

Design and Development of Solar IT Kiosk for Remote Area Development in Arid Regions of Bihar, India

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Abstract: Development is a multidimensional process including economic and intellectual activity. The later should be satisfactory to most of the people at that time and in their social and cultural set up. Development of arid areas and deserts therefore, must be supplemented by education, health and opportunity to influence the government policies as well as participate in globalization process. Information technology and its development in arid areas are very important to nurture multidimensional development goals with individualism. It integrates the rural areas with the global family and provides opportunity to improve skills, education and health. The Indian telecom revolution in the last decade has provided much needed input to arid area development in terms of penetration of telecom technologies. However, the growth rate of internet in arid areas is still lagging due to several reasons, from skill development, operation and maintenance to reliable sources of power. In this conceptual paper, the role of IT in development of arid areas of Bihar is presented. It is envisaged that solar energy operated IT kiosks can be used to replace the older STD telephone booths and creation of library in local language on the basis of local requirement for information dissemination.

Key Words: Arid area, Development, Solar energy, IT kiosk

1. Introduction

Development is 'a transformation of society, a movement from traditional relations, traditional ways of thinking, traditional methods of production, to more modern ways'. It should be viewed as a multi-dimensional process involving major changes in social structures, popular attitudes and a condition of life from unsatisfactory to satisfactory. Alternatively, it can be considered as an improvement of people's lifestyles through improved education, incomes, skills development and employment i.e., multi-dimensional development. It should be sustainable also. Sustainable development may be defined as "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs". The definition explains how communication and ICTs impact on development. ICTs influence this change through information-transfer. ICTs, with their huge capacities to produce, transmit and store information within countries and across national borders, also have the capacity to allow people and organizations to share this wealth of knowledge in the pursuance of development goals.

In any developing region, one of the prime ingredients of development is information. Furthermore, how that

information is disseminated between people is also crucial. One of the most important preconditions for the full and comprehensive implementation of sustainable development is the need for a sustainable information society (Servaes and O'Regan, 2005; Servaes, 2003). ICTs, therefore, make it possible for those people who have access to this technology, to share information to create a sustainable information society. To this end, arid areas must establish, develop or upgrade their information and communications infrastructure for the important linkages and relationship with the concept of sustainable development. ICTs provide a platform for 'information-sharing' and 'information-storage' towards this sustainable development. Information is disseminated for various purposes; information about new fertilizers, agriculture, land development, public health, education, Govt. policy, new developments in similar regions and so on. The process of education is basically related to information dissemination and ICTs, because information educates (or information is education), and ICTs disseminate education or information. It can assist in the development of communications and information infrastructures of Low Income Regions (LIR) providing choices for them. ICTs are part of the information society infrastructure in developing nations, which LIRs should develop in their own regions towards their own economic development.

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For those economies that are unable to adapt to the new technological systems, their retardation becomes more pronounced. Regions devoid of IT, do not manufacture and share enough information for their own development. Furthermore, the ability to move into the Information Age depends on the capacity of the whole society to be educated, and to be able to assimilate and process information. And it relates, as well, to the overall process of cultural development, including the level of functional literacy, the localization of content of the media (instead of the globalization of the media content), and the diffusion of information within the population as a whole.

There is a direct correlation between access to telecommunications and socio-economic development. The former is no longer the consequence of development, rather it is a necessary precondition for development. This view is shared by various other experts, including Nulens and Van Audenhove (1999).

2. IT and Development in Arid Areas of Bihar

Bihar province is situated in middle of Upper India India, sharing boundary with Nepal in the north. It can be divided into predominantly two parts, North of and South of Ganges river. Areas, south of the Ganges river, has serious ground water problem and is dominated by barren mountains. Most of the area can be broadly termed as arid and semi-arid with low productivity and few developmental activities. It is one of the major reasons of poor people being lured to extremism and rebellion.

The unprivileged citizen in these arid rural areas need to be educated and provided with skills and knowledge that open up new possibilities leading to improvement of quality of life. Nonetheless, the state of IT enabled services in these areas of Bihar is in no way compares with that in urban areas. The striking disparities are also depicted in IT education. This has created a serious "digital divide" between those who have access to ICTs and those who have not. In order to close information gap, cost-effective, efficient and viable computer systems should be used in the arid rural areas. Thus, by focusing IT enabled services supplemented by decentralized energy sources in non-electrified rural areas, isolated and marginalized youth can be included in information revolution. Given the predominantly poor rural society in the region, the level of awareness of the rural people has a paramount impact on their poverty reduction. Equal access to information can ensure significant progress in poverty alleviation initiatives as experiments in hilly terrains of Nepal shows (Shrestha *et al.*, 2004; Anand *et al.*, 2004).

