ISSN 2515-8260 Volume 09, Issue 08, 2022

RECENT INNOVATIONS IN SMART IT AND COMMUNICATION FOR RURAL DEVELOPMENT (NCRISC)

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ABSTRACT

Human society is developing with rapid momentum and achieved various successes for making its livelihood better. The civilization is witness for various changes related to it's the development through different catalysts like industrial development, green revaluation, science and technology, etc. The present era is augmented on Information and Communication Technology. This technology has proved its potential in various sectors of development in urban and rural landscapes. Rural regions, although rich in natural and cultural resources are often seen as regions with certain deficits in knowledge capacity that can strain efficient exploitation of these resources. Knowledge and information society nowadays are taking a variety of forms across rural areas, with considerable impact on the development perspectives of rural regions. On the contrary, urban areas are seems to more inclined to accept and adopt Information and Communication Technology due to advantages of literacy and better infrastructure as compared to rural areas. Due to such suitable situations of urban landscapes good amount of success of this technology is visible in the form of smart cities and better livelihood of residing human beings. But the problems, consequences and opportunities in urban areas are different for effective utilization of Information and Communication Technology for sustainable development of rural masses. The present research article discusses about rural development in developing world for the up-liftment of livelihood of the rural masses and to take a 'look ahead' at scientific developments and technologies that might be influential over the next 10-20 years. The driving motivation behind the concept on " Smart Village " is that the technology should acts as a catalyst for development, enabling education and local business opportunities, improving health and welfare, enhancing democratic engagement and overall enhancement of rural village dwellers.

INTRODUCTION

According to Maria Hewitt ,"the perceived magnitude of rural health care issues and also the impact of any modification publicly policy rely on however 'rural' is outlined". A geographical area typically called village could be a geographic area settled outside cities and cities. Agricultural areas are ordinarily rural, as area unit different forms of areas like forest. later on agriculture is that the chief supply of resource at the side of fishing, bungalow industries, pottery, etc. in step with the Erstwhile committee of Republic of India, a settlement with a most population of 15,000 is taken into account as "village". variety of rural units or villages in Republic of India have increased from 6, 38,588 to 6, 40,867. in step with 2011 census, geographical area has population of 68.84%, whereas geographic region has population of 31.16% only.

The government has already recognized this issue and has place serious efforts through numerous schemes for enhancing bread and butter of rural plenty (Tripathi, 2019; Pandey, 2022). Presently, rural development chiefly focuses on financial condition alleviation, higher bread and butter opportunities, provision of basic amenities and infrastructure facilities through innovative programmes of self -employment. The population residing within the geographic area additionally desires constant quality of life as enjoyed by

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individuals living in sub urban and concrete areas (Sharma, 2022). higher bread and butter in geographic area could cut back worrying effects of financial condition, state and inadequate infrastructure on urban centers inflicting slums and eventful social and economic tensions. Hence, rural development thinks about with economic process and social justice, improvement within the living normal of the agricultural individuals by providing adequate and quality social services and minimum basic desires becomes essential. Such rural development not solely improve bread and butter in geographic area, however additionally could cut back the migration of rural population in urban areas for employment and cut back pressure on urban infrastructure.

Such changes are not very uncommon for human beings as human civilization has passed through various phases of development. Some of the milestones, which are witness to this development, are Prehistoric age, Stone Age etc.; the current era of human development is quit ahead and popularly known as "Smart age". Human beings are using smart phones, smart TVs and live in smart homes. The concept of smartness is popular in respect of human development irrespective of rural or urban area, literate or illiterate in all the countries and India is not exception to it. Like many developing countries, India too is a rural dominated country. Though, the awareness of the smartness concept is well recognized by the planners and policy makers, but not effectively implemented for the rural areas.

In recent times, there is an immense interest in the development of Smart Cities. Making a city "smart" is emerging as a strategy to mitigate the problems generated by the urban population growth and rapid urbanization. Globally, the concept of 'Smart City' is a significant initiative that seeks to improve the quality of life of urban citizens. Smart Cities across the country has the potential to be a game-changer in the country's urban landscape and the lives of ordinary citizens. The smart city initiative is having good potential for urban development and India has also
recognized this potential and is at the edge to start implementing this concept. This will facilitate better living for about 30% of the population, who live in urban area. But, more than half population will not be benefited from smart city development. Conditions in rural area are very different as compared to urban, so the same model of smart city cannot be implemented for the villages. The efforts of rural development may not work on the same principle as of smart city. Hence, utilization of Information Technology, which has proved its potential for the development, may be used for rural development through a concept of "Smart Village". The Smart Village concept will be based on the local conditions,
infrastructure, available resources in rural area and local demand as well as potential of export of good to urban areas.

