

Role and Potential of Information Technology in Sector of Agriculture

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Abstract

For developed countries, agriculture and industrial sector continues face such problem as requirement for increasing the food productivity as well as output, and development for job opportunities of poor and rural people. The agriculture sector is having affects by economic trends as well as rapid shifts. The findings showed there is a strong requirement of IT that be used for dealing with problems as well as improvements and increased productivity and advertising of agriculture. But, IT's interest in agriculture was not exploited completely. Introduction of Information technology in rural and agricultural sector is fairly slower compared other economic sector in which the contemporary information technology was incorporated at higher speed. The aim of the paper is examining function, capacity, participation of information technology in this business and demonstrate the opportunity for information technology usage in several agriculture sector areas. Their results are on literature available and economic theory, which indicated that information technology had tremendous potential in helping producers and stakeholder in increasing performance of the agriculture, effective and profitability. Players, though, have other drawback and challenge in dealing with in application and usage of information technology. There are several way where information technology could be made in use to share data, such as digital kiosks that not only offer essential resources, such as telephone, schooling, health care, agriculture and irrigation, electronic banking, municipal services, etc., specialist networks that help to define marketing options and optimum approaches. Information technology enables to forecast the outcome precisely crop physiology relevant to the agriculture. The study of leaf protein is an interesting research that helps in addressing deficiency of protein as well as malnutrition. The current study dealt with IT's role for Agricultural production.

Keywords: Agriculture, Agribusiness electronic commerce, Farm-level Intelligent Decision Support system, Information Technology

Introduction

Agriculture has played a major role in majority of underdeveloped countries with regards social as well as economic growth. Justifications is to including concern that are related to safety of safety and welfare of people, the requirement in maximizing the productivity and enhancing the quality of food. The challenge of each country growth in agriculture are big, not just due to meeting the increased demand of food, but because of hunger as well as reductions of malnutrition[1]–[6]. Issues therefore are made complicated as growth of agriculture industry, given conservation of nature environment, to be done in a sustainable way.

In the current situation, growers are facing lesser margins in profit, the cost of a lot of inputs such as fertilizer and fuels has risen, whereas prices of the product has been fairly steady, or fallen. Excessive international trade and deregulations of market in the growing countries has increased pressure on a number of smallholder farmer. For harnessing full impact of the structural developments, price, markets and export practices of agriculture goods are revisited. Around the same time, processes for technology transition under changing circumstances need to be revisited and revitalized. It is India's important sector and will be advantageous tremendously from ICT application, in bringing about change in backward-looking social and economic condition of the poor.

Agriculture is a livelihood sectors and most village poor are dependent for their livelihoods on rain fed farming and weak forest. Farmers of village area often deal of failed crop and animal diseases and solution to their problems remain out of reach due to limited communication facilities. ICT's service position will improve the opportunities of village communities by improvement in their access of information of market and increasing costs of transaction for poor traders and farmers.

Although India is having large and rapidly growing information technology industry, accessible to integrated circuit technologies in rural areas is very small. The current IT adoption levels are far from adequate in Indian society. The National Farmers Policy emphasized the usage of ICT at rural level to reach farmer with right advice and information. With the background information, paper explains the level of farmers' attitudes towards ICT applications in agriculture, the influence of ICT applications in agriculture.

Significant restructuring of the agriculture sector has occurred in previous decades. Agriculture has been driven by bid in the past but it is driven by competition today. They may assume, however, that the knowledge will guide agricultural production in future. New knowledge must hit end-user rapidly for taking advantage in future incentives and deliver profits. Crop, nutrient, soil, and safety of plants knowledge is one factor of effective farming. Accurate knowledge-based and Information-intensive farming methods would be main factor in sustainable agricultural development. Farmer should therefore be known of merits of internet and other knowledge and ICT which offer information service which are essential in food production management. The economic value of ICT use is not completely exploited in agriculture. Instances involve precise farming and livestock management in which ICT may promote more effective choice-making not just for farm-related business managers as well as for policy makers.

