Abstract:
Indian Agriculture has made tremendous progress in the last half century by augmenting the food grain production. The Indian Agricultural Extension system had played a significant role in transfer of production technologies from the research stations to the farming community. Though the production has been enhanced, not so much bothered about remunerative prices of agricultural products due to several constraints at various levels. Active participation of farmers in marketing of their produce through an organized system has become a necessary in the context of globalization and liberalization of economy. The Indian farmers have to transform themselves from mere Producers-Sellers in the domestic markets to Producers-cum-Sellers in a wider market so as to realize best returns for their efforts, risks and investments. Farmers need to know the marketing information and strategies to make their production system market oriented. On the other hand, entire Indian Agricultural Extension system needs to be oriented with knowledge and skills related to marketing. Information technology (IT) has connected the world globally and is now changing our lifestyle and social consciousness dynamically. For the last two decades it has emerged as a best tool for global information sharing and mutual communication. It has made its impact in every fields of life from medicine to agriculture.

Introduction:
Information systems are assuming an ever increasing importance in the agricultural development and playing an important role for sweeping changes in socio-economic development of the country. Computer based information systems / data bases and communication networks are today a pre-requisite for taking coherent and balanced decisions. The use of computers has brought awareness on the potentials of IT in agriculture. Areas of usage advance from computing to the existing multitude of uses in agricultural research, decisions support systems (DDSs), Expert Systems (ECs), Extension Services to farmers, Farm Management, training etc.

Agricultural information can be made available to the farmers round the clock through the internet. The internet is emerging as a potential tool to contribute to agricultural development. Websites and rural portals in regional languages can be developed and hosted on the World Wide Web through internet. This will provide information to farmers in their local language, besides chat software’s in local languages can be developed and made available to the farmers through these rural portals. The software’s will help farmers in getting into discussions with experts and other farmers and experienced persons and will help in exchanging views and information and final solution to their problems.

Information Technology can be defined to include the computing technology i.e., all processor based machines and peripheral and the communication technology such as the facsimile machines, modems, satellites, radio, telemetry etc.,

Information Technology (IT) tools
The most commonly available IT tools in Indian context are:
1. Radio and Interactive Radio
   Radio is the oldest IT tool and provides entertainment to masses to a great extent but with very little emphasis on agriculture extension services. Some of the applications of this very common tool are:
   - Relay of talks with experts on almost every issue associated with agriculture
   - Mass communication bulletins
   - Interactive discussions with experts and training of farmers and extension Workers.

2. Television
   For communicating with an audience through audio-visual medium, TV has been very strong and advantageous tool.
3. Video Cassettes and Interactive Video Disk (IVD)

It provides an opportunity to user for easy access to vast amount of material, including video, slides, graphics, text and animation.

4. Internet

It enables communities for two-way communication and facilitate dialogue among communities, planners, development agencies, researchers and technical experts and encourages community participation in decision making.

5. Multimedia

It describes the use of different media and technologies to present the information in variety of ways. Mass media components such as graphics, animation and sound enhances the extension process through visualization.

6. Video conferencing

It is an audio plus visual conferencing for farmers located in distant villages. This technology is very flexible and open to entire world.

7. Compact disk read only memory (CD-ROM)

The compact disks or optical disks are alternate to magnetic tapes. A CD-ROM can store large amount of information in compact and convenient form. It can store vast amount of material, viz., text, graphics, sound, slides, animation, small amount of video and offers self placed learning to users.

8. Expert System (ES)

This provides ready access to information on improved varieties, crop management, irrigation management, weed control etc to extension workers and farmers. This new technology provides expert advice and information immediately to less experienced users. This system also provides an opportunity to see that how agricultural experts are capable in solving day to day problem of the farmers.

9. Geographical Information System (GIS)

The GIS is computer based data band for the information generated through remote sensing which is stored and preserved in the raw as well as in the processed form.

Countries Using ‘IT’

Information Technology in other countries:

- In Bangladesh, the GIS – derived maps are being used to calculate fertilizer doses.
- In Nigeria, the GIS – derived maps are being used to assess the risk of land degradation.
- In China, the farmers are analyzing computer models to determine their pest management strategy.
- In Japan, the computer based Decision Support Systems (DSSs) have been developed for alternative cropping, poultry production control and marketing of farm produce.
- In USA, the Agricultural Market Service (AMS) of USDA reports on prices, availability and quality of goods linked by a network combining VSAT and E mail.
- In Ghana, the traders are using cellular phones to get price quotations for cocoa.

Information Technology in India:

There are a large number of innovative initiatives both in the government and non-government sectors to take information technology to agrarian communities.

Some of the Information Technologies in India

1. M.S. Swaminathan Research Foundation (MSSRF), village knowledge centers (VKS) in Tamilnadu and Pondichery.
2. Bhoomi in Karnataka
3. Drishti in Haryana
4. SEWA in Gujarat
5. E-Sewa, E-Sagu in Andhra Pradesh
6. Gyandoot in Madhya Pradesh
7. Maha Agrinet in Maharashtra
8. Tarahaat in Delhi
9. Akshaya in Kerala
10. N-Logue of IIT, Chennai
11. Kissan Kerala
12. EID parry’s Agri-Line Project
13. ITC’s Choupals etc.
14. ICAR has proposed a plan to modernize sits Agricultural Research Information System (ARIS) with the help of information technology.

