



Rural Development in The Context of a Smart Village

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Abstract: Our society is developing with rapid momentum and achieving various successes for making its livelihood better. The civilization is the witness to various changes related to its development through different catalysts like industrial development, green revolution, science and technology, etc. The present era is augmented on ICT. This technology has proved its potential in various sectors of development in urban and rural landscapes. This article deals with the study and development of a village as a smart village. It defines a smart village as the bundle of services that are delivered to its residents and businesses effectively and efficiently enabling education, local business opportunities, improving health and welfare, enhancing democratic engagement and overall enhancement of rural village dwellers. “Smart Village” is that modern energy access acts as a catalyst for development in education, health, security, productive enterprise, environment that in turn support further improvement in energy access. It focuses on improved resource use efficiency, local self-governance, access to assure basic amenities and responsible individual and community behaviour to build a happy society. It makes a village a smart village by taking smart decisions using smart technologies and services. The present research article discusses rural development in the developing world for the up-liftmen of livelihood of the rural masses and to take an 'outlook' at scientific developments and technologies that might be influential over the next coming generations.

Keywords: Rural technology, Communication, Education, Landscape.

Introduction:

One of the most important and accurate questions that contemporary societies have to address is ‘how to make people’s communities and their settlements more sustainable. An ever-growing number of aspects of most societies and their economies are inextricably linked to changes brought forward by technological developments that are transforming people’s everyday routines, perceptions of the environment, access to electricity, food, health, education and many others. It is important to note that the concept for urban smart communities is already very well established—e.g., Smart Cities, but less so for rural communities as the concept, Smart Village has only recently gained momentum. The main objective of this paper is to review and discuss already existing initiatives and projects on rural development especially in Smart Villages in Europe and beyond. To understand the influences of smart development and how communities embraced it. It is necessary to make a review of the practices, policies and initiatives. Only then we can use and apply the concept to new environments more successfully.

Concept of Smart Village:

The so-called smart development of infrastructure is hardly strictly divided into two polarized sets of frameworks, rural and urban. In the case of Indian smart development, it is necessary to consider both spaces simultaneously, their mutual interconnections and take into account that significant changes in one will affect the other and another way around. The smart growth plans for villages put their emphasis on various attributes. In such contribution, they emphasize-

- (i) creating new housing choices and opportunities;
- (ii) making communities more accessible by foot;

- (iii) enforcing the sense of place in communities;
- (iv) preserving different environmental zones;
- (v) connecting new and the existent developmental aims; and
- (vi) more varieties in terms of transportation.

Secondly, even though the implications of technologies are often used in discourses on smart communities, the technological and digital components of the transformation are not the only ones, not necessarily the most important in specific cases. Based on smart/successful agricultural decisions, the education level of the village inhabitants has increased, the population has grown, and health services improved. The smart dimension is addressed in most for addressing other specific aspects: sustainability, well-being, (inclusive and equitable quality) education, empowerment of women and girls, management of water resources, accessibility of sustainable energy, sustainable economic growth and decent work, building resilient infrastructures, fostering innovation, reducing inequalities, making human settlements more inclusive and sustainable, taking actions to combat climate change, protecting ecosystems, etc.

Smart Cities Vs Smart villages:

Numerous amounts of research have already been done on developing and studying the evolution of Smart Cities in terms of elevating rural development and an existing city's transportation systems, government systems and improving health record organization. While research on smart cities might support the efforts in smart villages research, the modelling of smart villages needs to consider different phases. There is a basic distinction between developing a smart city and modelling a smart village, because of the varying priorities and needs of a city as compared to a village. According to an American researcher, the 'Smart Cities' information and communications technology is the backbone of a city's life including infrastructure, architecture and all the objects used to make it liveable and sustainable. Internet and connectivity are the key components. Considering that rural environments and smaller remote communities have their challenges and opportunities, including the possible absence of legacy infrastructure, transcribing the approaches of cities may not be appropriate. The concept of a smart village requires fundamentally different thinking in terms of objectives and processes.

