EXPANDING THE VILLAGE KNOWLEDGE CENTRES IN PONDICHERRY

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INTRODUCTION

Brief History

Often funding agencies and donor governments face the question as to whether they should support the integration of information and communication technologies (ICTs) in their development projects. Should the money be invested in computers and communication equipment or will it be better spent on food, shelter, health, and education? The choice need not be "either/or". If used intelligently and innovatively, ICTs can form an integral component of development projects as demonstrated by the award-winning Information Village Project of the M. S. Swaminathan Research Foundation (MSSRF).

The project was developed in January 1998 by the MSSRF as part of its programme for taking the benefits of emerging and frontier technologies to the rural poor. M. S. Swaminathan, the architect of India's "green revolution," is a geneticist by training and an accomplished agricultural researcher. He was aware of the tremendous potential of biotechnology and genetic engineering. In the past few decades, information technology (IT) has emerged as a great force and has changed the way people live and work in the developed countries. Swaminathan hypothesised that if new ICTs could benefit rich countries, why should they not be harnessed to help poor countries. He convened an international, interdisciplinary dialogue in 1992 with participants concluding that ICTs could have a major role in promoting sustainable agriculture and rural development in the developing world. However, mere technology alone would not do the trick. Wisdom to use the technologies intelligently and innovatively would be essential. The technologies of the industrial revolution have only exacerbated the divide between the rich and the poor. Swaminathan fully realized that all technologies have this weakness. He was looking for ways to harness the benefits of new ICTs while at the same time, preventing them from further exacerbating existing divides. This is a task meant for only a few people and Swaminathan is surely one of the select few.

In order to benefit farming families, the generic information found in the networks, including the Internet, should be locale-specific knowledge that rural women and men can utilize and act upon. This was the model adopted for implementation of this project. Swaminathan has often commented, "... whatever a poor family can gain benefit from, the rich can also gain benefit; the reverse does not happen." Thus, involvement of the poorest of the poor in rural areas (over 300 million in South Asia) in managing the use of ICTs was considered essential for the success of this project.

The project, which started in 1998 in Pondicherry, Tamil Nadu, was chosen because it had certain initial advantages, such as an accessible government and reasonable telecommunication infrastructure (an urban teledensity of approximately twenty). The level of poverty is high in the rural areas, where 21 per cent of families have less than US$1 per day as family income. The biovillages project, an earlier programme of the Foundation for Community Asset Building based on biological technologies was fully operational in this region. The ICTs project was expected to complement this programme, and derive benefits from the linkages.

This project is supported by the International Development Research Centre (IDRC) and the Canadian International Development Agency (CIDA). For electronic knowledge delivery to the poor, ten villages were connected by a hybrid wired and wireless network, consisting of personal computers (PCs), telephones, very high frequency (VHF) duplex radio devices, and email connectivity through dial-up telephone lines that facilitate both voice and data transfer. This has enabled villagers to obtain the information they need and use this information to make improvements. The bottom-up exercise involves local volunteers who gather the information, feed it into an intranet, and provide access through nodes in different villages. Value addition to raw information, use of the local language (Tamil), multimedia (to facilitate illiterate users), and participation by local people from the outset are noteworthy features of the project. Most of the operators and volunteers providing primary information are women, thus giving them status and influence. All centres evolved to meet the increasing information demands made by the community.

This project has won two major international awards, viz., Motorola Gold Award 1999 and Stockholm Challenge Award 2001 under the "Global Village" category. The knowledge centres are situated in *panchayat* buildings, temples, a midday meal programme centre, and a private house.

IMPACTS ON POVERTY ALLEVIATION

Income Poverty

The Village Knowledge Centre (KC) Programme is having a positive impact on communities in terms of promoting development, social change, cultural values, solidarity, political awareness, community organization, and participation. We are currently working in ten villages. In September 2002, three more fishing villages were added. Although we lack economic data, there are several success stories recorded by journalists and scholars.

Creation and updating of relevant content to suit local needs is a key factor in the programme. Prior to commencing content-building activity, extensive consultations

were held with participating village communities through small group meetings. It emerged that the provision of dynamic information on prices and availability of inputs for cultivation such as seeds, fertilizer, or pesticides was important to every farmer. Knowledge of grain sale prices in various markets in and around Pondicherry is critical to farmers during the harvest season. This information helps farmers market their produce more profitably.

In 2001-2002, we are conducting a survey of both users and nonusers in five villages. This is an ongoing process, which is yielding very interesting results. People derive economic benefits from employment news, crops, fish market details, and computer training. They also value information on loans, and news on government entitlements, and dairy farming. Real estate agents and small merchants finalize trading deals through wireless telephones. Weather and wave height, education details, daily news, recipes, notice board announcements, important phone numbers, transportation, power outage details, and public address system announcements benefit in intangible ways. Women are very interested in health information, recipes, and names for newborn babies based on astrology. Computer training for women and children in the local village ensures safety (not necessary to travel to distant towns), and saves time and money.

Incense manufacture. A group of women in Kizhur village decided to start a small business enterprise manufacturing incense sticks. They began as subcontractors but their confidence and enterprise increased as a result of utilizing the rural knowledge centre. Due to the searches carried out by the village volunteers and project staff, they were able to develop the necessary skills for packaging and marketing their own brand name of incense. The women were quickly able to develop local outlets for their products and using the village KC, gradually found more distant customers. The village KC facilitates small entrepreneurial activity and mobilizes latent productive capacity among women who live in a culture that traditionally has the tendency to marginalize them.

Sea conditions. The MSSRF Value Addition Centre at Villianur delivers daily images of predicted wave conditions in the Bay of Bengal to the centres at Veerampattinam and Nallavadu. The images are obtained from a website run by the US Navy. The sea conditions are of crucial importance for the safety of the fishermen. The information is so critical that it is transmitted verbally to the fishermen as they are preparing their boats early in the morning, across a public address system through loudspeakers placed on the roof of the centre. The information is regarded as "life-saving" by the fishermen.

