MAINSTREAMING SMART VILLAGE IN RURAL DEVELOPMENT:

A FRAMEWORK FOR ANALYSIS AND POLICY

1. INTRODUCTION

The phenomenal allocation of Budget 2018 for Agriculture and Rural Development sectors has attracted attention of media, policy makers, academicians and common people alike. This has come after 70 years of independence when the nation is still reeling under rural distress and agrarian crisis. According to Census 2011 data, 69% of India's population, or around 833 million people of India, lives in rural areas, against 31%, or 377.1 million people, in urban areas. The World urbanization trends 2014 report from United Nations projected that the latter figure will jump to 50% by 2050.In this context, Ministry after a lot of brainstorming under the leadership of Honorable Prime Minister came up with a program named as Shyama Prasad Mukherji Rurban Mission (SPMRM). The main objective of the program was to make the villages smart and as growth centres of the nation. Through this program, government intended to breathe life into the statement "The soul of India lives in its villages" given by father of the Nation.

The program was an ambitious attempt to transform rural areas into "Economically, Socially and Physically Sustainable spaces", or smart villages "which would trigger overall development in the region". The Prime Minister during the launch of the SPMRM program said that "It is true that people are moving from our villages with great speed. They want a certain quality of life—good education, healthcare, electricity, Internet and entertainment options. The governments of the time didn't think about how these people will settle in the city and how basic necessities will be provided. With this mission, this government has thought of a way to tackle that". Till December 2017, 266 village clusters were adopted under SPMRM program against the target of 300 village clusters till 2019. Even though the term Smart Village has appeared in the program document of SPMRM but as it appears, the idea of developing smart villages has not come to the center stage in development discourses.

Nevertheless, the concept has already gained currency in many development organizations both National and International across developed and developing nations. Perhaps time has now come to make fresh interventions with new momentum to gear up Building Of Smart Villages In India.

2. EFFORTS ON CREATING SMART VILLAGES

Other than the efforts from Ministry of Rural Development, a significant number of state governments have shown a keen interest on the idea and are working on bringing it to reality. The responsibility of implementing

this idea in the states has been taken up either by the state governments themselves or by societies or non-government organizations or a corporates.

These programs have been named differently in different states. Most importantly, even though the aim of the programs is same, the focus areas under these initiatives are all different from one another.

To have a comprehensive understanding on the existing models of Smart Villages across the country, a framework has been formed and shared below for reference.

2.1 Smart Energy

Provision of clean and sustainable, energy is central to almost all other dimensions of rural development. Energy security is the secret mantra, which enables development in agriculture, health-care, education and skilling of rural communities. With a wide variety of solar, wind, biomass and biogas technologies now available at competitive costs, we are at the cusp of witnessing energy disruption and creating an abundant energy economy.

For rural energy supply and management, the element of 'smart' refers to creation and management of mini, micro and nano grids within the energy eco-system of a village or a group of villages. It is particularly relevant to rural areas with no or unreliable grid connectivity. These micro / nano grids bring in the element of self-reliance in energy for rural community and create a possibility of giving back the surplus to the grid. Developing a village with this approach can usher in a new developmental model. The vision for a smart village revolves around energy security.

Energy is the golden thread that connects economic growth, increased social equity, and an environment that allows the planet to thrive. One such case has been shared in the below for reference.

Chhotkei village in Angul district of Odisha has emerged as the first smart micro grid implementing village in India. The village gets a supply of 30 kWp (kilo watt, peak) Solar-power.

The village has installed a Smart Nanogrid to meet the energy demands of 140 households, 20 streetlights, a temple, and three community centres. After usage the village saves around 10 kWp which they set aside for day-time use in irrigation pumps and microenterprises to improve agricultural output, to enable value-addition to agriculture, and generate employment.

2.2 Smart Connectivity

Smart connectivity has two distinct connotations for smart village concept. One is to provide reliable and high-quality broadband and voice communications. And the second, probably more importantly, through a range of Information and Communication Technology (ICT) solutions, applications and services, be an integral part of smart technology solutions for all other domains like smart agriculture, smart water management, smart education, smart health-care and so on.

Rural communities tend to be politically disenfranchised due to their relative remoteness. Consequently, they lack information on societal issues and have difficulty becoming actively involved in debates about how to address them. Smart villages, through ICT, can allow rural communities to become more aware of their social, economic and political rights, engage in governance processes at all levels to the collective benefit and empowerment of all.

An example of Smart Connectivity has been shared below for reference.

Mori Village in East Godavari district of Andhra Pradesh state is also known as a Super Smart Village with the following characteristics:
- It is fully digital with all the households enjoying WiFi
- It has Internet connectivity making all transactions cashless.
- All the 1,189 households are provided with the internet at 15 Mbps speed, cable TV, and telephone connection through fiber grid.
- Each of them can watch 250 television channels with the Cable TV.
- All their transactions are through e-banking, AP Purse, Rupay cards and SBI Buddy.
- Even small grocery shops have been given e-pos machines.

