INFORMATION TECHNOLOGY : AVENUES, SCOPE AND CHALLENGES IN THE FIELD OF AGRICULTURE

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When transportation technology led to shrinking of physical distance by orders of magnitude tele-communication technology made terrestrial distances irrelevant, the IT heralds the death of time and distance. IT brought about revolutionary changes to physical, social and economic infrastructure of a nation. The world has thus started beginning to feel the power and potential of IT in every aspect of human activities. The changes and developments in Information and communication technologies have had a major impact on teaching, learning and extension. The use of computers, facsimile, satellites and various forms of video is becoming integral part of the technology transfer and extension process.

According to 2001 census Indian Rural population resides in 640 lakh villages. It's very difficult to reach with technological changes happening in the field of science and technology particularly agricultural Technologies. Application of electronic media in the field of agriculture and rural development is already established in developed countries. But its application in developing countries is a challenge for all the professionals. If we look at our rural base then we have to analyse our basic infrastructure in terms of electricity, roadways/railways, and some human factors like psychological status of individuals, their socio-personal and economic status and the level of education they possess.

Reflections From the Past Experiments :

Satellite Instructional Television Experiment (SITE)–The fondest dreams of Dr. Vikram A. Sarabhai, architect of the Indian space programme was to harness the fruits of space technology to speedup the pace of development in the rural heartland of India. The Satellite Instructional Television Experiment (SITE) conducted during 1975-76, using the ATS – 6-satellite loaned to India by the NASA of USA was the convincing demonstration of the commitment of the ISRO is the rural development in all its dimensions and manifestations. This experiment was conducted with the direct transmission of instructional programmes to 2400 villages spread across six Indian states (Rajasthan, Bihar, M.P., Orissa, Karnataka and A.P). The programmes telecast under SITE covered areas such as agriculture, animal husbandry, family planning, education, national integration and other development related issues as well as entertainment. It was a down to earth application of the application of satellite technology for meeting the mass communication needs of a developing country like India. A study of the impact of SITE revealed that instructional programme blended with entertainment could make a significant impact on the rural society.

Kheda Communication Project (KCP) :

In this Project 550 community TV sets were provided in about 400 villages in Kheda district, which has now been divided into Anand, and Nadiad districts. This project was launched by ISRO in 1985. The mandate of this programme was to exploit the potentials of space technology as an important tool to support education and developmental efforts in the country. The KCP, which came to an

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end in 1990, received UNESCO award for rural development in 1985.

Jhabua Development Communications Project (JDCP)–This project was launched in 1996 by ISRO in Jhabua, a tribal dominated district of MP with the objective to gain experience in the use of interactive satellite based network for rural development in a real life situation. Encouraged by the successful run of JDCP and its positive impact at the grass root development. The project has been recently extended to include a further 250 villages in the neighboring districts of Dhar and Badwan.

Avenues:

Gram Sat Pilot Project–This multipurpose project aims at strengthening the communications and social services network in rural areas. Gram Sat received a shot in the arm from the educational channel (Vidya Vahini) announced by Prime Minister Atal Bihari Bajpai. Using INSAT-3B system. Capability the state of Orissa is harnessing the Vidya Vahini network for providing education, information and training in rural and remote areas of Kalahandi-Bolangir-Koraput (KBK) regions of the state. The network will be extended in a phased manner to cover the entire state of Orissa to provide interactive programme, developmental information and broadcast capability.

Community Information Centres (CICs)–Launched by Ministry of Information Technology in every block of Sikkim and other North-Eastern States of India. Each CIC will have one server computer system and five client configuration computer systems linked in a LAN and connected to a V. SAT for internet access. It will help the govt. functionaries to use e-mail and Internet for communicating with the district and state level officers. The IT infrastructure at CICs to be used to capture information about local resources from different parts of the world to the block. With these centres the state govt. are expected to make use of the facility to spread awareness about internet and evolve a business model to help local youth to obtain gainful employment by operating internet booths, IT Kiosks and other such centres.

Samadhan Kendra–This pilot project is being implemented in Tamil Nadu. It will attempt to provide information based on day-to-day needs of the rural people. The basic aim of this project is to provide all four types of service available under one roof.

- An, Information Centre with a number of decision support systems for various categories of users, a large updated information bank, with web connectivity to serve the information needs of rural areas.
- Need based continuing Education Packages to identified target groups.
- Message Centre.
- Vocational Training Centre to promote basic computer and IT skills among the youth of the area.