Notebook charity scheme. The school at Veerampattinam was able to make contact with a charity scheme whereby 180 notebooks were provided free of charge to tudents.

Bus service schedules. The schedules of bus services that operate in the districts in and around Chennai (Madras) and Pondicherry are a regular and useful source of information. Village travelers find that they are able to plan their journeys, often involving several connections with overnight stays, so that they are able to reduce the time spent waiting to catch connecting services. It is the nature of low-income rural households that lost time equates with lost income, or the accumulation of duties that have to be performed at a later stage. As for any busy working person, saving time represents a real benefit.

Procurement of quality seeds. Like all farmers, the villagers served by the MSSRF rural KCs require high quality seeds to achieve maximum potential. The village KC at Kizhur performs an important function in locating suitable sources of quality seeds and ensuring adequate supplies for farmers when they need them. Prior to the installation of the village KC, securing an adequate and timely supply of quality seeds was a highly unreliable process, which led to significant variations and uncertainties in crop levels. The village KC therefore contributes greatly to food security.

Veterinary services. Access to health care is applicable to animals as well as people. One farmer was able to summon help from the village KC staff when he feared his cow might die. After searching the networked information sources for a veterinary surgeon nearby, one was dispatched. The surgeon, who was contacted by telephone, arrived in time to save the cow.

Grain prices. In the village of Embalam, local farmers are able to obtain daily market prices for their produce from the village KC. There are two prices to obtain: one from the government market that has minimal fluctuations, and another from the private market with high fluctuations. Consequently, there is considerable benefit for farmers from choosing which market to deliver their produce to and from monitoring the differences between the two prices on a daily basis. The farmers consistently obtain the best possible price for their produce.

Private tuition. At the Embalam village KC, an enterprising schoolteacher has started using computer facilities to provide additional after-hours tutoring to local schoolchildren, for which he charges a fee. The village KC manager initially allowed the teacher to use the computers free of charge. After observing that the teacher was profiting from the service, the manager started charging the teacher and tuition charges were reduced. Thus, both the teacher and the village KC benefited and children were able to receive extra tuition.

Insurance. Through the information services of the village KC, villagers discovered a national life insurance scheme subsidized by the central government and operated by a local insurance agent. The agent had not sufficiently publicized the scheme and the

villagers did not know whom to approach. The village KC network was mobilized to obtain further information regarding the entitlements and the name of the agent. As a result, villagers were able to approach the agent directly and with confidence to make their applications and receive their entitled insurance policies. Furthermore, the village KC operator devised and implemented a data base that generates premium renewal advice for every household covered by the scheme. This is used to ensure that no insurance policy lapses due to late renewal payments. The policy is advantageous to the villagers to the extent that every household in Embalam village has taken out an insurance policy. Villagers are confident that their coverage will be continuous and that premiums will be renewed on time.

Employment opportunities. One volunteer at the village KC was informed of job vacancies for women at an agricultural processing factory located 5 km from Embalam. The volunteer was keen to bring employment opportunities to women in her village and therefore distributed the information via the village KC network. The factory was able to fill its vacancies faster than expected. After hearing of the village KC network, the factory decided to use it as their first choice channel to obtain local labour. Such a partnership represents a win-win situation with benefits accruing to both parties. The factory can access a steady supply of labour both quickly and cheaply, and villagers are promptly informed of job vacancies.

Savings cooperative. Village women learned about the concept of savings cooperatives through interaction with the village KC information sources. In India, savings cooperatives are a popular means of obtaining loans for people who would not normally qualify for a bank loan. The cooperatives operate by members making regular payments to the scheme, and then borrowing money when the need arises. Members are allowed to take out loans which exceed the value of their contributions. New members can even borrow before they have commenced payments. The popularity of the scheme is derived in part by the support it receives from the government. Under certain qualifying conditions, registered savings cooperatives are entitled to receive government loans at interest rates well below prevailing market rates. Local banks are required by law to provide banking facilities to registered savings cooperatives. Having discovered the scheme through the village KC, village in Embalam formed a cooperative and now use the computers at the KC to administer their accounts. One of the KC operators, who is a woman, acts as the cooperative treasurer and secretary and utilizes the KC's facilities.

The women's self-help group in Embalam is using its public access centre to sell locally-made products and handicrafts, such as lime pickles and roofing products woven from local palm leaves. They are also using the system to contact other women's groups with which to share their experiences. They have recently made

contact with another women's self-help group of "ecopreneurs" in Kulumai who have established a Rs 2.5 million business, making environmentally-friendly recycled paper products out of banana waste that had traditionally blocked vital waterways in their village.[1/]

Capability Poverty

From our user register, we find that most villagers use our entitlement data base. Incidentally, as the programmes become widely known, we find greater transparency in governance.

The experience of Pondicherry and elsewhere is that one of the greatest implications for social change is the way in which bringing information into the public sphere increases the accountability of officials. This is a feature that could be built strongly into any model as a way of minimizing bureaucracy, waste, and even corruption. As one person puts it: "The only way to overcome money power is through knowledge power."[2/]

Villagers often asked how the hub (at Villianur) would be able to pass on, and follow up on, suggestions they were making to different levels of authorities through the new network. The team at Villianur decided to send letters,[3/] to political representatives with copies to relevant department heads in the administration.

The citizens' charter data base provides information from government departments, such as current activities and procedures to obtain various entitlements. We provide addresses of contact persons, details of schemes, application forms, and so forth.

Fishermen's housing loans. One of the tasks of the MSSRF Value Addition Centre is to seek out and publicize various entitlements which community members may be qualified to obtain. Over 100 such entitlements have so far been identified. It has become a highly complex task for individual families to understand their entitlements and how to obtain the benefits. One such entitlement of particular interest to the villagers at Veerampattinam is the Fishermen's Housing Loan, a government-subsidized scheme for providing low-cost loans to fishermen for the purpose of buying or constructing a home. Prior to the advent of the rural knowledge centre, villagers were not aware of the scheme. Today, nearly every fisherman in the village has benefited from it.

