



Comprehensive Role of Computer Applications in Agriculture: Review Paper

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Abstract— *Our farmers today need the right information for successful farming that can be made available to them easily. To break the communication barrier and knowledge gap that exists today India has farmers' portal for its 28 states. Few farmers use this online portal, and few visit local agriculture universities to get package of practices. e-Agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use (ICTs) in the rural domain, with a primary focus on agriculture.*

Keywords— *ICT, e-Agriculture, GPS, GIS.*

I. INTRODUCTION

The biggest challenge for Indian agriculture is the decreasing size of land holdings, which can potentially make the profession unfeasible. Indian agriculture is undergoing a heavy stress as average land holdings is decreasing day by day. Our acreage has remained at 140 million hectares since 40 years but the number of farmers has increased from 7 crore to 14 crore. We are adding one crore farmers every five years. With smaller land at disposal, there is a decrease in farmers' capacity to invest in land. With average land holding halved, the cost of getting inputs and time consumed has doubled.

Unlike the all-India trend of a declining average size in operational land holdings, small and marginal farmers were leaving agriculture in Punjab by either selling their land or leasing it out. Average size of operational land holdings per farmer in India is 1.2 hectares according to the agricultural census of 2011. The worry is land is dividing due to population pressure and farmer is not interested in this profession then only the question is how to make this profession remunerative. Besides the improved cropping practices, technology can also play an important role.

II. REVIEWS

Computers are the part and parcel of life in today's world. From the schedule starting from early bed to late night, all the activities are online. Today whole world is shrunk to technology and nobody is far away in any aspect. One can talk of any enterprise, everything is linked to technology. India, being an agrarian country where livelihood of 65% population depends on agriculture. This is the sector where we are far behind in computers. Our agriculture is mechanized but our farmers are lacking knowledge regarding role of computer applications in agriculture. It has been rightly said that computers and their applications changed the structure of most traditional occupations like agriculture. Technological advances have brought about drastic changes in agriculture, its subsidiary occupations like fish farming, dairy farming, bee keeping, mushroom farming which results in a tremendous increase in productivity.

Computers help in one of the most important aspect of agriculture i.e. Weather Forecasting. Many unsolved problems can be unfurled just having access to weather advisories/forecast. Major operation of sowing can be adjusted according to weather forecast by which the farmer can save money spent on seed. Many crops are sensitive to rainfall like germination of direct seeded rice, cotton, pulses, maize. The sowing can be done by following weather forecast. Many spray applications can be done according to weather otherwise the large amount of money spent on the pesticides also goes waste. Nowadays all field operations are done by contract labor whose wages are sky-rocketing. So input cost can be reduced by just access to computers.

If computers have changed the ways of farming, then the Internet has only doubled that pace of change. In today's times, agriculture is not just about crop production or livestock farming and associated activities. The challenges brought forth by ecological factors affecting the environment need to be a major consideration for any kind of farming activity. Farmers need to preempt environmental impact due to climate change and this is where modern technology comes to the rescue.

III. USES

In a nutshell, the uses of computers in agriculture include:

Information technology: Changes in information technology will help in a big way to improve agri-business and incomes of small farmers. Indian private companies and NGOs are global leaders in providing information to farmers, as a spinoff from India's meteoric rise as a world leader in ICTs. E-Choupal has expanded access to internet in rural areas. Up to 6,400 internet kiosks were set up between 2000 and 2007 by ITC Limited, one of the largest agricultural exporters.

It reaches about 4 million farmers growing a range of crops - soybean, coffee, wheat, rice, pulses or shrimp - in over 40,000 villages. They get free information in their language about local and global market prices, weather forecasts, farming practices and crop insurance. It serves as a purchase centre, cutting marketing costs and allowing farmers to obtain a bigger farm price.

The M. S. Swaminathan Research Foundation established Knowledge Centers in Pondicherry in 1997. With the support of the Indian Space Research Organization, centers in each village are connected by satellite to a hub at Villianur. The women self-help groups use the centers' computers to manage their business accounts and coordinate their activities, using video links with the other villages.

The declining costs of ICTs are giving small farmers much greater access to information. Mobile phone coverage in India is expanding at breakneck speed. Nokia sold several lakhs of new mobile phone handsets, and new subscriptions are averaging 6 million a month, many in rural areas. Computers are now being linked through mobile phone networks to greatly expand the scope of information. By linking communication technologies to market exchanges in commercial centers, even small farmers can overcome the enormous informational asymmetries that limit their bargaining power in traditional supply chains. The revolution in mobile phones is helping the small farmers to get information about crop prices and input prices and other related information on agriculture.

Machinery

Farm machinery and other farm operations like fertigation, herbicide application, water management, use of sensors for different field operations etc. has replaced the traditional conventional methods. Computer operated softwares for different crops are available to assess yield performance by using different parameters. Computers are used for record-keeping related to cost of production, transport, agricultural operations, and in the estimation and calculation of profit and/or loss. The Internet viz various portals in agriscience, most government websites provide this kind of information free of cost, covering agricultural land masses helps in interaction among farmers and between farmers and agriculture/subject matter specialists. This results in an exchange of knowledge and serves as guidance for farmers to improve production and earn profits. Mechanization has reduced human/animal effort and increased the speed and quality of production.

Geographic Information Systems (GIS) are commonly used for evaluating land and providing a site assessment to aid what is now known as precision agriculture. These hi-tech, interactive systems provide information based on a variety of factors such as soil conditions, drainage and slope conditions, soil pH and nutrient status, etc. Before access to these technologies, farmers were ignorant about soil output, and unpredictable weather conditions affecting crop quality and profitability. Precision agriculture provides farmers with control by predicting vital information including fertilizer application and problems with drainage, insects, and weeds.

Global Positioning System (GPS) based technologies also help to monitor irrigation, field mapping, soil sampling, tractor guidance and crop scouting. This kind of technology equips farmers with enough information to increase crop yield in a manner that is consistent with the best environmental practices for sustainable agriculture.

Assistance of decision-support systems-if farmers want to increase the profitability of their production, decision support systems must be continuously developed and improved.

E-agriculture

An emerging field of agricultural practices, e-agriculture focuses on coming up with innovative ways and best practices to use the existing information and communication technologies (ICTs) for sustainable agricultural development and food safety standards, particularly in rural areas. E-agriculture encompasses other related technological fields such as agricultural informatics, agricultural development and business. It aims to deploy all available technologies (computers, mobile computing, satellite systems, smart cards) for the empowerment of farmers and strengthening of partnerships across the food value chain.

IV. CONSTRAINTS

The uses of computers in agriculture do have some real constraints such as, the lack of hardware and software infrastructure, training and skills, and research priorities. However, once these are overcome, the use of computers goes past automation and software application. In fact, it could be instrumental in bridging the digital divide and bringing prosperity to agriculturists not only in the United States, but also in other developing and emerging economies around the world.

V. CONCLUSIONS

Increase in income from products sold through updated information about mandis(markets). Good communication between farmers, experts. There will be reduction in travelling cost. Handy and useful information of weather, crops, pests, irrigation schedule, etc need not be read from packages sold, hence knowledge enhancement is there.

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