Digital Transformation of Indian Agriculture

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Agriculture remains the largest sector of Indian economy which provides employment to 60% of the population. The social conversion and the economic growth depends on the performance of the agricultural sector. Indian agriculture faced arduous trials to grow more food in the past. Even today, many of the problematic challenges are faced by agriculture in India. The challenges antagonizing Indian agriculture include waning productivity, fading and chastening natural resources, declining land fertility and ground waters, frequent pest attack, growing demand for quality food, rotten farm incomes, bitty land holdings and matchless changes in climate. Apart, the economic challenges include declining farmer income, farm productivity, post-harvest loss, huge debts. To trounce these problems, digitization in agriculture has been focused. The convergence of agriculture and ICT is a new growth area to help in efficiency in production, distribution and consumption. This paper focuses on understanding the concept of digital farming and problems on the issues of agriculture.

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1. Introduction

Agriculture plays a vital role on Indian economy and over 58% of the rural households yet depend on agriculture for the major source of livelihood and is the

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way of life for them. Agriculture and other allied sectors contribute to 17.9% of GDP of India (2014-15). India is the second larger producer of agriculture products and accounts for 7.6 percent of total global agricultural output. Agriculture is the core sector not only for food security in India, but also for nutritional security, sustainable development and poverty alleviation. Indian agriculture has crossed many landmarks such as Green Revolution, Evergreen Revolution, Blue Revolution, White Revolution, Yellow Revolution, Biotechnology Revolution and the most recent is Information and Communication Technology Revolution. The “Digital India” program launched by the Prime Minister on 1st July, 2015 aims at creating digital infrastructure for empowering rural communities and enables digital delivery of services and promoting digital literacy. This evidently insists on the role of Digital Agriculture within Digital India.

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2. **Use of ICT in Agriculture**

Digital revolution is the creation of fourth industrial revolution heralding technological change, combining technologies transforming systems, industries, countries and societies. Advances in computer and information technologies, connectivity, artificial intelligence, biotechnology, geographic information system have brought tremendous marvels in developing countries. Digital transformation brought in changes in lives of people and help in speeding up the progress of developing countries leading to inclusive agriculture, rural growth and organizational growth in agricultural economy and manufacturing sectors.

Indian Information Technology industry is one of the wildest growing industries in the country. The IT industry has built very valuable brand parity for itself in the global markets. The IT industry embraces of Software Industry and Information Technology assisted Services (ITES) which includes Business Process Outsourcing (BPO) Industry. Indian IT Industry is considered a pioneer in software development. The Indian IT industry accounts for approximately 67 percent of US$ 124-137 billion market. In the 2014/15 financial year only, the IT
industry in India produced annual revenue of around 120 billion U.S. dollars, a significant increase from around 60 billion U.S. dollars in 2008/09.

Information technology has the highest potential to improving the efficiency and productivity of agriculture and allied sectors. IT facilitates farmers on the overall qualitative improvement by providing timely and quality information inputs for wise decision making. Further, IT helps the extension workers, agricultural officials to access the latest information in turn which raises the ability to serve the farming community effectively. The Digital India move is for e-powering people living in rural India as well to those government and non-governmental machinery who work for the welfare of rural people. ICT is an all-encompassing umbrella term which provides the optimal usage of information and communication technologies including devices, networks, mobiles, services and applications from the new media technology with internet, sensors and existing electronic media and satellites. Precisely e-agriculture requires the conceptualization, plan, development, appraisal and innovation. There is a dire need for the standards, plans, approaches and tools as well the development of individual and institutional capacities and policy support.

3. Digital Farming

Digital Agriculture can be seen at as use of ICT and data ecosystems to upkeep the development and delivery of timely, localized information to make farming profitable, sustainable. Rural connectivity is the prime motive to providing low cost data and access to information. This helps empowering rural youth to comprehend their full potential, farmers to increase their profitability by accessing equitable markets and rural businesses to offer value added benefits. Digital technology will upsurge high harvests of agriculture productivity by recommending ideas to farmers on crop, planting date, variety of seed to be sown, weather forecast and projected market prices. Remote sensing is another big data resource to support the development of weather, watershed management, soil vigor and crop insurance coverage etc. The unmanned Aerial Vehicles are also used for assessing crop health, damage and yield with more accuracy than satellite technology.

