



**Biotica
Research
Today**

Vol 2:7 **567**
2020 **569**

Digital Farming – A New Era of Indian Agriculture

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 Open Access

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 **Keywords**

Digital farming, ICRISAT, Netafirm, T-Hub

Article History

Received in 11th July 2020

Received in revised form 12th July 2020

Accepted in final form 13th July 2020

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How to cite this article?

Sahoo, 2020. Digital Farming – A New Era of Indian Agriculture. Research Today 2(7): 567-569.

Abstract

In agriculture, India is a land of contradictions. The country is the host to the world's largest number of malnourished people. Agriculture provides livelihoods for about half of the Indian population, most of who are small holder farmers, yet a majority of government agricultural subsidies are used by medium- and large-scale farmers. Parallel to India's tremendous successes in the modernization of agriculture, small holder farmers have been marginalized. The average debt of a single farming household has been risen five fold in a decade, while increases in farm incomes have not kept up, and more than 3,00,000 Indian farmers have committed suicide since 1995. Given the complexity of Indian agriculture, no single policy change or technology shift will move the country toward its dual goals of raising income for small holder farmers and continuing to strengthen the competitiveness of Indian agriculture, but the digital transformation of agriculture occurring worldwide holds some promise for progress.

Introduction

Small and marginal holdings (less than 2 ha) account for 85% of the total operational holdings, farming 157.35 million ha or 44% of the total operated area. The average size of holdings for all operational classes (small & marginal, medium and large) has declined over the years: down to 1.16 ha in 2010-11 from 2.82 ha in 1970-71. In 2018-19 India's tractor sales went up 10.24% at 8,78,476 units, compared to 7,96,873 in 2017-18. The largest arable crop is rice (44 million ha), followed by wheat (29.65 million ha). India's wheat yield rose annually by 1.8% from 1983 to 2013, for rice this was 1.71% annually. This is slow compared to China. India is one of the largest producers of food grains globally. Though its agriculture is very small-scale, yield from farming is low and the pressure on land is enormous. This needs to change with the help of digital precision technology. From drones to satellite images and sensor technology, the agricultural industry is changing in a remarkable way. Technological innovations are reshaping the way farming is done. Modernization of agriculture and the use of digital technology have caused new concepts to emerge such as precision farming, digital farming and smart farming.

Digital Farming

The essence of digital farming lies in creating value from data. Digital Farming means to go beyond the mere presence and availability of data and create actionable intelligence and meaningful added value from such data. Digital farming is integrating both concepts - precision farming and smart farming. According to a paper on Digital Agriculture by DLG (German Agricultural Society), digital farming is understood to mean "consistent application of the methods

of precision farming and smart farming, internal and external networking of the farm and use of web-based data platforms together with Big Data analyses". Farmers in India are using AI (Artificial Intelligence) to increase crop yields (a report by Microsoft News Center, India on 7 November, 2017). AI in agriculture is just getting started. Shifting weather patterns such as increase in temperature, changes in precipitation levels, and ground water density, can affect farmers, especially those who are dependent on timely rains for their crops. Leveraging the cloud and AI to predict advisories for sowing, pest control and commodity pricing, is a major initiative towards creating increased income and providing stability for the agricultural community.

AgroCares Technology Initiatives for Digital Farming

AgroCares Scanner has made it possible to test soil and feed in an easier, faster and more affordable way than with traditional methods. This enables arable farmers and advisers to take more soil samples, collect more data and optimize their fertilisation strategy. When it comes to feed, the NutriOpt On-site Adviser offers insights into feedstuffs and nutritional recommendations to optimize animal nutrition. The mobile apps that the Scanner works with provide not only data but also recommendations on how to utilize this data in a smart manner. This means the Scanner is a smart farming tool that creates actionable intelligence from data. Farmers get access to real time soil/ feed information across devices that give them the opportunity to make informed decisions about fertiliser application or their animals' nutrition.