Advantages of ‘Information Technology’ in Agriculture:

1. IT industry can offer solutions, which can improve the working situations and lives of the farmers with in this country.
2. Consultancies regarding diseases, pest alerts, animal health, difficult weather (or) any abnormal ground conditions are the key needs of the farming community.
3. Providing low cost connectivity will enable the farmers to achieve relevant information and seek answer to his specific questions by means of internet.
4. It could enhance the profits of a farmer by making the middle structure ineffective by providing direct market access.
5. Farmer can check the market rates of the agricultural commodities in regional language along with data on agricultural schemes, crop technology, when to spray and plant their crops etc.
6. Providing the information and various application forms on the Net can check corruption and harassment of farmers by the Government officials.
7. The farmer need not to visit the offices for form collection and information gathering, they can download the form at their own place and submit the application.
8. They can follow the progress of their application through Net.
9. Land records can also be made available online, this will help to create transparency.
10. Establishing computer – aided and internet connected rural knowledge centers will help trigger a knowledge revolution in agriculture and will lead to an efficient and eco-sensitive precision farming movement.

Impact on Agricultural Extension:

The whole extension system is affected by Information Technology tools and techniques in a big way as it reduces the dependency for personal advice to a great extent.

Following examples illustrate how the Information Technology could function in the field of agricultural extension.

1. Farmers may visit an extension office with an insect that is causing heavy damage to their crop. The extension worker can identify the insect by consulting a database of digital photographs of various pests that have been photographed in the area by local entomologists.
2. Using a chat room, crop pest specialists can be consulted to know how to accurately identify and control the pest. Local extension worker can consult an online directory of pesticide suppliers and based on the information they can suggest the use of appropriate pesticide
3. The development of an expert system (weed adviser) can provide extension workers with accurate and easily accessible decision support for the identification and control of common weeds in crops.

Problems in use of Information Technology in Agriculture in India

There are three types of problems:
1. Operational Problems:
   b. Economic constraints: Non-existence of reliable background information about Information Technology and inadequate capital resources to invest on them.
   c. Weak basic infrastructure: Non-availability and intermittent failure of electricity and inadequate Tele-communication infrastructure in rural areas.
   d. Deficiency of skilled human resources: Inadequate technical and operational expertise in order to manage systems.
   e. Lack of maintenance of infrastructure: Break down of latest and imported equipments may create inconvenience due to non-availability of spare parts in domestic market.

2. Contextual Problems
   a. General conceptual inadequacy about the use of Information Technology: Lack of clarity about the potential of Information Technology among various developmental officials and general public as well as lack of management awareness among top officials about their applications in long term planning.
   b. Misfit of Information Technology into Indian Organizational and Socio-cultural environment: Since, most of the new technologies are developed in industrialized nations to cater their needs may create the problem of misfit with the administrative and socio-cultural environment conditions of our country.
   c. Existing lower literacy rate: Can hamper the introduction of language based IT’s in rural areas.

3. Strategic Problems:
   a. Absence of comprehensive policy support: To channelise the use of Information Technologies in agriculture and prevailing import restrictions are also responsible for stagnation in penetration of these technologies into the development stream.
b. Weakness of domestic research and development base to indigenous production of technologies

c. Dichotomous application of Information Technologies in rural areas, virtually widens the gap between information rich and information poor.

Strategies for application of Information Technology in Agriculture

a. Defining national development needs synthesized form information needs of different participants in the agricultural development – planners, policy makers, national bodies, researchers, educationists, industries, traders, farmers, producers etc.

b. Information Technology infrastructure development – creation and strengthening of telecom infrastructure all over the country with priority to rural areas and providing cheap and quality services.

c. Information Technology Manpower Development – Upgrading the quality of Information Technology education and training to produce skilled manpower for better production and maintenance of costly equipments.

d. Indigenization of technology development and production – strengthening the domestic research through fruitful collaboration with technically advanced countries.

e. Formulation of comprehensive Information Technology policy - A separate information technology policy can be formulated which comprises of regulation and monitoring of Information Technology production, acquisition, experimentation and implementation in development projects.

CONCLUSION:

Indian farmers have moved from subsistence to self sufficiency due to advances in production technologies. In order to be successful in the world market, Indian farmers have to shift their focus from Supply Driven to Market Driven so as to get high returns from farming. Besides providing information and training on production technologies, the extension professionals have to provide the needful information on important aspects of marketing such as grading and standardization, storage, processing, market information and pricing of farm products through Information Technology. The Information Technology in Agriculture needs to be reorganized in a changing scenario.

A range of communication technologies have been developed and are being used to meet the demand of rural population of the country. Availability of computer, network and data bases has been essential to take up major development programs. At present benefits of Information Technology are available primarily to urban elite masses. India is vast country and the need of the hour is to extend this facility to the entire nation, even to the remotest of the region and villages, so that everyone has access to this technology only then the entire farming community will be benefited from the advancement in Information Technology and their status and living conditions can be improved. Infact Information Technology and information highways are going to dominate this century.

References:


Ramesh Babu T (2005) ICT and Agriculture with special reference to IPM, “Market Intelligence and IT in Agriculture” held at College of Agriculture, Acharya N.G. Ranga Agricultural University, Hyderabad during 15th to 24th November.

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