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A Recapitulation on Exigency of Smart Villages in Indian Ambience

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Abstract- *Human society is developing with rapid acceleration and achieved various successes for making its livelihood better. This paper deals with study and development of village as a smart village by delivering all required services to its residence and businesses in each possible manner. Smart village is smart entrance to sustainable services and a channel for development enabling the provision of good education, health, security, productive enterprise and environment. Irrespective of Indian priorities being different, there is need to understand these development paradigms from bottom. In this context the Smart village concept needs to be looked from different perspectives. The aim of this paper is to develop the vision of smart village and its prerequisite for development. Need is to identify main designing factors affecting smart village design in Indian context. We are making smart village by captivating smart decisions using smart technologies and services.*

Keywords- *Urbanization, Rural development, Smart Village, Designing parameters, Factors affecting smart village*

I. INTRODUCTION

Villages are the heart of the nation. Hence, for the development to the grass root level, focus must be dedicated to the progress of villages. It is growing fact that the rural population is suffering more consequences for livelihood as compared to urban areas. In India there are around 6,00,000 villages out of them 1,25,000 villages are underprivileged so there is a need for designing and building the village as a smart village. Urbanization is not only related with economic development but over the time it started aspiring people due to better quality of life. Urban areas have been seen as solutions for boosting economy, developing employment, creating skills, providing better health services and many more things. Most of the 'unsolvable' troubles in today's metro cities (traffic, garbage and sanitation) stem from a single root cause – the massive inflow of people, which congests the cities. The big metros have become a kind of big slums. India is trying to cope up with this dynamics and complexities of city and urban-rural development in country. For this every village has to become a self-reliant republic which requires planned, corporate and intelligent work.

There is no need to create anything new, just need to pay attention to creative restoration as current era of human development is bit ahead and popularly known as "Smart age". Unfair growth between rural and urban landscapes leads to the challenges of rapid urbanization. It is estimated that by the year 2050, the number of people living in Indian cities will touch 843 million.

One of the major challenges in India is growing population and rapid urbanization which gives an emerging need of 'Smart Village', which will assure proper sanitation facility, good education, better infrastructure, clean and pure drinking water, health facilities, safe environment, resource use efficiency, waste management, renewable energy etc. There is a need to design, develop and plan 'Smart Village', which be self-governing in providing dozens of services and employment to people resides in villages. The fact is the basic necessities of all human being irrespective of where they live remain the same.

This concept will play essential role in maintaining the balance between the development of rural and urban areas and help to reduce migration of rural population in urban areas to provide better living. The India Smart Village Challenge is designed to encourage greater vision of municipal officials and their partners, more involvement and inspiration from villagers, and the development of proposals that will produce concrete benefits in people's lives.

Table-1 State-wise lists of villages in India as per Census 2011

Sl No	State	Total Villages	Sl No	State	Total Villages
1	Andaman and Nicobar Islands	560	19	Madhya Pradesh	55429
2	Andhra Pradesh	28293	20	Maharashtra	44198
3	Arunachal Pradesh	5616	21	Manipur	2639
4	Assam	26637	22	Meghalaya	6861
5	Bihar	45076	23	Mizoram	853
6	Chandigarh	13	24	Nagaland	1454
7	Chhattisgarh	20335	25	NCT of Delhi	225
8	Dadra & Nagar Haveli	71	26	Odisha	51583
9	Daman & Diu	27	27	Pondicherry	101
10	Goa	411	28	Punjab	12858
11	Gujarat	18676	29	Rajasthan	44981
12	Haryana	7007	30	Sikkim	460
13	Himachal Pradesh	20752	31	Tamil Nadu	17089
14	Jammu & Kashmir	6768	32	Tripura	901
15	Jharkhand	32623	33	Uttar Pradesh	107452
16	Karnataka	29736	34	Uttarakhand	16919
17	Kerala	1553	35	West Bengal	40996
18	Lakshadweep	27		**Total**	**649481**

(In Wikipedia, List of villages)

II. AIM

The aim of this paper is to sharpen the vision of an integrated smart village by neighbouring hurdles of personal, social, environmental and economic dimensions of village and how they can be overcome. Also to provide the framework conditions necessary for the provision of energy services to villages to enable the livelihood opportunities (healthcare, education, clean water, and sanitation) and empowerment embodied in villages.

