Final Assignment

Development of a Sustainable Village Ecosystem

Based on the Theme: Smart Village

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**Abstract**

This project report deals with study and development of a sustainable village ecosystem. We define a sustainable village ecosystem/smart village as bundle of services of which are delivered to its residence and businesses in an effective and efficient manner. “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.There is an urgent need for designing and developing ‘Smart Village’, which are independent in providing the services and employment and yet well connected to the rest of the world. In this report we focus on improved resource use efficiency, local self-governance, access to assure basic amenities and responsible individual and community behavior to build happy society. We making smart village by taking smart decisions using smart technologies and services.

*Key Words*: Smart Village, self-governance

**I. INTRODUCTION:**

Villages are the heart of the nation. Hence, for the development to percolate to the grass root level, focus must be devoted to the progress of villages and to smarten the rural population using ICT solutions to achieve self-sustainability. As per statistics there are 720 districts in 29 states and 7 Union territories in India with a total number of 6, 49,481 villages. All areas which are not categorized as urban area are considered as rural area. According to 2011 census, rural area has population of 68.84%, whereas urban area has population of 31.16% only. A rural area is a geographic area that is located outside cities and towns are also known as 'village' in India. With modernization and urbanization people migrate from one place to another place for different facilities such as education, employment and affinity of people towards the locality or city. 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 and well connected to the rest of the world i.e. smart village. The smart village corrects the social oversight by providing accommodations for sustainable family relationships without disturbing the lifestyle of different generations. To accomplish the ‘Smart Village’ status, the community, individually and collectively, will be empowered to take smart decisions using smart technologies and with the support of smart manpower and by managing to be self-sufficient. According to Mahatma Gandhi’s philosophy and thoughts smart village project provides, “Global means to the local needs.”

**II. METHODOLOGY:**

**1. NEED FOR SMART VILLAGES**

At present, one of the major challenges in India is growing population and rapid urbanization. This urban growth to certain expansion is unavoidable, as the economic pursuits and aspirations of the population do change and expand. This needs to be invert and suitably managed through a balance between rural and urban quality of life. A “Smart Village” will furnish long term social, economic, and environmental welfare action for village community which will capable and empower enhanced involvement in local governance processes, encourage entrepreneurship and build more lively communities. At the same time, a “Smart Village” will ensure good education, better infrastructure, proper sanitation facility, health facilities, waste management, renewable energy, environment protection, clean drinking water, resource use efficiency etc.

**2. SERVICES REQUIRED FOR SMART VILLAGE**



Figure

**Services required for sustainable village,**

1. Food security.

2. Democratic engagement –

1. Good governance

2. Social development.

3. Health welfare-

1. Environmental development

2. Personal development.

4. Education - Basic knowledge for awareness.

5. Local business - economic development.

**3. REQUIREMENT OF SMART VILLAGE**

1. Smart security.

2. Efficient public transportation system.

3. Improving sanitation conditions

4. Solid and liquid waste management.

5. Rain harvesting /Rain water drainage system.

6. Safe drinking water facilities.

7. Use of renewable energy.

8. Energy conservation.

9. Grievance redresser.

10. Strengthening CBOs.

11. Functional bank account.

12. Facilities regarding to the agriculture.

13. Latest& affordable medical facilities.

14. E-governance.

15. Use of modern technologies for improvement of locality.

16. Improvement on women empowerment.

**4. BENEFITS**

1. Locally produced and locally consumed energy:

In villages if the mountains, hilly area are present then use of solar energy & wind energy then energy is produce in that village itself & use for development of village.

2. Creation of job:

Generally village people migrate from village to city for purpose of job. If village becomes smart so all the job requirements are fulfils & people not migrate from one place to another.

3. Contribution to global environment:

The system can reduce reliance on fossil fuels &contribute to reduction of greenhouse gases such as carbon dioxide. Energy consumption optimization 25-30% average energy saving.

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

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

**5. AWARENESS PROGRAMMSFOR PEOPLE**

**5.1. GOVERNMENT CONTRIBUTION**

(a) Reorienting education towards sustainable development –

• Education is critical for promoting sustainable development and improving the capacity of the people to address the environment and development issue.

