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From Tradition to Technology: Understanding the Barriers to Digital Farming Adoption

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Abstract: ***Agri - tech can bring improvements and innovation to present agricultural practices with the help of digital farming and the latest technologies. However, the majority of the Indian farming sector remains heavily reliant on manual labor and traditional agricultural production methods. Farmers also have limited access to the latest agricultural technologies, such as high - yielding seeds and advanced machinery, as well as relevant farming information. Farmers are interested in making a profit from agriculture, but they are hesitant to make a new change. Primarily judged by their inability to abandon the systematic farming practices they had been following for years and failed to adopt new technologies. The new generation can easily adopt technology, but middle - aged and older people do not understand it easily. Another important fact is that many of the new generation is not considering agriculture as a major means of livelihood. Most of the farmers are approaching the changes with fear. They are not aware of the need to implement new technology in agriculture. Farmers do not consider even an increase in profits as a reason to adopt new technology. Here, it is very necessary to educate the farmers about the beneficial effects of the technology. Comprehensive development in the agricultural sector is possible only by including them in the real frame. Agricultural prosperity can be achieved by incorporating the services of information technology into the daily affairs of farmers through the direct intervention of the government.***

Keywords: Agricultural Technologies, Reluctance of Farmers, Technical Adaptation, Training and Education, Comprehensive Development in Agriculture

1. Introduction

The universe is at the peak of technological innovations and developments. This is one of the most glorious periods in human history. Our educational institutions, workplaces, legislatures, and even our washrooms are equipped with up - to - date applications capable of performing different kinds of activities.

Agriculture employs more than 60% of the Indian population and accounts for approximately 18% of the country's GDP. The agricultural industry has been facing deviations and improvements in agricultural tactics and systems. Skills have progressed, and sustained revolutions lead to increased crops and decreased expenses. Even though planters can now use mobile devices and the internet to learn about improved farming methods, acceptance of these technologies in India is still low.

"Digital farming" refers to the use of information technology and data applications in farming and agricultural activities. By utilising technologies in the agricultural process, digital farming assists farmers in the farming value chain in improving agricultural productivity and farm chain management.

There are numerous activities dealing with digital farming, which include both technical and non - technical aspects. Technical activities can be further classified into IT and non - IT. IT plays an important role in digital farming, and the latest technologies such as artificial intelligence and robotics have many applications in the farming sector.

Digital farming systems offer an exceptional viewpoint that expands the capacity to make prominent decisions. Over the next five years, the market for farming robotics is expected to grow from its current value of $5 billion to over $10 billion.

Modern farm technologies
Drones are used for pesticide spraying, disease scouting, crop monitoring, etc., and sensors are used for soil, irrigation, disease, and pathogens. Likewise, most of the satellite information is now available for data analysis.

Further to the above, a bunch of farming companies have commenced introducing artificial intelligence (AI) in agriculture, which has opened new paths for improvement, e. g., crop yield simulations. Sophisticated algorithms can easily detect plant disease even before its symptoms appear.