The future contributions of ICT to agricultural production can be perceived by reducing prices, increasing production and enhancing productivity. In particular, farmers' data requirements should be evaluated and reported, and then appropriate information systems (IS) created. In designing the programs, the emphasis is on emerging problems resulting from agricultural sector deregulation and globalization.

As stated earlier, the study aim to provide a theory based approach in the study of the importance and potentials of ICT in giving knowledge assistance to agriculture sector having a specific emphasis on e-commerce, and shortcomings in the application of ICT, and removal of shortcomings. The paper is organized in six sections to achieve this purpose. Knowledge foundation of agricultural production is given after introductory remarks. The internal and external contributions of ICT to agricultural development are discussed in brief while the fourth section of the paper addresses ICT use in EU agriculture. Possibilities of internet technology usage of agricultural goods in electronic commerce are explained in the fifth section of the article. The sixth section of the paper deals with shortcomings of agricultural sector ICT application and potential solutions to the problems. Conclusions relating to ICT use in agriculture are discussed in the final section of the report.

Information Technology and Marketing of Agricultural Production:

Reasonable quality knowledge is necessary requirement for the development of all agricultural areas. In countries on the verge of joining greater markets the value of knowledge is especially strong. It is the situation, for example, in many Balkans and former communist countries in Eastern Europe where accession to the European Union is a matter of concern. In such countries, agricultural production is confronted with globalization that reflects a logical extension of the cycle of integration into the European Union, highlighting the need for timely and accurate details.

Enhanced connectivity and access to knowledge contribute directly to each nation's socio-economic growth. Agribusiness is an emerging field with tremendous potential for ICT use for the social and economic growth of the agricultural (community) population and rural areas. Farmers, however, also have trouble having essential information in shape that is straightforward for them to make appropriate decisions about increasing agricultural production. With enhanced data verification, comprehensive cost analysis, and advanced marketing tactics, farmers should be able to make smarter decisions and more profits. Furthermore, the introduction and usage of ICT will greatly boost their husbandries' improved competitiveness.

IT is nowadays buzz technology. It is software which allows in quickly and easily exchanging information. Because of the technology, distance among nations is reduced or difference between them, and now world is becoming an international village. The technology provided opportunities for developed nation and non-developed nation in building their strategy and contest among developed nations.

Awareness is the key to its growth in any market. It is no exception to this. If right and relevant informations is provided in the correct time, it can be of great help to agriculture. It helps to take appropriate steps, to plan plans for the next season or year, to focus on changes in the market, and to prevent adverse conditions. Agricultural development may therefore depends on quickly and relevant the information is given to the end users. There are traditional method for providing end-users with the data. They are mostly inoculated, untimely, and contact is just one way. The data will take a long time and the end user will receive feedback.

Impact and Contribution of ICT in Agricultural Production:

Precise farming common in developing countries is focused on the intensive need for ICT and contributes directly to the production of agricultural commodities. Remote sensor technologies with assistance from satellite technology, geographic information systems (GIS), agronomics, and geotechnical engineering are applied to improve agricultural output. ICT helps farmers track and react daily to changes in weather conditions.

Meteorological field systems supplied with solar power can be attached to farmers' computers for transmitting information on current air and soil temperatures, rainfall, relative air humidity, leaf moisture, soil moisture, daytime duration, wind speed and solar radiation. Many of these precision farming strategies and technology require significant capital investments that are payable to big farms. They are ideal for commercial farming, although they are less ideal and less successful for small businesses and farms.

It should be noted that ICT had offered a number of program for both economic and social development. An impact assessments was considered important for determining if any significant change is there on part of farmer in Agriculture before and after ICT applications. It should be noted that after his ICT Application in Agriculture, a change that a farmer does not possess before ICT application in Agriculture can take place in the farmers. Via his observations and communication with the farmers, the researcher has identified eight economic and social characteristics that the farmers may or may not possess in Agriculture prior to their ICT application. As such, the economic and social characteristics for the purpose of the study include improved produce, avoidance credit buy, comfortable living, poverty reducing, changed family, progressive spending, enhanced lifestyle change and child support.