• Basic education provides underpinning for any environment and development education, the latter needs to be incorporated as essential part of learning.

• It is critical for achieving ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participations in decision making.

• To achieve the accessibility of environment education, linked to social education from the primary school age through adulthood to all groups of people.

(b) Increasing public awareness –

• Public awareness should be recognized as a process by which human beings and societies can teach their fullest potential.

• Small scale enterprise promotion through social media.

• Education empowerment and access to information through smartphones.

• By making Motivational Videos.

**5.2. PEOPLES ROLE**

• Inculcating hygienic behavior and practices. ART

• Inculcating respect for the cultural heritage.

• Volunteerism: activities for promotion of voluntarism like BhratNirman.

• Reducing risk behavior - alcoholism, smoking, substance abuse.

• Behavioral changes. Various programs implemented by gram panchayat,

• Drinking water pipeline is under construction with the help of rashtriy peyjal yojna,

• Mahatma Gandhi national rural employment guarantee scheme – under this jalygovt. Scheme is under construction.

**6. SUSTAINABLE IDEAS**

**1. MAGIC PIT OR SOAKPIT:**

• Magic pit is covered porous walled chamber that allows water slowly soak into the ground.

• Magic pit can offer a cost efficient opportunity for partial treatment of waste-grey or storm water and relatively safe way of discharging it into the environment and therewith recharging groundwater bodies.

• As waste water percolates through the soil from a magic pit, small particles are filtered out by the soil matrix and organics are digested by micro-organisms. Sub-soil layers are water permeable in order to avoid fast saturation.

• Magic pit is best suited for soil having good absorptive properties; clay, hard packed or rocky soil is not appropriate.

• It should be located at safe distance from drinking water source (30m at least). It odourless and not visible because of that it do not cause any problem regarding with health.

• A magic pit should be last between 3-5 years without maintenance but after that it needs to clean.

• When the performance of the magic pit deteriorates, the material inside the magic pit can be excavated and refilled.

• For future access, a removable lid should be used to seal the pit until it needs to be maintained.

• For magic pit Govt. give a fund of 2111/-Rs.

**Benefits:**

• Can be built and repaired with locally available materials.

• Technique simple to apply for all users.

• Small land area is required.

• Low capital cost; low operating cost.

• Recharging ground water bodies.



Figure – Magic Pit



Figure

**2. SOLID WASTE MANAGEMENT:**

• Establish a waste collection, transport and treatment within the panchayat.

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

Green dustbin = bio-degradable waste

Red dustbin = non-biodegradable waste.

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

• To collect this waste, under Mahatma Gandhi National Rural Employment Guarantee Scheme gram panchayat appoint a team of trained youth called as Friends of nature who do entire operation starting from collection to composting and land fill.

• For this management, various tools and equipment are required for daily collection and treatment of waste and the land required to construct treatment plant and capital cost required to construct vermin-compost bed and shed which are obtained under Solid Waste Management Scheme Fund and Mahatma Gandhi National Rural Employment Guarantee Scheme.

• For collection of waste tricycle is required, 1 for 300 households.

• The payment of Green Friends will be given for first 100 days from Mahatma Gandhi National Rural Employment Guarantee Scheme and next 100 days from Solid Waste Management Scheme Fund.

• After that village panchayat may use its own revenue generated from solid waste management activities and users.

**3. 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.



Figure – Bio gas

**3.1 Biogas production for each house-**

• The biogas plant is made of F.R.P. Material which is resistant to water, sunlight and electricity, if it is take care of well, can be used for up to 25 years.

• Everyday 10 kg cow dung along with 15 litres of water is put in the mixing tank.

• The cow dung is brought from cowsheds from nearby areas, where owners want to dispose it anyway.

• The mixture is fermented inside the fermentation tank by the anaerobic bacteria.

• The mixture is then converted into slurry through which methane gas and co2 gas are released. They also put kitchen waste into the tank for producing biogas which used for cooking.

• The amount of biogas produced can be used for feeding 4-5 members of the family and 10-15kg manure is released from the plant everyday which is utilized in their backyard.