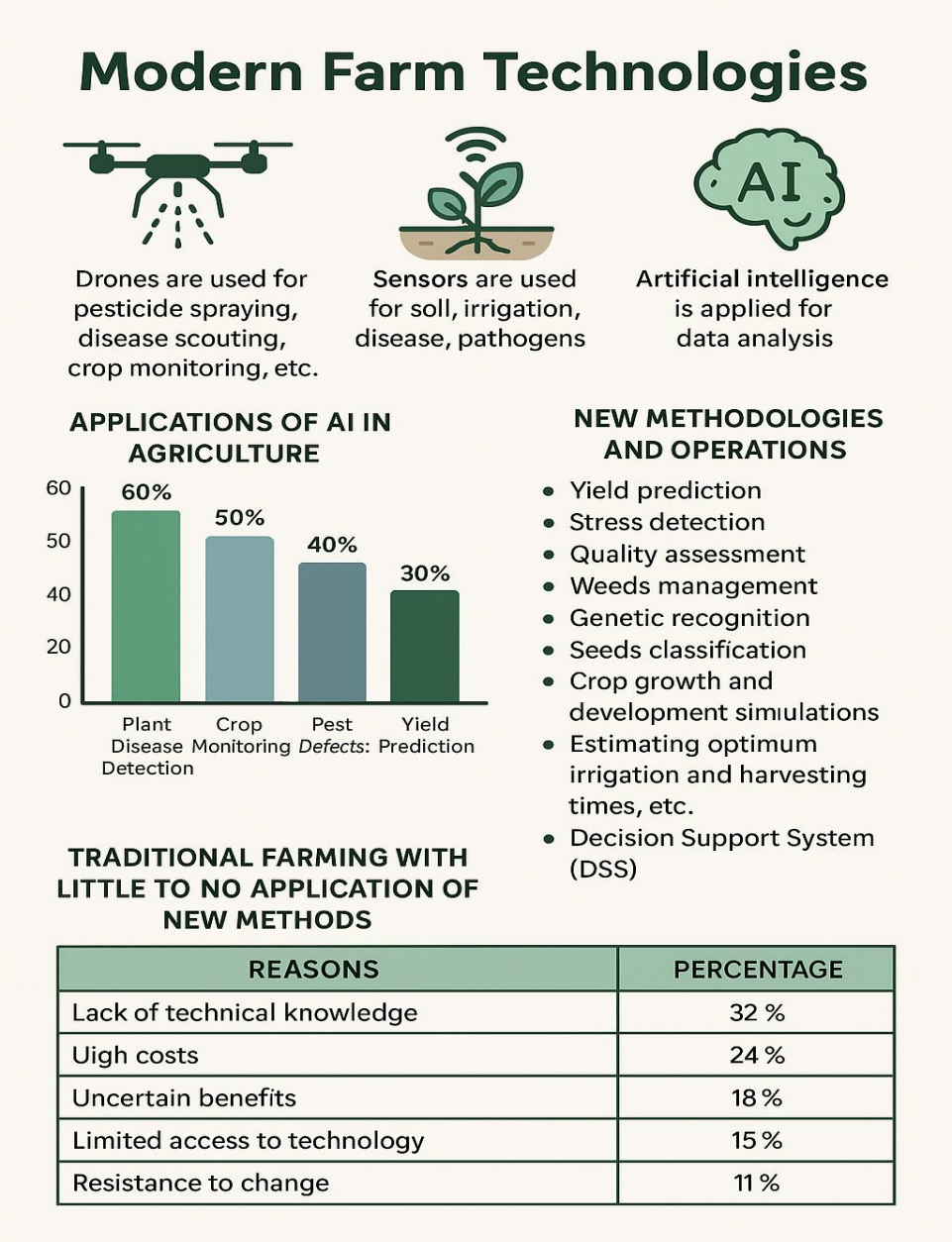
Similarly, the following new methodologies and operations are being used to enhance agricultural activities and the systematic development of the farming process:

- Yield prediction
- Stress detection
- Quality assessment
- Weeds management
- Genetic recognition
- Seeds classification
- Crop growth and development simulations