III. OBJECTIVE

Literature based research work is carried out to distinguish requirements of a village to become smart. The main objective of this review paper is to identify influencing parameters to design a smart village for betterment of people and development of village itself.

IV. LITERATURE-REVIEW

Literature published in various national, international and other online and local journals; national, international and other conferences; Ph.D. dissertations; books; etc. have been studied and their small important contents have been stated here. The following part covers critical literature review of the research topic which can be helpful for the further content analysis.

Albino et al. (2015) clarified the meaning of the word "smart" in the context of villages and cities through an approach based on an in-depth literature review of relevant studies as well as official documents of international institutions. They also identified the main dimensions and elements characterizing a smart city. Descriptions of smart cities included qualities of people and communities as well as ICTs.

Auon (2013) presented a five steps approach for converting our urban centers into more efficient and sustainable places to live, which are setting the vision, Bringing in the technology, Working on the integration, Adding innovation, driving collaboration. The aim of the smart city should be to reduce the energy wastage & give a better quality of life to its residents. Each and every city can be converted into a smart city by simply working on the backward sectors.

Azim et al. (2014) stated that smart city designing can help improve the quality of urban life in various areas so that using the minimum amount of investment in make cities smart, we have the maximum efficiency by participation of the public in different levels of community to improve the urban life. Information technology can be used as one of the factors that accelerate the smart goals and its smart design.

David Freshwater et al. (2000) has found sustainable development must address how the people of the community generate the income to maintain their rural lifestyle. The reality of both modern rural and urban life is that economic condition rapidly changes so a discussion of sustainable employment has to be conducted in a dynamic context.

Dr. Milind Kulkarni et al. (2010) 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 indoor air quality, solid waste management and renewable energy etc. 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. Keeping in touch with technology should integrate digital design, which will make the village not only clean but also smart.

Esther W. Dungumaro et al (2009) The availability of safe water and adequate sanitation is critical not merely for health reasons, but also for economic development. The study finds a relation-ship between the socioeconomic status of households and the availability of water and sanitation. The study recommends that generalizations concerning the feminization of poverty need to be avoided.

Gill et al. (2014) provided framework for establishment of smart cities and strategy for housing the urban poor in composite living through cross subsidy by unlocking of land value. Normative norms and standards of services, approval process and application of technology is prime moving factor.

N. Viswanadham et al. (2010): Dozens of services including construction, farming, electricity, heath care, water are required. All the techniques and technologies needed to build a smart village are available now and some of them are being used in villages in India but these are disparate, fragmented and piecemeal efforts Development of strategy, integrated planning and above all monitoring and execution of the activities using appropriate governance.

Rutuja Somwanshi et al. (2016) 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 city. The smart village corrects the social oversight by providing accommodations for sustainable family relationships without disturbing the lifestyle of different generations. Due to this overall status of village increases and village will become self-dependent and contributes well towards the development of nation.

S.Sesha Talpa Sai et al. (2016) said that the present era is augmented on Information and Communication Technology which has proved its potential in various sectors of development in urban and rural landscapes The "Smart Village" concept aims to realize its goal through providing policymakers with insightful, bottom –up analyses of the challenges of village development. Smart Villages 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.

Zhao Zhifeng (2009) the development of villages in the surrounding rural areas of Beijing is highly impacted by the socio-economic transformation. He has said to restrict and guide villages which conflict with ecological conservation and construction of Beijing's infrastructure. The Village System Planning intends to deal with the future of villages' development under urbanization so as to realize the sustainable development of rural areas.

V. MAJOR FINDINGS

The various researchers have recognized the potential of ICTs (Information and communications technologies) for rural development and it may play key role for the fast and sustainable development of rural India in coming years. Implementation of ICT based activities shown in fig. 1 in rural area will become the durable attempt in achieving smart goals. Introduction of innovations, new ideas and best practices of self-management is the key feature as well as an important strategy for the Smart Village.

