁸

¹PG Student, NanasahebMahadik College Of Engineering Peth, Maharashtra India

²PG Student, NanasahebMahadik College Of Engineering Peth, Maharashtra India

³PG Student, NanasahebMahadik College Of Engineering Peth, Maharashtra India

⁴PG Student, NanasahebMahadik College Of Engineering Peth, Maharashtra India

⁵PG Student, NanasahebMahadik College Of Engineering Peth, Maharashtra India

⁶PG Student, NanasahebMahadik College Of Engineering Peth, Maharashtra India

⁷Asst. Professor, Dept. of Civil Engineering, NanasahebMahadik College Of Engineering Peth, Maharashtra India

⁸Asst. Professor, Dept. of Civil Engineering, NanasahebMahadik College Of Engineering Peth, Maharashtra India

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ABSTRACT – This project report deals with study and development of “AHIRWADI” as a smart village. “Smart Village” is that modern energy access acts as a catalyst for development in education, health, security, productive enterprise, environment that in turns support further improvement in energy access. In this report we focuses on improved resource use efficiency, local self-governance, access to assure basic amenities and responsible individual and community behaviour to build happy society. We making smart village by taking smart decisions using smart technologies and services.

Key Words: modern energy, education, health, security, productive enterprise, environment, etc

I. INTRODUCTION

In India there are 610 districts, (200 backward) 600,000 villages (125,000 backward.) About 800 M people in India live in villages and at least half of them are below 25 years of age. India is an agro based country with its 70% of population residing in rural areas. After independence in 1947 all the governments focused to develop the villages on priority. As on today the investments were made in Health, Irrigation, Communication, and Education in our Five year plans, and measurable growths are seen in all these sectors. Village is main criteria for development of nation, so develop the village in such a way that which is self-dependent in providing the services, employment & well connected to the rest of world & new technology that is SMART VILLAGE.

1.1 Concept

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

1.2. Requirement Of Smart Village

1. Efficient public transportation system.
2. Use of renewable energy.
3. Energy conservation.
4. Solid and liquid waste management.
5. Improving sanitation conditions
6. Smart security.
7. Use of modern technologies for improvement of locality.

II. LITERATURE REVIEW

R. LaxmanaReddy explained in their Designing Pavement for a Typical Village Road in India – A Case Study, The Extension of rural road network is of vital importance for bringing the social amenities, education and health within reasonable reach of villagers/tribal's and for the expeditious transportation of agricultural produce from tribal villages to market yards and distribution centers. There are 72407 habitations in the state of Andhra Pradesh, of which only 41619 habitations are connected by all-weather roads. The total length of road network in the state is about 146944 kms (91307 miles). Of the total road length of 146944

kms, the length of BT road is 8819 kms, WBM is 34226 kms and Gravel road is 60768 kms. There are 6824 unconnected habitations of which 6134 are having a population of 100 and above. The existing soils, climate and terrain conditions in Srikakulam district of Andhra Pradesh state in India are suitable for the development of Agricultural, Sea and Horticulture Products. This paper attempts to address the issues relating to design of such a village road through which the all-round development of the District can be achieved.

S. R. Katkar and P. P. Nagrale explained in their Defining Pavement Condition States to Quantify Road Quality for Designing of Pavement Maintenance Management System Important factor in the Pavement Maintenance Management System (PMMS) is to quantify the quality of pavement. Earlier research is based on various parameters such as pavement condition index (PCI), mechanistic properties, and physical distress. Ultimate objective of Maintenance Management System (MMS) is to optimize the resources required to upgrading that utility. In none of the previous research; the relationship between pavement condition and corresponding maintenance cost has been considered in designing of MMS. In this study, 70 pavements are studied and an attempt is made to categories them in various condition states based on their repair cost. The research is useful in designing of cost-effective MMS.

