



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

DIGITAL TECHNOLOGY AND INDIAN AGRICULTURE

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Abstract

As a source of livelihood agriculture remains the largest sector of Indian economy. It provides employment to 58.2% of the population. The social transformation of the country and the economic growth depends on the performance of the agriculture sector. In the recent past, the per capita agricultural output has seen a steady rise, but the sector's contribution to the GDP has been decreasing. Deceleration in the agricultural growth is the major challenge faced by the so called agrarian Indian economy. The reasons for the deceleration are many like lack of public investment in research and development and irrigation, inefficiency in providing inputs, rural credit and extension services, land fragmentation, out-dated tenancy law, lack of modern market and rural infrastructure, inappropriate input pricing policies etc. To overcome all these problems, digitization in agriculture has been introduced. The convergence of agriculture and information and communication technology (ICT) is a new growth engine which helps in increasing the efficiency in every process of production, distribution and consumption. This paper focuses on understanding the concept of digital Technology and development of Indian agriculture.

Keywords: Agriculture, Digitization, Indian economy, deceleration, GDP

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INTRODUCTION

Agriculture plays a vital role in India's economy. Over 58 per cent of the rural households depend on agriculture as their principal means of livelihood. As per the 2nd advanced estimates by the Central Statistics Office (CSO), the share of agriculture and allied sectors (including agriculture, livestock, forestry and fishery) is estimated to be 17.3 per cent of the Gross Value Added (GVA) during 2016-17 at 2011-12 prices. (Agriculture in India, 2017)

Agriculture in India

The agriculture sector employs nearly half of the workforce in the country. However, it contributes to 17.9% of the GDP (statisticstimes.com, March 2017). Over the past few decades, the manufacturing and services sectors have increasingly contributed to the growth of the economy, while the agriculture sector's contribution has decreased from more than 50% of GDP in the 1950s to 17.49% in 2016-17 (at constant prices). India's production of food grains has been increasing every year, and India is among the top producers of several crops such as wheat, rice, pulses, sugarcane and cotton. It is the highest producer of milk and second highest producer of fruits and vegetables. The production of food grains in India reached a record 275.68 million tonnes (MT) during FY 2016-17, as per the Fourth Advance Estimates (AE) released by the Department of Agriculture, Cooperation and Farmers Welfare, Government of India.

Important Challenges of Indian Agriculture Sector

The agriculture sector challenges will be important to India's overall development and the improved welfare of its rural poor. The challenges are as stated below:

1. By 2050 the world will have additional 2 billion and India has to feed 750 million.
2. India is currently using resources 50% faster than world can sustain.
3. Every second, India loses a football field size of farm land due to soil erosion and urbanization.
4. India has total 329 million hectares of land of which round 37% (120.40 million hectare) of the country's total geographical area is affected by various kinds of land degradation.
5. On an average 16.4 tones of fertile soil is lost every year per hectare.
6. India's small-holder farmers (those owning less than 2.0 hectares of farmland) comprise 78 percent of the country's farmers, but own only 33 percent of the total cultivated land; they nonetheless produce 41 percent of the country's food-grains.
7. Current farming technology costs far more than most farmers can afford.

While a food scarcity may sound like a faraway problem right now, it's a reality that India could be facing in as little as 15 years. India's growth has been largely jobless, with only 15 million jobs created during the last 10 years. With employment per factory declining steeply over the years, the chances for a revival seem difficult.

Hence, policy makers have to initiate and include policy actions and public programs to develop this sector and make it much more productive, internationally competitive, and diversified agricultural sector.

Digitization in Agriculture

The convergence of agriculture and information and communication technology (ICT) is a new development in India which is intended to increase efficiency in every process of production, distribution and consumption. This system can be also described as an integrated agricultural system. The main keys of the integrated agricultural system includes data processing and digital control machinery for digitization, data transmission, data collection, network and automation of agricultural activity (Tang, 2002). The current agriculture has converged with technologies such as information technology (IT), biotechnology (BT), environment technology (ET), and nano technology (NT). (Hwang, 2002) And it mainly focuses on areas such as cost reduction during production level, reduction in labor burden, high quality and organic production, and quality management in facility. Second, it is important to meet consumers' needs at the production and distribution stages through building a system, which delivers food safety information. This means, IT applications need to be expanded in the agriculture farming automation system. Furthermore, at the distribution and processing stages, advanced distribution technologies using IT need to be introduced including the convergence of distribution data. These are the very small portions of the digital agriculture system that is part of making big database of the whole agriculture system.

LITERATURE REVIEW

Some of the studies published in the relevant literature on digitization concerning the agriculture sector have been included.

State of Indian agriculture (2015-16), talks about Indian agriculture, performance, challenges and way forward. It explains the growth of the agricultural sector, regional variations in agricultural growth, capital formation in agriculture, production performance, performance of the horticulture sector, correcting land use pattern, rejuvenating of irrigation tanks soil and health, drought proofing and water wise efficiency, agriculture to climate change, managing agricultural inputs better etc.