• The initial cost for setting up a biogas plant is somewhere between Rs.25000 and one can recover the cost by saving one.

• The biogas production is best way to use natural recourses which is non-polluting and also use for making organic manure because of that we can use it in agriculture to reduce the harmful effects of chemical and pesticides.

• The biogas is used not only or cooking but also used as electrical purpose by converting the gas into electricity in invertors.

• It is a cheaper technology, helps to reduce the greenhouse gases and also helps to reduce waste generated.

**4. RAINWATER HARVESTING: -**

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

**1.** Directly from roof tops and stored in tanks,

**2.** Monsoon runoff and water in swollen streams during the monsoon and storing it in underground tanks,

**3.** Water from flooded rivers can be stored in small ponds,

4. Collection and transfer of rainwater into percolation tanks. So as to facilitate discharge into ground.

(a) Roof rainwater

(b) Ground water recharge

(c) Surface rainwater

9.5 Rain water harvesting

• But for village we use roof rainwater harvesting for houses.

• With rooftop harvesting, most any surface – tiles, metal sheets, plastic but not grass or palm leaf can be used to intercepts the flow of rainwater and provide a clean water and year-round storage. Other uses include water for gardens, irrigation of annual crops pastures and trees, domestic and livestock consumption, ground water recharge.

• The rainwater harvesting is mandatory to all in village.

• The reasons for using rainwater harvesting systems answer three questions:

**What**: rainwater harvesting will improve water supply, food production, and ultimately food security.

**Who**: Water insecure household or individuals in rural areas will benefit the most from rainwater harvesting system.

**How**: Since rainwater harvesting leads to water supply which food security, this will greatly contribute to income generation.

**Advantages:**

1. Rainwater harvesting provides a good supplement to other water sources. Thus relieving pressure on other water sources.

2. It can be as a buffer and can be used in times of emergency or breakdown of public water supply systems.

3. Helps to reduce the storm drainage load and flooding in the cities.

4. It is a flexible technology and can be built to require meets of any range. Also the construction, operation and maintenance is not very labour intensive in most systems.

5. Prevents water wastage by arresting soil erosion and mitigates flood.

6. Sustains and safeguards existing water table through recharge.

7. Arrests sea water intrusion and prevents salination of ground water



Figure-6 – Rain water harvesting



Figure 7

**5. ROPLANT**

• Reverse osmosis (RO) is a water purification technology that uses semipermeable membrane to remove ions, molecules and larger particles from drinking water.

• About 60% of diseases afflicting the rural population are waterborne.

• Therefore provide 2 RO plant of capacity 2000 lph having cost of 10 Lakh each and which is implemented under the various scheme of Department of Rural Development and Panchayat Raj.

• With RO plant provision of WATER ATM is done to solve the problems such as delivery of water using manpower and payment related issue.

• The cost of one litre of water is 50 paise.



Figure 8 – water Atm



Figure 9 – RO water

**6. WATERSHADE MANAEMENT:**

• Watershed development refers to a set of measures that help retain water within a watershed. These include soil and water conservation, a forestation, grasslands development and protection of biomass.

• Water management means properly organizing the hydrosphere in order to prevent major water crisis in future.

• The main goal of Watershed Management is to implant the sustainable management of natural resources to improve the quality of living for the population.

**Important aspects of water management include:**

• Hydrosphere

• Hydrological cycle

• Exchange of water

• Transportation of water and irrigation.



Figure 10 – Watershed

**III. DISCUSSION AND RESULTS:**

PM Narendra Modi should have given more importance to smart village than smart city as Gandhiji wanted. But there are some villages that are smart without any government plans. Chief Minister Nitish Kumar today pitted his "smart village" concept against Prime Minister Narendra Modi's ambitious smart city programme, saying his project would ensure people no longer have to move to cities. Over the years, a few of India’s resilient rural villages have been trying to remain relevant and adapt to change without losing their valued traditions and skills that have survived down the ages. Some of the villages are Dharnai (Bihar), Payvihir and Hiware Bazaar (Maharashtra), Chizai (Nagaland), Punsari (Gujarat) etc.

**IV. CONCLUSION:**

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

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