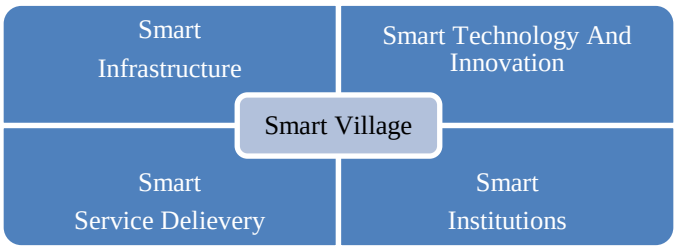

Figure 1 Components of Smart village
("Smart Villages – Need of Emerging India", S. T. Sai, International Journal of Innovative Research in Information Security ISSN: 2349 -7009(P), Issue 09, Volume 3, December 2016, 51-54)

The availability of safe water and adequate sanitation is critical not merely for health reasons, but also for economic development (WHO and UNICEF, 2006). The importance of water and adequate sanitation is recognized at both local and global levels. As per fig. 2 this observation suggests that female-headed households are likely to be larger than male-headed households – a point of concern insofar as the literature maintains that households with more members are more likely to be faced with poverty than households with fewer members (Kimenyi and Mbaku, 1995).

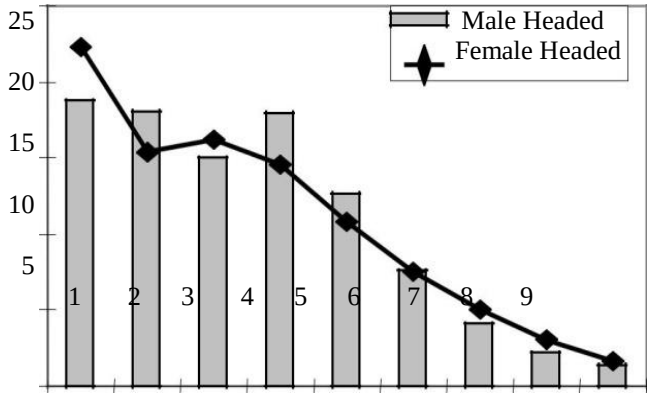

Figure 2 Number of persons in household (H) v/s % of household (V)
("Availability of Domestic Water and Sanitation in Households", E. W. Dungumaro 2009, Committee for International Cooperation in National Research in Demography, 107-125)

The components taken in to consideration will vary from region to region for villages, based on the available resources and opportunities. Some examples of them are shown in fig. 3.

- For Environmental component: Factors identified from the literature are: Availability of Natural resources, Greenhouse gas emission, Consumption of energy from renewable sources, Quality of resources, Environmental protection, Sustainable resource management, Biodiversity, Recycling of used resources.
- Economic Component: This component will include Local administration, Economic participation, Profitability, Domestic investment, foreign direct investment (FDI), Land acquisition, entrepreneurship etc.
- Social Component: This component may address issues related to Community life, Participatory democracy, Social innovation, Proximity services, Basic Facilities, Recreational and Cultural facilities, Smart People, Safety and Security, etc.

Figure 3 Core Smart Village
('Case Study and Planning Of Smart Village", A. A. Jadhav, 5th International Conference on Recent Trends in Science, Engineering and Management-16, ISBN: 978-93-86171-12-2, December 2016, 929-938)

Table 1 presents sources that fall under improved and unimproved water and sanitation as categorized by WHO and UNICEF.

Table 2 Water sources and sanitation facilities

Improved drinking water source	**Unimproved drinking water source**
Piped water into dwelling, plot	Unprotected dug well
Public tap/standpipe	Cart with small tank/drum
Tubewell/borehole	Tanker-trunk
Protected dug well	Surface water (river, dam, lake, stream, canal, irrigation channel)
Rainwater collection	
Improved sanitation facilities	**Unimproved sanitation facilities**
Flush or pour-flush to	Flush or pour-flush to elsewhere
- piped sewer system	
- septic tank	
- pit latrine	
Ventilated improved pit latrine	Pit latrine without slab or open pit
Pit latrine with slab	Bucket
Composting toilet	Hanging toilet or hanging latrine

The Smart Village ecosystem brings all the services of the village and its providers and users on a single platform. The ecosystem also comprises entities like regulatory agencies and media outlets that can have a less immediate, but just as powerful, effect on the business in the village.