Integrated biomass and solar town concept for a smart eco-village in Iskandar Malaysia (2014): This paper presents a new integrated biomass and solar town concept that can serve as a global model for smart eco-villages in tropical countries. In this research, a renewable energy (RE)-based distributed energy generation (DEG) system for an eco-village driven by the “integrated biomass and solar town” concept was considered in order to optimise RE resource utilization. To design a cost-effective integrated biomass and solar town, a mixed integer linear programming (MILP) model was developed. The proposed model considers actual operation constraints due to biomass availability, weather variation, and restriction of the thermal plant. The application of this new concept on the Iskandar Malaysia (IM) case study with an average daily demand load of 16,900 kWh/d revealed that a 417 kW direct-fired biomass power generator, 412 kW biogas thermal power plant, 136 kW solar photovoltaic (PV) modules, and sodium sulphur battery with an energy capacity of 3046 kWh and power of 1530 kW were required. The annual cost of the integrated biomass and solar town was

estimated to be approximately RM 3 million at an electricity cost of RM 0.48/kWh.

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

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

Solar power energy solutions for Yemeni rural villages and desert communities (2016):

According to UNDP Policy Note 2014, only 23% of Yemen rural community have access to electricity – having connected to national grid or use small isolated generating units – while the country is one of the richest in solar energy with over 3000 h per year clean blue sky. The objectives of this paper is to concentrate on the utilization and the cost effectiveness of photovoltaic solar energy for electrification of Yemeni rural and desert communities, which will result in enhancing education, culture, science, medical services, and improve the living conditions in rural areas. Otherwise, energy poverty that is a facet of a multidimensional poverty in Yemen will persists because the possibility of connecting rural communities to the national grid, even in the next ten years, is invisible due to major political and financial problems that the country is facing. Moreover, PV energy is environmentally clean and has proved to be one of the best solutions for rural electrification in many countries worldwide due to noticeable drop of PV systems prices with the advance in PV technology. Accordingly, it should be the best solution for rural electrification in Yemeni as well. The paper demonstrates the cost effectiveness and the design procedure of utilization of solar energy for rural and desert

communities in Yemen using a number of subsequent cases typical to Yemeni communities and provides also a practical study to support Bedouin backpackers.

Dr.Milind Kulkarni (2010): According to this paper, In India majority of the population still lives in villages. A lot of work needs to be done in making the villages clean. There are different aspects of clean village such as: water supply, sanitation, indoor air quality, solid waste management and renewable energy etc. All these aspects have different alternatives with the associated merits and demerits. In some aspects such as water supply, considerable work is done whereas in some areas like sanitation lot of work is required to be done. We can learn lot of lessons based on success and failure in adopting different alternatives. Keeping in touch with technology clean village projects should integrate technology and digital design, which will make the village not only clean but also smart. The paper discusses all these aspects with reference to Maharashtra and India. This discussion plans to give important inputs and alternatives to policy makers so that they can redirect and reformulate the policy. Engineering students can design and implement projects of clean and smart village which will help in their skill development. At the end paper gives recommendations for effective making of Clean and Smart Village.

VidyaBhavraoThillar, ShamalaChandrakantYadav,(October 2016) have a studied on digital library, the information communication technology has changed the face of library function . Digital library is a collection of large digital object and electronic information, which can be accessed by a large number of geographically, distributed user. This paper is focusing digital e-library sources, advantages, challenges and disadvantages. The digital resources are available on various digital media's such as CD Rom, DVD, Floppies, Online Data Bases, Digital Archives, etc. Today various type resources are available and accessed are internet online and physical media (stored data on CD Rom, Audio, Video, etc.) based creation of digital resources with the establishment of digital library is the need of the day .Digital library can store a large volume of digital information in archival form. It provides the users fast search tools, immediate access to the rapidly growing information in multimedia form quickly on the screen in an interactive mode. A digital library may refer only to electronic resources or means combinations of electronic resources, services that via a network. In simple

terms, e-resources are those resources, which require computer access or any electronic product.

