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STUDY ON EMPHASIS OF TECHNOLOGICAL MODIFICATION IN THE USE OF LAND AND AGRICULTURAL OPERATION

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ABSTRACT

Technology must be used effectively in agriculture to increase output and worker employability. Understanding how to employ technology in the agriculture industry effectively is the major goal of this study article. Many different kinds of technology are used to increase productivity. The main factors affecting the adoption of technologies, types of technologies, technologies used in the agricultural sector, advanced agricultural technologies currently in use, areas of information technology, and the function of information technology in managing agricultural education have all been taken into consideration. The agricultural industry has to get familiar with new technologies like biotechnology, nanotechnology, high-tech protected farming, and contemporary irrigation systems to increase productivity if it is to expand and develop effectively. These technologies might be useful in boosting productivity and profitability if they were used properly. The use of technology would help farmers maintain their prospects for a living.

Keywords: *Technology, Agricultural Sector, Production, Sustainable Farming Systems*

INTRODUCTION

People in rural regions are thought to work mostly in agriculture. Modern and new methods must be applied in the agriculture industry in order to feed the growing population. In order to push yield frontiers forward, utilise inputs creatively, and diversify toward more sustainable and high-value cropping patterns, new technologies are needed. These are all knowledge-intensive technologies that need both capable farmers and an effective research and extension infrastructure. It also calls for a reinforced interface, where the focus is on a shared interchange of information that benefits everyone. The motivation for using agricultural technology is said to be making efficient use of resources. Green manure, crop rotations, and other strategies for resource saving are available (New Technologies in Agricultural Development, 2010).

A key factor in the country's overall growth and development is an improvement in agricultural growth. The rationale is that this industry provides 65 percent of the population with a living wage. Amounting to 14% of the GDP, agriculture does, however, contribute to this figure. A number of agricultural revolutions have boosted the industry. These include the Information and Communications Technologies (ICT) Revolution, the Green Revolution, the Evergreen Revolution, the Blue Revolution, the White Revolution, the Yellow Revolution, and the Biotechnology Revolution. Utilizing technology is crucial for increasing production, and what is needed is the expansion of these established systems. The most important factor in agricultural expansion is considered to be infrastructure-assisted agriculture extension. The private sector's involvement

would speed up the adoption of new technology in this industry (New Technologies in Agricultural Development, 2010).

Factors relating to Adoption of Technologies

Technology adoption factors may have an impact on the development of sustainable agricultural systems. It is a broad notion that is impacted by the creation, dissemination, and use of current and emerging biological, chemical, and mechanical processes at the farm level, all of which are included in farm capital and other inputs (Adoption of Technologies for Sustainable Farming Systems, 2001).

A difficult and contentious topic for farmers, extension agencies, agriculture businesses, and policy makers is the adoption of technology for sustainable farming systems and other agricultural practises. To fulfil a variety of shifting and varied demands from customers and the general public for food, fibre, and other related goods and services, the agricultural sector has to utilise a wide range of evolving technology and farm practises across many distinct farming systems and structures. The results are frequently portrayed as having uncertain consequences on sustainability. The agricultural workers and farmers need to get a sufficient grasp of how to employ technology to produce.

Technology use has increased as a result of farmer demand. New technology have long been a target for farmers looking to save expenses. Additionally, customers are demanding low cost, high quality food that is being produced using organic methods in many nations, with more variety, consistency, and year-round availability. This is due to rising incomes, improved knowledge, and better communication channels. The desire from customers for their food to be produced using methods that reduce environmental constraints, conserve natural resources, and give more consideration to rural practicality and animal welfare is growing at the same time. The sources of supply and the level of competition are expanding as a result of trade liberalisation. The media, pressure organisations, food merchants, and processors strongly inform farmers about the various needs, which are reflected in policies.

