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Research Article

Modern Agricultural Technology, Its Importance, Usage for the Improvement of Agriculture

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ABSTRACT

The new or modern technology in agriculture sector can substantially improve the agricultural production and sustainability, for instance best management practices for improvement of agriculture are widely applied nowadays. However, the modern technology is changing the way that humans operate the machines, GPS locators, as computer monitoring systems and self-steer programs allow the most advanced tractors and implements to be more precise and less wasteful in the use of fuel, fertilizer or seed. In future, there may be mass production of driverless tractors and other agriculture machinery which use electronic sensors and GPS maps. The 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 labour. Modern technology in agriculture has increased production and productivity. This in turn has improved food security and income for farmers. In addition, it has helped create new jobs and improve the quality of life for rural communities. On-farm, precision agriculture technologies can minimize inputs required for a given yield. For example, variable – rate application (VRA) technologies. A number of empirical studies find that VRA improves input use efficiency. Modern agricultural technology has been developed with keeping two important things in mind: first thing is to obtain the highest yields possible and, second thing is to get the highest economic profit possible.

1. Introduction

Agriculture is the foundation of many economies around the world, and it is critical to feeding the world's growing population. Furthermore, rising food demand necessitates farmers to develop new methods of increasing output and efficiency. As a result, agricultural technology, also known as Agritech, has become the solution for farmers to overcome various operational challenges. Modern tools and equipment, such as improved irrigation systems, precision farming techniques and mechanization, help farmers optimize resource utilization, reduce manual labour and achieve higher crop yields. This, in turn, can improve food security and contribute to economic growth. This technology Increases use of fertilizers has led to the loss of soil fertility. The use of ground water for tube well irrigation has led to water depletion. Modern farming methods require a great deal of incapita, nowadays there is the use of inorganic fertiliser, the consumption of reduced amounts of pesticides, the use of different tractors and machinery. The availability of such inputs has seen the need for the use of natural resources and process with aim of improving agricultural output and reducing costs. The use of modern technology in agriculture comes with a lot of benefits. Modern farms and agricultural operations work far differently than those a few decades ago, primarily because of advancements in technology, including sensors, devices, machines, and information technology, systems, precision farming techniques, and mechanization, help farmers optimize resource utilization, reduce manual labour,and achive higher crop yields. This, in turn, can improve food security and contribute to economic growth.

The objective of this study is to comprehensively analyze the evolving landscape of the agricultural sector in India, including recent trends in agricultural technology, the performance of agricultural growth technology, and the current status of modern and sustainable agriculture

2. Materials and Methods

Agriculture is the backbone of every economy. In a country like India, which has ever increasing demand of food due to rising population, advances in agriculture sector are required to

Figure-1. Old School Farming with Modern Technologies

meet the needs. To add to it, the present economic conditions and government policies of India are such that it necessitates the adoption of Precision farming or smart farming. It will enable the farmers to maximize their crop yields and minimize the input costs as well as the losses due to reasons like uncertain rainfall, droughts etc. This information is being gathered by the use of remote sensors, satellite images, surveys etc. This information along with the knowledge of subject experts and researchers should be readily available to the farmers in order to exploit its potential worth.

