

Information Technology—A Tool for Rural Community Development

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“Idea of Community project is something which is basically revolutionary, if it works well..... We have not given enough attention to such rural areas in the past and unless we bring them up to a certain level we shall always be weighed down by them.

— Pandit Jawaharlal Nehru

1. INTRODUCTION

Rural community development is the process of allocating for resources in to rural areas so as to optimally utilise the existing local resources and raise standard of living of rural folk. There are various kinds of resources which could be provided to achieve this objective. Most of these inputs are being applied, in some form or the other, in most of the rural areas and yet the problem of time and space continues to block the pace of development. These inputs that are guided by sectoral approaches, do not synchronise with each other, and thus do not deliver the compound benefit to rural people.

Information technology (IT) could be an enabler which could synchronise the investment made so far and trigger the multiplier effect in the areas of rural community development.

2. IT DEVELOPMENTS

We are living through a historic period of technological change. This was brought about by the development and widening application of information and communication technologies. These technologies are different from and faster than, anything one has seen before. They have a huge potential for opportunity creation, higher standards of living and better services.

IT is already an integral part of our daily life. It is providing useful tools and services at our homes and offices. The production of goods as well as services is becoming more and more information-based. IT is creating a society based on information.

Let us look at some of the developments in IT. Hardware-wise, the systems have become faster and compact in size. The processing has doubled every eighteen months. For the first time, standard hardware combined with standard software created economies of scale that make powerful computing solutions available at affordable prices.

The software technology has also made tremendous progress, from machine-dependent languages to almost machine-independent languages. Over the last few years, we have seen PCs offering not only more processing power at less cost but also many choices. The fastest system of the future will offer in addition to the high performance, more realistic 3-D graphics, flawless video and image processing.

The network computers (NC) would become a part of the day-to-day life. Though some of these systems will look like today's laptop, some will be hidden in devices, such as telephone, television, refrigerator, etc. An NC will have compliance to standards, low cost and

easy administration. Over the next few years, the NC will also have options for some class of users for data entry, form processing etc. However, PCs will still be the choice for processor-hungry applications, like 3-D graphic and video. The next generation of home television may have built-in network computer to provide video mail, video conferencing and other allied activities. The television will take the shape of NC. Some of the organisations have already developed set top devices to facilitate Internet access and e-mail through TV.

Merging of television with PC will need some compromises both in technology and standards. In a few years time, a set top computing could be powerful enough to replace some of the existing PCs. This will result in aligning of forces from multiple industries in digital broadcasting, media computing and video games. At the centre of TV-PC convergence, we expect a lot of multimedia developments are expected. These will be based on the broadcasting standard and optimum utilisation of bandwidth. The new chip design for multimedia process may adopt HDTV technology at the cost of pentium chips. Undoubtedly, the web standard will prevail to enrich the existing broadcasting environment.

The need for wireless communication and handwriting recognition will grow along with the mobile computer systems. The hand-held devices we may be carrying around the turn of the century, may look like ones we carry every day in our pocket or briefcase. However, they would not act the same. Regardless of the operating system, they would use less power, cost less and would have more features, including connection to computer. Towards this, the companies are working on integrated chips. Some companies already have the technology that integrate data and voice. Using this capability, the PCs of the future can be used for talking as well as for processing. Reliable handwriting recognition is necessary to make the hand-held computing device a really user-friendly system. But this technology may take a little longer than the wireless. Optical read only memory (ROM) could also boost the storage capacity of the hand-held device. The PCs that run businesses today will soon run the

homes, controlling security, lighting, and energy from central locations. When the cellular service will migrate to new digital standard that allows data to be transferred at 48 kbps, the situation will improve. There will be tremendous opportunities available in the next millennium to improve ones standard of living and also make the world a knowledge-based society.

3. RURAL COMMUNITIES

One of the notable features of rural communities is the closeness of their settlement location to the nature. Though It has some advantages, it also brings quite a few problems. The inter-village distance, over-dependence on natural cycles, lack of employment opportunities beyond primary sector and illiteracy etc. act as a trap of incessant poverty to individuals.

On the systematic analyses of the aforesaid problems faced by rural communities, one observes that these problems center around the issue of marginality from the main stream, resulting in inaccessibility to the information.

There are numerous examples and case studies available, establishing that good transport and communication systems are a prerequisite to initiate the development process in a given region. There are cases where mere introduction of telephone network in the rural areas has changed the rural economy scenario effectively.