Technologies are used and exploited in various ways depending on the nation. The various ways and levels at which they are implemented are a result of the many policies and concerns surrounding the achievement of sustainable agriculture. In certain nations, the development, acceptance, and dissemination of technologies are governed by market signals, voluntary co-operative industry-led initiatives, and other factors. Government action has received a lot of attention. Such government participation includes direct financing for research, payments for distribution and implementation, legal restrictions, information, and help, and can range from a supporting to a mandated role. Moreover, a key element in determining which technologies are implemented at which farm sites is the general framework of agricultural policy and the degree of support.

Research initiatives, farmer education and training programmes, guidance, and information are all moving in the direction of striking a balance between economic effectiveness and social and environmental sustainability. The major goal of the research and recommendations was to boost profitability and productivity. The emphasis is on reaching those goals in a sustainable way, which necessitates using technology and altering farming methods. The profitability of the technology used in the agriculture industry is not always obvious. To identify the technologies that would be useful for raising production, research has been done. Biological pest management, biotechnology, information technology, bioremediation, precision

agriculture, and integrated and organic agricultural systems are some of these goals. Other challenges, such as those involving institutions, educational and training systems, and the importance of both public and private research initiatives, must also be addressed. Technology has been developed in the global market and utilised at the farm level, but has an influence on sustainability outside the farm. Some sustainability challenges are not handled through technological features, but by bringing about changes in the types of agricultural output and its locations. There are universal industries for both traditional and more recent technologies, particularly those connected to biotechnology, information, and precision agricultural methods. These technologies are frequently sold on the domestic market, yet they are only used locally. However, farm level adoption had consequences on sustainability that went beyond the farm. Resolutions on the adoption of technology at the farm level are frequently linked to those made elsewhere in the food chain as a result of increased vertical integration, whether through formal ownership structures or contractual agreements along the whole food chain. Technology adoption is interdisciplinary and takes into consideration goals for sustainable agriculture.

Technology adoption entails risk and trade-offs. It is crucial for the technologies to support an economically effective agricultural sector, the financial viability of the farmers, and improved environmental performance in order to create sustainability. Technology is developing quickly, and information on the costs and advantages of implementing new technology in agriculture is sometimes insufficient. Therefore, decisions on the adoption of technology are made in an environment of ambiguity with a significant degree of trial and error in its application, and the rate and extent of adoption vary dramatically across farmers. The organisation of the farms and the number of farmers who are able to secure their financial situations in the future may be significantly impacted by this.

The implementation of sustainable farm technologies is being aided by research and development initiatives, the movement towards better farmer education and training, the shift in the focus of guidance, quick and affordable ways of disseminating and exchanging information, the availability of financial resources, pressure from consumers, non-governmental organisations, the media, and the general public. Many policies, including those that deal with agriculture, the environment, and research and development, offer a mix of incentives and barriers to the adoption of new technologies. Farmers' actions are gradually restricted by environmental rules, as well as by legislation, animal welfare standards, and public health policies.

OBJECTIVES

1. The study of agriculture project introduces contemporary cultivation techniques to produce large-scale production.

2. Researching the use of agriculture as a source of employment and economic empowerment for the society's unemployed youngsters.

Types of Technologies

Software, hardware, and org-ware are the three categories into which technologies are frequently divided. Understanding the distinctions between various technology kinds as well as their synergies and complementarities is crucial to comprehending how technology is used in the agricultural industry. Hardware refers to tangible equipment, software to the procedures, aptitudes, and information necessary for

using technologies, and org-ware, short for organisational technologies, refers to the legal and administrative frameworks governing the ownership of technology. Hardware in the agricultural industry is represented by various crop types, software by farming techniques or research by new farming varieties, and org-ware by the regional institutions that support the use of agricultural adaption technologies. The simultaneous integration of hard and soft technologies with org-ware is now acknowledged as being crucial for success in adaption. Hard and soft technologies are frequently deployed in isolation (Technologies for Adaptation in the Agricultural Sector, 2010).