In the Indian context, villages square measure the center of the state. Hence, for the event to percolate to the grass root
level, focus should be dedicated to the progress of villages and to smarten the agricultural population exploitation ICT solutions to achieve self-sustainability. unbalanced growth between rural and concrete landscapes ends up in the challenge of speedy urbanization in already thronged Indian urban lots. one in all the most consequences of uncontrolled urbanization is lack of livelihoods, smart customary of living and amenities within the villages of Republic of India. good village conception might play crucial role in maintaining the balance between the event of rural and concrete areas and facilitate to cut back migration of rural population in urban areas. Urban population density is increasing in uncontrolled manner, whereas the numbers of cities square measure still inadequate to accommodate the migrating population from villages. This has to be reversed and fittingly managed to boost quality of life in Indian cities. The conception of "Smart Village" also will address the multiple challenges like unplanned urbanization, under-development of villages, migration for economic pursuits, higher customary of living etc.

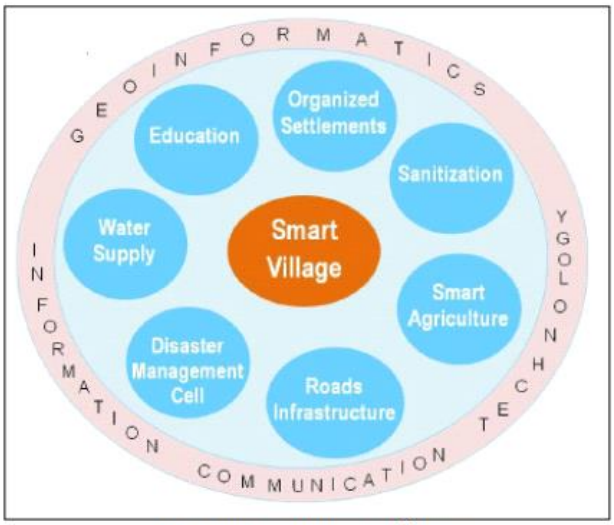

Fig. 1 Core Smart village

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NEED FOR SMART ITs FOR RURAL

When "India lives in its villages" said Mahatma Gandhi. India being a rural dominated country, the smartness concept is not even thought about the rural areas. It is a growing proven fact that the agricultural population is suffering a lot of consequences for bread and butter as compared to urban areas. The difficulties of bread and butter is also forcing rural population to migrate to the urban areas.

Understanding urbanization and therefore the links between rural and concrete areas is key to creating the foremost of the worldwide transformations happening round the world, and to difficult the numerous myths that exist. The village communities are very little republics, having nearly everything that they require inside themselves, and virtually freelance of any foreign relations. within the development method, there'll be several changes within the demand and provide of varied wants, as rural population can tolerate the method of amendment. At present, one among the main challenges in Bharat is growing population and speedy urbanization. This urban growth to sure extent is inevitable, because the economic pursuits and aspirations of the population do amendment and evolve. This must be reversed and fittingly managed through a balance between rural and concrete quality of life. The concept of "Smart Village" will address the multiple challenges faced for sustainable development of rural India.

Also in context of European customary a preface is declared as per "Hyper Village", an idea of Sony Europe and Forum for Future's Collaborated Project, is concerning exploring ways in which to make a lot of equity between rural and concrete communities within the pursuit of a a lot of property future.

There is Associate in Nursing pressing want for planning and developing "Smart Village", that are freelance in providing the services and employment and however well connected to the remainder of the planet. supported varied programs undertaken taken by Central and state governments beside additional technological initiatives, the good Village are able to do good infrastructure, good service delivery, good technology and innovation, good establishments beside optimum mobilization and utilization of accessible resources, resulting in quicker and a lot of inclusive growth. A 'Smart Village' can comprehend a property and inclusive development of all sections of the village community, thus as they relish a high customary of living. this may offer long-run social, economic, and environmental welfare activity for village community, which can change and empower increased participation in native governance processes, promote entrepreneurship and build a lot of resilient communities (Mohanty et al., 2021). At a similar time, a "Smart Village" can guarantee correct sanitation facility, smart education, higher infrastructure, clean beverage, health facilities, atmosphere protection, resource use potency, waste management, renewable energy etc.