Health facilities. In 1999, when our informatics staff visited various primary health centres, we observed a number of interesting aspects. Most of the doctors at the primary health centres were men. User registration showed that women only reported colds and fevers. However, when we organized a health camp with the support of

Jipmer Hospital and Eye camp and Aravind Eye Hospital, as expected, women were found to be suffering from other ailments.

Cataract operations. The MSSRF rural knowledge centre at Kizhur discovered a health camp, a scheme for free medical treatment at a hospital more than 400 km away. For a limited period, the camp was offering free cataract operations. Several people in villages with knowledge centres applied and underwent operations.

Educational facilities. Our KCs provide information on courses available in different colleges, hostel facilities, and costs. Parents and students often refer to this data base and choose appropriate courses. Another important development is that after children started using computers and compact disk (CD) ROM educational materials, the school dropout rate declined considerably. There is a greater awareness among the community of the value of education. On the day results of public examinations of higher secondary board examinations are announced, huge crowds flock to our centres in order to see the examination results and to obtain the scorecard or mark sheets.

Schoolchildren are regularly using the centre to learn basic computer operations and seven children come to the centre regularly. The middle schools in the villages use the centres to type their exam question papers for term examinations and monthly tests. Many schoolchildren after receiving the educational scholarship application from the school, come to the centre and are guided by volunteers in filling out forms and the necessary certificates to be attached. Parents find it difficult to fill out such forms and the centre helps them whenever necessary.

EMPOWERMENT AND SOCIAL CAPITAL

Empowering the Weakest

Gender concerns are central to the project and we believe that incorporating this concern is essential for project success. Due to a deliberate decision, more than half the volunteers operating the KCs are women. This has positively reflected on the increase in the number of women users. In the evenings, some KCs provide counseling to women. Most of them form self-help groups and use the loans to educate their children and start cottage industries. KCs help women obtain training related to new economic opportunities such as incensestick manufacturing or mushroom production. By handling computers and answering questions posed by men, women are able to gain new confidence and status within the community. In the fishing village, there are fewer women users who get news through the public address system. Many women report that they do not have enough time to visit the centre due to the demands of housework and labour. Some women obtain information from other women who have visited the KC (see box 1).

Box 1.

In the village of Embalam, the century-old temple has two doors. Through one lies tradition. People from the lowest castes and menstruating women cannot pass its threshold. Inside, the devout perform daily pujas, offering prayers. Through the second door lies the Information Age, and anyone may enter. In a rare social experiment, the village elders have allowed one side of the temple to house two solarpowered computers that give this poor village a wealth of data, from the price of rice to the day's most auspicious hours.[4/]

Here "anyone" includes the Dalits, who are people of the lowest caste, referred to as "untouchables" in colonial India. Caste-based division is still a problem in southern India despite the enforcement of strict laws. Our knowledge centre at Embalam has made a minor dent in the problem. A new knowledge centre in Thirukanchipet, a village of Dalits, has led to another minor social revolution. Although the village KC is located in a Dalit (untouchable) locality, upper caste men and women visit the centre to obtain information (see box 2).

Box 2.

Information from the computers in this area, where people live in thatched mud huts, has saved the life of a milk cow named Jayalakshmi, prevented the blindness of an old woman named Minakshi, and routinely warned fishermen of stormy weather that can claim lives. Some months back, Subrayan Panjaili...who cannot read or write, sat in the courtyard of her small home in the village of Kizhur, in Pondicherry, with the family's only milk cow....For five days and nights, the cow moaned while in labour. Something had gone wrong and she was unable to deliver her calf. Mrs. Panjaili grew ever more fearful that the cow would die. "This is the only good income we have," she said, explaining that the four gallons of milk the cow produced each day paid the bills. Word of Mrs. Panjaili's woebegone cow soon spread to Govindaswami, a public-spirited farmer. The village's computer, obtained through the MSSRF, is in the anteroom of his home. The computer is operated full time and for no pay by his 23-year-old, collegeeducated daughter, Ezhilarasi, who used it to call up a list of area veterinarians. One doctor arrived that night and, by the light of a bare electric bulb, stuck his arm into Jayalakshmi, pulled out the calf's spindly leg and tied a rope to it, then dragged the calf into the world [5/]

No special efforts are made to promote access to ICTs among the poor. Our goal is to empower them to improve their standards of living through better access to useful and relevant information. Many "telecentre" projects, in our opinion, make the cardinal mistake of putting the technology ahead of the people. For us, the people, their context, and their needs come first. Then comes the content that can satisfy those needs. Technology is just an enabler to deliver the content in a cost-effective manner.

Building Social Capital

In the beginning, we selected two private houses in which to set up the knowledge centres. After six months, we realized that the private houses were not allowing socially underprivileged people inside. The owners shared the information only with their friends and relatives. In one private house, they operated the centre at irregular hours. Noticeable damage to equipment was also discovered.

In Embalam, a washerwoman, who collected clothes from her clients is now a volunteer operating computers and dispensing information. In Thirukanchipet, the *Dalit* landless labourers used to get their tea at the local tea stall served in glasses meant only for their caste. After some of the *Dalits* started working in the Thirukanchipet KC, they became emboldened to challenge this practice. They started to write poems of Bharati condemning caste-based discrimination on KC notice boards. Today, there is only one set of glasses in the tea stall. In yet another development, landless labourers who received part of their wages in kind now get the correct amount of wages, fixed by the Department of Labour.

We now have a close relationship with government departments. The Department of Science and Technology, Government of Pondicherry, sanctioned the cost of wireless technology for five KCs. The Department of Agriculture hopes to link its farm clinics to our hub. The Department of Statistics uses our network to disseminate agriculture-related information to villagers. Now field supervisors use our KCs to transmit statistical data collected in the field to their head office. We plan to charge for this service after six months. The payment will go directly to the KCs from the Department of Statistics.

The police and fisheries departments already share their contents with our hub. The Department of Education has also shown interest in linking its adult education programme with the KCs. They have also requested us to guide them to frame a curriculum for the Early Childhood Education Programme (Sarva Shiksha Abigyan), a Government of India Programme. We have already submitted some publications produced by our foundation. The District Rural Development Agency (DRDA) also hopes to link more than 500 women's self-help groups (SHGs) (micro credit and savings groups) to rural KCs to increase their knowledge and income.

