

Effectiveness Use and Importance of Modern Technology in Indian Agriculture

Er. Ashok Kumar pandey¹, Dr. C. K. Tripathi², Dr. Arvind Pratap Singh³,
Dr. Naveen Vikram Singh⁴

Introduction:

The agriculture sector forms only about 18 percent of India's GDP despite employing almost 65 percent of the total workforce. Despite significant improvement in food grain production, there are several challenges to tackle as the government aims to increase agricultural production as a share of GDP.

Agriculture in India is largely dependent on nature, but climate and global warming issues make farming unpredictable. The need of the hour is to educate farmers in the use of modern technology and innovative approaches to increase productivity and raise profitability.



Agricultural development practices over a while have been perceived to exploit natural resources faster than they could be renewed. Exponential growth in the human population has resulted in demand for food and shelter, which the "natural" carrying capacity of the land is under pressure to provide.

Natural imbalance is visible in pollution, soil degradation, wildlife population decline, and human-created alterations of flora and fauna. It is reasonable to assume that human population growth will continue and place greater demands on the agri-ecosystem. Thus, technology has and will continue to play a major role in agriculture and sustainable development going forward.

Agriculture Technology

Technology has a major role in farming and agriculture practices; and with the advent of digital technology, the scope has widened. Innovation in agriculture is leading an evolution in agricultural practices, thereby reducing losses and increasing efficiency.

Er. Ashok Kumar pandey¹, Dr. C. K. Tripathi², Dr. Arvind Pratap Singh³,
Dr. Naveen Vikram Singh⁴

¹SMS (Agril. Engineering), KVK Balrampur.

²SMS (Agril. Extension), KVK Sultanpur.

³Assistant Professor (Agril. Extension), KNIPSS Sultanpur.

⁴Assistant Professor (Entomology), KNIPSS Sultanpur.

This is positively impacting farmers. The use of digital and analytic tools is driving continuous improvement in agriculture, and the trend is here to stay, resulting in improving crop yields and helping to increase the income of the farming community.



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availability of weather information and disaster warnings, and also have instant access to farm data. Having a range of technologies enables the transition of modern agriculture in the field. There are many promising trends and pilot projects in modern technology in agriculture. New-age technologies focus on robotics, precision agriculture, artificial intelligence, block chain technology, and more.

Improved productivity from the mechanization of agriculture

Manual labor and hand tools used in agriculture have limitations in terms of energy and output, especially in tropical environments. Resistance to agricultural mechanization, especially among smallholder farmers due to accessibility, cost, and maintenance issues, often acts as a detrimental factor.

Effectiveness of Modern Technology

Technology in agriculture affects many areas of agriculture. India managed to achieve self-sufficiency in food grain production by leveraging modern methods of agriculture along with farm mechanization.

Uses of modern technology in agriculture in India

The use of modern technology in agriculture can enable millions of farmers to benefit from the acquisition of real-time farm information. Farmers can have ready



To reduce manual labor and make processes faster, combine harvesters are finding greater use. Indian farming is

characterized by small landholdings, and the need is to partner with others to take advantage of modern machines.

Capacity building of farmers through hand-holding, making modern machines available especially to small farms, and tackling affordability issues through policy will lead to greater adoption of mechanization services going forward. Agricultural mechanization has the potential to, directly and indirectly; affect yields through a reduction in post-harvest losses and an increase in harvest gains.

Climate/ weather prediction through artificial intelligence

A major advance in agriculture is the use of artificial intelligence (AI). Modern equipment and tools based on AI enable data gathering and assist in precision farming and informed decision-making. Drones, remote sensors, and satellites gather 24/7 data on weather patterns in and around the fields, providing farmers with vital information on temperature, rainfall, soil, humidity, etc.



However, AI finds slow acceptance in a country like India where marginal farming,

fragmented landholdings, and other reasons act as impediments. But there is no doubt that technologies based on AI can bring precision to large-scale farming and lead to an exponential rise in productivity.

Agriculture Sensors

Communications technology has evolved rapidly in India and made smart farming a possibility. Sensors are now being used in agriculture to provide data to farmers to monitor and optimize crops given the environmental conditions and challenges. These sensors are based on wireless connectivity and find application in many areas such as determining soil composition and moisture content, nutrient detection, location for precision, airflow, etc. Sensors help farmers save on pesticides, and labor, and result in efficient fertilizer application. They allow farmers to maximize yields using minimal natural resources.



Improving farm yields and supply chain management use Big Data

The collection and compilation of data and its further processing to make it useful for decision-making/problem-solving are

expanding the way big data functions. Big data is slated to play a major role in smart farming, and the benefits percolate across the entire supply chain and the markets. Agriculture is becoming larger, and it depends on a large number of variables.

This is resulting in greater collection and use of complex data, which has to be meaningfully interpreted and managed. Data can be from external sources such as social media, supplier networks, markets, or from sensor/machine data from the fields. Transformation of agriculture from using big data is taking place that affects crop yield, supply chain management, yield prediction, etc.

Livestock monitoring

The use of chips and body sensors can help prevent disease outbreaks and are crucial in large-scale livestock management. Chips and body sensors measure vital parameters and indicators that could detect illness early and prevent herd infection. Similarly, ultrasounds are a useful tool to judge the quality of meat. This helps control and improve the quality of the meat.



Monitor and Control Crop Irrigation Systems through Smartphones

Mobile technology has also been playing a significant role in monitoring and controlling crop irrigation systems. With this modern technology, farmers can control their irrigation systems via smartphones and computers instead of driving to each field. Moisture sensors planted underground can provide information regarding the moisture levels present at certain depths in the soil.



Importance of modern technology in agriculture in India

Technology in agriculture affects many areas of agriculture, such as fertilizers, pesticides, seed technology, etc. Biotechnology and genetic engineering have resulted in pest resistance and increased crop yields. Mechanization has led to efficient tilling, harvesting, and a reduction in manual labor. Irrigation methods and transportation systems have improved, processing machinery has reduced wastage, etc., and the effect is visible in all areas.

Conclusion

The world population is slated to grow to about 9 billion by 2050. The challenge is to find ways and means to produce enough to feed it. The challenge of reducing acreage under agriculture and food wastage in production and distribution is having a major impact on the world. The increasing role of technology in agriculture to address these issues is the only way forward to a food-secure future. Technology can help save foreign exchange for countries, increase productivity, and lead to an improvement in the overall standard of farmer communities. India has a long way to go in the adoption of modern farming practices through technology. Technological advances appeared eventually, in agricultural development in India. The introduction of tractors was followed by new tillage and harvesting equipment, irrigation methods, and air seeding technology, all leading to improved quality of the food and fiber. Farmers can leverage scientific data and technology to enhance crop yields and keep themselves abreast with cutting-edge methods of farming. The increasing role of technology in agriculture to address these issues is the only way forward to a food-secure future.

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