

# New Technologies for Agriculture: A Macro Analysis



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## Abstract

Increasing levels of the global population have made an agriculture dearer occupation. Population growth is companied with more demand for food, nutrition, vegetables, agro products, employment, etc. The world is experiencing new innovations and inventions which will help the farming community to increase its production level and to enhance agricultural productivity. Information and communication technology, biotechnology, remote sensing technology, geographical positioning system, artificial intelligence, mobile phones, World Wide Web, television, radio's etc., have played highly relevant role in disseminating agricultural related information to the farming community. Over the years, the information received by the farmers helped them to their productivity and farming knowledge base. The present study is an attempt to discuss the new technologies available for the agriculture, particularly, relevance of new technology in agriculture and its usefulness among the farming community.

**Keywords:** Agriculture, Farming, ICTs, Population.

## Introduction

Food and Agricultural Organization in its publication on "Information and Communication Technologies for Sustainable Agriculture - Indicators for Asia and the Pacific" published in 2013 highlighted the importance of new technologies in the field of agriculture in the following words. "The demand for food is expected to increase by 60 percent in the next 37 years as the world's population is estimated to reach 9.2 billion by 2050. This has to be attained under existing and foreseeable constraints such as the stagnation of expansion of arable lands, scarcity of water resources, advancing environmental degradation, negative impacts of climate change, natural disasters and emerging diseases, competition between foodcrops and bio-energy crops in the use of limited natural resources such as land and water, increased use of food grains for animal feed and bio-fuel, rapid urbanization and a declining agricultural labour force, especially young farmers. If we fail to meet this production target, food shortages may occur, and social and political stability as well as world security and peace might be threatened as we witnessed in the recent past. Addressing these challenges requires coordinated responses and concerted efforts among all stakeholders, including the public and private sectors. The task of feeding the ever growing population is not going to be an easy task. ICTs, GIS, remote sensing, precision farming and many other technologies or processes hold great promises and are our arsenal in the fight against hunger and in feeding the billions" (FAO, 2013). It is true that such an efficient and timely step is very much required to feed the world by the year 2050. The new technology has the power to eradicate a large number of problems the farming community. The farming community is in need of various types of information such, managerial, technical, chemical, marketing, soil health, information on seeds, pesticides, various crops to increase the productivity and lead a decent standard of living for opting agriculture as a situational occupation.

It is true that world and transformed from industrial revolution to the information revolution. Modern farms and agricultural operations worked far differently than those a few decades ago, primarily because of advancements in technology, including sensors, devices, machines, and information technology. Today's agriculture will routinely uses sophisticated technologies such as robots, temperature and moisture sensors, aerial images, and GPS technology. These advanced devices and precision agriculture and robotic systems allow businesses to be more profitable, efficient, safer, and more environmentally friendly (USDA).

It is estimated that the global population, expected to hit 9 billion by 2050, has heightened the demand for food and food related articles and placed pressure on already-fragile resources. Feeding that population will require a 70 percent increase in food production by 2015. (FAO, 2009). The relevance of new technologies in agricultural development is going to be significant in future initiatives for increasing the productivity of agriculture worldwide. It is clear that more and more rural people/community are using radio, community radio, mobile phones, mobile phones with advanced features and the Internet. In some contexts, farmers have used video through Internet applications to gain advice on crops, animal husbandry, the threats posed by weather, pests and diseases, markets and prices and in the process enhance their access to and use of NARS-derived technology (WB, 2011, P.7).

The World Bank has taken five main trends as the key drivers of the use of ICT in agriculture, particularly for poor producers: (1) low-cost and pervasive connectivity, (2) adaptable and more affordable tools, (3) advances in data storage and exchange, (4) innovative business models and partnerships, and (5) the democratization of information, including the open access movement and social media. These drivers are expected to continue shaping the prospects for using ICT effectively in developing country agriculture (WB, 2011, p 7).

Mobile-based applications are also becoming more suitable for poor and isolated communities, especially though feature phones. Drawing on simple, available technologies such as SMS, service providers can offer mobile banking, other transactional services (selling inputs, for example), and information services (market price alerts). Other publicly and privately provided services such as extension and advisory services are delivered over mobiles, which are increasingly not just "phones" but are actually multifunctional wireless devices. (WB, 2011, p.8.).

According to the World Bank report on ICT in Agriculture, Geospatial information is also becoming easier to access and use as mapping tools, such as Microsoft Earth or Google Maps, bring geographical data information to nonspecialist users. Scientists and development organizations have created substantial sets of dereference data on population, poverty, transportation, and any number of other public goods and variables through more affordable, usable geographic information systems available on standard Personal Computers and mobile devices using web-based tools (WB, 2011, P 8). The ICT infrastructure components include hardware, software, networking, wireless, computer systems, Internet access, mailing systems, servers, videoconferencing equipment etc. along with the human capacity that manages and operates the ICT infrastructure should be popularized among the farming community. It is sensible that the farming community is always recipient to the newest innovations in the field of agriculture.

Another path breaking new technology available for agriculture is the democratization of information and science facilitated by ICTs. It is also contributing to agriculture and rural development more broadly. Vast quantities of information held by institutions and individuals are becoming visible, publicly accessible, and reusable through the open access movement (WB, 2011, P 9)

Crowdsourcing is another technology available for the use of farming community in which scientists, governments, and development organizations request feedback from farmers and consumers through devices like mobile phones, is also facilitating agriculture development. Farmers can use SMS to send critical local agricultural information like incidences of pests or crop yields that was previously difficult to obtain without expensive surveys by researchers. Using the digital tools available, consumers can also provide information related to changing consumption patterns and tastes to private enterprise (WB, 2011, P 10).

Apart from the above, Soil and Water Sensors, Weather Tracking, Satellite Imaging, Pervasive Automation, Minichromosomal Technology, RFID Technology, Vertical Farming, precision farming, geographical positioning system, remote sensing technology, artificial intelligence, genetic technology, etc. are widely used by farming community with the help of research institutions, agricultural universities and other private players in the world wide.

#### **Aim of the Study**

The present study is an attempt to know the new technologies available for agriculture and its relevance to the farming community. Secondary sources used for narrate the paper. Plenty of literature available on the topic, worldwide experiments, applications of new technologies for agriculture and rural development are clearly visible in the available topic. Food and Agricultural Organisation, globally, involved in creating awareness about the use of information and communication technologies for agriculture. In India, Indian Council for Agricultural Research (ICAR), along with many state agricultural universities working hard to grab and dthe benefit of new information and communication technologies for agriculture.

#### **Conclusion**

New technologies available for agriculture have lots of promises to fulfill the needs and aspirations of the farming community. Increasing productivity and sustainability in the field of agriculture is possible because of the newer varieties that are resistant to certain types of pests, innovations in irrigation technology and improved communication channels, enhanced by advances in information and communication technology and greater use of mobile phones, have provided opportunities to address these challenges of the agriculture.

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