TOWARDS DEVELOPMENT OF SMART ITs FOR RURAL

It is clear that the situations and challenges in developing urban and rural area are different due to the constraints andopportunities. Several researchers believe that the present technologies developed for the sensible town could also be helpful for the sensible village construct. Researchers reportable that the sensible village system may be developed on the lines of sensible town model. The elements taken in to thought can vary from region to region for villages, supported the offered resources and opportunities. Following are some generalized pointers for the event of sensible Villages

Economic Component: This element can embrace native administration and economic factors. it'll cowl governance models, bandwidth, mobility, cloud computing, entrepreneurship etc.

Environmental Component: This element can address the problems associated with resources and infrastructures offered

at native level. it's going to cowl cleaner technologies, public and different transportation, inexperienced areas, sensible growth, temperature change etc.

Social Component: This element could address problems associated with community life, democratic democracy, social innovation, proximity services etc.

Probations thus involved by ENRD (European Network for Rural Development):

Basic EU rules process the legal framework provides a comprehensive list of the legislative acts relevant to the implementation of rural development policy within the 2014-20 programming amount. thus involved EU rules on sensible IT are descripted as :-

- **Common provisions rules (EU) No. 1303/2013:**A collection of basic rules process the common strategy approach for the European Structural and Investment.

- **Rural Development rules (EU) No. 1305/2013:**A collection of specific rules on support for rural development underneath the EAFRD (European Agriculture Fund for Rural Development).

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- **Horizontal Regulation (EU) No. 1306/2013:** Rules on the funding, management, observance and analysis of CAP (Common Agriculture Policy).

- **Transition Regulation (EU) No. 1310/2013:** Provisions on rural development's support underneath the EAFRD control the transition between the 2007-13 and 2014-20 funding periods.

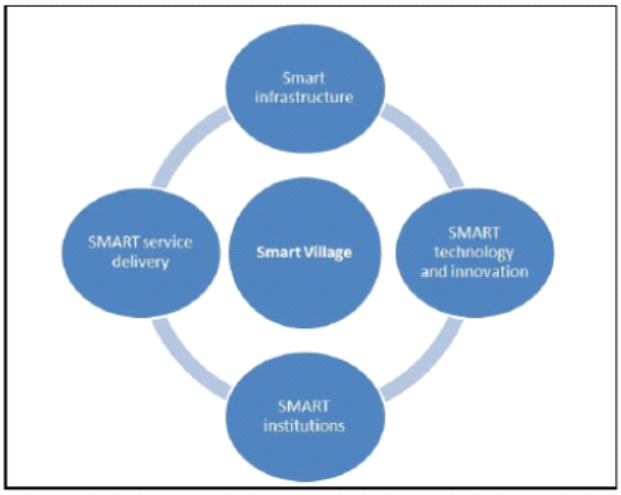

Fig. 2 Components of Smart village

ICT FOR SMART VILLAGE: PROBLEMS VS. POTENTIALS

The core of ICT is regarding the conversions of data and Communication Technologies that allows the gathering, processing, storing, transformation, retrieval and eventually transmission of data.

Information and communications technologies (ICTs) have established its immense potential for the good thing about human beings in numerous fields. info associated communications technologies (ICTs) ar usually accustomed assure the proper to an education and learning, and have a possible to serve developing desires. the assorted researchers have recognized the potential of ICTs for rural development and it should play key role for the quick and property development of rural Bharat in coming back years. info technology (IT) will create a distinction in an exceedingly developing country solely, if it's designed in shut collaboration with its users.

Based on the analysis on limitations of ancient rural coming up with and construction, the village coming up with has to be a bottom-up method that focuses on the local people participation. data and communications technologies (ICT) have an outsized potential for sweetening of rural life through its applications in varied areas of the agricultural village development. Globally, the result of IT/ICT technologies has improved lifetime of individuals living in urban areas. Rural population has remained largely neglected and least beneficiary of such technological developments leading to a virtual digital divide between the agricultural and therefore the urban population.

