

Role of ICT in Agriculture

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SUMMARY

Agriculture is a gigantic sector of the Indian economy as its share to gross domestic product (GDP) is almost 18 per cent. Over 60 per cent of the population adopts agriculture as main occupation. ICT in agriculture provides farmers with vital information pertaining to sowing, crop protection, and improving soil fertility that enables them to improve agricultural productivity. Weather-related advisories and alerts help them prepare for sporadic events such as floods, drought, or even pest and disease outbreaks, thus preventing significant crop loss. ICTs also provide them with a reliable channel to seek the best market price in the local markets and other daily updates for their produce to ensure they receive fair returns.

INTRODUCTION

In order to accelerate the productivity and employability of individuals, agriculture requires successful technological use. ICT in agriculture is also known as e-agriculture. ICT in agriculture offers a wide range of solutions to some agricultural challenges. ICT can improve farm management and farming technologies through efficient farm management, risk management, effective information or knowledge transfer etc., realizing competitive and sustainable farming with safe products. Farmer has to make critical decisions such as what to plant. When to plant? How to manage pests? While considering off-farm factors such as environmental impacts, market access, and industry standards.

Major role of ICT in Agriculture

Information and Communicational Technology has many roles to perform for agricultural development starting from decision support systems to the trading of crops.

Decision Support System

ICT has a great role as a decision support system for farmers. Through ICT, farmers can be updated with recent information about agriculture, weather, new varieties of crops and new ways to increase production and quality control. The dissemination of adequate, efficient and tailored technologies related to agro-climatic zone, size of farms and soil type etc. to the farmers is deficient in Indian agriculture and it is the real challenge in front of policymakers in India. Information and communication technologies can broadcast precise and authentic information at right time to the farmers so that they can utilize it and get benefits. The decision support system through ICT facilitates farmers in planning types of crops and practicing good agricultural practices for cultivating.

Widen Market Access

One of the major drawbacks in Indian agriculture is complex distribution channels for marketing of agricultural produce. Farmers do not get acquainted with the updated prices of commodities, proper place for selling their inputs and consumer trends also. ICT has the great potential to widen marketing horizon of farmers directly to the customers or other appropriate users for maximum benefit. Farmers may connect directly with many users and may get information about current prices for their commodities. They can get access to the market sitting at home. Further, it will curtail the middle profit also which will be beneficial for the farmers. This can improve a farmer's source of revenue; empower farmers for making good decisions about appropriate future crops and commodities and marketing channels to sell their produce as well as to get inputs.

Importance of e-agriculture technology:

Water, fertilizers, and nutrients no longer have to be used in whole fields evenly by farmers. The minimum requisite amounts and the goal areas can instead be used, or individual plants can be treated accordingly. Benefits include:

- Higher crop productivity

- Decreased use of water, fertilizer, and pesticides, which in turn keeps food prices down
- Reduced impact on natural ecosystems
- Less runoff of chemicals into rivers and groundwater
- Increased worker safety in addition, robotic technologies enable more reliable monitoring and management of natural resources, such as air and water quality. It also gives producers greater control over plant and animal production, processing, distribution, and storage, which results in:
 - Greater efficiencies and lower prices
 - Safer growing conditions and safer foods
 - Reduced environmental and ecological impact

Some of the e-Agriculture initiatives in India are indicated below:

AGRISNET

It is a comprehensive web portal to broadcast relevant information to farmers, which was initiated and funded by the Ministry of Agriculture, Government of India. The AGRISNET serves farming community by disseminating information and providing services through use of Information & Communication Technology (ICT). It has following goals: i) Providing information to the farmers on quality of the inputs and its availability ii) disseminating information of various government schemes and recommending fertilizers after soil testing iii) Providing information on latest technologies for increasing productivity in agriculture.

AGMARKNET

Agricultural Marketing Information Network (AGMARKNET) was commenced in March, 2000 by Ministry of Agriculture, Government of India with the aim of empowering decision-making ability of the farmers regarding selling of their produce. This portal was developed to pace up the agricultural marketing system through broadcasting information about influx of agricultural commodities in the market and their prices to producers, consumers, traders, and policy makers transparently and quickly.

