

# Internet Of The Things For Villages: A Significant Stage Towards Nation Building

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## Abstract

*The world has now become global village due to digital revolution. Small Cities are transforming to metro cities and people in the urban area are observing growth in living standards due to the advanced technologies. Still some regions of rural area are distant from benefits of the new trends. Even at some locations it is essential to provide the basic facilities. Especially after the globalization it is now compulsion to facilitate every region of the country with equal mechanism. Hence the term smart city has been developed. The meaning of the phrase 'Smart village' is very simple. In the age of digitization, no any part of the country should be isolated. The facilities like education, Healthcare and transportation should be easily available within the area of the village with some minimum quality standards. For the transformation from 'village' to 'smart village recent technologies are required. This paper discusses how the latest technologies with its subsequent systems can be used to convert the village in to the smart village. Without technology there is no meaning of human life. Various techniques are tabled here to make rural life peaceful, wealthy and sustainable. And also proposes some solutions on the problem of rural area.[1].*

**Key Words:** smart village, IOT for social sustenance, Development of rural area, Indian smart village, village development

## 1. INTRODUCTION

It was very early stage of human life, when he was living in the caves. Then he started the farming, and that was the starting point of civil societies. The root of smart village is actually there. Especially for a country like India smart village is not a new concept. In the historical time the villages in India were smart villages operating with "Bara Balutedar" like carpenter, farmer etc. The people in the village were independent and doing the business well within the premise. In various ancient scriptures like 'Arthashastra of Kautilya' and 'Samarangan sutradhara of king Bhoja scriptures there was detail description about the establishment of villages[2]. There were rules regulations for the location of market place, houses etc. Still in some villages you can find the old water supply systems. Mahatma Gandhi's 'Gramswarajya' concept was not different than a smart village.[3] In 2015 the then Indian government has taken the initiative to make a cluster of nearly 300 villages across the country for the project of smart village. The European commission has published a document titled as "EU action for smart villages" in 2017.[4] The purpose of this initiative is to develop the rural areas and make them accessible on global map. It is also pressing to make the life of rural population more independent, more wealthy and more prosperous. Now in the age of the digitization and computers the concept of 'Gram swarajya' is turning in to 'smart village'. In general, we are considering that major fraction of population is living in cities. But in a country like India, the situation is different. As per the census of 2011 nearly 70% people are living in the villages.[5] and their share in the Gross Domestic Product of the India is nearly 75% [6]. Hence for Indian society, it is essential to concentrate on the development of rural area. To provide the basic facilities like healthcare, education, transportation using modern technologies in rural area will be more fruitful and also boosting the rural economy using digital tools will be more effective for the economic growth of the country. Hence it is responsibility of every technocrat to provide the solutions on the problems in rural area and to nurture the latest techniques there for further development. Ultimately technology is the tool that can make human life easier.[7].

## 2. THE SMART VILLAGE

The term smart village is very broad concept. It includes the establishment of a mechanism by using digital tools that empowers the local body to administrate the village. But it is not limited to that only, a smart village should ensure good education, better infrastructure, proper health and sanitation facilities, waste management, energy conservation, clean drinking water for the local communities. It is also expected to boost the local entrepreneurs and build network for them by using recent technologies. Also, revenue generation from the local resources is important for the economic growth of local communities. The term Internet of the Things is very significant in the case of smart village. In the urban area internet facility is easily available for people for utilization. In case of rural area still, its lacking in the infrastructure. Though it is available in some regions, there is no efficient utilization of the digital tools. Hence these regions are totally dry in the context of information.[8]



**Fig.1 smart village**

If we are able to provide the facilities to the unprivileged regions, it will definitely help to boost their economy. Digital tools like internet and various communication channels as well as electronic gadgets has to play important role in the case of smart villages and finally there will be value addition in our overall national growth.

## 3. USAGE OF THE DIGITIZATION FOR SMART VILLAGES

The digital techniques are very useful and are able to provide the solutions on the problems of rural populations. If we consider the case of Rural India, the people are facing many problems in their routine life.