Figure 4 Smart Village Ecosystem
('Case Study and Planning Of Smart Village", A. A. Jadhav, 5th International Conference on Recent Trends in Science, Engineering and Management-16, ISBN: 978-93-86171-12-2, December 2016, 929-938)

Fig. 5 shows that some of the major services required in smart villages are social, environmental, personal, educational and economic development. Some other needs are Water supply, Sanitation, Storm water management, Urban development, Solid waste management, Power Supply, Educational facilities, Heritage maintenance, Infrastructural facilities, Affordable housing.

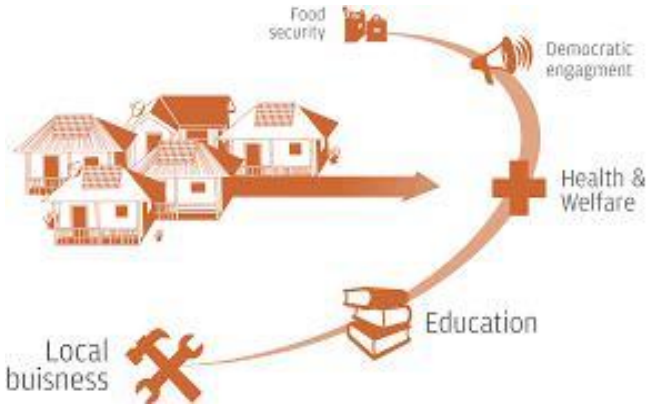

Figure 5 Services required for Smart Village
('Study and development of village as a smart village", R. Somwanshi International Journal of Scientific & Engineering Research (IJSER-16), ISSN 2229-5518, Volume 7, Issue 6, June-2016, 395-408)

VI. OUTCOME

There is no universally accepted definition of a Smart Village. The conceptualization of Smart Village, therefore, varies from place to place, depending on the level of development, willingness to change and reform, resources and aspirations of the residents.

Some of the requirements of smart villages are:

1. **Quality of Life**: The quality of life should be as in city. Services provided to residents must be effective and efficient like education, healthcare facilities, amusement, proper sanitation, hygienic environment, healthy food and pure water.
2. **Sustainability**: Social, Environmental and Financial sustainability can be three important dimensions in making a village smarten. The services need to be financially sustainable so that there are no financial constraints to delivering quality services. However, in doing so, tariff structures adopted should be such that they are affordable for the poor and yet recovers costs at higher levels as use.
3. **Competitiveness**: It may refer to a village's ability to create employment opportunities, attract investments, experts, professionals and people. The ease of being able to do business identify its core competence, comparative advantages and analyse potential for generating economic activities. Once that is done, the gaps in required economic infrastructure can be determined.
4. **Physical attribute:** Some of the physical infrastructure such as transportation, availability of houses, energy system, water supply system, sewerage system, sanitation facilities, solid waste management system, drainage system, etc. which are all integrated through the use of technology. These can be very important and core part of development.

6.1. Smart Village

Smart Village is a concept adopted by national, state and local governments of India, as an initiative focused on holistic rural development, derived from Mahatma Gandhi's vision of Ideal Village and Self Reliance. Therefore, conceptualized view on smart villages is has become more tentative. Pillars of smart village concept are:

Smart Governance	Includes political and active participation, Citizenship services, Improving the decision-making processes and Smart use of e-Government.
Smart Citizen	People should be smart in terms of their skill and educational levels, as well as the quality of social interaction in terms of integration of public life and their ability to open to the outside world
Smart Energy	The variable nature of power generation from renewable energy sources requires that networks, generation and consumption must be connected in an efficient and intelligent way as smart power generation, smart power grids, smart storage, and smart consumption.
Smart Technology	Use of technology by research and development also promote innovation, which includes areas such as new means of marketing and more efficient organizational and managerial systems.
Smart Infrastructure	Smart Infrastructure designs will need to be defensive and proactive to become sustainable. These would serve a huge amount of uses instead of serving one single purpose.
Smart Healthcare	Smart Healthcare provides citizens with considerable advantages in terms of information and even favours the availability of alternative better option and of remote treatment.

