



Developing A Smart Village Model for Mutkeshwar Village

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Abstract: A smart village is aware of its residents, available resources, and relevant services and programs. It understands what it needs and when it requires it. The rural population requires the same level of quality and status of life as persons living in suburban and urban areas. The idea behind the "Smart Village" concept is that technology should be used to promote development by enabling education and Local economic opportunities, boosting health and welfare, increasing democratic engagement, and improving the general quality of life for rural village people.

Index term – Introduction, concept, requirement, benefits, awareness program, information of Mutkeshwar village, preparation of report, total cost, photos.

1.0 INTRODUCTION_:

1.1 Background of the study

Smart Village:

A community with access to global markets thanks to digital technologies and open innovation platforms."

Although there is no official definition of a "smart village" in EU legislation, there are a number of defining characteristics connected with the smart village concept, with local community involvement and the use of digital

tools viewed as important factors. Local people's participation in improving their economic, social, and environmental situations, collaboration with other communities, social innovation, and the development of smart village initiatives are all part of the notion. Many elements of living and working in rural locations can benefit from digital technologies. The smart village concept also implies the use of smart solutions in both the public and private sectors across a broad range of applications.

Let's begin by differentiating between Urban and Rural

Urban: An area is a human habitation with a high population density and built-environment infrastructure. Urban areas are formed as a result of urbanization and are classified as cities, towns, conurbations, or suburbs based on their urban morphology. The term "urban area" can be used to describe towns, cities, and suburbs. The city itself, as well as the surrounding territories, makes up an urban area. Many cities are referred to as metropolitan areas, or "larger" cities, such as Greater New York or Greater London.

Rural: In India, rural areas are referred to as 'Countryside' or a 'village.' It has an extremely low population density. Agriculture is the main source of income in rural areas. A town with a population of less than 15,000 people is considered rural. Rural is defined by the National Sample Survey Organization (NSSO) as an area with a population density of up to 400 people per square kilometre. Villages that have been surveyed but do not have a municipal board Agriculture and related sectors employ at least 75% of the male working population.

1.2 Present scenario of the Mutkeshwar Village

This settlement is home to people from Katkari tribal community of Maharashtra. This settlement is located in one part of the Gaganbavada village. The other group of people that resides in the Gaganbavada village belongs to the local Maratha community. Historically there has been a wide developmental gap between these two sections of this village, despite being part of the same geography. Such

disparity is common in many rural (and urban) parts of India. Inequality in opportunities to earn a livelihood, to good education; access to basic amenities, including, medical facilities, clean drinking water, electricity and clean environment; is widespread in many parts of rural India. CRISIL team wanted to take up an initiative to showcase the impact of bringing in focused development to such isolated and forgotten parts of our rural landscape. However, right from the stage of conception, our goal was not to urbanize these villages, but to bring about holistic changes keeping the local social and environmental fabric intact. Our objective was to understand the imminent problems that a village faced and bring about visible changes in the scene.

Main occupation of the villagers is working as daily-wage laborers, mostly working as a construction worker or as bamboo handicraft workers in the neighboring villages and towns (e.g., Kale, Salwan, Kolhapur city). Women and children typically engage in household activities and tend to the infants in the families. Disturbingly many of the families are also involved in the preparation and sale of the local liquor. These activities are driven by lack of opportunities and also due to the traditions that have persisted over time.

10-15 years ago, there was no toilet in the village. People used to sit on open toilets and due to this diseases were constantly spreading in the village. People get sick. A few years later, toilets were constructed in the village as per the plan of the government. Some people in the Gram Panchayat as well as educated people took the initiative and implemented the scheme by

making it mandatory to build toilets in their homes.

There is no solar system in the village. No hospital facilities. Also, Gaganbawda has been sold in the last 5 years, which means that people from the city have come here and bought it by luring people. As a result, the local poor have to pay wages in their place. Young children in the village have to travel a distance of 50-60 kms for work. They are currently in a situation where salaries are low and expenses are high due to inflation.

The water required for the field has to be supplied to the crops at night as there is no light during the day. Cows come to the mountainous areas at night so the farmer can be a threat to the lives of the people. Till date, the Gram Panchayat has never implemented such a cleanliness campaign in the village or any other campaign that would be useful to the women and children of the village. Gutters are not well maintained in the village. Ration grains are not given as per government rules.