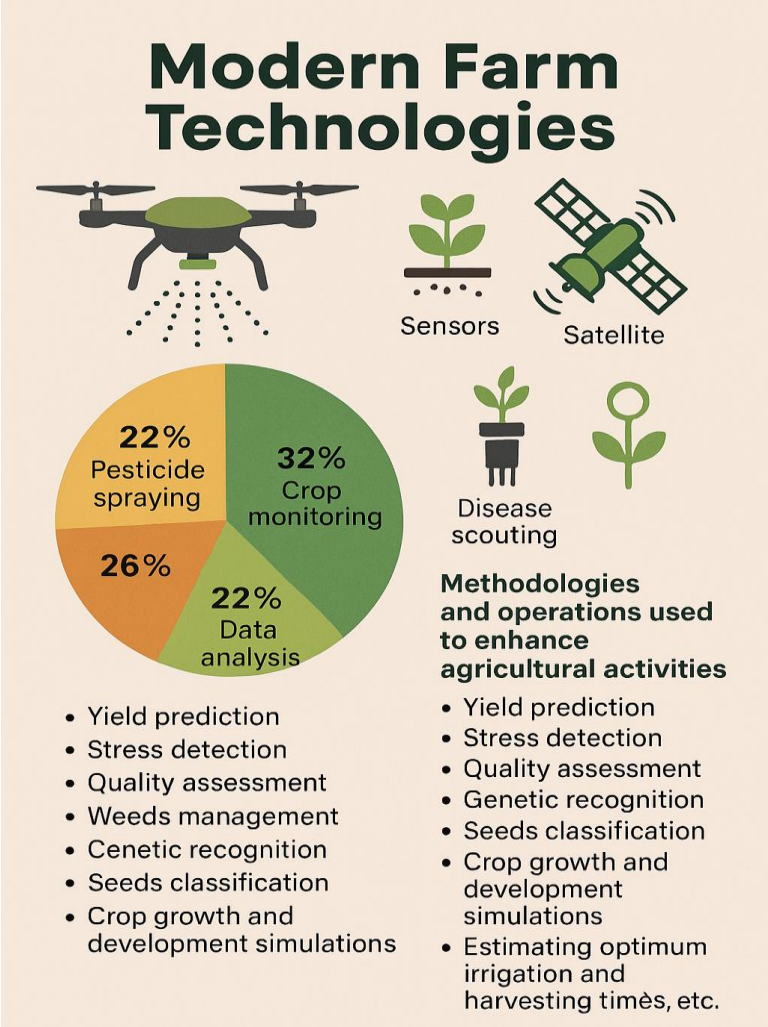
- Estimating optimum irrigation and harvesting times, etc.
- Decision Support System (DSS)

Data plays an important role in the digitalization of farming. The historical data will help to analyse various situations that farmers have already gone through in past years. These are helpful in the prediction of future production, weather, and various plans. Digital farming can reduce climate change vulnerabilities by forecasting weather. Farmers can also navigate the rain and produce better results. These data are critical to the optimal working of farms, and if agriculturalists own their data entirely, they can evaluate the benefits and drawbacks of their work.

But, unfortunately, most of the agricultural communities are doing their traditional farming with either little or no application of new agricultural methods. This study seeks to identify the various reasons for farmers' reluctance to adopt new farming technologies and to examine public perception of technical adoption.



REASONS	PERCENTAGE
Lack of technical knowledge	32 %
Uigh costs	24 %
Uncertain benefits	18 %
Limited access to technology	15 %
Resistance to change	11 %



2. Research Methodology

The study was conducted during 2021 - 2022 in the rural region of the Idukki district of Kerala, as it has one of the largest farmer populations. Five villages from the Idukki district were chosen at random. To analyse how farmers see agricultural technology, 120 farmers were chosen as convenient responders. To get pertinent information, the chosen respondents were personally questioned using a structured interview schedule. After that, to understand the findings, the obtained data were tabulated and statistically examined using basic statistical methods like average and percentage.

Why do farmers hesitate to use novel agricultural techniques and applications?

This study seeks to understand why a substantial number of farmers are still not using new ideas and current technologies. The farmers' responses are presented below.

Inadequate understanding of the latest technology

The majority of farmers are unaware of the most recent technologies. This is due to a lack of training and knowledge. Few people are perplexed by the introduction of new approaches into current programmes. Many technologies require computer proficiency to understand the operations, which is not easy for farmers to understand. Most software is now available in the form of mobile applications, which farmers can easily grasp. Mechanical know - how is not easy to learn for the common man. Repair and maintenance, in particular, are causing problems after they are implemented.