Indirect Contribution of ICT to Agricultural Production:

Indirect effects of ICT are expressed in empowering farmers to make decisions that should be recognized in future agricultural production. Farmers require timely and accurate sources of information which are described in the previous section of paper. Currently, growers are reliant on traditional sources of inaccurate information and don't have reliable information. Alterations in the agricultural climate faced by farmers not only make knowledge valuable but also important for them to stay competitive and to succeed on a globalized environment.

Efforts to include the details would therefore be inefficient if farmers are unable to use ICT. Elementary computer literacy is necessary in order for farmers for using Internet resources to search for valuable knowledge and communications. They can track pricing via the internet, and connect as much as they want with colleagues around the world. They are able to share thoughts, ask questions and get feedback on different subjects. Advice from scholars and agronomists on growing crops and livestock is of special significance. ICT drives the reduction of the distance between agricultural researchers and farmers resulting in highly integrated agriculture contributing tremendously to the domestic economy and to civilization.

Role of IT in Agriculture:

As far as agriculture is concerned, the capacity information technology (IT) will be narrowly evaluated under 2 headings: (a) as tool of direct contribution to the agricultural produce and (b) as indirect tool of enabling farmers to make quality and informed decision that might have a positive effect on way in which agricultural and related activity are carried out. Popular in the developed countries, precision farming makes extensive usage of it to directly contribute in agriculture productivity[7], [8]. Techniques of remote sensing are being used for improving the agriculture output by making use of satellite technology, geographic information system, and soil science. Where wide tracts of land are involved, this method is capital intensive and useful.

As a result, it is more suitable for corporate-based farming. The indirect merits of information technology are important and remains utilized in empowering Indian farmers. In order to make decisions, Indian farmers need reliable and timely sources of knowledge feedback. The farmer actually relies on sluggish and ineffective. The changing environment that Indian farmers are facing not only makes information useful, but it is important to remain competitive.

Role of IT in Plant Physiology:

By adjustment in physiological structure and functions, plant reaction to their management and environment interventions. Functional and structural models of plants combine 3D plant structures representation with physiological function. The FSPM consist of architectural section of plant structure and a process section plant operation. The first one dealt with I type of organ which are initiated and how they are connected (topology), (ii) organ expansion dynamics co-ordination, and (iii) geometric variables (e.g., leaf angles, leaf curvature, and microbial biotechnology). The part of the process will include any physical or physiological process which affected plant development as well as growth. Protein in Leaf is a good of cyanocobalamin, ascorbic acid and folic acid (Vitamin B9) as well as LPC thiamin, riboflavin and pyridoxin (Iliyas and Badar, 2010) (e.g. photosynthesis, distribution of C).

Introduction of Precised Agriculture via Animal Breeding Technology and Informatization of Cultivation:

Agricultural production plant via networking. Measurement and monitoring of the greenhouse climate network. Targeted crops: tomatoes, cucumber. Automatic control and alarm system of the building in real time. Grain storage's remote management facilities of agricultural products of higher quality. Remote control of the environment via Internet. Control and evaluation in real-time of the storage facility of variation in temperature. Livestock database and system of analysis of individual information. Personal registry of dairy cattle information and personal program of recognition. Establishment of automation of the agricultural facility. Yield forecasting program which uses the database of the climate of the farm facility.

Remote control and agricultural facility measurement system. Greenhouse network for monitoring the climate using mobile communication technologies. Use GPS (Global Positioning System) to collect and distribute information on crop growth and pest information. Develop a mobile information service device. Post-harvest management automation to improve agricultural product quality. Management of the environment for horticultural products. Optimal system for maintenance of the environment and automatic management. Accurate agriculture implementation used new developing high-tech technology[9]. Techniques for diagnosing plant nutrient with chloroplast analysis, optimum recommendation for fertilization. Operation of plant lot quality with GPS. Site-specific framework for controlling crops productivity.