The research concept views smart villages as a vehicle by which to advance human development and thus view the components of the human development index namely education, employment and health as the key factors to focus on in developing the concept of a smart village. Thus, in contrast to a smart city; information and communication technologies are relevant only to the extent that they advance rural development. A key component of making villages smart through improving rural services with the help of digital and communication technologies but rural communities take the initiative in building on their strengths and developing new opportunities. The concept of Smart Village is towards designing a policy framework where digital communications technology plays an active role.

Parameters for Framing Smart Villages:

The objective of smart villages is to develop a scale for 'smart design' of village communities, through which they become self-reliant and sustainable. The design of a smart village needs to consider four important aspects.

➤ First, there is a need to point out the development issues that can be replicated across villages without compromising on the ability of each village to customize to their needs. It can simply be exemplified by this that there is a need for a primary school and a PHC (primary health centre) facility. A more sophisticated, albeit well-known example, is the versatility and customized use of generic multi-micronutrient powders in different foods for reducing iron deficiency among children.

➤ Secondly, framing up requires adaptation to match local community needs and available resources to ensure sustainability. This requires an endogenous receptivity and initiative, and a community capacity to examine and customize available opportunities that are relevant for the community. Thirdly, smartness concerning sustainability and resilience lies in the ability to constantly learn and respond to changes in the ecosystem.

➤ Fourthly, the development policies and practices that can be lined up through explicit and implicit social networks in the community and between communities need to be analysed. Social capital & networks and fixing them up to levels beyond the immediate community; can result in sustainable development as well as impact knowledge flow and innovation.

This research work is largely concerned with the second of these aspects, namely the development of community capacity and endogenous receptivity and initiative. I propose an approach to both qualitatively and quantitatively locate the baseline of these attributes in a given community, and to

understand the conditions under which the mechanisms through which there may be moved from the baseline. This should shed light on the readiness or preparedness of a community to move towards being a smart village community.

Interpretation of Research Technique:

A primary survey method will be outlined based on the information and knowledge acquired during the field research. Survey instruments will be planned to collect village level information on the three pillars of the human development index (HDI), namely education, employment and health. Additionally, information will be collected on social capital, aspirations, wealth and asset ownership, leadership, resilience and perceived happiness and wellness of the community. Finally, all parameters that are contributory to inequality will be analysed. Parameters like perceived happiness and wellness go beyond the human development index (HDI) and can be measured over time to indicate the development of rural areas. The focus will be on perceived happiness and wellness and not on any attempt to measure “factual” wellness, as there are various views on how wellness should be measured. Parameters like social capital, aspirations, leadership and resilience may be indicators of the potential of a village for development which can help villagers determine their path to becoming a smart village. Social capital may promote development. It may also facilitate learning by the creation and exchange of knowledge and it can positively impact grassroots development. Though it has been seen to decline with changes like youth migrating out of the village, what gives optimism for smart village development is that it may grow with certain internal changes. Women’s empowerment may create social capital. It cannot be measured directly rather proxy measures relevant to a culture can be used to assess social capital. It can manifest in collective action in the community, how disputes are resolved, trust, solidarity etc. Leadership can also play a key role in the creation of social capital. The research will assess whether social capital lies in the hands of a few people, as this can adversely impact rural development. Aspirations and poverty are related. Poverty can lead to a loss of aspiration to reach one’s potential. Our approach to Smart Villages is consistent with the perspective of Prof. Amartya Sen. In his opinion, the goal of development boosts human freedom. It is also the primary means of development. Prof. Sen quotes “The ends and means of development call for placing the perspective of freedom at the centre of the stage. The people have to be seen, in this perspective, as being actively involved—given the opportunity—in shaping their destiny, and not just as passive recipients of the fruits of cunning development programs.”. An indicator of freedom is the path of aspiration. Research shows that when entrepreneurial aspirations are encouraged through conducive institutional environments, poverty reduction can be achieved. Resilience is another important parameter. In this context, it is referring to “community resilience”. It is generally pointing as a positive characteristic of a community but scientific literature, policies and practice do not seem to have a consensus on its definitions and core characteristics. Conceptually, communities can thrive when challenged by change. Community resilience can prevent as well as enhance recovery from a disaster or a traumatic event. It is indicative of the community’s ability to prevent poor outcomes from happening, as well as its capacity to restore and adapt itself after an event. The Community Advancing Resilience Toolkit, a community intervention framed to promote community resilience, describes community resilience as the capacity to transform its environment and learn from adverse situations collectively. In rural communities, this adaptive capacity is related to the ability of the rural community for social learning as well as innovation. Secondary research will review existing studies related to the smart villages’ development. International organizations viz. the UNO, World Bank, WHO conduct periodic studies in collaboration with other national organisations to address various development issues, especially in developing countries. Governments around the world conduct countrywide surveys to collect data on specific issues relevant to that rural sector. In India, the Ministry of Statistics and Programme Implementation conducts surveys through its NSO centres. The National Institution for Transforming India (NITI Aayog), a policy on a ‘think tank’ initiated by the Government of India in 2015, also conducts research that would have policy implications. Most of these studies are at the national, state or district level to help implement policy or evaluate the specific intervention programmes. Access to village level data; is a challenge and disaggregation of data is, in general, difficult if not impossible. In India, secondary data is available at the village level for certain areas like school enrolment, availability of teachers and teaching infrastructure etc. Initial data will be collected using mixed methods, which include quantitative and qualitative data collection techniques. Two types of research techniques will be used for data collection:

- Structured (closed-ended) questionnaires for qualitative data
- Unstructured (open-ended) questionnaires for qualitative data

Separate questionnaires will be prepared for village level and household-level data. Simple unstructured questionnaires will be prepared for youth in schools. Questionnaires will be framed through a multistage process. To ensure relevance to the communities, questionnaire items, selected from various dimensions of questions, will be judged by surveyors on the ground, who work closely with the villages. The modified questionnaire will be translated for initial testing in a few villages before it is used for data collection. For the sake of practicality, the initial testing will take place in whichever villages are firstly invited, through their village leadership. The research survey team does not intend to disrupt any power structure. The surveyor will also test and compare a paper-based data collection system with an electronic data collection system for final rollout. Qualitative data will be collected through group discussions and key informative interactions. Respondents for both qualitative and quantitative data collection would be household members or representatives, village leaders (elected as well as non-elected) and youth in schools. The process of empowering village communities will begin with data collection itself. Representatives from the villages would be encouraged and trained to collect information about the village, building among them ownership and engagement of the process. The process will enable the village community to develop a holistic and objective perspective for their village.

Collection of Samples:

Appropriate sampling methods will be used to select villages for exploratory research. After completion of the exploratory research, initial data would be collected from selected states when the government permission is obtained. A stratified random sampling method would be used to select villages in the selected state. The sample will include representation from districts and sub-districts of the selected state. I should aware that these sub-districts could have different names (for example, in India, they may be called tehsil, taluka, etc.) Each subdistrict will contain several villages, and I will again apply random sampling to this collection. I have to keep in mind that sub-districts may vary greatly in terms of size and number of villages. The sample size may vary between 5–10% of the number of villages in the sub-districts. The sample will be further stratified by the type and size of the village. I have a wide ontology of three major types of villages, namely remote and isolated, not so remote, and peri-urban. This classification depends upon how far or inaccessible the villages are from an urban centre. This ontology would be elaborated in further detail in a paper during preparation. It is important to understand the justification for the stratification of villages based on approach and distance from an urban area. In my opinion, the smart rural development cannot be based on a 'one-size fits all approach and the specific rural parameter has to be taken into account. Villages, as stated earlier, can be placed on a rural-urban continuum and face different challenges. Rural areas distant from urban centres face the consequence of social and economic downfall due to outmigration (moving away from the area, within a certain geographical boundary) of youth. Pre-urban areas face the pressures of modern development, where local infrastructure cannot handle the intensity of development. The two types of rural parameters also vary concerning entrepreneurial activity and knowledge enhancement due to differences in population density and connection to urban centres.