Three more similar projects have been initiated for implementation in M.P. and A.P.

Warna Information Village/Warna Wired Village Project–The concept of a fully automated village is a dream of many brought to reality at Warna. The special Task Force on IT recommended development of the cooperative movement through use of state of art IT. This has led to the genesis of the "Wired Village" project. The primary objective of the project is to demonstrate the accelerated socio-economic development of a cluster of 70 contiguous villages around Warna in the Kolhapur and Sangli districts of Maharashtra. The project has been jointly carried out by the National Informatics Centre (NIC) on behalf of Government of India, The Govt. of Maharashtra and the Warna Vibhag Shikshan Mandal (MVSM) to create appropriate infrastructure for 70 villages on cost sharing basis in the ratio of 50:40:10. The project was implemented in December 1998. The project serves the information needs of the farmers on different crop cultivation practices of major

crops, sugarcane cultivation practices, pest and disease centres marketing information, dairy and sugarcane processing information etc. right up to the village level.

Gyandoot Project Scheme–It was an e-governance pilot project started by M.P. Governance in Dhar district. In five blocks of Dhar district twenty-one major centres were connected through Internet. These computers, established in the Gram Panchayats (Village level), have been named Soochanalaya (Information Centres), providing user-charge based services to the rural mass. The Internet has been appropriately named as Gyandoot (Messenger of Knowledge). Thus each Soochanalaya effectively caters to approximately 15 Gram Panchayats and about 25 to 30 villages, as they are located at block headquarters or at prominent market places or major roads close to bus stands. This pilot project benefits over half a million villagers living in 311 Gram Panchayats at and over 600 villages. The services will be on the basis of farmer advice and their felt needs.

Information Village Project–M.S. Swaminathan Research Foundation (MSSRF) has undertaken a pilot study in villages in Union Territory of Pandicherry. The project is aimed at bringing the benefit of modern information and communication technologies to the poor and assetless families in villages. A value addition centre, which is the hub of the information network, has been established in Villianur village and four information shops in different villages have been established. These information shops are computer aided and Internet connected knowledge centres at village level. These centres are owned and controlled by the villagers that use them and provide the information they demand. The knowledge centre are based on the principle of inclusiveness. All members of the rural population derive benefit from them, regardless of age, gender or social status. Invariably, the villagers choose four women to operate each centre, each spending about 2-3 hours a day. (TOI. September, 5, M.S. Swaminathan). The knowledge centres have effectively empowered rural communities with information on environment, health, sustainable agriculture and aquaculture. Meteorology, market and prices. Rural families give priority to information on health, livelihoods weather and markets. Generic information is converted into information specific to each location, thus enhancing its practical relevance.

Intelligent-Community–It's a joint venture launched by A.P. Government and US based Information Technology Company, Hewlett-Packard, to create the world's first i-community in five mandals of Kuppam constituency of A.P. represented by Chandrababu Naidu . This project will provide browser-based services to access govt. benefits, agriculture information's, educational resources and health care records are being on test run. With assistance from a global community leadership training voluntary agency. World Corps, and chief ministers' schemes for unemployed entrepreneurs has come forward to set up a chain of Community Information Centres (CICs)-local cyber dhabas-which also serves as copier shops, telephone booths and dissemination points, for a variety of govt. welfare schemes.

E–Chapels–This modern concept has been introduced by ITC in several villages of MP, Haryana and Punjab. In this experiment ITC provides computers to the villages with Internet access. Farmers have to grow only those varieties recommended by ITC to meet the industrial need. For this the company will pay a premium of Rs.100/qtl. Otherwise farmers are free to know the global wheat price through Internet and will be paid the same for their produce. This approach is commodity-based approach in extension terms.

The Crux of all these Experiment

- People managed.
- Demand Driven.
- Caters to all community members including woman and youth

- Content should have local relevance
- Content should reflect value addition
- Content should be in local language too.
- Information that makes a difference is one that is useful in directing local activities.

Scope:

Electronic Governance–One of the major applications of IT for better quality of service to the citizens is Electronic Governance. EG can provide secure, reliable and controlled interface between the government and citizens through computer communication network. EG is more than just citizen service and is a combination of technology, process reengineering and a new style of leadership. Citizens and consumers of government services are now more aware of their rights and they demand access to information and transparency in their dealings. While trying to provide access to information; certain specific issues need to be addressed. For example :

- How to avoid duplication of collection of same data that can be shared by many services ?
- How to keep the information up to date?
- How to make information widely available?
- How to ensure confidentiality and security?
- How to use new developments in IT for maximum benefit?