3.1 The Strategy

A pro-active strategy is essential for enabling the rural communities to face the unprecedented challenges brought about by the fast changing global economy, environmental degradation and demographic scenario. Transparency and access to relevant IT opens up a variety of channels of communication that are not restricted by time, space, languages and cultures. This accessibility would in turn create a chain sequence of actions for faster development. It highlights the importance of bridging the gap between cultivators, agriculture producers, developmental agencies, scientists and the consumers

through initiation of interaction and dialogue. It facilitates the bottom-up articulation and sharing of the information on needs and the gaps.

Active participation of the all concerned agencies and the rural population would enable to pass on the benefits directly to whom these are intended. In this process, there would be an increasing efficiency of the developmental resources, less duplication of activities, and reduced cost of communication and coordination among the developing agencies. It should be noted that IT is an enabling technology. It is the people who have to realise the need for working together to make the most of the decentralised and accessible IT tools.

By improving the communication between government agencies, non-governmental organisations, private sector entities and educational institutions, enormous benefits could be drawn by sharing information in the areas of cultivation, forestry, health, nutrition education, etc. IT facilitates sharing experiences in a more transparent manner through lessons learned and by observing the best practices which were evolved over time for successful development by various communities. In addition to the vertical information exchange the system will also enable horizontal information exchange, between agencies involved in the development of a particular locality or community. This mesh of vertical and horizontal communication for rural development would greatly benefit the rural communities to choose and implement relevant technologies in agriculture production, health, nutrition and other social welfare programmes.

Today's technology offers tools to overcome the language barrier. The rural community can create their own discussion group and web sites to communicate their problems and progresses to seek guidance and assistance from national and international agencies through the Internet. This will facilitate faster progress.

To attain sustainability and success, IT applications should focus on the needs of the local community and for the requirement of the rural community. It requires an approach that catalyses local participation, support information and communication needs

assessment, and create awareness among the potential users, help build communities of users and local management. Simultaneously, one needs to develop and strengthen intermediators and agencies that serve rural community so that it can make the most appropriate use of Internet tools.

The extension of IT to communities at village level will stir and strengthen rural economy. The exposure to Internet and the delivery of information, at village level, would create several opportunities and also check the labour migration to urban areas. The IT potentials are unlimited.

4. TELEKIOSK

The concept of telekiosk could be an affordable solution for extending IT revolution to rural areas. This infrastructure could lead to a more aware, well-equipped, economically vibrant, and transformed rural society.

This typically consists of a personal computer, printer/scanner, modem, telephone and an assistant. The objective of these telekiosks is to provide the basic information services to the communities in the villages and also provide means of communication with the rest of the world. These kiosks could play an important role in facilitating the socio-economic development in the villages.

The importance of Telekiosk lies in the fact that the local people would initially gain experience and benefit by the use of this technology, and subsequently graduate to having their own facility. This demand stimulation can act as a mean of bringing about general provision of higher quality computer communications. These kiosks also facilitate in reducing several disadvantages that the rural communities may have, with regard to telecommunication and IT. By sharing the equipment and the infrastructure, the cost can be reduced drastically thus making it viable for the villagers to use it. Otherwise, it would be prohibitantly expensive and not cost-effective for the villagers to invest in these infrastructure. These kiosks will also provide opportunity for the villagers to acquire skills in using the technology so that they can perform the task with the knowledge available in the

communities. It would also facilitate in improving their skills through interactions with diverse skills and knowledge available elsewhere through this network. These telekiosks could be easily created in most of the rural areas/villages with a small investment.

Today, most of the villages have access to a post office which is manned by the postal department. These post offices have the basic infrastructure wrt space, power, etc. By converting these postal infrastructure into telekiosk, one could provide an integrated information service to the villagers. Some of the services that could be provided by this telekiosk are:

- Sharing of computer and communication resources
- e-mail/communication
- Information access
- Interaction with Government bodies
- Formal and informal training
- Business support services.

5. WIRED VILLAGE—A PILOT PROJECT

Having recognised the importance of IT for socio-economic development, IT Task Force set up by the Prime Minister has recommended cooperative implementation through the use of state-of-the-art IT. This is the genesis of wired-village project.

The primary objective of this project was to demonstrate the effective contribution of IT infrastructure in the accelerated socio-economic development of a cluster of 70 contiguous villages around Warana Nagar in the Kolhapur and Sangli districts of Maharashtra.

The project aims to:

- Utilise IT to increase the efficiency/productivity of the existing cooperative enterprise by setting up a state-of-the-art computer communication network and the latest database technology.
- Provide agricultural, medical and educational information to villagers at facilitation booths in their own villages.

- Provide communication facilities at these booths, linking them to the Warana Cooperative Complex.
- Bring the world knowledge at the doorstep of the villagers through Internet via NICNET.
- Create a database of villagers on various socio-economic aspects.
- Provide tele-education to both primary and higher educational institutes by developing IT centres.
- Establish a geographic information system of the surrounding 70 villages leading to greater transparency in administration, especially in the matters related to land.