Geographic unapproachability is another aspect of remoteness that needs to be considered in stratifying; the population. Mountainous regions and islands have natural barriers to approach, which further increases rural deprivation. In these regions' unapproachability and development potential, form a vicious cycle. Poor network opportunities and availability of services in these regions make the problem of outmigration, which in turn result in loss of jobs opportunities and available services, making them unapproachable. At last, 'the poor' do not form a homogenous category. Different subcategories among poor populations, impact levels of participation and collective action. One of the differences is caused by the movement in and out of poverty. Some people were not born poor but situations make them into poverty; some are persistently poor and some came out of poverty. The data from research so far also indicates heterogeneity due to varying timings and places of migration into the village and the extent of diversity among village community groups. Different subcategories may have varying socioeconomic needs that impact collective action and potential for development. The sample layout will also consider the level of heterogeneity of a village for stratification.

Research Area Mapping:

The apparatus would be supplemented with participatory mapping, a participatory research tool. It allows rural communities to actively participate in the research process by visually representing the area where they live. In simple terms, it is a map created by the rural community of its physical and social structures. These maps may not be scale but provide information on the spatial distribution of facilities for health, education, recreation, public utility, networks, practising faith and all services used by them. In addition to providing information about the spatial distribution of infrastructure and resources, the participatory process helps to understand a community's social dynamics, challenges and potential solutions to focus the challenges. Maps can include actors in the community responsible for achieving certain targets or those who are opposing some actions. As well, a sociogram can be an extension of the map in which relationships between different actors and groups is visualised. Social mapping benefits the community as well. It helps them document and record local knowledge; raise awareness within the community; reflect on their issues and think of actions they can take; build community cohesion. The research team and the community are both in a process of invention. The various tools have been used for improving land administration and management of natural resources, as a teaching tool for public health and for building strong links between a community and a local rural school. The mapping process can lead to insightful discussions on identifying issues, priorities and possible actions for rural development.

There are several high-tech multimedia and internet-based technologies available for mapping, data collection and analysis of samples. These can be efficient in monitoring development over time. I will evaluate the options based on access and digital literacy of participating communities. It is important to ensure that the benefits of the participatory process are not lost when using technology for smart villages. There are several examples of social mapping currently in use, though there do not seem to be examples in the peer-reviewed literature that are being used in a rural setting. One study, in the village *Kandalgaon*, in the vicinity of Kolhapur district of Maharashtra state, India worked with respondents to create a map, highlighting various aspects of sustainable energy services act as a catalyst for development by providing good education and health care, access to clean water, sanitation and nutrition, the growth of product to enterprises to boost income and enhanced security, gender quality and underline certain social dynamics. This in turn led to the respondents reflecting on areas of concern/improvement. During analysis, the author found that although a visual representation of the thrust area was lacking in certain information, the presence of the map plan allowed them to then start a dialogue, which helped the respondents to further open up and discuss certain nuances with them.

Field Analysis:

The research activity in fieldwork will provide both quantitative and qualitative data for analysis. In this activity, an analysis will involve integrating both types of data, as they will be designed to measure different aspects of village factuality. The two types will provide a more complete picture of the ground reality and can be analysed concerning the hypothesis or theoretical assumptions of the research. Triangulation connects qualitative and quantitative empirical findings with theoretical propositions. Analysis of surveyed data will use several techniques including clustering, analysis & dimension and reduction. In dealing with data that depends on several parameters; clustering analysis can help us to observe potential relationships. There are several well-known algorithms for this kind of analysis and I will use a combination of them according to the context. For example, in analysing data that is collected in a social context, there is a degree of uncertainty or unreliability in the information provided. Thus, it is useful to consider the use of a mixture-modelling algorithm to understand such data analysis. Along with cluster analysis, a technique called dimensionality reduction will be used, to reduce the number of variables being analysed, without a significant error in the calculations. Dimension reduction arises from a methodology that exploits sparsity. In other words, indicators may depend or be essentially determined by just a few of many possible parameters that are measured Electronic mode data capture may be used to capture baseline information. In health research, it has been observed that electronic mode data collection introduces both reliability as well as savings in time compared to paper-based questionnaires. This has been observed even among users having varied experience and literacy levels to collect and transmit health-related information.