VII.CONCLUSION AND RESULT

Understanding about overall urban–rural issues is somewhat limited. To narrow the gap between urban-rural issues work must be done pertaining to overall effectiveness of smart village development. By the period of time the share of urban population is increasing. About 25-30 people migrate every minute to major Indian cities from rural areas in search of better livelihood and better lifestyles

Smart villages will not only reduce this migration but also irrigate the population flow from urban to rural area due to healthy atmosphere, hygienic environment and having quality life as it is in city. Hence it is necessary to identify what is to be prepared to make a village smart for betterment of village itself. In fig. 6, identified designing factors are shown. Total 36 factors have been there, which are distributed in 9 different groups.

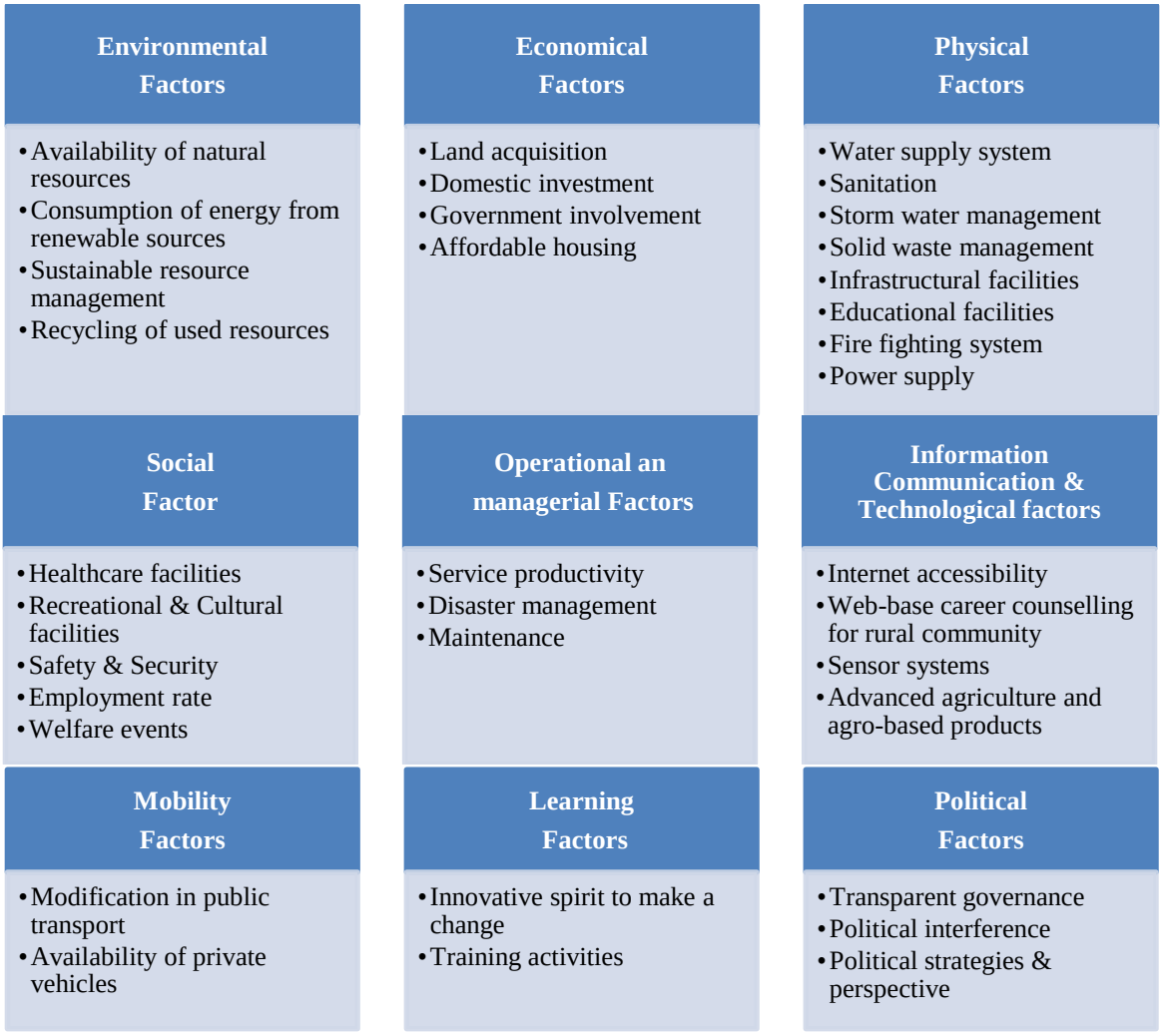

Figure 6 Framework of identified designing parameters

Designing parameters of smart villages will bring changes in:

- Cultural activities
- Social deeds: Improving the well-being of every resident in society, increases self sufficiency and reducing poverty
- Economical: Due to various businesses economical status and standard of living increases
- Environmental: Use of natural resources reduce the pollution and plantation brings the eco-friendly environment
- Educational: E-learning, training and other modern techniques increases the level of thinking and personal development
- Contribution to global environment: Use of renewable sources of energy lead to reduction of green house gases and energy consumption optimization which will save 25-30% energy.

This paper will be having high potential in development of any country as one has said, "***The best, quickest and most efficient way is to build up from the bottom.***"

REFERENCES

[1] Albino V., Berardi U., Dangelico R., "Smart Cities: Definitions, Dimensions, Performance, and Initiatives", Journal of Urban Technology, Febuary 2015, 1-19
[2] Aoun C., "The Smart City Cornerstone: Urban Efficiency", Schneider Electric, ISBN: 998-2095-01-30-13, 2013, 1-13
[3] Azim A., AghaJani R., "Designing Smart Cities", Indian Journal of Fundamental and Applied Life Sciences, ISSN: 2231– 6345 (Online), Volume 4, 2014, 146-153