ICRISAT – Digital Farming Strategies

i) Working Together with T-Hub

ICRISAT is working together with T-Hub, Telangana State's start-up incubator, to bring together the former's expertise in agriculture across the value chain and the latter's vibrant and extensive network of entrepreneurs. The collaboration spans multiple programs covering agriculture as the core domain and technology innovation which will create impact on a large scale. Among the areas to be explored include the setting up of an accelerator hub for agriculture; partnerships and synergies across the innovation spectrum; sponsoring agricultural related programs; and ways in which ICRISAT can become a partner in T-Hub's Accelerator program in the agriculture domain.

ii) Revolutionizing Agriculture through ICT - ICRISAT

Over the last few decades massive technological development and opportunities have transformed people's lives. However, these opportunities have not benefited the agriculture sector in a significant way. Farmers and various other actors along the agriculture value chain need significant amounts of information. Information

and Communication Technologies (ICTs) will play a key role in knowledge exchange, targeted recommendations, market integration and access to finance to make agriculture a profitable enterprise and attractive for youth.

Netafirm India Initiatives (By Government Association)

Conventionally, canals have been one of the most important mediums of irrigation for agriculture in India. However, the drawback with canals is the en route evaporation of water, which prevents adequate supply of water to the crops, thus increasing the farmer's dependencies on rain. But, with the government's intervention in the ongoing situation, things have started to change. The government is now looking out for solutions that would curb the loss of water on account of evaporation, and also ensure that the water is optimally used for agriculture. While the water-use efficiency in canal-based irrigation is only 30-35%, the government is making efforts to increase it by 20% for irrigation projects. This involves the consideration of techniques like lift irrigation and micro-irrigation. Drip irrigation improves WUE to more than 85%. So, along with the central government, the states like Karnataka, Maharashtra, Haryana, Orissa, Gujarat, Telangana, AP, and MP too have initiated efforts to improve WUE. In this regard, the application of micro irrigation techniques in the command area is found to be improving the WUE.

Netafirm supports the government's initiatives on the following aspects-

- NetBeat™ - The first irrigation system with a brain
- Dynamic Crop Models™ - Take precision irrigation to the next level
- NetBeat™ - The all-in-one digital farming solution
- Initial feasibility study of the project
- Calculations of water budget, crop water requirement etc.
- Designing of entire project
- Estimates & tentative costing of projects
- Guidelines set for formation of Water Users Association, agronomic practices & operational & maintenance methodology
- Training capacity building of all stake holders
- Market linkages with agricultural input & procurement companies

Digital Farmers - Mobile Application

This Application connects Merchants, Farmers, Fertilizer dealers, Seed dealers etc. on Common Digital platform. It provides Daily news for Farmers and also show daily Market rate. It also shows Government schemes for Farmers. It shows notifications related to Chatting, Product Bidding,

Schemes, and Updates. It provides free info about Organic Farming and Animals Farming to increase knowledge. Daily Updates of application are also shown.

Key Challenges in Digital Farming

1. Connectivity in rural areas.
2. Non-awareness of the varying farm production functions.
3. Size of individual management zones.
4. Barriers to entry for new firms.
5. Lack of scalability and configuration problems.
6. Benefits not immediately apparent.

Way to Overcome the Challenges in Digital Farming

For the relationship to work, costs and the price of end products must not increase, whilst allowing yields to rise. This is particularly important moving forward as the Food and Agricultural Organisation of the UN (FAO) has predicted that in order to keep pace with population growth; food production must increase by 70% by 2050. The agriculture industry is faced with a number of challenges in achieving these imperatives with limited availability of arable land; global climate change; the growing scarcity of water; the price and availability of energy particularly from fossil fuels; and the impact of urbanization on the supply of rural labour. Technology will play a central role in helping to overcome these challenges while ensuring costs are kept to a minimum and this can already be seen with the arrival of precision agriculture in the milking industry, for example.



Source - <https://mahyco.com/indian-agriculture-in-the-digital-age-how-can-it-help-the-farmers/>

Figure 1: Mahyco banner – Indian agriculture in the digital age



Source - <https://www.developmentnews.in/modern-agriculture-india-benefit-iot-digital-knowledge-sharing/>

Figure 2: Modern Agriculture in India to benefit from digital knowledge sharing

Conclusion

With Indian agriculture and allied sectors on the verge of adopting new technologies such as IoT and Agri-drones, foreign companies can play a very important role in supplying these new technologies to farmers. Though there are many India companies active, close to 267 million farmers need to be catered for. This enables private and foreign entities to expand their footprint in this part of the globe. However, their technologies also need to be affordable. To cater for them, government, industry, and research institutions have to form a consortium, so that Agri-Tech start-ups can flourish and meet the demands of Indian farmers.

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