Case Study of *Kandalgaon* Village Area:

Infrastructure

➤ Road

- Listing of existing kutchha roads and replacing them with the pucca road.
- Partial levelling of internal streets according to the land slope.
- Construction of bus shelter at the chowk.
- Construction of internal street and wastewater channel.

➤ Telecom and information technology

- Increasing efficiency and accessibility of common service centres.
- E-literacy to each willing citizen.
- Establishment of a smart school.
- 4G unit setup.

➤ Irrigation

- Micro-irrigation and drip irrigation.
- Promotion of less water consuming cropping pattern in an un-irrigated field.
- Promoting rainwater harvesting structure.
- Promotion of water recharge or moisture conservation structure

➤ Energy

- Uses of alternative sources of energy i.e., solar energy are used.
- Installation of solar/ electricity connections in a public building.
- All houses are to be electrified with the clock power supply.
- Installation of street lights through conventional and nonconventional sources.

Civic and Other Amenities

➤ Household amenities

• **Housing-** There are 748 households in *Kandalgaon* Gram Panchayat. Some people are eligible for IAY benefits. Priority list has been finalized in Gram Sabha i.e., Permanent Waiting IAY list but still, it is to be updated which is in process.

• **Drinking-Water-** Potable water connectivity is there in almost all the houses but is not regular. Due to this irregularity, the underground water pipeline was installed some years back, which has many leakages and at some points, it is also mixed with wastewater channel. Wastage of drinking water is also a problem, which can be solved with behaviour change. Here, the main source of drinking water is *Kandalgaon* Lake but supply is not regular and the main water supply scheme is also not properly maintained. So this problem can be solved by providing 24x7 water supply and regularly maintaining water supply scheme.

• **Electricity-** All houses have an electrification facility but the Supply of electricity is with low voltage, irregular, having many power cuts and power failure. Misuse of electricity and line cut is also a burning issue. Gram Panchayat can co-operate with the electricity department to check theft cases, regular and timely recovery and payments of bills, which would ensure 24X7 supply.



Public Amenities

• **Street Light-** Though Gram Panchayat has provided street lights, which is insufficient. Solar energy options for street lights can also be explored. Gram Panchayat can motivate each household to fix a bulb or tube/LED in front of their house and in this way Gram Panchayat can manage street lights at a low cost.

• **Cremation ground / *Shamshan Ghats*-** There is sufficient space for *Shamshan Ghats*. But the Boundary wall shed & proper all-weather approach is not there.

• **Libraries-** No such facility is there. However, a small library for school students is available.

• **Sports and playgrounds-** No facility is available for Sports. A playground is available in School which is not properly maintained. Daily yoga & sports activities are not found.

• **Community Hall-** There is no community hall in the village. si it is necessary to build a hall in the village.

• **PDS outlet-** Two PDS outlet is properly working near Shyam Temple. At present PDS outlet is providing services to people with ration & kerosene.

• **Post office-** There is no post office working in the village.

- **Banks-** There is only one bank in the village.
- **Public transport-** Public transport is available along with private vehicles on local & main routes. The frequency of buses is good.
- **Health**
 - Posting of Lady doctor
 - Insurance of Health Card.
 - Installation of the water supply connection
 - Ensuring AYUSH facilitation in the village
 - Checking of leakage points where contamination occurs in drinking water in a village
 - Establishment of Solid & liquid waste management unit
 - Renovation of ponds
 - Working on behaviour changes through health volunteers
 - Campaign against alcoholism & smoking through Schools as well as places of worship
 - Reducing the availability of risky substances in the village
- **Sanitation**
 - House-to-house campaign through health volunteers and *Swayam Sevak*.
 - Education through *Anganwadi* centres, schools, and organization of camps.
 - Wall Writings; Information Boards at relevant locations.
 - Facilitate the construction of toilets in each household.
 - Facilitate construction or make functional toilets in all public institutions.
 - Construct covered drains along with liquid waste treatment pits.
 - Effective garbage collection, segregation and disposal systems.
 - Initiate behaviour changes campaigns on hygiene and sanitation through the involvement of youth groups and social communication methods like street theatre.
 - Establishment of solid and liquid waste management unit.
- Education**
 - **Early childhood care**
 - Earth filling of low-lying area.
 - Construction of assessable track/buildings with repair & renovation in existing structures.
 - Preparation of technical estimate, report and approval of finance and administration and construction.
 - Public Health Engineering Department will ensure for safe drinking water supply.