- 1) Crunch of water: -Most of the rural locations are in remote places. They require water for drinking, usage and agriculture purpose. But after rainy session water is available very rarely. It is essential for them make the optimum use of available resources.
- 2) Forecasting of the weather: -Still people are dependente on external sources to get the judgment of

weather. Also, no facility is available to provide accurate weather forecasting at that particular location. For villagers it is important to get the exact reading of weather as farming is the main source of their living hood

- 3) Security issues: -In many remote locations, security is the main issue. The problem is inaccessibility to authorities in any unwanted situation like theft. Some mechanism is needed to prevent such happenings and to save the life of local people.
- 4) Education Facilities: -Though basic education is available in remote area, special arrangements are required for the provision of training in competitive exams etc,
- 5) Lacking of Entrepreneurship: -Huge potential is there in rural area for the entrepreneurship development. Only thing is needed is to gather them together and provide a centralized marketing facility physical as well as digital to sell their products.
- 6) Waste disposal: -There are various sources of waste material in villages. In traditional system Biogas is the only way to incorporate the waste material. But we can find out different ways of revenue generation using waste.
- 7) Energy Conservation: -Most of the villages are electrified, but still some part of Indian continent is facing the crunch of electric power. Along with the development of new energy sources, energy conservation is one of the ways to face the power crunch

For such issues we are proposing some mechanisms and systems.

#### **4. SOLUTIONS USING SMART DIGITAL TOOLS**

##### **A. EnergyUtilizationand Conservation System**

Maximum Villages in India are electrified now. But still there are the region where crunch of electricity due to various reason. Hence utilization of optimum energy is the only option for them. IOT or Internet of The Things can play a significant role in the Energy conservation and utilization and Control. The mechanism of the system is following.

- 1) PEUC (Personalize Energy Utilization Control): -This unit can be attached to electric meter. It will provide the information of electric consumption and points of heavy electric consumption to user. Also, the data will be sent to a central system.
- 2) FEUS (Field Energy Utilization System):
  - In villages electric supply is required for irrigation as well as dairy and Poultry Farm. This device will read the electric consumption in the above business. Also helps to find out the points of consumption.
- 3) CECU: -This unit will receive the consumption signal from every household of a village as well as farms and industry. In case of excess consumption, it will issue the warning to the smart phone. After waiting for week, it will automatically terminate the supply of user. It will send directly the weekly report to the main center of distribution company by internet.

##### **B. LocalWeatherForecast System (LWFS)**

Villagers are always eager to know the predictions of weather in their area. For that purpose, they are dependent on central laboratories and government agencies. But it would be best thing if they get the information about weather at their location. Following facilities are required to develop the mentioned mechanism.

- 1) Anemometers: -Anemometers shall be installed at various locations to sense the wind speed and direction of wind. Use of digital anemometer always provides the information like ambient

temperature, dry bulb temperature, wet bulb temperature, wind speed and air volume at a time.

- 2) Digital rain Gauge Sensor (DRGS): -It helps to provide the reading of the rainfall at that particular location
- 3) Centralized Data Storage and Processing (CDSP):-The anemometers and Digital Rain Gauges shall provide the input to CDSP. It will also take the input like cloud position from metrological laboratories around. It will store and process the data for forecast.
- 4) Central Digital Display Board (CDDDB): -A digital display board can be installed at central location in the village, which provides the daily weather forecast. Also, it can be sent on user mobiles.

### **C. Village Security System**

Many villages are located in remote areas. It is very difficult for them to prevent the events like theft. Also, sometimes local issues can spark turmoil between the population. In that case there is no provision to control and to communicate it to local administration. Following Mechanism can be used for the security of villagers.

- 1) Installation of CCTVS at particular locations: -CCTV units can be installed at the selected places in the villages. The footage will be stored central station which is directly connected to nearby authorities through internet.
- 2) Installation of Motion Sensors: - Motion sensors can be installed at various places like Gram Panchayat, Bank, College, Temple to detect the abnormal movements. If anything, which is not regular is detected it can be directly communicated to the authorities through internet facility
- 3) Sound and Fire detectors: -To prevent the incidents due to fire, fire detectors can be installed, that will alarm to villagers and authorities immediately. Also, we can provide the noise sensors to detect the abnormal sounds.