2.1 Importance of Modern Agriculture

The physical foundation of human energy, health, and physical wellbeing ,all key components of every important human activity. Making them more widely available at lower costs increases the capacity of any population to invest in more productive work, education, economic development and cultural activities. More people the world over eat more and better because of modern agriculture. Increased production continues to enable steadily improving diets, reflecting increased availability of all foods, dietary diversity and access to high-protein food products; The additional food modern systems provide has enabled hundreds of millions of people to realize more of their potential and better lives, thus enhancing the achievements of all, from students to retirees. It increases workforce productivity and generally supports human development and growth; The current hunger and malnutrition that extends to some one billion people reflects poor policies, low productivity and low incomes. The basic facts are clear. Failure to continue to apply new technologies to advance productivity on the farm and across the food system simply worsens every aspect of these problems, especially those forced on individuals and families who live in poverty. To a very large extent, current food insecurity problems reflect bad policies, poor infrastructure and low economic productivity in the nations where these conditions occur, rather than a physical lack of food or food production capacity; The significant hunger and malnutrition that persist in many parts of the world would have been far worse had agricultural systems not grown and developed as they did; The physical pressures on the environment that have become increasingly prominent public concerns have been greatly ameliorated by modern agriculture, which has reduced to the need to expand land area, and thereby reduced pressure to cultivate fragile lands and forested areas. Modern agriculture includes successful new technologies, including biotechnology to enable both higher yields and reduced environmental impacts. The establishment of the Soil Conservation Service and other important steps that continue to improve farming practices through public and private programs until they have all but eliminated wind and water erosion hazards. For example, the pioneers of ―no-till agriculture actually began in the early 1960s in efforts to save fuel and stop erosion. And, the environmental movement of the late 1960s lead to the creation of the Environmental Protection Agency in 1969―and to major changes in pesticides and pesticide regulation since that time. A few relatively simple practices have had great success in protecting both soil and water quality and are being widely adopted now.

2.2 Benefits of Agritechnology

The advantages of Agritech range from increased crop productivity to reduced environmental impact. It also helps to improve the working conditions of small farm workers.

- Higher crop productivity: Agritech helps farmers increase the yield of their crops through precision agriculture techniques, reducing waste and increasing the efficiency of their operations.
- Decreased use of water, fertilizer, and pesticides: Agritech helps farmers make more informed decisions about when and how much to apply. This way, they can reduce waste and environmental impact.
- Reduced impact on natural ecosystems: By reducing the use of harmful chemicals and improving efficiency, agritech reduces the negative impact of agriculture on the environment.
- Less run off of chemicals into rivers and groundwater: Agritech helps farmers monitor and control the use of chemicals, reducing the risk of contamination of water ways. This has a significant impact on the environment and public health.
- Better facilities to provide workers: With the use of technology, agritech provides better working conditions for farm workers, increasing their comfort and safety.
- Greater efficiencies and lower prices: By improving efficiency and reducing waste, agritech leads to lower costs for farmers, making their operations more sustainable.
- Climate/weather prediction through artificial intelligence: Agritech helps farmers decide when to plant and harvest their crops. It provides a clear indication of the role of

weather forecasting in farming. This way, they reduce the risk of crop loss due to unpredictable weather conditions.

- Resilient crops developed via biotechnology: Agritech helps farmers create crops that are more resistant to disease, pests, and environmental conditions. As a result, it reduces the risk of crop loss and increases yields.
- Agriculture sensors: Agritech provides farmers real-time data on soil moisture, temperature, and other factors that impact crop growth. This allows them to make informed decisions about when and how to water, fertilize, and care for their crops.
- Safer growing conditions and safer foods available in the market: By improving the efficiency and sustainability of agriculture, agritech leads to safer growing conditions and healthier foods for consumers.
- Reduce environmental and ecological impact: By reducing waste and the use of harmful chemicals, agritech helps reduce the negative impact of agriculture on the environment and local ecosystems.

3. Results and Discussions

The most pressing issue in the world today is the food supply. The demand for food has increased at more than twice the rate of population growth in the last 35 years. In fact, according to a report by the Food and Agriculture Organization (FAO), about 10% of the global population, or 815 million people, are malnourished and do not have enough food to lead active and healthy lives. The use of modern technology in the agriculture sector is wide spread. It has helped the farmers in many ways. Adoption of new and improved technologies has increased the production and productivity of crops. This has also helped in reducing the production cost. The use of technology has also made the process of farming easier and more efficient.