The adoption of water harvesting technology is an illustration of technical innovation that has utilised all three categories of technologies. Early in the 1980s, farmers created techniques for restoring damaged land by raising the quality of the soil. This is accomplished by digging tiny holes in the ground, into which farmers plant sorghum and millet after adding small amounts of manure. The customary planting trenches are used to complete this operation. These holes contain water and nutrients that are precisely concentrated where they are needed and hold water for a very long period. This aids in the recovery of the damaged ground and helps the plants withstand dry times better. Hardware might include the seeds or trees that are produced in the pits. The procedures for digging the pits and enhancing soil fertility can be thought of as software, and the farmer-to-farmer field schools used to disseminate the knowledge to other farmers in the area are known as org-ware.

Utilizing all three types of technology will ensure the expansion and development of the agricultural industry. Hard technologies or hardware are prioritised and frequently used in isolation, which is an issue of concern. When farmers employ these technologies, it is essential that they are well informed and use them in a responsible manner. The creation of training facilities has allowed for the dissemination of knowledge and information to farmers on how to employ technology to increase productivity and profitability. In order to implement these three types of technology in a way that is mutually beneficial, the countries require encouragement and support. It is important to make sure that the agriculture industry uses technology in a sustainable and practical manner (Technologies for Adaptation in the Agricultural Sector, 2010).

Technologies used in the Agricultural Sector

Utilizing technology in the agricultural industry is primarily intended to boostproductivity and ensure that there is enough food for everyone. The following technologies have been mentioned: 2010: New Technologies for Agricultural Development.

Utilizing biotechnology technologies in agriculture may increase crop yields and make them more resilient to biotic and abiotic issues. Given the rising demand for food, the effects of climate change, and the shortage of both land and water, this might relieve the situation and improve food supply. In 2011, 170 million hectares, or around 12 percent of the world's arable land, were planted with genetically modified crops such soybean, maize, cotton, and canola by more than 17 million farmers. However, the majority of these crops were not cultivated primarily for direct consumption. In India, the first commercialization of genetically modified cotton and biotechnology cotton occurred in 2002, and by 2011, over seven million farmers had adopted this technique over 10.8 million acres, or 93 percent of the nation's total cotton acreage. The farmers' profitability has grown thanks to biotechnology cotton, which has also greatly decreased the usage of

chemical pesticides in this crop. Biotechnology has helped Indian cotton producers experience a 15–20% reduction in food insecurity.

Nanotechnology: There are several ways that nanotechnology may be applied to agriculture. It can support soil fertility, balanced crop nutrition, efficient weed control, carbon nanotube-enhanced seed emergence, the delivery of agricultural chemicals, field-sensing systems to monitor crop conditions and environmental stresses, and enhancement of plant traits against environmental stresses and diseases. Significant prospects for the creation of novel goods and uses for agriculture, water treatment, food production, processing, preservation, and packaging are made possible by nanotechnology. The food business, consumers, and farmers all stand to gain from its use. In certain nations, people may purchase food, health food items, and food packaging materials made using nanotechnology. Additional goods and uses are now in the research and development stage. The packaging of food has a tremendous deal of potential to be transformed by nanotechnology. Once functionalized, nanoparticles like titanium dioxide, zinc oxide, and magnesium oxide—or a mixture of them—can be effective in killing microorganisms. They are also more affordable and secure to employ than metal-based nanoparticles.

Safeguarded Cultivation - Production of horticultural crops has increased both qualitatively and quantitatively under protected cultivation, or greenhouse cultivation. In India, there are now 25,000 hectares of land under protected agriculture. While there are roughly 2000 hectares of greenhouses where vegetables are grown. Land holding restrictions, fast urbanisation, declining agricultural output, declining biodiversity, and an ever-increasing population have all contributed to an increase in the need for food, particularly vegetables, which have undergone repeated and protected cultivation. These elements have provided a fresh perspective on how to generate more in a little space. Rainwater collection may also be done in polyhouses. A 175 square metre polyhouse has an erratic yearly consumption of around 52,000 litres. Water use for a crop lasting six months is 26,000 litres per half-year. The amount of rainwater pouring on the poly-roof house's in an area with an average yearly rainfall of 400 mm is in the neighbourhood of 70,000 litres. 56,000 litres of rainwater may be collected on the assumption that collection productivity is 80%, which is more than the required amount annually.