- *Anganwadi* workers will identify the children of the 0-6 years age group with the help of ASHA and helper. Ensure their registration and regular attendance at each centre with a functional committee and local people's involvement. Formation of Women welfare committees, strengthening of it and to make it functional through identification of pregnant and lactating women, anaemic adolescent girls etc. and to generate awareness programme. **Nutrition education to women/adolescents School and higher education**
- Filling the posts of required staff.
- Identifying training needs of teachers and quality education measures individual attention to weak & needy students.
- Plan proposal, approvals with timeline and execute accordingly to the gaps identified in
- **Infrastructure**
- Convert the private schools into smart schools,, Smart schools will have IT enabled. classrooms, e-libraries, web-based teaching and will make all students e-literate. This will be done by filling the infrastructure gaps i.e., Installation of Holistic Quality Education Improvement System.
- Advance tentative indent of study material.
- An adult literacy campaign may be initiated.
- Introduction of units of NCC, NSS, SCOUT.
- Use of cultural forms viz. street theatre, puppetry and other social communication methods throughout the year.

Social Development

- **Situational Analysis**
- Social Development is a concept that is interrelated with Mind Change. Development involves the introduction of new ideas into the social system to produce higher per capita incomes and improve the levels of living through modern production methods and improved social organization.
- Development is building up the capacity of the people so that they can build a better future for themselves. Development is an experience of freedom in deciding what people choose to do. The capacity to take a decision decide to do something brings dignity and self-respect.
- Development efforts, therefore start with the people's potential and proceed to their capacity enhancement and growth. It is essential to see that access to entitlements is available to all especially the vulnerable sections and Social evils are under control and supervision.
- **Strategy**
- Organize citizen-centric education campaign/movement.
- Involve youth groups in health camps and adult literacy drives.
- Create discussion groups through the libraries.
- Celebration of the village day through exhibitions and honouring the village elders, and local role models, especially women, freedom fighters and martyrs.
- Song Competition for different festivals and occasions.
- Organization of committees for peaceful and crime-free village life.
- Organize Gender Sensitization programs.
- Providing a variety of options: Gym, yoga, walking/jogging, sports for everyone to choose.
- Health volunteers to guide and follow up personally for better health.
- Identification of addicted people & consequent intervention.
- Working on behavioural changes – SHGs and health volunteers.
- Campaign through Schools, Youth Clubs, SHGs, as well as places of worship.
- Reducing the availability of substances inducing deviant behaviour in the village.
- Facilitation in construction of toilets in each household.
- Improving personal hygiene for all consisting of Daily cleaning of teeth, Use of Sanitary.
- Toilets, Daily Bath, washing hands after toilet and before eating and Wearing clean clothes.
- Personal menstrual hygiene of adolescent girls and women.
- IEC initiatives to promote the use of toilets – both individual and institutional along with taking benefits of schemes.
- Initiate behaviour changes campaigns on hygiene and sanitation through the involvement of youth groups and social communication methods like street theatre.

Innovative Communication in Smart Village

As it has not been observed that 'innovation' is being used in the way that it is as described here, there are instances in which some aspects of it have been employed and we describe one such instance here. The surveyed area was investigated as if rural youth have improved employment opportunities through ICT initiatives and digital inclusion. This study could help understand if mobile telephones could catalyse the development of smart villages in India. I have used household surveys within villages in two states in India, Punjab and Tamil Nadu. In Tamil Nadu, the sample consisted of 3 districts with 100 participants, and in Punjab sampled 1 district with 112 participants. The discovery process involved designing a research method to examine the choices made by rural youth, in terms of their education and employment. A network sensing architecture application is used to geographically map the quality and availability of mobile internet connectivity. From that, one could construct maps using their parameters for the quality of the connectivity available from every service provider on the market. The author wanted to see whether the aspirations of the rural youth were reflected in his mobile device usage. This might provide an understanding of what programs could be implemented to help with the youth's social mobility. For the most part, my innovative process was a combination of secondary and primary research. The outcome of the study was to present findings and analyses that could be used by other researchers and practitioners or policymakers.