[4] David fresh water 2000, Direct and indirect rural development policy in a neo conservative, North America
[5] Dr. Milind Kulkarni 2010, International Journal of Research in Engineering, Science & Technology
[6] Esther W. Dungumaro, "Availability Of Domestic Water And Sanitation In Households", 2009, Committee for International Cooperation in National Research in Demography (CICRED), 107-125
[7] Gill H., "Smart Cities and Affordable Housing in India", The International Journal Of Business & Management, ISSN: 2321 – 8916, Volume 2, Issue 8, August 2014, 67-73.
[8] Jadhav Aditya A, Dhavan Gaurav R., Nikole Pritesh P., Ghutukade Manisha R., Jadhav Anil B., Sherkar Vitthal A., "Case Study And Planning Of Smart Village", 5th International Conference on Recent Trends in Science, Engineering and Management (ICRTSEM-16), ISBN: 978-93-86171-12-2, December 2016, 929-938
[9] N. Viswanadham, Sowmya Vedula, "Design of Smart Villages", Indian School of Business, Hyderabad 500032, India, September-2010
[10] Rutuja Somwanshi, Utkarsha Shindepatil, Deepali Tule, Archana Mankar, Namdev Ingle, "Study and development of village as a smart village", International Journal of Scientific & Engineering Research (IJSER-16), ISSN 2229-5518, Volume 7, Issue 6, June-2016, 395-408
[11] S.Sesha Talpa Sai**, "**Smart Villages – Need Of Emerging India", International Journal of Innovative Research in Information Security (IJIRIS), ISSN: 2349-7009(P), Issue 09, Volume 3, December 2016, 51-54
[12] Shah Manan S, M.Tech Thesis, "Critical Success Factors For Designing of Smart Cities In Context With Gujarat, May 2016
[13] Zhao Whiffing 2009, International Journal of Research in Engineering, Science & Technology
[14] Smart Village Project, National Informatics Centre: http://smartvillage.nic.in/
[15] Smart Villages - A Community Driven Initiative Reconstructing Rural India, smartvillages.org
[16] Smart Village Scheme Guideline - Panchayat, Rural Housing & Rural Development
[17] "India Village Directory @VList.in". *vlist.in*. Retrieved 2016-06-04
[18] N. Viswanadham, "Design of Smart Villages" Indian Institute of Science, Bangalore, February 2014