We provide content for many All-India Radio (AIR) programmes relevant to rural communities. AIR Pondicherry, has broadcast the series "Silicon Valley" in which people are interviewed who benefited from the KCs. Today, government departments aim to set up information kiosks in other villages. They have already started to implement ICT applications in their work from the impact of our village KC programme.

CULTURAL CHANGE

Coping with Cultural Change

ICTs solve health problems resulting from cultural attitudes. Women's groups in Embalam and Kizhoor made it clear that cultural attitudes prevented them from discussing their health problems, especially diseases and disorders of the reproductive tract, with male doctors and younger females. Because they are in need of such information, arrangements were made with a senior professor of the Gynecology Department in Jipmer Hospital in Pondicherry to interact with around thirty women from Kizhoor and Embalam. We developed a multimedia presentation with rich graphics as a result of this meeting. The gynecology department has prepared information on prevention of many related disorders. We developed multimedia flash cards with relevant information for use by women showing minimum guidance.

Procurement of paddy seeds. Panchali lives in Kizhoor village, just opposite the local KC. When asked about the impacts of the KC, she explained the benefits derived from the information obtained from the centre. During the rice season, she obtained information on procuring paddy seeds for her land. Volunteers at the KC guided the female farmer to approach Ariyur PASIC depot where the government was selling seeds to farmers at a subsidized rate. She recalled that only five years previously she utilized the government subsidy with the help of the information obtained from the *gramsevika* (rural social worker). Since then, she has been able to secure government benefits with the help of the volunteers in the KC. Without much difficulty, she can procure paddy seeds in time for sowing. Due to the availability of timely information, she was able to save both time and money.

Paddy price information. Ms. Rengalakshmi is an agricultural labourer who lives in Kizhoor. She was of the view that the prevailing market prices of paddy in Pondicherry were only known to landlords and not to labourers. Labourers who do paddy harvest work are given wages in kind. Paddy price information is therefore vital but agricultural labourers do not have access to such price information. Landlords used to exploit labourers by paying lower quantities of paddy in lieu of wages. Today, paddy price information is available through the KC.

All-female management of a KC in a temple - Embalam. Sundary is one of the four women volunteers who manage the KC located in Amman Temple. She commented that many people in the village and even from neighbouring villages visited her KC for information regarding agricultural prices, government schemes, and the list of people below the poverty line. Around twenty women took out a Janatha insurance policy after finding out about the scheme from the KC. People frequently asked for women- and childrelated health information. Free medical check-ups for eye problems and free eye

operations arranged by this KC have been well received. During the general election, the KCs explained to people how to record their votes in the electronic voting machine through the use of visual information. Sundary observed that after taking up voluntary work, she was given the chance to visit Chennai and Pondicherry for training and met many visitors while acquiring useful knowledge and providing information to villagers. She added that the workshops on gender issues and training gave her additional confidence. Initially, those who made unfavourable comments have now started to visit the KC for information - so that all four volunteers can now operate the personal computer (PC) and other equipment without fear. She noted that they also felt confident to speak at public meetings. Rukmani, another volunteer, gave the following account:

> The siren kept in the KC is useful to agricultural coolies (workers), particularly for women who go to the field and come back on time. Previously, some landlords used to cheat the coolies by telling them that their working time is not yet over. Another impact is that schoolchildren and teachers come to use our computers. The teacher who is giving tuition to some students comes to the KC with his students and uses the centre's computer, and CDs related to plants and animals.

Furthermore, she adds:

> ...the VVV Club for Embalam women regularly conducts meetings in the KC. Members gather information from the KC... the local milk cooperative society has asked us to lead their savings groups and two of our KC volunteers agreed to it... we feel equal when we are asked to decide about the location for the site, to organize the MoU signing ceremony between the temple trust and MSSRF, and everyday we are acquiring new knowledge and our children also benefit by coming to the centre.[6/]

Leadership. The Embalam KC was established in January 1999 with the signing of a memorandum of understanding (MoU) with the temple trust. The temple trust is one of the formal village institutions consisting of five members with the government appointing the members. Supporters of the ruling party are usually appointed. There are around thirteen women's self-help groups in the village. The trust gave the space and the women's groups agreed to manage the centre by nominating four volunteers, all of whom are high school graduates and married.

In the year 2000 the then ruling *Dravida Munnetra Kazhagam* (DMK) state government was dismissed and the Congress party formed the new government with support from regional parties. This created problems in the village institution. The ruling party tried to appoint its own party cadres as temple trustees, for which there was resistance from the opposition party. Congress wanted to have control over the KC. This resulted in

conflict between the two parties and four rounds of discussions were held in an attempt to resolve the conflict. Finally, male members agreed to hand over the KC management to the women's groups in the village. They took this decision based on the assumption that the women were apolitical. Since women are not actively aligned to political parties, the arrangement is working smoothly.

Women-run KCs attract 12 per cent more female users than others. The female members seek additional information on vegetable prices, pre- and post-natal care, employment opportunities, and micro-enterprises. The centre also provides information on agriculture, training, weather forecasting, and so forth. Volunteers also said that many female members are also visiting the KC to discuss personal family problems. The women members feel that separate counseling centres for women do not exist in the villages. In future, they expect this kind of service through the KC. This is an unexpected outcome. This KC can be termed women-responsive and women-oriented.

Women volunteers who are running the KCs and managing the ICTs feel that they are looked upon as information providers. They feel proud of their new status despite initial adverse comments from the community. Volunteers have also started collecting information on indigenous knowledge systems and developing some useful brochures in Tamil for display in the news bulletins.