There is no waste disposal and drainage facility in the village. As a result, the incidence of the disease has increased. Funds from the government come to the Gram Panchayat but not even 50% of the funds received every year are used. People are not even told how much money has been raised for which work. The people below the poverty line will have a housing scheme implemented by the government and the people of Pradhan Mantri Awas Yojana will not get it yet. Every year people try hard to get their rightful home but the Gram Panchayat, Panchayat Samiti officials do not appreciate them. People get annoyed by making mistakes.

Water facility: 8-10 years ago, water used to reach the village by Siphon method. There was no other cost (no electricity). The villagers were getting water naturally. Due to that Siphon system people were getting clean and abundant water for 9-10 months of the year but after some time some people bought the land and took possession of that land and Siphon was closed. The people of the village as well as the people of the Gram Panchayat did not object in this regard. There is still plenty of water available in that place. And it can solve many problems in the village.

After some time the village was getting water by Jack well method. But now due to the breakdown in Jack well, people have started using water by putting motors in the river for the last 5 years. Everyone in the village has a motor in the river. And so the chances of getting an electric current in the water are also very high. Children, other people, animals are constantly in the river and this can lead to some accidents. The Gram Panchayat has also ignored all these things. During the last few rainy days, the villagers had no drinking water for 8-10 days. People stored rainwater for themselves and their animals. Also, in the rainy season, the road leading to the village was completely blocked, which caused a lot of inconvenience to the people. In the rainy season, flood waters are coming from 3 sides of the village and children cannot even go outside. They have to use drinking water in the rainy season for drinking.

School Building: The construction of the school in the village is 50 years old and it is now completely ruined. In the rainy season, it is very difficult for the students. The school in the

village is from 1st to 4th standard only. The children of the village have to walk 4 to 5 kilometers outside to get education after 4th standard

1.3 Objectives of The Project

- To study the Smart Village concept.
- To assessment status of the facilities in Mutkeshwar village.
- To carried out cost analysis for Smart Village implementation in Mutkeshwar village.
- To develop a model for Mutkeshwar Village.
- To suggest recommendations.

1.4 Methodology of the Project

The purpose of this study is to contribute towards enriching the smart village, systematize all the policies and focus on their study and analysis. It can be beneficial for policymakers and future policy development. The methods used to arrange a model in this research were done through preliminary interview, literature review of previous studies, books and analysis of supporting regulations.

2.0 LITERATURE REVIEW

This review synthesizes the current literatures that are germane to smart village facilities and its management. The purpose is to highlight the issues useful to the successful completion of this study. However, it must be stated that this review is eclectic due to the fact that there are limited works in this area. Thus, the review is divided into some major sections namely concept of smart village and its management, facilities management, and empirical studies. The first is

broken down into concept of smart village tools. In the second point how to make a smart village by the using of different components are explain in details. The composed of definitions and scope of facilities, advantages of different facilities, its uses, its benefits. They study the project report deals with study and development of smart village. Smart village is one of the energy access acts as a catalyst for development in education, health, security, productive enterprise, environment that in turns support further improvement in energy access. This report focuses on improved resource use efficiency, local selfgovernance, access to assure basic amenities and responsible individual and community behavior to build happy society. Smart village by taking smart decisions using smart technologies and services.

3.0 Concept of Smart Village

Smart Village was one of concepts for the developed villages in India. This concept was developed by Viswanadham and Vedula in their book entitled "Design of Smart Village". A smart village model followed a model from smart city as an effect of integrated technology changes to be implemented in the remote areas.

Smart rural development in India can reduce the migration into the urban sector and even bring back many villagers who help the village for better lifestyle, if technology is brought into each and every region of the village, it can help to provide electricity to each and every household, the education system will change and students will develop computer skills, many of the health issues with end with proper sanitation and construction of toilets followed by smart farming.

Different Components for Making Village Smart

- i. Magic pit
- ii. Solid Waste management
- iii. RO Water
- iv. Bio Gas
- v. Rainwater Harvesting
- vi. Roads
- vii. Gutters
- viii. Income Sources
- ix. Education
- x. Street Lights
- xi. Good Governance
- xii. Health Care Facilities
- xiii. Women Empowerment
- xiv. Transportation
- xv. CCTV Cameras

4.0 METHODOLOGY

Selection of a Village

Mutkeshwar village in Gaganbawda taluka has been taken for this project. Because in this village, the living conditions of the people, facilities, knowledge, roads, gutters, etc. are there which are not available in this village. Also, this village is in a remote area and the people there are not aware of the facilities provided by the government. It belongs to Desh or Paschim Maharashtra region. It belongs to Pune Division . It is located 40 KM towards west from District head quarters Kolhapur. 340 KM from State capital Mumbai. Mutakeshwar / Khadule is surrounded by Radhanagari Taluka towards South , Vaibhavawadi Taluka towards west , Panhala Taluka towards North , Karveer Taluka towards East .This Place is in the border of the Kolhapur District and Sindhudurg District.