2.3 Smart Agriculture

For any village, its agricultural eco-system is one of the most intrinsic identities that directly relates to its social, environmental and financial fabric. Efficiency and productivity in agriculture is directly related to the farming practices adopted by the communities. Fortunately, the intersection of technology and agriculture has opened up a lot of opportunities for the farmer, consumer and suppliers. This intersection is now called as Precision Agriculture (PA).

The development of PA is driven by Internet of Things (IoT), BDAA (Big data and advanced Analytics) and the plummeting cost of sensors in the semiconductor industry. Infusion of PA techniques and practices can

drive transformation at every stage in agriculture. The immediate benefits are self-sufficiency for villages, generating business and increasing financial freedom for villagers (both farmers and suppliers).

An example of Smart Agriculture has been shared below in the box for reference.

> Climate Smart Village, Noorpur Bet, Punjab. Farmers and researchers test and implement portfolios of climate-smart agricultural practices, technologies, and services, which can be combined together to make the best out of an increasingly difficult situation. Climate Change Agriculture and Food Security (CCAFS) and Consultative Group on International Agricultural Research (CGIAR) engaged with the cooperative to create Climate Smart Village through infusion of technology, capacity building of farmer and improvisation in farming practices.

What is PA and how does it work?

Precision agriculture (PA) is a technology-enabled approach to farming management that observes, measures, and analyzes the needs of individual fields and crops. By allowing farmers to apply tailored care and manage water more effectively, it boosts production, improves economic efficiency, and minimizes waste and environmental impact. PA adds value right from field to fork.

Its development is being shaped by two technological trends: **big-data** and **advanced-analytics** capabilities on the one hand, and **robotics**—aerial imagery, sensors, sophisticated local weather forecasts—on the other.

It uses a system of IoT sensors, mobile communications, big data and analytics in the cloud. They all come together to help farmers use more precise amounts of fertilizer, water and other resources. Recommendations can be adjusted in real time to reflect changing weather conditions. Soil sensors and aerial images help farmers manage crop growth centrally, with automated detection systems providing early warnings of deviations from expected growth rates or quality. From seed genetics to environmental conditions, anything that affects farm production can be measured and analyzed. Digital technology can empower farmers to collect information in the field and it is expected to allow them to monitor each plot of land in future to determine precisely what crop they need to produce to thrive, with reduced usage of resources for cultivation.

Post-harvest, delivery of produce to the right destination / market with least wastage is an important consideration. This can be aided through automated systems that track, in real-time, the status, performance, and potential bottlenecks of critical equipment to optimize fleet management. Coupling transport-management systems with agricultural sensors can allow unified hauling of inbound transportation generating huge savings. Agriculture-specific payment systems and financial services can help farmers make their economic models more resilient.

2.4 Smart Education

Smart villages aim to increase the time available for students to study and will address prevalent factors that negatively affect the ability of students to acquire the knowledge and skills necessary to achieve economic goals and improve labor productivity.

ICT-equipped schools can provide a good deal of handholding in accessing internet and consequently the world's knowledge base, ending the information isolation experienced by many rural communities. New opportunities can be generated for distance and adaptive learning, reducing the need to move to towns or cities to achieve higher levels of education. In addition, ICT and internet access also have a "pull factor", providing incentives for school attendance and for attracting and retaining good teachers, addressing issues such as school dropouts and cognitive development.

> Nandangram smart village in Itahar administrative block in Uttar Dinajpur district of West Bengal. In this village gainful employment, education and health are together taken care by creation of Health, Education and Employment (HEE) centers. These centers are run by village residents who have links with the nearby city and a reasonable degree of organizing capability as well as some land where they can practice adulteration-free agriculture.

2.5 Smart Health

At the most basic level, households in smart villages will be able to consume potable water and a more nutritious diet due to the reduced cost of boiling water and cooking food, and enhanced agricultural productivity arising from associated development initiatives and reduced wastage. ICT-enabled m-health initiatives can enable mobile health diagnostic solutions, requiring relatively low levels of local medical skill and providing access to specialist health-care services based in urban communities where necessary. Epidemiological data can be gathered, providing the opportunity for more effective interventions and early warning capability to address health related challenges such as malnourishment, underweight child birth, anemic mother etc.

2.6 Smart Environment

Smart villages can be stewards of the environment aided by technologies to monitor key environmental indicators such as forest health, water quality, soil conditions and changes to the landscape. They can also reduce pressure on deforestation using efficient cook stoves to decrease the need for traditional biomass energy sources such as charcoal and wood a key driver of unsustainable forest use.

Smart villages can host community-run recycling facilities ranging from those equipped to recycle wastewater and organic waste from agro-processing, to next-generation facilities for the recycling of e-waste, including energy-storage and generation technologies such as batteries and solar panels. Depending on geographical

endowments, some smart villages will be able to operate as regional ecotourism hubs, an activity that can improve the welfare and connectivity of rural and urban communities.

The aforementioned Villages have all emerged as Smart Villages but only in a particular domain. It's not holistic in nature. However, the pressing need of hour is to have a Smart Village with all sorts of comprehensiveness in it.

An example of Smart Climate Village has been shared below in the box for reference.