KISAN CALL CENTERS (KCCs)

KCCs were commenced on January 21, 2004, by the Department of Agricultural and Co-operation with the main intention of endowing extension services to the farming community in the local languages. The queries of farmers are tackled by agricultural graduates on the helpline, a toll-free number in their local language. The agricultural scientists also visit the field in person to get an idea about complex agricultural problems to resolve them.

Application of Technology in Agriculture:

1. In the area of agricultural inputs, IT can be used for controlling demand and supply. Based on the annual crop schedule, the need for agro-inputs can be calculated and supply tracked accordingly. Agriculturalists can access details on the availability of crops, fertilizers and pesticides in various regions. This could allow him to obtain inputs quickly and at a lower cost.
2. Universities of agriculture and other national institutions routinely release enhanced varieties of different crops. The important features of these variants such as their performance, disease tolerance and adaptability could be communicated to farmers via the website,
3. The website can show audio-visual clips of the causative body and the affected/diseased plant component with their control measure. This will help farmers in rural regions to detect and correct the disease.
4. There are some 28,000 soil survey maps of the Department of Agriculture through digitalization and to maintain them continuously, necessary knowledge can be extracted through GIS technology.
6. Basic agricultural data can be generated by remote sensing & GIS where the survey numbers in the cadastral village maps can contain attributes such as ownership, soil productivity, crop pattern, etc. The data may be combined and interpreted to support decision-making at various levels. These details may also be exchanged with other agencies.
7. In order to develop successful Watershed planning initiatives underpinning the Agriculture Department integrated information structures with different elements of watershed programmes must be established and tracked at different levels.
8. It is vital that the specifics of all watersheds and villages in Maharashtra, utilizing GIS, are gathered in the preparation of a successful crop plan. When this information is accessible, it helps to prepare a production

schedule on micro-level. Farmers will need to provide details on the seeds of different crops and the predicted yield in different seasons. This will allow them to choose alternate plants in a specific season considering potential supply glut.

9. Micro-level data can be used to prepare for the farmers an interactive module which takes account of local agro-climate conditions and suggests an alternate crop plan for them. Appropriate software to track the crop plan effectively by different officers at different levels may be created and updated. Policymakers may use the GIS technologies to evaluate crop area and performance. It will help shape the market/credit policies in the short and long term.

10. For predicting rainfall, region in various plants, yield estimates and soil resources, the use of data for satellite imagery to predict agriculture-related details should be implemented.

11. The interactive module must be prepared to support the agriculture budget to record and raise awareness of the viability of cultivable data.

12. To increase efficiency, it is essential to make the latest knowledge accessible to farmers on the facets of development and post-production of the different economic crops. A crop guide with accurate and authentic details on essential varieties, planting techniques, prescribed fertilizer doses, the kinds and control of pesticides, harvesting and post-harvest methods including the primary processing of farmers is urgently needed. This data should be updated and dynamic.

13. In India there are 30 per cent post-harvest losses of fruits and vegetables. It is therefore vital that our farmers are educated to reduce such losses by adequate collection, processing, grading, wrapping and storage methods. Farmers should be aware of the storage requirements, storage methods and optimal storage time of economic crops. This will help him to keep the product in decent shape despite the demand glut.

14. A database of numerous agricultural agencies and institutions is urgently needed. Information should be gathered for farmers from agricultural input producers and distributors, agro processing suppliers, exporters and importers. Detailed reports on function in other agencies, such as NRCs, SAUs, and training centre's, should also be included. In the context of compiling study results, scientific guidelines from four agricultural universities in Maharashtra should also be generated for the agricultures research database.

15. The use of IT for agricultural expansion would in future be highly prioritized. During the development of any IT framework for agriculture, farmers as players, generators and users of expertise should remain focused. In order for the collaboration of scientists, extension staff and farmers to transmit technologies and knowledge more efficiently, extensive usage of digital information technology should be encouraged. Considering farmers' individual farm management, some helpful software packages should be created and published on the website. Drip designs, Green House design, cropping patterns, farm accounting and management are some of the applications that require immediate attention.

16. In the Department of Agriculture and in the business sector, multimedia extension content in the local language should be promoted. The farmers will profit greatly from multimedia CDs in different topics.