Sindhudurg District Vaibhavawadi is west towards this place .

Work Methodology

As per following sequence this work has been completed.

1. Pre Field Work
2. Field Work
3. Data Processing Work
4. Data Conversion and Joining
5. Data Analysis

Village Data :

Sr. No.	Description	Details
1.	Locality Name	Mutakeshwar / Khadule
2.	Taluka Name	Gagan Bavada
3.	District	Kolhapur
4.	State	Maharashtra
5.	Region	Desh or Paschim Maharashtra
6.	Division	Pune
7.	Language	Marathi and Kannada
8.	Population	1500

9.	Water Supply	Kumbhi River
10.	Electricity	MACB
11.	Farming	Sugar Cane, Rice
12.	Income Source	Farming, Animal husbandry

5.	Drains not constructed	Drains and Gutters for all lanes
6.	Piped water supply not provided	Provision of piped water supply
7.	No clean water facility	RO Plant facility
8.	No hospital facilities	
9.	Biogas is not used properly	Biogas facility and guideline to all villagers for proper use of biogas
10.	Lack of Sanitation facilities and poor hygiene	Solid and liquid waste management, Sanitation
11.	Lack of knowledge	Skill development training linked to economic activities Fully equipped mobile health unit Sustainable green energy provisions

Mutkeshwar Village Requirements

Sr.No.	The present condition of the village	Facilities required
1.	Bad road condition	Proper Concrete Roads & Inter-village road connectivity
2.	School upto 4 th Standard	Upgrading school/higher education facilities
3.	The school does not have proper toilet facilities	Proper toilet facilities for boys and girls
4.	Street Lights are not provided	Streetlights

		Public transport LPG for cooking Digital Literacy Agro Processing, Agri Services, Storage and Warehousing Citizen Service Centres- for electronic delivery of citizen centric services/e-gram connectivity. Components pertaining to agriculture and allied activities
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		would be required to be given special emphasis while developing these clusters.
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Our Implementation Plan

Establishing the new infrastructure for the welfare of the villagers, their day to day activities along with future development were taken into consideration, so that the living standard of the people may be enhanced. This consists of developing internal and approach roads, providing safe drinking water, toilets and sewerage system, schools for education, health centre, gutters, rain water harvesting, biogas, street lights ,skill development centre etc. Following activities take place under redevelopment.

Cement Concrete Road Estimate :

A cement Concrete road is 1 Km long 8 m wide and 15cm thick over a sub-base of 10 cm thick gravel. Prepare a detailed estimate for this road.

Detail of Measurement

Abstract of Cost

Sr. No.	Description of Item	Qty.	Unit	Rate	Amount
1	Box cutting in road crust and consolidating and dressing the sub-grade	750	Cum	50	37500
2	Supplying soil gravel and stacking including Labour for spreading and Consolidating soil gravel	450	Cum	1800	810000

3	Cement Concrete (1:2:4) with 20 mm down stone chips for road slab including floating the concrete surface after compaction and belting after floating for skid resistance and including brooming, edging, etc	450	Cum	7400	3330000
4	Providing necessary joints in the concrete slab and filling the joints with bitumen	2600	Rmt.	60	156000
	Total				43,33,500/-
	Add 5% for contingency = $(5 \times 11296000) / 100$				216675
	Add 2.5% for work charge establishment = $(2.5 \times 11296000) / 100$				108337
	Grand Total				46,58,512 /-

Rain Water Harvesting (RWH) :

Rainwater harvesting at your home in four simple steps

We can take a few little steps to reduce our dependence on groundwater. To start with, we could save rainwater at our home or building in an effective manner without spending too much money. By using this method, an average Indian family can easily harvest enough rainwater to meet its daily needs of water for washing, bathing, and even drinking. Following are some of the simple steps you need to take to start rainwater harvesting at your home or building:

1. **Cleaning your catchment area:** This is the place where most of the rainwater is received and can be diverted from. First of all, you need to clean your roof

or catchment area to prevent any dirt or other unnecessary materials from contaminating the water. Over the years, rooftop rainwater harvesting has emerged as one of the most popular options in India as it is easily doable.