### **D. Virtual Market Place**

To encourage the entrepreneurship in villages, it is essential to provide them market places for their products. Physical Marketplaces are there; but through the virtual market places. It is easier for them to get connected with nearest big markets and sell their products. Following steps can be taken to build virtual market place.

- 1) A web site for the local entrepreneur should be developed.
- 2) All the local Wholesalers and Retailers should register on it
- 3) Tie-up or MOU should be signed between the nearest big markets in cities.
- 4) The market will communicate them their daily requirement like vegetables, milk, meat through the web.
- 5) The villagers will respond the requisition as per availability.
- 6) If the villagers are manufacturing some special products like 'Varli Paintings or food related items, they can upload it on website for individual customers.
- 7) Some part of the revenue generated from these affairs shall be utilized for the development and maintenance of virtual market.

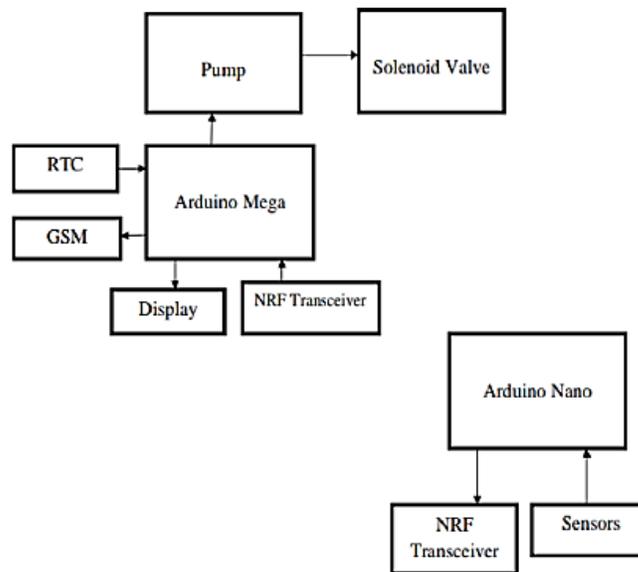
### **E. Proposed system for irrigation**

In villages water utilization is more for irrigation than the housing usage. Because sometimes it is not necessary to supply the water for fields, and possibility of water wastage is there. This system is used to prevent the excess supply of water. This system utilizes two inputs temperature and moisture content of

the land for the irrigation purpose.

**Table-I: Block Diagram of the system**

| If                   |                           | Then                    |
|----------------------|---------------------------|-------------------------|
| <i>Soil Moisture</i> | <i>Temperature sensor</i> | <i>Signal for relay</i> |
| Yes                  | Yes                       | Active low off          |
| Yes                  | No                        | Active low off          |
| No                   | Yes                       | Active high on          |
| No                   | No                        | Active low off          |



**Fig. 2. Block Diagram of the system**

Here the pump will be turned on or off based on the readings of the temperature and moisture sensors.

Apart from that there are various areas In which the smart tools can be used to Improve the quality standard of village Population. Still there are problems related to sanitation and woman health issues as well as un nourished children.

This copies there to working these areas using IOT. The combination of traditional programs like Bio-mass energy and modern technology will definitely help to develop the rural and remote areas. In past initiatives were taken to provide basic facilities for villagers. Now, in the age of information it is necessary to promote them on global-map.

## 5. CONCLUSION

The digitals tools can be used effectively to find out the solution on human problems. When we consider the worries of the villagers, it is wise to use the digital tools along with the traditional mechanism. Though we feel that remote population is not aware about the internet and related things, it is a half-truth. The reach of smartphone is there in villages too. The modern tools work faster and provide better analysis

and results. The technologies proposed in this article is an effort to minimize the irritation faced by remote population due to whims of nature and human. Initially we can see unaffordability in solutions related to smart villages. But through the aid of CSR (Corporate Social Responsibility) and other financial institutions (government and private) it can be worked out in smooth manner. Government of India is already launched the 'Unnat Bharat Abhiyan' for the development of rural area. Technocrats can go through that channel also to complete the project. These solutions will definitely contribute in the enrichment of the village population.

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