Agriculture Mechanization: India has a large labour force (55%) but a smaller farm mechanisation sector (40%). Farmers become more impoverished as a result of less profitable farming methods. 138 million land holdings, which are many compared to the two to three percent of the people who own property in the United States of America, are one of the main obstacles to farm mechanisation in India. One of the most crucial elements for increasing production is farm mechanisation and the employment of contemporary tools, machinery, equipment, and gadgets for timely and efficient completion of tasks in agricultural fields. Small machines that are appropriate for horticultural activities in the highlands and hills will increase the utility of the operation and farm revenue. Farm mechanisation will contribute to a reduction in costs while increasing overall production. Farm mechanisation can assist to save 15 to 20 percent on seeds, 15 to 20 percent on fertiliser, enhance crop intensity by 5 to 20 percent, save 20 to 30 percent on time, reduce manual labour by 20 to 30 percent, and boost farm output by 10 to 15 percent overall.

Role of Information Technology in Agricultural Education Management

The following list of areas highlights the importance of information technology (IT) in managing agricultural education: (Chauhan, n.d.).IT Resources for Agricultural Teachers and Curriculum Designers - In order for teachers working in agricultural schools, colleges, and universities to effectively use IT, they must be given the necessary tools. In the modern world, IT plays a crucial role in promoting individual learning. It is crucial to set up training for these people in computer basics before gradually acquainting them with complex computer application modules. Technology must be used by educators to deliver instruction to students. The educational planners and administrators should receive training on how to construct an annual budget plan, budget needs for the infrastructure, time tables for monitoring and scheduling the teaching resources, as well as how to build and maintain thorough student records and files.

Agriculture and IT Students in Classrooms The learners or students at agricultural institutions and schools need to be well-versed in the usage of various technologies. People need to be informed of crucial things, such how to utilise Power Points while presenting presentations. Prior to the introduction of technology into the classroom, most learning took place through lecture-based instruction. The use of technology has led to advancements in teaching and learning techniques. Videos and internet presentations are shown on LCD screens. To facilitate learning and comprehension, computer displays are used to display information from CD-ROMs on specialist agricultural themes.

IT in Virtual Classes for Agricultural Learners - With the development of the internet, students may participate in a virtual class on their computer display at home or at work. This makes it clear that before using technology, one should have sufficient training. One is able to take an online exam after having taken the computer-based virtual class. He will have to enter on the computer in order to receive his evaluation report right away. Future virtual colleges and universities will be built on the foundation of virtual classrooms. Both nations with dense populations and those with sparse populations have found them to be advantageous.

Indian Agricultural Education: New IT Dimensions A course on international agriculture, the WTO, trade-related intellectual property rights (TRIPs), global conventions on climate, biodiversity, and desertification, computer technology, patent and trade literacy, and international standards are required of agricultural graduates in order to prepare them for the challenges and demands of the new millennium. IT plays a significant part in achieving this. Therefore, the course curriculum should include knowledge generating about computers, software application, Data Base Management Systems, PowerPoint, drawing software, computer programming, multimedia, the internet, and the function of TV and radio in Information Communications Technologies.

CONCLUSION

With the primary goal of satisfying people's needs for food, the relevance of technological use in agriculture has been acknowledged. Although India's agriculture has improved, its principal horticultural and agricultural crops are less productive than those in other nations. The use of technology still has shortcomings. Food grain, fruit, and vegetable yields per acre in the nation are far below average worldwide. Even the most productive states in India fall short of the worldwide average. Similar to this, by taking into account the seeds, soil health, pest control, crop-saving irrigation techniques, and post-harvest technologies, the productivity of pulses and oilseeds may be boosted.

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