2. **Redirecting water with pipes:** Rainwater will be redirected towards the container through PVC pipes. These PVC pipes or gutters come in cylindrical shapes and can be easily attached to the drain pipes on the roof to redirect the water towards the storage tank.
3. **Installing rain separator and storage tank filter:** The next step is to install the first rain separator or the washout

pipe. It is basically a simple valve to block the entry of water into the tank while cleaning the roof and also during the initial stages of raining, when the water could be of poor quality due to air pollution and other factors. This valve requires cleaning after every rain to discharge wastewater or dust-filled water, which we usually get during the start of the rainy season. Besides that, you need to install another filter right on the storage tank to get clean water. This filter is also used to prevent the entry of dust and other small particles into the storage tank.

4. **Overflow pipe for the extra water:** You also need to install an overflow pipe on top of your storage tank to release excess water. It is recommended that you put your storage tank at an elevated place to prevent any sort of bacterial or fungi growth around it and also for keeping it away from the reach of stray dogs or other animals.

How much will it cost to catch rain?

Rainwater harvesting methods are site specific and hence it is difficult to give a generalised cost. But first of all, the major components of a rainwater harvesting system - rain and catchment area - are available free of cost. A good proportion of the expenses would be for the pipe connections. By judiciously fixing up the slopes of roofs and location of rainwater outlets, this could be brought down considerably. However the cost varies widely depending on the

availability of existing structures like wells and tanks which can be modified and used for water harvesting.

Typically, installing a water harvesting system in a building would cost between Rs 2,000 to 30,000 for buildings of about 300 sq. m. The cost estimate mentioned above is for an existing building. The costs would be comparatively less if the system were incorporated during the construction of the building itself. Some basic rates of construction activities and materials have been given here, which may be helpful in calculating the total cost of a structure. The list is not comprehensive and contains only important activities meant to provide a rough estimate of the cost.

RO Plant:



DETAILED ESTIMATE

NAME OF WORK: Providing RO plant in Mutkeshwar, Tal. Gaganbavda, Dist. Kolhapur

Abstract sheet

Sr.No.	Item of work	No	Unit	Qty	Rate	Amount
1.	Site cleaning	1	Lump sum		2000	2000
2.	Line-out as per drawing	1	Sq.Ft	299.23	5.00	1496.15
3.	Excavation for foundation up to hard strata as below including removing the stuff up to a distance of 30m beyond building area & stacking and spreading directed etc. Completed (lift upto 1.5m) a) Soil and soft murum b) Hard murum	1	Cu.M	11.65	576.00	6710.4
4.	Plinth filing with approved excavated material murum and soil 3 layers including watering compacting and raming	1	Cu.M	16.69	545.00	9096.05
5.	Providing and laying in PCC FOR 1:4:8 Footing, Raft slab pcc,Plinth beams trap/granite /quartsite greise metal per detailed drawing s as including shuttering per detailed drawing s as including shuttering fromework compaction and roughing curing etc. i) For Foundation ii) For floor	1 1	Cu.M Cu.M	1.28 2.78	5240 4125	6707.2 11467.5
6.	Brickwork: 6" brickwork Fly ash brick& burnt brick moulded and non moulded bricks for foundation & superstructure and terrace brick bat coba with inclu.scaffolding and curing etc.	1	Cu.M	10.67	4500	48015.00

7.	Plastering : Internal and External, Providing cement plaster 18mm&12mm thk. in two coats in CM 1:5 including scaffolding curing etc .	1	Sq.M	141.07	165.00	23276.65
8.	Tiles: providing and laying shahabath & ceramic of 6mm thk. tiles approved pattern colour size required bed 1:6 rubbing polishing ,cleaning etc complete.	1	Sq.M	27.83	750	20872.5
9.	Doors : Providing and fixing pvc door shutters panel and frame of fixture and fastning hardware etc complete.	1	Sq.M	1.93	3500	6755.0
10.	Providing and fixing aluminium glazed powder coated sliding window as per design	2	Sq.M	2.92	1500	4380.00
11.	Providing and fixing AC Sheet roofing with structural steel etc completing.	1	Sq.M	34.70	900.00	31230.00
12.	Electrical Work	1	Lumpsum			20000.00
TOTAL						= 1,92,006/ -

Details About RO Plant :

- Total Costing of RO Plant : 3,94,013 /- + 1,92,006 /- = **5,86,019/-**
- RO Water per house : **20 liters**
- A RO plant can be installed on land owned by the Gram Panchayat.
- For this project we design 4000 liter of RO Plant.