Finance and Insurance–Farmers can get their crops and animals insured with e-commerce enabled agribusiness companies on a good interest rate. Farmers can take loans or money on credit from such companies on a reasonable interest rate avoiding the village mahajan and other such traps. Common queries regarding loan and savings in bank should also be addressed.

Land Records–Computerisation of land records is one of the most challenging applications of Information Technology. More than half of Indian population is affected by the land records system. Therefore, any change in the existing system would have to be a hundred percent foolproof and secure. Land records are no more just documents used for revenue collection but are increasingly being used for planning and management. Land records contain details about ownership, classification of lands, cropping pattern, tenancy, etc. The Patwari or village level functionaries maintain these at the village level. The Record of Right (ROR) is a basic document, which is produced out of the land record system and can be used as a proof of property for sanction of loans, etc.

Geographical Information System–The Geographic Information System (GIS) is a composite of computer-based tools and methods for integration and spatial data from different sources. It also provides the environment for analysis, modeling and display of data. IS is well suited for collation of data of diverse nature i.e. alphanumeric data, paper maps and remote sensing imagery. It is therefore an excellent tool for management of large bodies of spatially extensive data with all the advantages of speed, precision and consistency without computation errors. GIS is widely used for regional planning, natural resource management, water resource management, etc. It is also used for dissemination of large volume data in simple, presentable format.

E-Weather–The growing of crops to feed the populations of the world is directly affected by climate change. Food production is totally dependent on favourable growing conditions. Role of IT in weather forecasting is two folded i.e. generating weather forecasts and its dissemination to the farming community. Meteorology Division of Indian Meteorological Department (IMD), Pune deals with agricultural weather forecasting. It maintains a network through an agro-meteorological observatories across the country with the cooperation of agricultural universities and research institution. In their daily evening programmes for farmers, All India Radio

broadcasts farmers' weather bulletins in different regional languages. A second bulletin is also issued for broadcast in the morning during the rainy season. The bulletins are also published in newspapers. Farmers' weather bulletins provide a district-wise forecast of weather during the next 48 hours, with an outlook for the following 2 days, taking into account the effects of weather on crops grown in their respective regions. IMD prepares agro meteorological advisories twice a week in consultation with agricultural experts of the State Agricultural Departments for broadcasting by AIR and TV. The advisories contain the advice the farmers regarding what agricultural operations they may undertake in the context of the prevalent weather conditions. The agro-meteorological advisories are very useful to farmers for scheduling of irrigation to save water, and choosing the optimum timing for spraying of pesticides, application of fertilizers, etc. Need of the hour is to make these bulletins available on the internet (e-weather bulletins) so that farmer can make use of this data in planning his routine agricultural activities.

Agricultural production–One of the frequent applications of computers on the farm is in the recording and organization of financial accounts. For more sophisticated recording and organization of financial accounts. For more sophisticated recording systems, the farmers must plan future projections more effectively by basing them on historical records and trends. Some simple arable software packages record current crop, previous crops, spray usage, and financial performance for individual fields. Forecasting procedures can also be used to create or amend cropping plans, or to produce financial projections which provide a comparison between the performance of the current year's crops with those predicted in the original budget or with those of previous years.

Horticultural use of microprocessor monitoring and control is well established. Humidity and temperature are of great importance in the production of glass house crops. Local meteorological variables can be monitored and recorded at low cost using computer based automatic weather stations. More importantly for the farmer perhaps, these devices are able to process the data and report when weather conditions favour particular crop diseases or advise on irrigation schedules.

In veterinary science, computerized feeding systems have been developed particularly for dairies. These systems enable a farmer to program feed dispensers to provide individual animals with a specific concentrate ration in a particular day. NDDB has successfully employed computers at its milk collection centres for better services to the dairy farmers.