Language issues

Previously, most of the applications and software were commonly in English instead of the local languages, without any options to change the languages. It caused a lot of confusion and fewer acceptances from farmers as they were not flexible with English. Some technologies have technical terms and notifications in different languages, which also confuse the end users. Several applications now provide alternatives for regional languages, but farmers still remember the early difficulties.

Low education

The majority of farmers have only gotten an elementary school education and have had no formal training in the latest technology. Some of the latest schemes have lots of programmes and procedures; even the application demands a lot of documentation. They won't be able to keep up with the current strategies in these instances unless they have sufficient instructions and help.

Fear of failure

When confronted with change, fear is the most powerful emotion. This anxiety is what prevents farmers from embracing many new technologies.

Numerous such questions emerge in them, such as:

- Can change be wrong?
- Will the change be costly?
- Can it be accepted?
- Whether financial damage occurs?
- How will society react?

Some farmers are hesitant to make a change because of a negative experience they or their co - farmers experienced in the past.

Heavy dependence on traditional ways

Agricultural technology in the nation has also seen the development of several ground - breaking new technologies. But the nation frequently falls short of providing the people with these advancements in their entirety. The farmers' reluctance to give up conventional farming methods is one of the main causes of this. They frequently block fresh concepts. They don't want to advance in their career or pick up new abilities.

Apprehensive of financial risk

Farmers worry that a rapid shift in the system will have an impact on their ability to manage their finances. Some farmers are concerned about financial interruptions in light of allegations that internet fraud is still common. The majority of farmers lack the confidence to make significant investments in new technologies.

Less government assistance

The government is prepared to provide farmers a sizable sum of money and support. Even when making successful interventions, governments frequently fail to achieve the desired growth in the agricultural sector.

It may be due to one of the following reasons:

1) Insufficient long - term planning
2) The inefficiency of Govt officials who are supposed to be the go - betweens for farmers and the government.
3) Farmers lack sufficient information.
4) Farmers do not get aid promptly.
5) Farmers' perspectives are not respected.

Lack of professionalism

Gaining profit from agriculture is crucial when it is a source of income. Only if each step of the agricultural process is carried out with extreme attention and accuracy will farming be lucrative. To do that, it is crucial to consider agriculture as a business or industry. Yet, a sizable portion of farmers continue to cultivate their land exclusively using conventional farming methods. They do not make use of agriculture's business potential; they simply use it as a means of sustenance. Even today, farmers are hesitant to adopt the numerous new technologies, tools, and IT - based agricultural support that are easily accessible. Government officials and representatives from other agencies involved should take the appropriate actions if agriculture is to become more professional.

Farmers worried about low yield

Some farmers are concerned that the production of their organic crops may suffer as a result of recent agricultural advancements. This view is shared by the majority of farmers who are happy with the existing situation. The current good crops may be produced using some of the self - developed tips and traditional methods they have developed.

Old age farmers: did not believe in new technology and only believed in their own

The majority of farmers are elderly or middle - aged, which makes it difficult for them to accept new technologies. A relatively small percentage of young people are considering agriculture as a serious profession. Technology adoption is significantly influenced by age. They are hesitant to adopt new technology in favour of their long - established farming methods and tools. Although young people must work in agriculture today, many are hesitant to do so.

3. Suggestions

- Farmers should receive specialised training on new technologies so they can adapt their methods of change and better grasp it.
- The description and campaigns should also be translated into the farmers' native tongues to increase acceptability.
- It's important to take steps to bring more educated and young individuals into the agricultural industry.
- Farmers' concerns should be addressed via counselling and education.
- Incentive programmes should be developed to increase farmers' access to the possibilities of new technology.
- Financial systems should be transparent and error - free.
- More interventions from the government are needed.

Farmers will be doubtful whenever the government offers new agricultural techniques. It's because of their experiences with less government collaboration and follow - up following implementations. These circumstances must be addressed by comprehensive initiatives. The majority of the government's initiatives do not reach the grassroots level. Farmers are not receiving the cash that has been assigned to them.

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