Information Technology and Indian Agriculture:

Technologically, as illustrated in the previous chapters, it is possible for developing the suitable system to meet information requirement of Indian farmers. Systems that are user-friendly can produce interest in the farmers and other working at grassroots, in particular with content of local language. Dedicated networks will be built or capacity of the Internet in making similar service which are available for all part of country can be harnessed. In past regime, it was suggested that for maintaining an undeniable competitive advantage for exports, it is useful for focusing more on certain agriculture products[5], [10]–[13]. This calls for immediate action for implementing technology like remote sensing, bio-engineering, GIS etc. India satellite technology has already made fast progress. Using remote sensing and GIS technologies, agricultural quality can be tracked effectively. This will not only help to prepare, inform and track plant status, but will also help to respond quickly to conditions of crop pressure and natural disasters.

Through these technologies, challenges of stress in crops, problems in soil and natural disaster can be addressed effectively. In bigger tract of land, a start in precision farming will be encouraged in which export capacity can be tipped in favor of our country. When designing these programs, it is important to understand that machines are not familiar with the large target audience. This places premium on user friendliness and considering

technologies of touch screen for improving user's levels of comfort may be helpful. Touch screen kiosks are often found to provide a platform for accelerated training and higher engagement with their intuitive approach. Once the appropriate software packages and databases are in place, the dissemination of information is a major challenge. In order to set up data kiosks, NGOs and other cooperative societies can be used. There is also a need for private enterprise to be involved in such activities. The kiosks will provide data about other areas of interests like information, education in which people need to travel distance like government offices, courts, etc. It is possible to envisage email services, lift questions to experts, upload electronic videos to attract expert's attention to location-specific issues.

CONCLUSION

Farmers and policy makers working on developing agricultural production should be able to use ICT efficiently to adapt to current circumstances that are marked by: full and selective deregulation of the agricultural market, reductions of government protectionist policies, opening of agriculture market, volatility in the agriculture climate and development of opportunity for export. Value of village life can be enhanced by offering reliable knowledge that allows better decision-making. To tackle these issues and rising digital inequalities and separate rural and urban areas, ICT will play an important role in promoting rural and agriculture transition.

Indian farmers and those working for their welfare need to be e-powered to face the emerging scenario of full or partial deregulation and reduction in government security, opening up agricultural markets, agricultural environment volatility, and leveraging potential export opportunities. Quality information inputs that provide improved decision-making capabilities can also improve the quality of rural life. Information technology will play an important role in foster of village India's transformation processes to meet the challenge and eliminate faster growing divisions. The authors have concluded by this study the Indian Govt.

Quick domain improvements allowed for production and delivery for electronic resources in agriculture. State plan will be in design for introduction as well as application in agriculture. Global organizing institutions with deliberative position in process of formulation will serve as catalyst. In agricultural and village areas no one entity will effectively enforce on its own. Thus, industry with important agricultural impact, such as fertilizer or food industry, should jointly promote and facilitate the introduction of ICT in agricultural production.

A remarkable achievement is being made, especially in field of agriculture, by giving farmer with a number of facilities, including services of ICT, to help farmer in understanding new method of cultivation, availability of agriculture inputs, irrigation source, the availability of pesticides and fertilizer to increase productivity and production. The success of any IT service to village India depends on the development of the distribution points 'proper revenue model. The rural kiosks 'clicks and mortar' should be merged with the industry of 'bricks and mortar' to make them profitable undertakings by making them a gateway to rural India. Through supplying and distributing the necessary products, the knowledge kiosks will generate revenue from the industry. Once these points of distribution prove economically viable, no crusaders will be needed for the IT revolution in rural India.

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