17. The equipment for the public extension must be highly qualified and capable of supplying grass root knowledge and technologies. It can play a key role in distributing knowledge-based technology that is fundamental to agriculture. Similarly, involvement of the private sector can be facilitated, including cooperatives, NGOs and farmers' organizations. The use of IT to disseminate knowledge by these institutions has been shown to be quite successful. These agencies will promote Agro Cyber Cafes, particularly run by unemployed farmers, like PCO/STD booths at the village level.

18. The private entity shall have the facilities and the hardware for an Agro cyber cafe, while the government can provide assistance in the form of CDs and applications to ensure the district KVKs, line departments and markets have accessible suitable details. The department should have those details for reimbursement to farmers and farmers' associations. Ideally, Agro Cyber Cafes will be in any village.

19. Local Loop Wireless In delivering and running telecoms and Internet networks in the rural areas, technology has been found to be extremely successful. The state should follow an ICT policy comprising of internet, cable television and Community radio, covering 10 million farmers and aiming at covering every farming family in their attempts to disseminate and sell knowledge.

20. Marketing of agricultural products calls for a broad network of national and foreign links to link market access among the markets and exporters/producers/traders/industries and customers. It is essential to develop this network from which day by day details may be given concerning the arrival of commodities and the prevailing prices, export documents and information relating to leading national and foreign marketing bodies.

21. Globally and internationally relevant requirements on grading, packing, marking, stockpiling, transportation, shipment, health and plant health, quality assurance and quality certification in agriculture sectors would allow both domestic and foreign trading and processing industries to conduct large-scale agricultural marketing operations. The producers should be provided with information on export practices, legislation and regulations to encourage exports.

22. For policy development, infrastructure planning and analysis, data on various aspects of agricultural marketing are relevant. The Atlas of Agricultural Markets at the State level must be established to include knowledge for any crop, major processing regions, movement and storage of each product and large consumer centre's. This will promote the implementation of effective marketing policy in the agricultural field, both public and private.

23. The rules of the WTO and GATT would have a significant effect on agriculture. Therefore the usage of ICTs should be widespread in simpler application of these regulations.

24. Many of the central government-built institutions in India, such as the NCDC, NAFED, TRIFED, NDDDB and the APEDA, specifically participate in the implementation of agricultural marketing programmes to assist farmers in their marketing processes. Other bodies are available to support exports, such as commodity boards and export promotion councils. The farmers and targeted communities should be able to take maximum advantage of the new prospects across all the related programmes and policies of these organizations. You will use the Website to distribute this knowledge effectively.

25. It is important that extension workers and farmers are computer scientists in order to penetrate the Information Technology on the grass root level. The State wants to implement a massive computer literacy campaign at diverse stages. There is basic programming knowledge for current employees in the agricultural department and universities. However, anyone interested in these fields should be recognized and specialized computer application training should be provided. In the development of IT capability of farmers and woman organizations, Local NGOs and institutions should also be active. The subject of information technology should be included in the Agriculture Colleges' degree programme.

26. To consolidate process and distribute knowledge on different facets of agriculture, a Virtual University for Agrarian Prosperity as a centre of excellence needs to be set up. In order to receive strategic assistance from the Commissioner of Agriculture and NIC, it may be formed in Pune. A Technical Advisory Committee composed of data generators, data administrators and data consumers could be held at the virtual university. The plant must be fitted with the new equipment, applications and skilled workers. Department and SAUs with expertise in agriculture, horticulture, conservation of land and water, post-collection management and marketing could attract the workforce. In addition, the centre should be operated by professional personnel with experience in hardware and programme administration. To ensure that the source of knowledge that is circulated is accurate, an appropriate process must be established. An app with revenue data such as the correct recording may also be built for better use of such centres.

CONCLUSION

Agriculture is one of the most essential sectors in our country. ICT farming, particularly the use of multimedia technology and other innovative approaches to interactive knowledge transfer processes, is transforming agricultural extension services. ICT has been instrumental in empowering farmers through knowledge and building their capacity to incorporate various environment-friendly practices around regenerative agriculture in order to achieve rural and agricultural developmental goals.

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