E-Agricultural Markets–Farmers' needs vary with season, crop, weather and location. So most of agribusiness services need to be regional in scope. Many farmers don't have so much of time or information access to make and implement informed marketing decisions because commodity prices are always changing. So, they can get information on comprehensive grain marketing and risk management programs from any e-commerce site based on agriculture just by clicking on a link. This also gives the farmers peace of mind, and ability to concentrate more on producing their crop. Acquiring Inputs like seeds, fertilizers, pesticides, agricultural implements etc is possible via E-agricultural markets from anywhere in the world. At present personal credit card is the effective mode of payment for e-commerce, which is cumbersome method for farmers in availing e-agricultural market facilities. A credit card should be made at panchayat level so that each and every farmer under that panchayat would be able to use that credit card.

Education, Research, Training and Extension for Agriculture–Micro computers play an important role in the areas of education, training and research for

agriculture. It ca be used to train personnel on the use of specific software packages. The training programme may include computer assisted-learning (CAL) by using special training software related to the package with which guides the trainee through the various features of that package. This type of training applies to other software packages in which it is important that the user is fully conversant with all the available features in order to get most benefit from using the package. Examples include databases, spreadsheets, financial packages and farm record packages.

New agricultural research is needed to supply information to farmers, policy makers and other decision makers on how to accomplish sustainable agriculture over the wide variations in climate, soils, social, political and economic environments around the world. Many simulation packages are available for education and research and these are usually based in mathematical models of the agricultural system or process being studied. These include farm buildings design and layout, project planning exercises, linear programming techniques, cash flow analysis, depreciation, crop husbandry simulations, irrigation scheduling, and models of forage harvesting systems.

Analysis of experimental results is an important part of student project work and research work in general. Comprehensive statistics packages are available for microcomputers. These packages contain the range of statistical functions or methods of analysis required for research work in agriculture.

Challenges:

1. Maintaining a Healthy Linkages among the technology generation, Technology transfer and technology user system so that there must be a continuous flow of information. At any point of time any system can get the desired information needed by them.

2. Heavy Dependency on Urban-centered Telecommunication Infrastructures and the availability of computers that is affordable.

3. Literacy level of the farmers : As the literacy level of India in gone up to 65% but it doesn't mean that our farmers possess the technical knowledge required to run a computer or to understand the functions of internet at his own.

4. Information haves and information have not the whole world is divided into two class after the information revolution and there is a large gap between these two classes. The Internet is not only responsible for this. But unless we can make the tools of the Internet and other basic telecommunication services like the telephone more widely available especially to the rural poor, the expanded use of the Internet among the Information haves will widen the gap.

5. The processes of globalization and the transformation of industrial and agricultural economics into economics based more and more on information and knowledge infrastructures. Without this access, the information 'have-nots' will be at the mercy of external forces, with little or non-ability to understand, respond or direct the forces that affect their lives.

6. Issue to address the resource poor farmers as Indian agriculture in dominated by the small farmers who are also named as CDR (Complex Diverse Risk prone) farmers. Can the information technology will provide them viable alternatives for more profitable farmer business than the previous ?

7. Socio-Psychological characteristics of the farmers : Can rural population easily accept these changes. It's a great challenge for all the agencies involved in rural development to educate and convince the farmers regarding the benefits and uses of information technology.

8. Ability of Extension Workers to cope up with these changes : Every day million of information is pumped on websites. It is the extension worker or other agencies

who are to decide which information is relevant to their clients and how easily it can be transferred to their end users in an easily understandable form so that farmers can use these information in their day to day agricultural operations.

9. Replication and Sustainability : We have witnessed the success of SITE experiment in 1975 to these new experiments such as Warna Wired Village Project in recent years. The success of such projects have shown tremendous impact on rural life but the replication of such project in rest part of the country is still a matter of discussion. The sustainability of these projects so that rural mass should be benefited for a longer period.

10. Reorganization of extension services : Advances in information technology also provide opportunities for farm graduates to establish computer-aided and Internet connected Rural Knowledge Centres. These centres should help to convert generic into location specific information. The present extension service has outlived its utility. It can be replaced over time by farmer owned and operated knowledge centres. A virtual college linking such village knowledge centres to agricultural universities and research institutions can be established, so that farmwomen and men are able to get up-to-date and authentic technical advice. Nearly a million farm graduates (both men and women) can be involved in establishing and operating such Rural Knowledge Centres based on modern information and communication technology. Such centres can also operate local community radio stations. Such a restructuring and retooling of extension services will help to provide demand-driven and environment and farming movement. This great opportunity for achieving a transition from unskilled to skilled work and for designing a new extension service for the new economy should not be missed.

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