There is also completely different college of thoughts concerning the potential and adaptableness of ICT technology in rural areas. Butmobile technology too has played an important role in the economic and social empowerment of rural communities in developing areas to fill the digital divide. Still, rural areas typically suffer from slow and unreliable network infrastructures. This limits access to content and services that will promote economic development. However, with the utilization of ICT, capability development and authorization at individual and community level is achieved to make sure the demand, delivery, reach and use of quality services. All such palmy implementation of ICT primarily based activities in geographical region might prove the robust potential for more implementation of the technology. it'll conjointly facilitate in characteristic system bottlenecks / gaps, up knowledge analysis and watching, whereas enhancing acceptable technical and entrepreneurial skills, promoting social norms and behaviors favorable to the conclusion of village/community development. Introduction of innovations, new ideas and best practices of self-management is that the key feature additionally as a crucial strategy for the good Village. data management alongside ICT can target strengthening each capacities and systems of the community.

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GEOSPATIAL TECHNOLOGY FOR good VILLAGES

ICT may be a composite word having combination of the many tools and technologies. elaborate discussion on every and each tool and technology is out of scope during this paper. But, one in every of promising technology like Geoinformatics is also helpful for villages, whereas remodeling rural villages towards good village. Geoinformatics technologies will play a really outstanding role within the preparation and implementation of ICT within the "Smart Village" in terms of call support systems. offered completely different spatial and non-spatial layers is combined and integrated to facilitate analysis and build the most effective call. Recent developments in GIS, GPS, remote sensing, web-services and location-based services and technologies will support innovative solutions for management, governance and national participation practices compliant with good Village objectives.

Geo-spatial knowledge and Geographic data system (GIS) square measure essential parts for building good villages in an exceedingly basic means that maps the physical world into virtual setting. GIS-based coming up with and support systems enable planners and village community to expeditiously produce and visualize various eventualities and verify their potential impacts on future land use patterns and associated population with employment trends. the longer term of Bharat lies in changing every and each village into good villages. The thought of good village can offer the similar reasonably facilities to the villages, so the farming community can stay in villages and not migrate to urban areas. Future generations can contribute vastly in development method and revel in the standard agriculture activity with the utilization of contemporary technology. Following square measure some potential areas, wherever good Village might produce measurable and important impact:-

Organized Settlements: The village population is distributed in an exceedingly staggered manner and that they aren't well connected to the village roads. These is also re-distributed protective correct zones for habitation, playground, agriculture land and areas to develop varied infrastructures like bio- fuel generation centre, overhead storage tank, etc.

Smart Agriculture: So as to extend the standard and amount of agricultural production is exploitation "Sensor" technology to form farms a lot of "intelligent" and a lot of connected through the questionable "Precision agriculture" conjointly referred to as 'smart farming'.

Road Infrastructure: GIS analysis ensures all the homes in rural square measureas are well connected through rural road.

Smart water supply: There ought to be provision for water supply for agriculturaland drinking. This could facilitate effective and judicial utilization of the surface and spring water resources.

Smart sanitization: Smart equipments may be adopted in rural areas to facilitate disease free villages.

Education: GIS analysis is also distributed to search out appropriate locations to determine state-of-the art education hubs for the villages. Virtual room facility is also provided to use the advantage of offered specialists at alternative locations.

Disaster management (DM): Villagers square measure simply plagued by disasters thanks to lack of preparation. DM cells is also originated at the council level to deal with all the disaster connected problems. DM cell can connect with the National Disaster Management Authority (NDMA) through the central server for watching the longer-term eventualities.

CONCLUSION

Smart Villages are the necessity of the hour as development is required for each rural and concrete areas for higher keep and knowledge technology can provide effective resolution. There are palmy technologies accessible, that are enforced in urban areas. there's tremendous pressure on urban landscapes because of migration of rural individuals for keep. sensible Villages won't solely scale back this migration however conjointly irrigate the population result urban to geographical region. ICT/ IT and GIS are the unbreakable pillars to support the full method of village development. sensible village idea can have potential to uplift the grass-root level of the country, thus adding feather within the overall development of Asian nation.

Failure to utilize data Technology tools for rural development is due to lack of strategy, unfocused designing and in particular observation and execution of the activities. of these activities have to be compelled to be addressed supported the variable rural things. A specially designed appropriate framework for rural areas on the grounds of Science, Technology, Engineering, rules and Management can play necessary role to create next generation sensible villages. every village may be a distinctive example and having various set of issues and things. it should be tough to implement identical model of village development for all the villages. to deal with this complicated downside, Public personal Partnership (PPP) might play key role for developing sensible villages. advantages of the sensible village efforts are expected to be tremendous. sensible village idea has high replication potential in alternative countries of developing world. The concept of smart village may also be extended to small towns and also townships surrounding the big Cities.

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