The information technology sector holds new opportunities,

especially provided by globalization, which is a process to increase contacts between people across the national boundaries - in economy, in technology and in culture. ICT related industries in India are fastest growing segment offering huge opportunities in the form of increased investment and employment. It is, therefore, essential to ensure people's accessibility to knowledge-based services. Each individual may not benefit directly from the use of information and communications services. It is rather, through information disseminated by community leaders and key information providers such as elders, health care workers, teachers, and community development specialists, that the impact of SRDC information will benefit the population of entire societies.

3. Solar Based Rural Digital Centre (SRDC)

In the Information Age, the "Digital Library" concept is emerging as a model for information retrieval and storage, knowledge acquisition and management, and communications for rural development. The Proposed "Solar based Rural Digital Centre (SRDC)" can be viewed as a rural multipurpose 'IT Kiosk' providing the capacity to transform individuals and communities, and to alleviate poverty to some extent. It would be a response to the challenge and the promise of ICT for rural development - a cornerstone of social development in the Information Age with the mission to empower rural communities with the requisite technology infrastructure, financial capacity, and human resources to manage the transition to the information culture through a locally determined process. It is likely to develop as the heart of socio-cultural structure in the rural area.

The principal technical goal of the Solar based Rural Digital Centre is to develop web-based resource network consisting of at least one electronic Centre with access to internet to educate the isolated rural people so that the global knowledge network can bring vast benefits to them. It is the vision of the SRDC to empower local people through local self-determination and to benefit from access to global information. Like friendly mobile technology, it should be cheap and friendly to be accepted by rural population.

The choice and use of a particular ICT for information access will naturally dependent on its effectiveness in reaching the rural people. Undoubtedly, literacy and education in capacity building of the rural communities will not only make people able to access information, but also empower them to enlarge their choices and opportunities to improve their income levels and reduce social deprivation. SRDC could play a catalytic role in developing rural areas that include,

(a) Capacity building and training - Building human capacity begins with basic education and literacy. Citizens must

have the underlying skills to use the technology effectively. Building human capacity can help break the cycle of poverty and deprivation. Well-trained teachers in IT field having knowledge necessary to train their students would make easier to disseminate IT education and skills training to a broader segment of the population.

- (b) Creating employment - By creating employment opportunities in the rural areas by inception of computer literacy training, software development and tele-centers, information and communication technologies could help bridging the gap between urban and rural communities and reduce the rural-urban migration problem. Moreover, by providing training on computers, those trained may become small-scale entrepreneurs.
- (c) Targeting marginalized groups - Most rural poor people lack the power to access information. ICTs could benefit all stakeholders including the civil society, in particular youth and women. Other disadvantaged groups that could be targeted include the disabled and subsistence farmers.
- (d) Empowering rural communities - ICTs can empower rural communities that permit them to contribute to the development process. With ICTs, rural communities can acquire the capacity to improve their living conditions and become motivated through training and dialogue with others to a level where they make decisions for their own development. ICTs have the potential to penetrate under-serviced areas and enhance education through distance learning, facilitate development of relevant local content and faster delivery of information on technical assistance and basic human needs such as education, agriculture, and health.

4. Challenges in Use of ICT

There are several challenges in use and diffusion of ICTs for rural development in India, the major ones are,

- (i) Electricity: In rural Bihar, the electricity supply is limited to approximately 20% of the total population. One of the best means of access to electricity in the unconnected remote areas is the use of solar Photo Voltaic system.
- (ii) Local content and language barrier: Information available through ICTs is mostly in English, which the majority of rural communities cannot understand. There is a marked shortage of relevant material in local languages that respond to their needs. Hindi based operating systems must be developed - the sooner the better.

5. Outcome of the Knowledge-Based Services

Information is delivered thorough intranet (web or email

access) as the web-based information generation is easy and inexpensive. Rural communities being dependent on agriculture are very much interested in the information which could improve agriculture. Therefore, horticulture, livestock, vegetables and cash crops as well as their markets, inputs, credits related information will be of interest to them. The information related to health and education, particularly in case of sudden outbreak of any disease will be quite useful.

Use of Internet technology requires intermediary to operate and brokerage the information to the rural people due to low level of literacy. This intermediary will need to be trained and will have to have very good aptitude for brokering information to the rural community. For this, as far as practicable trainees from local areas with aptitude and interest in rural development should be selected for training. In the case of new technologies being targeted for transfer, it may be possible to get the local community leaders trained to do this. School children could also work as intermediary between parents and information accessing media. The effectiveness of field staff of service delivery organizations in technology transfer to the rural poor is going to be enhanced with availability of information through ICTs.