ENVIRONMENTAL MANAGEMENT

Managing the Physical Environment

Sea conditions. Two of our village KCs are in Veerampattinam and Nallavadu. Both are coastal villages with 98 per cent of families involved in fishing. The information requirements in these villages are different and more focused on the safety of fisherman while at sea, on the presence of fish near shore, and on techniques for post-harvest processing. These villages also receive information on wave heights for the coming 48 hours, downloaded from a US Navy website. We transmit the interpreted information through a public address system for the benefit of fishermen. The system is also used for announcing various government schemes related to fishermen, fish market details, employment news, distribution of rice in the local fair price shops, kerosene, sugar, and so forth, on a regular basis. Here is a typical account:

> Every morning at 4:30 a.m., Pannerselvan, a fisherman in the Indian village of Veerampattinam, drags his boat from the high, sandy shoreline to the water, revs up his engine and heads into the restless Bay of Bengal. As he navigates through the tricky currents, he is plagued by doubts. What will the weather be?

> And what about the waves, will they be high or low? And if a storm blows in, will he ever return?[7/]

Pannerselvan in the past got his answers the hard way. When the seas got angry, he got wet. But the fishermen of Veerampattinam no longer put themselves in harm's way every time they launch their boats. Three years ago, Swaminathan chose the village for a pilot project, a demonstration for central government policy experts to show that IT could change the lives of the poor. Through his Chennai-based research foundation, Swaminathan established a minimalist communication network linking phoneless Veerampattinam with the city of Pondicherry. The Internet arrived- and with it crop prices, email, and weather forecasts with ocean wave reports.

Four times a day, a local volunteer checks the web and broadcasts the information through a village public address system. Every evening as he sits sipping tea at a nearby stall, Pannerselvan can listen and decide whether it is safe to go fishing the next day. "When the computer says that there will be a storm," he says, "there has always been a storm. We all believe in it."[8/]

Save trees. In Embalam, when local people, aided and abetted by local politicians, started felling trees in a village neighbourhood, villagers rushed to the KC and located the Forest Department phone number using the web. They used the telephone in the KC to inform officials of the illegal tree-felling activities. The wood was impounded and the culprits arrested. Fortunately, the area is free from threats of floods and drought.

INSTITUTIONAL AND TECHNICAL ASPECTS

Policy and Regulatory Environment

There are government initiatives in India, such as that of the Pondicherry City Government and the Lt. Governor, Rajni Roy, which have extended their support to the project from the start. We are not implementing state policies in our project. Our project goals concern the people and the alleviation of poverty. The project itself was funded by IDRC, by "The Friends of MSSRF Tokyo," (a Japan-based NGO) which donated computers, and the Pondicherry City Government that provided a small grant. People contributed to the construction of buildings in two villages.

The establishment of our KCs greatly helped the villagers who are now more confident. Women feel much better placed and are able to obtain valuable information when necessary.

Management of Technology

Hardware. In the beginning, we were threatened by fears that rats would gnaw through the wires and that computer technology was beyond the minds of villagers. These assumptions have been proven wrong. It is worthwhile noting that rural people are able to understand computer training as quickly as city dwellers.

Initially, we designed special computer tables for the computer and wireless system to protect them from insects. Now we are using ordinary tables for computers. The villagers use papaya and other organic methods to protect the computers from rats and insects. At the start, the villagers unintentionally moved files from one directory to another, as they were not adept at using the mouse. In the training, we began with games and then introduced software such as MS Word, PowerPoint, Excel, PKZIP, PKUNZIP, PageMaker, Photoshop, use of the Internet, and voice recording. More than thirty villagers have currently conducted their own research projects after the completion of a twenty-day computer literacy training workshop on topics such as the history of the local temple, traditional health knowledge, self-help groups in the area, analysis of market committee data, and analysis of educational facilities in the region. Well-researched reports have been produced using all the techniques in which they were trained.

The village volunteers protect the computers from dust, periodically update virus protection software, clean printers, delete unwanted temporary files, scan the hard disk, and solve problems concerned with the drivers (and dll). Hardware problems are taken care of by project staff. In most of the knowledge centres, we are only using secondhand computers donated by various organizations and individuals in Japan. We are using Compaq, IBM, Packard Bell, and locally-assembled machines for communication and for training villagers. The staff also takes care to identify the needs of the village community. So far, none of the computers has failed due to the environment. The systems are a minimum two to four GB HDD and 32 MB RAM, using Windows 95 or Windows 98. Only CD drives are updated. For power, solar photovoltaic energy is used.

Network. Prior to setting up these village KCs, participatory rural appraisals (PRAs) were carried out in each village. In each case, the community identified and provided an accessible rent-free building, electricity, and volunteers. The volunteers, who are unpaid men and women, are chosen by the community and manage the centre on a voluntary basis. The project provides all the necessary equipment and training, as well as assistance in collecting data. A memorandum of understanding (MoU) is signed to this effect and is renewed when necessary.

Local project staff maintain the systems at the hub. In the village KCs the systems are maintained by village volunteers while the community is responsible for the KC. The importance of the KC is recognized by the community. Even in times of clashes between different groups (common in Indian villages), the KC and its equipment are not damaged. The wireless system and web server administration are taken care of by the Informatics Centre of MSSRF in Chennai.

Creating and updating information. A key factor in the programme concerns the creation and updating of relevant content to suit local needs. The value addition centre in Villianur has generated around one hundred data bases to fulfill the specific information needs of the local communities. Most data bases are updated on a daily basis. A considerable amount of information is accessed from local sources. Many of the data bases are in multimedia form for the benefit of illiterate people.

Prior to starting content-building activities, extensive consultations were held with participating village communities through small groups. It emerged that provision of dynamic information on prices and availability of inputs for cultivation, such as seeds, fertilizer, or pesticides was important to every farmer. Knowledge of grain sale prices in various markets in and around Pondicherry is critical for farmers during the harvest season. This information helps farmers market their produce more profitably. We also provide information on wave heights to fisherman 24 hours in advance, for their own safety. From our user registers, we find that most villagers use our entitlement data base. Many people use the address of doctors, especially specialists, ambulance services for taking pregnant women to hospital, for their family, and addresses of veterinarians for their livestock. An education data base describes the courses available in nearby schools, colleges, and neighbouring states along with information on costs. Young people are particularly keen on this service.