5.1 The Project Partners

The Warana project is jointly carried out by the National Informatics Centre (on behalf of the Central Government), the Government of Maharashtra and the Warana Vibhag Shikshan Mandal, to create an appropriate IT infrastructure for the 70 villages around Warana Nagar.

The estimated cost of the project is around Rs 250 lakh. Out of the total project cost, 50 per cent is being borne by the Central Government, 40 per cent by the Government of Maharashtra and the remaining 10 per cent by the Warana Vibhag Shikshan Mandal. The project was to be implemented by December 1998.

5.2 Wired Warana—the Infrastructure

With a view to provide complete connectivity to 70 villages in the Warana region, a three-tier structure has been implemented. The Sugar Administrative Building and the Engineering College form the main hub centres, the first tier. The six Business Centres and six IT Centres form the second tier and 70 Facilitation Booths form the third tier and take the connectivity down to the village level.

5.3 Hub Centres

The Sugar Administrative Building (SAB), being the backbone of the business, has been chosen as the hub for the Business Centres. The Facilitation Booths could access the SAB and the Business Centres through dial-up network.

To provide a stable, rugged and reliable network, a high speed wireless LAN is provided at the Business Centres. The roof top of SAB has been chosen for the installation of both the VSAT and the mast for omnidirectional antenna of the wireless LAN. A high speed IPA VSAT is installed on the roof top which is connected to a hub for Internet access. A mast of approx. 30 feet is constructed on the roof top of the building for installation of an omnidirectional antenna for a wireless LAN with a bandwidth of 2 Mbps. The radio modem of the wireless LAN is connected to the hub. The wireless LAN technology has been used to provide reliable Intranet/Internet connectivity to the Business Centres.

All existing machines are integrated in a LAN environment with two additional NT servers and four Win-95 clients. A proxy server is also installed which acts as a firewall.

The Engineering College is chosen as the hub for the intranet of all village booths. A high speed IPA VSAT is installed on the roof top of the college building which is connected to a hub. The Warana web-server is installed at the college. It hosts the web-based applications. A bank of 10 dial-up lines with modems is interfaced through a router to provide SLIP/PPP connectivity. All existing machines are integrated in the LAN environment, and a proxy server is installed which acts as a firewall to the Internet. The same server also functions as an e-mail server. The e-mail accounts are created in this server, for all users at the Facilitation Booths, IT centres and Business Centres.

The Business Centres access the wireless LAN via a unidirectional antenna installed on the roof top of each of the centres. A wireless LAN is set up at the centres which can communicate with the central VSAT installed on the SAB. The bank is also connected to the networks through a unidirectional antenna located on the roof top of the main branch.

The Business Centres sites covered are:

- ☆ Dairy
- ☆ Warana bazaar
- ☆ WAGPCOS
- ☆ Mahatma Gandhi Hospital

☆ Warana Cooperative Bank

Six villages have been identified for setting up IT centres. These villages are nearly 10 km from Warana Nagar. The idea is to provide IT facilities as close to the villages as possible. The computers are set up in a room of 20'x 20'.

At each Centre, six clients are installed in a LAN environment using structured cabling, with a receive-only VSAT (DirecPC) and a dial-up link. Eudora e-mail client is configured for SMTP mail service. The operating system on the computers is Windows-95. An HTML browser is installed for accessing web-server. Currently, the following villages have been identified for setting up IT centers:

- ☆ Mangale (West)
- ☆ Pargaon (South)
- ☆ Dhole (East)
- ☆ Nagaon (North)
- ☆ Satwe
- ☆ Kodoli

The Centres provide the following facilities:

- ⊕ Tele-education
- ⊕ Computer-based education.
- ⊕ Open University access (IGNOU)
- ⊕ Imaging (one of the centre)

Facilitation Booths are being set up in 70 villages (more than 30 booths are currently operational). They have dial-up facility for linking to the central hub located at SAB. Facilities such as remote health service (tele-medicine), public grievances and redressal will be provided through this booth. Each booth has a Win-95 multimedia computer equipped with a modem (33.6 kbps) for a dial-up link. It is configured for SLIP/PPP. The computer has multimedia facility, a hand-held scanner, a bar-code reader and a 132 column printer. An HTML browser is installed for web-access. Eudora e-mail client is configured for SMTP mail service.

The intranet set up in Warana Nagar forms a close user group over NICNET.

5.4 Software Applications

An MoU was signed between NIC, GOM and WVSM on 10 June 1998 to operationalise the network and have the applications in place within six months. NIC immediately started interaction with Warana users. From the requirement analysis carried out by the NIC team, 15 applications were identified for implementation. These can be grouped into web-based and network-based client/server applications.