NITI Aayog, Government of India (2015), states about raising agricultural productivity and making farming remunerative to the Indian farmers. The paper offers ideas on how these problems can be addressed so as to accelerate agricultural growth and bring remunerative prices to farmers. International Crop Research Institute for the Semi Arid Tropics talks about the digital agriculture, pathway to prosperity. This study aims to make agriculture profitable, improve farmer livelihood and reduce poverty. Agricultural situation in India (2017), gives farm sector news, general survey of agriculture, articles on agro economic research, commodity reviews and trends in agriculture.

Soma Dhar (2014) studies the socio economic and demographic status of Assam. The author highlight the various facts & figures of Assam and compare these with facts & figures of all India averages. The analysis of the data shows that, though in some cases the performance of state Assam is satisfactorily than the all India average.

Sharma (2007) tries to understand socio-economic implications of corporate-led initiatives in agriculture (mainly contract farming) in the state of Punjab, which has more experience in contract farming compared to other states.

Objective & Methodology

This paper focuses on understanding the concept of digital agriculture and how it propels the development of Indian agriculture. There are multiple software companies which have and are tying up with the Government of India with respect to how to build and enable the agriculture sector in this Digital Transformation. This paper also examines the approach taken by such companies to check how the supply-chain demand would be met in the future. The research is descriptive in nature. The study is conceptual and based on secondary data collected from company websites, newspapers and journals. The scope of the study is restricted to agricultural sector only.

Significance of Digital Transformation:

A digital transformation will help the farmers in multiple ways.

Access to Finance: The farmers in India today face acute shortage of money due to the various challenges highlighted earlier. Digital transformation helps the farmer in getting access to funds from various sources due to the exposure and awareness they get from being digital.

Forecasts on Climate Change: In India (as compared to other advanced countries), the ability to forecast weather changes and in turn the impact that it would have on farming, has been a difficult task. Having the right inputs on potential Climate Change will help the farmer in deciding the right seed to grow and in turn fulfill the demand that is out in the market.

Access to Farming Equipment and New Technology: In many of the developed countries, Robotics play a bigger role in farming. India is yet to see this advancement and hence there is a crucial need for this transformation.

Inputs for Better Soil Fertility and Soil Structure: The farmer in India rarely does an investigation of the fertility of the soil and hence the kind of seed to grow. What has been done in the past generations is what the Indian farmer today develops. There is thus a need to have a more scientific approach to agriculture.

Access to Markets: The farmer, though he does all the hard work today, is not compensated fairly for the work he does. Due to middle-men involved in the buying and selling of the farmer's products, the actual farmer gets a meager amount compared to the profits that the middle-men make. There is thus a need for a platform which will enable the farmer to sell directly to the buyers (rather than go through middle-men).

Access to Information: The farmer today bases his produce based on his peers and what has culturally been grown in his land. What worked yesterday or for someone else, does not always mean a success for today or for ourselves. The farmer will have to try out new experiments based on the information available which will enable him/her to produce more and get the right financial backing. The digital transformation is expected to handle this appropriately.

Small Landholdings: With the amount of barren land which is unutilized, the fact of the matter are that today, many farmers have very little land which does not help in growing the right crops. This needs to change if we need to overcome the challenges.

Predictive Analytics: Using the latest technology available in the market, if the agriculture sector is ignited with this digital transformation, the amount of data that would be available will help the farmer in growing the right crops at the right time. Thus the standard of living for the Indian farmer would go up, which would in turn encourage others to get engaged in farming.

Thus, the farmer can get benefited with above inputs using Digital Transformation.

Life Cycle in a Digital Transformation:

Digital technology is the only way forward to achieve the desired output. But it is not an easy task in a country like India. It is going to be a very slow and tedious process in implementing technology country wide. A digital transformation would encompass the following steps as detailed below, consisting of Planning, Capacity Building, Identifying the right stakeholders, providing mechanisms for Governance and monitoring. In the life cycle, we also need to look at how to onboard the Suppliers and Buyers, creating the supply-chain and demand pipeline. For all these to be effective, there is thus a need for a Point of Sale application (mobile enabled at some point), which would bring the buyers and sellers together on one platform.

How will this Technology Platform bring the change:

The change that this technology platform will bring is illustrated in the annexure.

The outcome of this would thus be Increased Income, Improved Resilience and Sustainable Eco-system.

CONCLUSION

Hence it can be concluded that the technology platform will bring the desired outcomes in agricultural sector like reduced costs, improved productivity and quality, improved prices, reduced risks and ultimately sustainable ecosystem. Many software companies (including Microsoft) have entered into agreements with various State Governments in India to help build this digital transformation. This has already seen much progress in Hyderabad, Assam, Karnataka to name a few. Policies need to adapt to this changing Digital world to ensure that the challenges mentioned above are overcome and lead to increased efficiency in the production, distribution and consumption of agriculture produce.

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