Discussion

I hereby discuss similarities and differences between my approach and that of the above two studies. My approach differs from the approach of others in several ways.

- Firstly, my project aims to look at multiple parameters contributing to the creation of smart villages and not just communications technology (or any technology for that matter). It considers education, employment and health, together with several other parameters mentioned above. I have considered these parameters taken collectively to be fundamental in building a smart village.
- Secondly, the innovative communication project was a meta-analysis of data that had already been collected for other purposes and it ended with their analysis and conclusions. On the other hand, my innovative process is meant to engage the communities that it affects in interpreting and potentially actioning the knowledge thus gained. The collective effort is envisaged to result in the development of a scalable model for implementation. Respondents in my research, unlike the telecom study, will play a role beyond data collection. They will be active participants in the future development of the village, and its transformation into a smart village.
- Thirdly, the study of sampled villages in two states of India. This project will sample villages more broadly. These sample villages will be the implementation centres, which would then influence other villages through networking and learning. In terms of initial geography, I am targeting selected villages in India, Kenya and Japan.
- Fourthly, the telecom study addresses sustainability but not scalability, while my focus is on scalable sustainable development.

My approach is also concerned with multiple parameters of community well-being and development and not just conservation agriculture. The project work will rely on data directly collected from villages and not secondary data sources. I plan to sample several different geographies. I am interested in both sustainability as well as scalability. The innovative process in this work is more akin to the agriculture study than the telecommunications study. In that, it is not limited to conducting research and involves developing a collaborative approach. Moreover, unlike both the telecommunications study and the agriculture study, I do not begin with an a priori concept of the direction that development ought to take, whether it is widespread deployment of telecommunications capacity or implementation of conservation agriculture. My process is the foundational part of a larger initiative of developing a scalable architecture of smart villages. The proposed outcomes of the Innovative Phase are-

1. Analysing the data that has been collected by the community.
2. Present this analysis to the village communities who provided the data, to create ownership of the process.
3. Creating a mirror for the communities to see their aspirations, assets and areas of Improvement.
4. Building a baseline for measuring potential future progress of the village towards becoming a smart village.

The process, therefore, will be more holistic and will require the research itself to be more detailed and conducted in multiple stages. It is about discovering how to build smart villages in partnership with those who are most affected by such transformation, namely the villagers themselves. Such a partnership

requires that the village and its population want such a transformation. In keeping with this goal, I propose that the survey be conducted by village representatives themselves, and not by an external team of researchers. Unlike the telecommunication study, where a representative sample of only rural youth was surveyed, my research process involves the entire village community. This project is not trying to identify a catalytic factor, but laying the foundation for an endogenous process of development, in other words, a process that is guided by the community itself.

Conclusions

The Smart Villages project is an interdisciplinary endeavour to address global poverty through a model that has a catalytic impact and is sustainable. The objective is to design a scalable smart architecture through which villages, whether remote or peri-urban, can break the cycle of poverty. In my view, one of the attributes of a smart village is the sentiment that it has achieved its potential. The Discovery phase of the development of scalable smart architecture uniquely creates a database that can be mined for modelling through an endogenous process. Innovation enables our learning at the grassroots level about the range of issues faced by rural communities, their diverse aspirations and strengths, the variety of paths to achieving their potential and relationships among relevant stakeholders. Most importantly, it enables me to gauge community capacity, endogenous receptivity and initiative. I feel that these factors are critical in determining whether a village will move towards a 'smart' village. Innovative thinking also provides an opportunity for the village communities to learn about themselves, map their assets, and create an environment of ownership to become 'smart'. The process of innovation has started in India, and my experience has helped me to abstract the process to some extent. The plan is to continue to test and refine this model by applying it to other geographies. As learning and exploration continue in this phase, information will be generated to help design the scalable smart architecture. The data collected from a sample of villages will also provide a baseline to monitor the impact of the model when it is implemented.

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