NehaLata, Dr.sharadkumarsonkar (2020), Studied about a Digital library, This study has been conducted for literature review on Impact of ICT on learning activities of users by Academic library services. The study focuses on the technology utilized in Academic libraries and impact on discovering how ICT keeps on advancing, and as it does it is turning out to be increasingly more incorporated with students and researcher learning. Brilliant machines and voice-controlled aides are only two instances of how technology is developing to make students' careers simpler. This study explains how technology changes the manner in which library services work and it additionally influences the way learning exercises of users. A review may be a self-contained unit- an end in itself or a preface to and justification for engaging in primary research. For review, articles on Information Communication Technology Application in the Libraries have been taken from print as well as e-resources.

III. INFORMATION OF AHIRWADI VILLAGE

Ahirwadi is a Village in Walwa-IslampurTaluka in Sangli District of Maharashtra State, India. It belongs to Desh or Paschim Maharashtra region. It is located 35 KM towards west from District head quartersSangli. 7 KM from Walwa-Islampur. 319 KM from State capital MumbaiAhirwadi Pin code is 416313 and postal head office is Walwa. Gatadwadi (4 KM), Tujarpur (5 KM), Navekhed (6 KM), Shirgaon (6 KM), Konoli (6 KM) are the nearby Villages to Ahirwadi. Ahirwadi is surrounded by PalusTaluka towards East, HatkanangaleTaluka towards South, SangliTaluka towards East, ShiralaTaluka towards west. UranIslampur, VadgaonKasba, Tasgaon, Sangli are the near by Cities to Ahirwadi.



Ahirwadi is small village in walwatahasil. Grampanchayat of ahirwadi is established in 1967. Population of ahirwadi is 1000 (according to 2011 survey) main occupation of people in ahirwadi is farming. There are 124 families in the ahirwadi village. Total land holding in this village is 200ha. In this irrigated land is about 150ha. and 25ha. saline land and remaining land is non-irrigated land. In this village major crops are sugarcane, grapes, soya, groundnut, sorghum. In this village one fully automated drip irrigation project is running i.e. Shree Bhairavnath Sahkari Pani Purwatha Sanstha in 100ha. area. Chairman of this Sanstha is Mr. Arun S. Yadav. These project helps villagers to earn more money and get economical stability. We have gone through the following methods of survey while investigation :

- 1) Social Survey
- 2) Aerial Survey
- 3) Reconnaissance Survey

1) Social Survey
The social economic survey is considered to be the most important source of statistical data on household expenditure and income as well as other data on housing, personal and household characteristics and living conditions.

In these survey we collected information of each and every family by door to door survey in which we collected data required for design parameter.

- 2) Reconnaissance survey

Commencement of any survey the area to be surveyed is thoroughly examined by the surveyor who then thinks about the possible arrangement of the framework this primary investigation of the area is termed as reconnaissance survey. During reconnaissance survey we walked through village and noted the various obstacles and whether or not the selected stations are inter visible.

- 3) Aerial Survey

Professional survey grade Drones using hybrid Vertical Take off and Landing (VTOL) technology in conjunction with CORS network to expedite the data acquisition used for large scale mapping purposes. The high-resolution images enable community members to easily recognize their own lots and view the dimensions of their work areas.

IV. WE HAVE INVESTIGATED THE FOLLOWING POINTS

4.1 Roads

Road transport is one of the most common modes of transport. Roads in the form of track ways, human pathways etc. were used even from

the pre-historic times. Since then many experiments were going on to make the riding safe and comfort.

In Ahirwadi village we can provide bituminous road. We provide three type of width.

Width of the road way :-

Main Road = 3.75 m

Sub Main = 4 m

Sub Road = 2 m

Earthen shoulder = 1m (at each side for main road)

Side slope = 2 horizontal : 1 vertical

Length of road way = 5+794 km

Interval = 20m

4.2 Solar Panel

All houses have the electrification facility but Supply of electricity is with low voltage, irregular, having many power cuts and power failure. Misuse of electricity and line cut is also burning issue. Gram Panchayat can co-operate with electricity department to check theft cases, regular and timely recovery and payments of bills, which would ensure 24X7 supply.