We have created rural yellow pages, on which people can insert their advertisements. For example, people can determine who is renting out tractors and at what price. A tailor buying a new sewing machine can announce the sale of his old machine. Most of the data bases are developed by project staff based on the enquiries of the village community. In the collection of information, some volunteers were also involved. These rural volunteers are trained by newspaper reporters to gather useful information and present it. All the information sent to the hub is collated and transmitted to the villages. Many volunteers in the village KCs are capable of creating content and devising web pages.

The village residents are most interested in dynamic and customized information. This is a resource-intensive activity and has implications for sustainability in view of the potential of involving more locals to create and manage local and customized information content. An encouraging development in this regard is that some village KCs create content

related to agriculture, animal husbandry, education, employment, health, government announcements, income-generating enterprises, the environment, and general information.

There is a great sense of ownership among the local people, who do not view the KCs as belonging to MSSRF. This is why there is no vandalism or damage taking place against the property. The village volunteers are selected by the community. The project staff at Villianur (the hub) and Chennai (MSSRF headquarters) have cordial relations with the local people.

Determining demand for ICTs. One thing that needs to be emphasized is that we are not overly keen to use ICTs. This is not our primary goal. Our goal is to empower people through improved access to information. In achieving this goal, if the use of technology provides an advantage, we will use the technology by all means. Initially, we used interconnected computers because we needed a rapid transfer of value-added information from the hub to the villages. For connectivity, we tried the telephone and modem (wherever telephones were available), Motorola two-way radio, and later spread spectrum technology. At the same time we have not abandoned classical technology. For the fishing villages, we get the crucial wave height information from the Internet. We use a geographic information system (GIS) scale to provide the perception of distance in the visual imagery. We use real audio for transferring the voice message from the hub to the knowledge centres in the coastal villages. We also place the message on a notice board and broadcast it over a public address system. Our philosophy is "horses for courses". Whatever technology is good for a situation, we will use it.

The users have adapted well to the available technologies. Many of them are now adept at using computers and have enjoyed the benefits of obtaining the information they need. As a result, their information needs are growing. More and more villagers will be adept at using computers and communication technologies, and will wish to take advantage of new technologies. Eventually, we will withdraw from the villages, leaving the entire programme in the hands of the local community.

Suppliers of technology. From the beginning, we have been using Motorola very high frequency (VHF) business radios for instantaneous communication and data transmission between the villages and the hub. The design is based on two major components. The intelligent controller of the two-channel network is capable of interfacing with telephone lines in full duplex operation. The controller does the primary switching with EPABX/ PSDN and diverts the call to the selective subscriber unit. The controller with two Motorola GM300 base radios acts as a full duplex single-channel controller with the capability to connect two telephone inputs. It can store up to 4,000 subscriber identities (IDs) for selective calling. The subscriber unit is based on the

Motorola GM300 and GP300 models. With the combination of two units of GM300 with a suitable interface board of ST869 in full duplex mode, we can add the intelligent controller to the subscriber in full duplex mode. With the help of the interface board, we can combine both Rx and Tx GM300 radios and convert it as a loop line interface. This loop line can be connected to the exchange or to a simple telephone. The interface is capable of generating the ring voltage needed for telephone instruments to generate a ring tone. The interface also has an intelligent system to scan fifteen channels.

The advantages of this system are: (a) the distance from the hub extends to a maximum of 25 km; (b) signals can be transmitted 360 degrees; (c) we can transmit voice as well as data during the same transmission; and (d) we can retransmit any type of file such as html, Word, PowerPoint, images, and Excel. On the other hand, the disadvantages are: (a) maximum speed is 4,800 bps; (b) file size should be below 1.5 Mb; (c) messages can be sent only sequentially, not simultaneously to all villages; and (d) it supports only four or five villages.

To overcome these disadvantages, particularly the transmission of a large volume of data, we introduced spread spectrum (SS) technology in December 2001 to the villages of Villianur, Embalam, and Veerampattinam using funds from a Ford Foundation grant to MSSRF.

Line speed is very high (11 Mbps) but the signal travels only point-to-point, not 360 degrees. However, one can connect another village from the last point and not necessarily from the hub. We can cover more than 80 km from the hub using this technology. The maximum village-to-village distance is 22 km. We have an engineer trained in networking (BE) and a diploma holder with considerable skill in fixing computers and connectivity. Occasionally, we need the help of the company's engineer.

The village community is not interested in the technology aspects (any more than the urban users are). What they are interested in is getting the information they need and getting it correctly and quickly. Content is the key element in our programme (second only to the people and their context). In our scheme, technology comes much later.

Adaptability of ICTs to local needs. We do not download the information and then look for users. Through surveys and continuous dialogue with village communities, we study what information is needed and what will be useful to the community. It is a long social process that precedes the introduction of technology and the establishment of the knowledge centre. We are careful not to put the cart before the horse. This is one reason for our outstanding success. We maintain ledgers in each centre and all queries are recorded and analysed.

We have continually monitored the programme. From our survey, we have found very interesting results. People derive economic benefits from employment news, crop and fish market details, and computer training. They also rate highly information on loans, and news on government entitlements, and dairy farming. Real estate agents and small merchants finalize trading deals through wireless telephones. Weather and wave height, education details, daily news, recipes, notice board announcements, important phone numbers, transportation and power outage details, and public address system announcements all provide benefits in intangible ways. Women are very interested in health information, recipes, and naming newborn babies based on astrology. Computer training for women and children in local villages ensures safety (women do not have to walk to distant locations), and saves time and money. Most nonusers have mentioned that they could not find time due to labour and office work. Some villagers are shy because they are uneducated, and the elderly are uncertain if they will get respect from young volunteers. Some old men avoid the centres because they are run by women. The community would like us to provide training in micro-enterprises and provide flash news on computer screens using multimedia, as well as increase the working hours of the hub and centres. Fishermen would like to obtain two-way communication between the sea and the shore, and training in protein extraction from fish.