> A project in Betul district of Madhya Pradesh has paved the way for climate-smart village through agricultural practices with the help of local institutions led by women farmers and United States Agency for International Development (USAID) and Consultative Group on International Agricultural Research (CGIAR).

2.7 Smart Infrastructure

In order to ease life of villagers in every possible way, a village has to be well supported with infrastructure to enhance efficiency of habitants and efficacy of inputs from the villagers. The infrastructure includes roads, institution buildings, weather station equipment, hospital equipment, telephone towers etc. Most of these infrastructures can be established with well-intended village habitants and the guiding institutions through convergence of funds, functions and functionaries. Smart element needs to be included in every stage of infrastructure development.

An example of Smart Infrastructure has been shared below in the box for reference.

> Smart Village Dhanora, Tehsil Bari, District Dholpur, Rajasthan. Under this project, efforts are being made for sustainable development by providing basic amenities like sanitation, safe drinking water, internal roads, and tree plantation and water conservation.
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> Barsimaluguri, about 11 km from the Indo-Bhutan border in Baksa district has been turned into a model smart village with 100 per cent toilets, solar power and pure drinking water, following an initiative taken by a few individuals under the aegis of Nanda Talukdar Foundation (NTF)

Initiatives of government under Unnat Bharat Abhiyan[1] (UBA) and Sansad Adarsh Gram Yojana (SAGY) are worth mentioning here in this section, for their intentions and outcomes.

3. ATTRIBUTES OF A SMART VILLAGE

As seen from the above section, different organizations are using the "Smart Village" in different connotations and contexts. But there is a need to create a broad frame work for using the term "Smart Village" that will have

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[1] UBA is a Ministry of Human Resource Development, Government of India programme to uplift rural India

certain attributes, development status etc. Thus there is felt need to have a common understanding on the Concept of Smart Village within the frame work of overall Rural Development and to have a set of attributes for such villages. These attributes needs to be drawn from all the existing efforts and resources available on the ground. This attempt will help in capturing the existing dynamics of sector based treatment and emerging attributes. The idea is to generate a 360 degree approach to create a Smart Village. Such a framework can guide all agencies/ organizations to work towards achieving the designated attributes. These approaches can be as follows:-

a. Social

- To bridge in equities in outcomes of development interventions across social groups leaving no one behind.

b. Infrastructural

- To remove the impediments which create deprivations due to infrastructural facilities.

c. Financial

- Attracting entrepreneurs and venture capitalist for productive investments in off grid villages in order to enhance opportunities for a village community towards livelihood and greater for financial security.

d. Technological

- Exploring various technological options to address the vulnerabilities arising out of and being experienced in and around rural India.

e. Behavioral

- Processes and mechanisms to bring about behavioral changes in the village masses in order to get their sustained involvement for creation of a smart village.

f. Environmental

- Appreciate and estimate the emerging environmental challenges which have already surfaced and are likely to appear in a more frequent manner and affect the rural space.

g. Political

- Mobilizing political consciousness, awareness and support towards the need for creation of a smart village

h. Sustainable

- Creating institutional arrangements at local level for ensuring sustainability of interventions and outcomes

The above mentioned sector based treatment can be considered as the way forward to achieve later mentioned attributes leading to accomplishment of 17 Sustainable Development Goals [2](SDGs) in future through Smart Village development program.

4. WAY FORWARD

Therefore, to develop a common understanding on the concept of Smart Village and to create a comprehensive framework for Smart Village, a two day consultative workshop can be conducted under the guidance of National Institute of Rural Development and Panchayati Raj (NIRDPR). The institute being the think tank for Ministry of Rural Development and Ministry of Panchayati Raj has the mandate to carry out training and research in connection to Rural Development across the country.

Hence, the paper titled "Mainstreaming Smart Village in Rural Development: A Framework for Analysis and Policy" proposes to have a two day consultative workshop with all the stakeholders associated with Smart Village and Rural Development. The proposed workshop should provide insight on the following points for preparing a policy document on Smart Village creation.

1. Conceptualize the framework for "Smart Village";
2. Develop a self-sustainable and viable model of smart village and draw an execution strategy;
3. Design technology solutions, smart village policy for better and empowered rural governance
4. Mainstream village communities, rural institutions in designing a Smart Village;
5. Design a detailed plan for investment and resource allocation mechanism for implementing smart village initiative;

The proposed list of stake holders for the consultative workshop are:-

a) Ministries associated with Smart Village initiatives
b) Representatives from the State Governments
c) State Institute of Rural Development
d) Non-Government Organizations
e) United Nation Organizations
f) Corporates etc.

The proposed workshop is expected to provide a framework for a smart village and mainstream it with rural people, resources and institutions. The workshop will draw an executable action plan in identifying agencies

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[2] The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.

and line departments and their respective roles. The workshop should envisage a holistic rural development agenda towards achieving the desired goals of overall rural wellbeing.

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Contact Person

Dr. Partha Pratim Sahu
Associate Professor
Centre for Entrepreneurship Development
Email- ppsahu.nird@gov.in

Mr. Animesh Ghosh,
Officer on Special Duty
to Director General
Email- animesh.nird@gov.in