The size of one solar panel is 1 meter x 2 meter, 150 solar panels are used in this solar plant. So, 300 sqm areas are required to install a 50kW Solar System.

50kW solar system energy generally used in large scale home, farm house, small schools, institutes, shops, petrol pump, restaurants, hotel, PG and guest house. 200 units average throughout the year of electricity produce by 50 kW solar system in a day.

4.3 Solid Waste Management

The Swachh Bharat commitment demands rural households to dispose of garbage in a scientifically sensible manner. The domestic waste generated in rural households of India is increasingly becoming an issue of serious concern. Though, solid waste generated in rural areas is predominantly organic and biodegradable.

The collected waste should be segregated into bio-degradable and non-biodegradable at each house itself by making two dustbins,

bio-degradable - Green dustbin = Wet Waste

Blue dustbin = Dry Waste

non-biodegradable - Red dustbin = Hazardous Waste

From bio-degradable waste we can prepare bio-compost and vermin-compost and non-biodegradable is sold to recyclers or sent to the landfills.

4.4 E-library

A digital library is a collection of documents – such as magazine articles, book, papers, images, sound files and videos – organized in an electronic form and available on the Internet or on a digital support, for example a CD-ROM disk. Compared to CD-ROM disks, Internet-based digital libraries have a plus: they can be updated on a daily basis.

No such facility in Ahirwadi. However a small library for school students is available.

4.5 Biogas Plant

Biogas is a mixture of different gases produced by the breakdown of organic matter in the absence of oxygen. Biogas can be produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage green waste or food waste.

- Total no. of houses=193
 - Existing no. of houses containing biogas plant = 13
 - Provide, for 30 houses individual biogas plant = 30
 - And for remaining 150 houses = 1 biogas plant for 2 houses = 75
 - Therefore total no. biogas plant = 105
 - Amount required for construction of 1 biogas plant = 25,000 Rs
- For 105 biogas = 105 X 25000 = 2,625,000 Rs.

4.6 Street Light:

Though Gram Panchayat has provided street lights, which is insufficient. Solar energy option for street lights can also be explored. Gram Panchayat can motivate Each household to fix a bulb or tube/LED in front of their house and in this way Gram Panchayat can manage street lights at a low cost.

Dimension

- L=34.5cm, B=17cm, Wt. =2.5kg, pole ht.=10Ft,
- Position = underground.
- All India courier cost for the street light = 3000 Rs
- 5 streetlights are existing which are obtained from Samajkallyan and Aamdar fund
- In Ahirwadivillage we provide 15 street lights

4.7 Plantation

In village roadside plantation is carried out and where the space is empty we can plant tree which helps to make environment friendly i.e. eco-environment.

4.8 CCTV Cameras

CCTV cameras are installed in the school, roads, entry and exit. 25 cameras are installed at a village so that the litterbugs can be spotted and punished.

4.9 Wi-Fi Connection

Free Wi-Fi is provided for the village. After consuming 100 MB data the connection will be terminates and user can re-login after a 10 minute gap.

Table -1: Cost Of Project

Sr.	Tittle	Overall Cost
1	Road	4050000
2	Solar Pannel	3700000
3	Solid Waste Manegement	28000
4	E-Library	1117000
5	Bio-Gas Plant	2625000
6	Solar Street Light	45000
7	Plantation	-
8	CCTV Cameras	70000

9	Wi-Fi Connection	400000
	Total Project Cost	12393000

V. CONCLUSION

After applying all these services and techniques the overall problems of Ahirwadi village are reduced. Due to this the cultural, social (improving the well-being of every individual in society, increase self-sufficiency, reduce poverty), economical (due to various businesses economical status and standard of living increases), environmental (use of natural resources reduce pollution and plantation brings a friendly environment), educational (e-learning and other modern techniques increase the level of thinking and personal development), living standard and overall status of the village increases. Because of that the village becomes self-dependent and contributes towards the development of the nation.

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