Bio Gas

Abstract sheet

Sr. No.	Item of work	No	Unit	Qty	Rate.	Amount
1	Site cleaning	1	Lumpsum		2000	2000
2	Line-out as per drawing	1	Lumpsum		1500	1500
3	Excavation for foundation upto hard strata as below including removing the stuffup to a distance of 30m beyond building area & stacking and spreading directed etc.completed (lift upto 1.5m) a) Soil and soft murum b) Hard murum		Cu.m	8.05	376	3026.8
4	Providing and laying in PCC FOR 1:4:8 Footing ,Raft slab pcc,Plinth beams trap/granite /quartsite greise metal per detailed drawing s as including shuttering per detailed drawing s as including shuttering fromework compaction and roughing curing etc.		Cu.M	0.438	4125	1806.75
5	Providing and casting m20 concrete trap/granite /quartsite greise metal for rcc per detailed drawing s as including shuttering centring fromework compaction and roughing etc complete . DOME AND OUTLET BO		Cu.M	1.05	3500	3675
6	Providing and fixing inposition HYSD- 415CBAR reinforcement of various binding with wires or track welding and supporting as required.completed.		MT	0.15	58000	8700

7	Brickwork: 6" brickwork Fly ash brick & burnt brick moulded and non moulded bricks for foundation & superstructure with including scaffolding and curing etc.		Cu.M	1.68	4500	7560
8	Plastering : Internal and External, Providing cement plaster 18mm&12mm thk. in two coats in CM 1:5 including scaffoldingg curing etc .		Sq.M	10.12	165	1669.8
1.	Sanitary Work		Lumpsum			5000
TOTAL						=34938/ -

Data Collection and Calculations :

Total no. of houses=295

Existing no. of houses containing biogas plant = 15

And for remaining 280 houses = 280

Therefore total no. biogas plant = 280

Amount required for construction of 1 biogas plant = 34,938/- Rs

For 580 biogas = 280 X 34938/- = 97,82,640 Rs.

Solar Street Lights

For 1 km Of Mutkeshwar village Road we need 66 numbers of street lights.

How 66 numbers for 1km ?

Poles provide at every 15m (50feet) Intervals

Estimate: For this project, we have taken quotations from different companies and taking their details, we have taken one of them for estimation.

Sr.No.	Name Of Company	Cost of 1 Solar	Required Qty.	Total Costing
1.	Sologix Power Ventures Pvt Ltd	12000/-	66	7,92,000 /-
2.	Sunguru Solar System	10000/-	66	6,66,000/-
3.	Vedant Sales	13000/-	66	8,58,000/-

Total Costing of Project :

1. Solar Street Light = 10,64,700/-
2. RO Plant = 5,86,019 /-
3. Bio Gas = 97,82,640 /-
4. Cement Concrete Road = 46,58,512 /-
5. Total Costing of Project = **1,60,91,871 /-**



On Filed Village Photos



Roads Condition





Gutters Not Provided

Jackwell Condition



School Toilet Condition

Conclusion

The total difficulties of Mutkeshwar village have been minimized as a result of using all of these services and techniques. Due to this, the cultural, social (improving the well-being of every individual in society, increasing self-sufficiency, and reducing poverty), economic (due to various businesses, economic status and standard of living rise), environmental (use

Technology will offer effective solution .There are successful technologies available , which have been implemented in urban areas. There is tremendous pressure on urban landscapes due to migration of rural people for lively hood. Smart Villages

of natural resources reduces pollution, and plantation creates a friendly environment), educational (e-learning and other modern techniques raise the level of thinking and personal development), living standard, and overall As a result, the hamlet has become self-sufficient and contributes to the nation's development. Smart Villages are the need of the hour as development is needed for both rural and urban an areas for better livelihood and Information

will not only reduce this migration but also irrigate the population flow from urban to rural area. ICT/IT and GIS are the unbreakable pillars to support the whole process of village development.

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