Technologies used in the agriculture sector are:

1. Soil Sensor: Soil sensor is used to measure soil moisture level, temperature and other factors affecting crop growth. The data collected by the sensors is transmitted wirelessly to the farmer, who can adjust his farming practices accordingly.
2. GPS technology: GPS technology is widely used in precision farming. It helps to find out the boundaries of the field and apply fertilizers, pesticides and herbicides correctly. This reduces wastage and increases efficiency.
3. Weather monitoring: Farmers can now access real-time weather data that can help them decide when to sow, how to irrigate and what type of crop to grow. This information can be obtained through weather apps or websites, or through dedicated weather stations on the farm.
4. Automation: Automation has been widely adopted in agricultural processes like sowing, transplanting, harvesting etc. This has reduced the dependence on manual labour and increased efficiency.
5. Drones: Drones are being used extensively for mapping, surveying and crop monitoring. They help in collecting data that can be used for planning and execution of agricultural activities.
6. Agricultural Robots: Agricultural robots are being developed to perform various tasks on farms, such as milking cows, picking fruits and vegetables, and even cutting grass. These robots can work for long periods of time without getting tired and can often do a better job than human workers.
7. Satellite Imagery: Satellite imagery is used for weather forecasting, crop monitoring and yield analysis. It helps farmers to take timely decisions regarding irrigation, cropping pattern etc.

Technology has played an important role in increasing agricultural productivity. For example, the use of mechanization has reduced the need for manual labour, thus increasing efficiency and production. The introduction of irrigation systems has also helped boost production by making it possible to grow crops in otherwise dry areas. In addition, modern technology has made it possible to develop high-yielding crop varieties that are resistant to pests and diseases. The use of technology in agriculture has also had a positive impact on food security. Increasing production has helped ensure that more people have access to nutritious and affordable food. Modern technology in agriculture has increased production and productivity. This in turn has improved food security and income for farmers. In addition, it has helped create new jobs and improve the quality of life for rural communities.

3.1 Impact of Agricultural Technology on Consumers

Agricultural technology has affected consumers in many ways. The use of modern technology has helped farmers to increase the production of crops and live stock. This has also helped in improving the quality of the products. The use of new technology has also reduced the cost of production. The adoption of new technology has also led to the development of new methods of marketing and distribution of agricultural products. This has helped the farmers to reach a wider market for their products. The use of technology has also helped in creating new jobs in the agriculture sector (Pujari et al, 2015).

3.2 Impact of Agricultural Technology on Farmers

In recent years, agricultural technology has had a significant impact on farmers around the world. With the help of technology, farmers are now able to increase their yields and produce more crops than ever before. Additionally, they can also reduce their costs by using less labour and inputs. However, there are also some drawbacks to the use of technology in agriculture. One of the main problems is that it can lead to excessive dependence on machines and chemicals, which can be expensive to maintain. Apart from this, if it is not used properly, it can also harm the environment.

3.3 Agricultural Technology can Create New Jobs

Technology can also help create new jobs in the agriculture sector. For example, the use of mobile phones and other digital technologies is providing new opportunities for farmers to connect to markets and sell their products directly to consumers. Apart from this, development of value-added services like agri-tourism is creating new employment opportunities in rural areas (Srinivas et al, 2013).

4. Conclusion

Modern agriculture technology has been developed with keeping two important things. The first thing is obtain the highest yields possible, second thing is target the highest economic profit possible. The use of modern technology, agricultural productivity has increased manifold. In fact, it is one of the few areas where labour-saving devices have been fully utilized. Today a farmer can do the work of many men and

women with the help of machines. This not only saves time but also reduces cost and increases production. The foregoing sections make the case that global food challenges have intensified steadily in recent years, especially since the beginning of the 20th Century, when the world's population was only 1.6 billion people and global needs could be met by increasing yields and agronomic improvements—and, fossil fuels became increasingly essential in the development of machines to replace animal power, and to allow production of fossil fuel based ammonium fertilizers.

Conflicting Interests

The authors have declared that no conflicting interests exist.

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