Functioning of systems under climatic and power conditions. In the beginning of the project, lightning affected the wireless antennae. We therefore installed lightning conductors. Over the past five years, we have not faced any problems. During the summer, the electric power fails very frequently. To overcome this problem, we use a solar photovoltaic power backup, which uses 80 per cent solar power and 20 per cent electricity in a normal situation. We use ordinary car batteries (distilled water) for backup. The solar plant capacity is 1 KVA.

To maintain computers and communication equipment, a diploma holder is needed. From now on, we do not depend on local users for maintenance. We have trained people to use computers, and about thirty locals are currently adept at preparing project reports. We have also organized a number of training programmes. The first group of trainees is now able to train others. The villagers have demanded appropriate certification for their training. In collaboration with a private training institute, we conducted a programme that included an examination and the issue of certificates.

PROJECT EVALUATION

Results

The Information Village Research Project is a dynamic process. Despite having a well-designed plan of action, most occurrences are governed by day-to-day activities. This is in the nature of all research projects and even more so in village-based development

projects. In the beginning, we did not have an exact idea about the location for setting up the KCs. We selected two private houses in which to set them up. After six months, we realized that the householders were not sharing the information with the entire community. Instead, they only shared the information with their friends and relatives. In one centre, they did not allow socially underprivileged people, the *Dalits,* to use the facilities. Subsequently, we set up KCs in public places, such as government buildings, temples, a midday meal programme building, and *panchayat* buildings.

In the original proposal, there was no provision for solar power. We therefore, added solar power after one year. Furthermore, in the original proposal, we only concentrated on wireless communication among villages. Slowly we adopted older systems such as the public address system and a community newspaper for distributing the information to the village community, and a siren to announce times. To run the project based on the original proposal will not be prudent. We need to adapt to changing needs and perceptions. This is because our understanding of ground realities was not 100 per cent accurate in the beginning. As we went along, we learned. In this process, the continual interaction with the village community was a great help. We also received assistance from other development agencies. Earlier this year, we had the benefit of working closely with a team put together by One World International on a project called Open Knowledge Network. This was not part of our original proposal. G8 Dotforce is currently funding One World International to replicate this part of the experiment in Africa. Soon we will have around twenty African, Asian, and Latin American development workers visiting our project and exchanging notes with us. This is probably the first South-South exchange among ICTenabled development projects - another aspect not in our original plan.

Potential for Expansion and Replication

A bottom-up process and community ownership are the two most important elements for success. Any agency which is keen to replicate our experience will succeed if this is clearly understood. As we are more of a research agency, it is not our ambition to continue replicating KCs in countless villages. Our goal is to demonstrate the feasibility. We would like others to carry forward large-scale implementation. We are ready to assist them in training. The Open Knowledge Network experiment gave us an idea of how we could make the entire exercise self-supporting within a few years. However, we believe that the government and the society at large cannot abandon their responsibility to the rural poor. Such programmes will need to be subsidized for some time. Constraints arise from the nature of social organization. If the downtrodden are empowered through better access to information and knowledge, the better-off classes that benefited from earlier

social dispensation may not relish this, which may lead to tension. The success of such programmes depends on how well these sorts of problems are resolved.

Project Expansion

The hub-and-spokes model of the MSSRF Value Addition Centre (at Villianur) linked to village KCs is a workable model. Proactive intermediaries in the village KCs (identified by the community and trained by the project staff) have contributed much to the success of the project. The introduction of ICTs in the rural setting has led to the creation of a community asset. It has also led to empowerment of the users, particularly the marginalized groups, such as women and the poor.

We are in the process of considering the establishment of KCs in public libraries and schools. The idea is to bring in newer elements and expand the reach. We need to go beyond working with one section of the community. In states such as Bihar and Jharkhand it may not be possible to secure rent-free space for establishing KCs. Extreme poverty is prevalent in parts of these states. We may need to bear the expenses of such centres along with the local governments.

NOTES

1/ James Jeynes, a management consultant from Accenture, UK, spent a week at our KCs and spoke to a large number of the local people, traders, businessmen, and government officials. He has suggested a number of possibilities, which, if properly implemented, could make the entire operation of the KCs selfsustaining in about five years.

2/ Excerpt from the Open Knowledge Network (OKN) Report submitted to the G8 Digital Opportunities Taskforce (Dotforce) meeting held on 26-27 June 2002, Kananaskis, Canada.

3/ Example of a letter from the Villianur team:

> 1st March 2002
>
> Sri.Gangadaran
> Member of Legislative Assembly
> VVP Nagar
> Thattanchavadi.
> Pondicherry
>
> Subject: Request to Increase the Visits of the Medical Officer to the Heath Centre on all working days in Embalam village.

Reference : Representation from the Women Self Help Groups in Embalam.

Sir,

We bring to your kind notice that recently the women's self help group members in Embalam expressed their concerns. One of their grievances is that the Health Centre in Embalam village has one ANM (auxiliary nurse midwife), and one compounder who attends the dispensary unit every day and distributes medicines only for general illnesses such as fever. The Medical officer only comes on Fridays. The problem faced by people is that on days other than Fridays, they must travel to Karikalambakkam Primary Health Centre (5 km distance) if they fall sick. Since bus facilities are limited, they face serious problems in cases of severe illnesses. They explained that if the Medical Officer visiting the Health Centre is able to come to the dispensary unit every day, their grievances will be solved.

May we request you to kindly do the needful.
Thank you.

Yours sincerely,

K. G. Rajamohan
Administrative Coordinator

encl : Representation from the Embalam villagers.
cc : The Director, Directorate of Health, Government of Pondicherry.

4/ Celia Dugger, "Connecting Rural India to the World," *New York Times* (28 May 2000).

5/ *Ibid.*

6/ Interview with Rakmani (2002).

7/ *AsiaWeek* (29 June 2001).

8/ *Ibid.*

ADDITIONAL REFERENCE

Harris, R. *et al., Success Stories of Rural ICTs in a Developing Country* (Ottawa: International Development Research Centre (IDRC), 1999).