5.4.1 Web-Based Applications

These six applications can be accessed by the villagers from the Facilitation Booths. They provide information about employment and agricultural schemes, government procedures information providing assistance in preparing applications for government certificates like ration cards, birth and death certificates, crop information, village information consisting of bus, railway, medical and hospital facilities, water supply details, etc. From the booth, the villager can interact with the Warana management to register his/her grievance and seek redressal. Agricultural marketing information is available from the Warana web-server, giving market arrival and rates of various regulated commodities on a daily basis. It is possible for students to seek vocational guidance from the booths by accessing educational and vocational information compiled by MSCERT. The URL of Warana web-server is <http://warana.mah.nic.in/warana>.

5.4.2 Other Applications

The sugar factory is the first and the largest cooperative business venture of the Warana Complex.

5.4.3 Cultivation, Cutting, Testing Transport Activities

These activities entail information exchange between the factory and the farmers, which are highly manpower-intensive. The wired management of sugarcane cultivation developed by NIC leads to a speedy, accurate and effective data exchange between the factory and the farmers, using the Facilitation Booth at the village.

The land records computerisation permits the villagers to view, print 7/12 extracts using data from compact disc, or from the tehsil site, right at their village booth. The super user can compile, update and process data at the tehsil site.

The dairy sector is the mainstay of the Warana Complex. The computerisation of the dairy activities will permit milk collection and analysed data to be made available to the villagers at the booth as soon as it is generated.

The Warana Bazaar (Warana Grahak Mandal) is a cooperative with the largest departmental store in Warana with an annual turnover of 31 crore. It has an inventory of 40,000 items. The Bazaar has 29 retail outlets catering to a large number of villages around Warana Nagar. The maintenance of the inventory is a major activity. A computerised inventory system with a bar-code-based item code is being developed for the Bazaar.

A geographical information system (GIS) is put in place for the Warana project. It includes making a base map of the neighbouring 70 villages, layering of socio-economic information like schools, population, land under cultivation etc. and linking cadastral maps and 7/12 extracts in Marathi to GIS.

The IT centres have been set up with a view to provide computer-based education facilities to the village children. AUTNIC, a computer-based self-learning and testing aid is provided at the IT centres to support the course curriculum of the school children. The Warana Vibhag Shikshan Mandal plans to prepare a multiple-choice question bank for all school grades for each subject using AUTNIC. This question bank will help the students in gaining a deeper insight into their courseware with a better understanding of the concepts covered.

5.5 Implementation

To comply with the time schedule of six months to establish the network, NIC had deployed professionals round-the-clock. Twenty engineers were put in over a full man-month, each in Warana, over an elapsed time of five months, to make the sites at the business and IT centres and the village facilitation booths operational and put the network in place.

The software professionals had been in action in parallel. Over 50 software professionals were involved full-time, in application development since June 1998. Each team handling an application had been constantly in dialogue with their Warana counterparts, visiting the Warana site, discussing and finalising the specifications, the implementation strategy and delivering, as per the approved strategy signed and agreed upon by the user, at Warana/GOM representative. Detailed discussions had been undertaken with the users. On the basis of the specifications drawn up, prototypes of the applications were built, demonstrated at the user site and then further modified. All the applications had been installed at Warana, only after approval and acceptance of the users.

The software developed for Warana is the single largest set of applications developed in the client-server/Web-based environment in Marathi. The software was delivered complete with detailed operational manuals in Marathi for the use of the local Warana users.

5.6 Human Resource Development

Extensive training on the applications and the administration of the network has been imparted to the Warana users on site as well as at Pune. Selected teaching staff members from engineering college were trained on managing the network.

The training imparted was sought to create an awareness in the villagers regarding the utility and benefits of the state-of-art equipment made available at Warana. It had also provided the required skill levels to the operators to handle the machines and to assist the villagers. The operating level staff at the hub centres had been given sufficient training, on site as well as at NIC, to confidently manage the network set up at Warana.

This project has proved immensely helpful in generating employment opportunities for the local population. The Facilitation Booths in each of the 70 villages would employ an operator each. Also, the five Business Centres would have two qualified computer experts each to manage Web, e-mail administration, Windows-NT administration and database administration. Apart from this, each of the six IT centres would be providing employment to two skilled computer operators.

Fifteen operators have already been recruited for the IT centres and village booths to assist the users in using e-mail, data transfer and the other applications loaded.

The Warana project is the forerunner to many such rural development projects envisaged by the IT Task Force. It would enable the villagers to benefit through the access to global knowledge sources. The applications installed and further planned are expected to provide transparency in administration.

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