The following seven knowledge-based services have been identified to deliver contents to rural communities:

- Governance Information System: The development of Governance Information System shall be a response of our constitution stating that every citizen has right to information. It would bring transparency to local as well as regional government operations and the government-public interface and improve efficiency and effectiveness of government's service delivery.
- Agriculture Information System: The development of the Agriculture Information System in the agriculture sector would contribute to expanding markets for agriculture products; increase in sale of agri-products to the rural population; provide increased market access for the rural population eventually leading to increased income for the rural population.
- Distance learning: The development of distance learning program using ICT improves the quality of education and increases access to education. These programs will be focused especially for unprivileged groups such as unemployed, females and elders.
- Tele-Medicine: The development of ICT application such as Tele-medicine could lead to the improvement of quality of health-care services available to the rural population and increase their access to health care facilities.
- Productive Economic Activity: Proper mechanism such as networking for the expansion of the market will lead to vitalization of the local industries leading to increased sales

of products, increased market activities and increased income for the micro-entrepreneurs. The development of Productive Economic Activity could be one of the areas which, if properly expanded, could contribute to rural poverty reduction.

- Energy and Environment: The knowledge-based service in the area of energy, environment and natural resource management would contribute to expanding markets for environment-friendly products; lead to improvement in indoor air quality in the rural areas; increase awareness in the use of alternative resources and environment conservation; improve understanding of the value of natural resources and the environment; and increase use of natural resources in a sustainable manner.
- Natural Disaster: ICT application for disaster management can provided rural communities with increased information about disaster prone areas and improves delivery of emergency services.

6. Methodology

Initially ten ‘Gram Panchayats (GP)’ in each district will be selected as target area on the basis of its distance from the nearest towns. More remote areas should be preferred. GPs with a school building may be preferred initially, where SRDC can be installed. Two persons from these GPs will be selected for training and use of these ICTs. Once trained, SRDCs will be installed with their help under supervision of experts.

It would be possible to implement the whole program within one year that would include three months training of SRDC worker, procurement of devices and installation. A cost benefit analysis of the system indicate that, over all cost is likely to be 7000 USD, which includes laptop, printer, PV based power supply, mobile phone and internet charges. One person can be employed at the site with monetary support of 200 USD per month, which can be generated from the system itself by charging very small amount from the users.

For example, if one person visits a nearby town to take a train ticket or fill up a form. It makes him loose one day salary and cost of traveling besides other indirect costs to the tune of 10 USD. He would be glad to pay one USD for the same service at the village.

7. Rural Health Policy Evaluation: A Case Study

A case study of rural health assessment was undertaken in remote rural areas of Darbhanga District in Bihar through block health care centers. In the first phase, it took three years to record nearly 100 parameters of female health issues. **Table 1**

Table 1. Rural Health Parameters of Darbhanga District (Bihar).

Description	(2010)	(2003-7)
	(%)	(%)
Girl's marry ing before completing 18 year	41.3	59.8
Female giving births of 3 and more childdren	51.8	57.8
Family planning (all Methods)	30.4	27.7
Mothers with at least 3 Anti-natal care videts during the last pregnancy	28.1	10.4
Mothers who got at least one TT injection during pregnancy	71	22.1
Children (12-23 months) fully immunized (BCG, DPT, Polio and Measles)	40.4	17.5

shows some of the important parameters recorded during 2004-2007. Priority sectors were accordingly defined to improve health care. It took just a few weeks in 2010 to collect data to assess these parameters again using Information technology. The data immediately highlighted its success and problems. These data are being used by policy makers for assessment and modification in existing health care policies and planning. Several health care units are now using generators to feed and transmit data instantly. Solar IT kiosks can provide such services from panchayat level rather block level, which is the lowest unit and provides more authenticity to data for policy formulation.

8. Conclusion

SRDC IT kiosks can also be used for much needed developmental efforts in rural arid areas. This is very important from various Govt. data collection for,

- (a) Sectoral information for priority areas such as rural health policy
- (b) Priority projection of integration
- (c) GIS and demographic application
- (d) poverty eradication program data
- (e) Surveys and consensus
- (f) land registration and land health, etc.

Several of these data collection methodology being adopted are full of flaws and do not necessarily depict the realities on the ground. The methodology proposed has double advantage - development of the rural area and improvement in inputs for the policy makers and planners.

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