COMMENT

Ricardo Ramirez and Dan Pellerin

Two statements from this excellent article capture the essence of its message, firstly: We do not download the information and then look for users.... It is a long social process that precedes the introduction of technology and the establishment of the knowledge centre;

and, secondly:
Many "telecentre" projects, in our opinion, make this cardinal mistake of putting the technology ahead of people. For us, the people, their context, and their needs come first. Then comes the content that can satisfy those needs. Technology is just an enabler to deliver the content in a cost effective manner.

Common sense indeed, but not that common in the last round of development hype to establish telecentre showcase projects. Putting people's needs at the forefront, rather than computers, requires a confident, visionary team with a community development commitment. This article demonstrates with a vast number of examples the significant contribution that information can make when it responds to people's needs. Some of the highlights merit special mention.

The authors describe the power of the process to overcome caste restrictions: Dalit groups that would otherwise have been excluded from the village knowledge centres gained acceptance, the same applies to menstruating women whom tradition would have kept at bay. These accomplishments are perhaps an indication that the centres have ushered in some sort of new era in the eyes of the local hierarchy, making it acceptable to change tradition (not to mention abiding with modern Indian law). Experiences in Nepal echo the potential of these new technologies to put caste differences aside.

The importance of placing women in control of these efforts is noteworthy. It echoes the experience by Grameen Telecom in Bangladesh whereby rural cell phones are placed in the hands of women and research shows that this very fact increases access to the communication service by village women.[1/] The increase in women's status at the village level is bound to have profound positive consequences in other aspects of village life: for example food security research has shown that women's status and level of education are positively correlated with improved nutrition practices in the home.[2/]

The authors provide many examples where time-sensitive information, i.e., on prices and weather, improves villagers' decisions about when to buy inputs and sell produce, or how to market new products. Weather information helps fishermen decide what risks to take at sea and data bases with services enable villagers to access medical and veterinary help. Indeed, experience in other countries shows that most of these services are possible simply by having access to a phone. What is new in this experience is the systematic effort at doing participatory rural appraisals (PRAs) and surveying local needs

and building data bases to respond to those needs; hence the value of computers. Making local information available is just as, important as downloading information from elsewhere. In this experience, the local information is made available through a range of other conventional media such as word of mouth, public address systems, community newspapers, and radio. The combination of modern ICTs with existing and proven community media demonstrates that the facilitators of this process are not blinded by the glamour of high-tech - how refreshing!

Technology-wise, it is pretty simple but the bandwidth of 4800 baud must be rather irritating. The three new sites on the 11 mbps are fairly straightforward and quite effective without being overly complicated. A radio can be replaced relatively easily and the networking skills required are well within the realm of the regions.

It is not clear how the bandwidth used is paid for at the Internet gateway. The authors discuss the ways the network is being used and the value. How the bandwidth is presently being paid for goes a long way towards determining sustainability in the long run, not to mention the fact that the demands that the users place on the system will put strain on the 4800 baud system. Otherwise it sounds like a good network which is focused, uses local talent to a large degree, and can grow without requiring a lot of outside technical expertise. Perhaps the ongoing training includes some "internetworking" from a design and implementation point of view.

For those concerned with sustainability and replication, the authors have some challenging messages. There are important unexpected outcomes such as the women's counselling services that emerged when women sought additional information on vegetable prices, pre- and post-natal care, employment opportunities, and micro-enterprises. These unexpected outcomes are valuable and would not have appeared in conventional project logical frameworks. Research in other places where broadband connectivity is expanding increasingly shows the need to embrace unexpected outcomes. As the authors emphasize, the process is dynamic and allows people to dream of new uses.

The sustainability of these experiences needs to address several dimensions. For those concerned with the financial and technological dimensions, it is important to note experience elsewhere which suggests that the village knowledge centres should not be expected to run entirely on a customer-paid-service basis, especially as they provide so many government-related services. In one recent study it was reported that telecentres in Hungary earned 60 per cent of their revenue from government sources, some of which were competitive funds.[3/] Government agencies are major financial contributors as the centre enables the gathering and distribution of information that would otherwise be more expensive and less timely to exchange. This brokering role, whereby community needs are matched with relevant information, is noteworthy and the groups have been referred to elsewhere as "mediating organizations".[4/]

For those concerned with the social sustainability, the centres should be understood as an educational process. The e-readiness that they are providing is significant: volunteers are learning on the job, community members are finding a familiar setting with local people which will help them explore the technology, and women are gaining skills and status. These benefits are not intangible - though difficult to quantify - and merit continued support from the public sector.

Replication of the experience represents a significant challenge in that the "cookie-cutter" approach for massification is not applicable. The nature of the organization that incubated this experience cannot be ignored as it imprints on the process: the people-first commitment and the attention to local needs before prescribing technology reflects a community development philosophy. Other organizations seeking to replicate this process first need to do a self-audit of their own principles and orientation. Community ownership and bottom-up planning is central to the accomplishments described in this article, and few organizations are humble enough - and donors patient enough - to emulate such a process effectively.

NOTES

1/ D. Richardson, Ricardo Ramirez, and M. Haq, "Grameen Village Phone" in A. Gumucio-Dagron, ed., *Making Waves: Stories of Participatory Communication for Social Change* (New York: Rockefeller Foundation, 2001), pp. 271-6. Available from http://www.rockfound.org/Documents/421/ makingwaves.pdf; accessed 2002.

2/ J. von Braun and E. Kennedy, *Agricultural Commercialization, Economic Development and Nutrition* (Baltimore, MD, and London: International Food Policy Research Institute (IFPRI) and Johns Hopkins University Press, 1994).

3/ F. Proenza, "Telecenter Sustainability: Myths and Opportunities" *Journal of Development Communication* (2002). An Internet version of the paper will appear in Dixon and Wattenbach, eds., *Bridging the Rural Knowledge Gap: Information Systems for Improved Livelihoods* (forthcoming). (Papers from a workshop at Food and Agricultural Organization (FAO) Headquarters, Rome, 4-7 December 2001).

4/ Ricardo Ramfrez, "A Model for Rural and Remote Information and Communication Technologies: A Canadian Exploration," *Telecommunications Policy* 25 (5:2001):315-30.