Digital Agriculture has to create its impact on reduction of business costs and for proper fixation of market price so that farmers benefit higher share of marketable value for the produce. Indian agriculture sector has undergone structural changes by shifting from traditional subsistence towards market oriented business. It would be always meaningful to view agriculture not only as farming alone but as a value chain including farming, aggregating, processing, warehousing and retailing. The degree of organization and governance of value chains is a major challenge to be dealt through e-agriculture. The presence of several middle men, lack of information of other links in the chain and incapability to invest in improving the performance hinder and lead to inefficiencies and lower
incomes in the subordinate end of the chain. Hence the technology should focus on improving production, processing, quality control, value addition to raw produce and accumulation of nearer farms ensuring high share of consumer prices for the producers. Indian small farm holdings are difficult to be stabilized as they are very large in number. Technology based commodity exchanges need to be created for price discovery, for marketing infrastructure such as construction of warehouses, cold storages etc. Confidence building, awareness creation on application of improved inputs and adoption of high technology of cultivation is to be extended to farmers. The highly dispersed collection of produce, transport, quality assurance mechanisms pose lots of challenges apart from accumulation of several small farms. These not only necessitate costs but also time outlays in the combination process. Several innovative business models have been tried out in world agro-based countries such as Brazil, Africa and China utilizing big data and mobile phones to increase value chain efficiency for upbring access to appropriate inputs and credit.

Inclusive growth has been the major mover of poverty reduction in Asia Pacific regions. People’s Republic of China succeeded in encouraging growth that generates prolific employment of poor, structural change of economy towards productive employment in secondary and tertiary sectors, promoting rural and agricultural growth reducing poverty in rural areas. It succeeded more, than India in higher agricultural growth, effective land reforms, public investments and R&D.

Indian government is confronting many challenges. Young men are migrating to urban areas from rural poverty to seek employment leading to women to work in agricultural sector resulting in feminization of agriculture. Their passive backbreaking labor results in low productivity affected by severe climate changes. In 2016 the Prime Minister of India introduced a new national policy to double farmers’ income by 2022. It is targeted towards poverty reduction, food security and climate change. The Ministry of Agriculture and Farmers Welfare launched a national scheme called Pradhan Mantri Krishi Sinchai Yojana (PMKSY) aiming to irrigating every farm and improve water use efficacy. The Digital India Program mainly aims at transforming rural economy and creating skilled jobs in rural areas. Digital India’s tactical keystones, the Common Services Centers are destined to deliver access points for delivery of various electronic services to villages, to uphold digital and financial inclusion, embolden rural entrepreneurship, and shape rural capabilities and livelihoods, offering a bottom-up approach to social change, predominantly among India’s rural citizens. New technologies facilitate small farmers to enhance knowledge on precision agriculture to improve timeliness of planting, securing best market prices through sufficient market information, availing fertilizer subsidies direct from banks and improving agricultural extension. Improved seed supply combined with land and water management increases farmers’ income proportionately. eNAM (National Agriculture Market), an online platform is launched by the Hon’ble Prime Minister
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of India in April, 2016 for the benefit of farmers integrating agricultural markets online, allowing farmers and traders to set fair deals and prices in buying and selling the final produce and to gain best prices across markets. Pradhan Mantri Fasal Bima Yojana (PMFBY), a new crop insurance scheme is also launched in 2016 by Government of India in now covering 37 million farmers in its ambit. The government is intending to invest more on research to develop multi resistant crops. India is lagging behind its Asian counterparts repelling the approval of genetically modified crops developed by its own scientists. Such crops can be encouraged to be grown by poor farmers which offer increased resistance to adverse climatic conditions. Digital India Land Records Modernization Program (DILRMP) is an effort updating land records aiming at improved land management along with utilization of mobile phones and ‘Uberised’ tractor services. Digital India is implanting plants to connect 2.5 million Gram Panchyats with high speed internet by 2018. Government of India has authorized all mobile phones to support at least one of the 22 India languages as mobile phone coverage is high over one billion of population are already connected. The government has focused on digitalizing 230 million ration cards with a universal ID and Aadhaar.

4. Challenges and Technology Mitigation

4.1 Land Reforms

The central government’s new approach will overhaul the program of digitalization of records including the possible use of drones. The Land Acquisition, Rehabilitation and Resettlement Act of 2013 is passed under the UPA government in 2013 to replace Land Acquisition Act, 1894. The new push for digitalization is evident through the budget allocation of Rs. 339.75 crores in the Budget for FY14 for the erstwhile National Land Records Modernization Program but has since come down to Rs 90.49 crore by FY16 of which only Rs 36 crore was spent. In FY17 under the new program it will rise only to Rs 150 crore. Since the program can only be executed by state governments the money with the Centre was a red herring, meant to finance studies in the sector. The support from the Centre will be technical like coordinating with departments and importing best practices from abroad. The digital plan involves many components. At the first stage, the states would commence to map the rural land using aerial and satellite imaging. Till now, states have only altered their written records to computerized records under digitalization program.

At the first level, the states would begin to map the rural land using a combination of aerial and satellite imaging allied with ground markers. Till now, states have only changed their written records to computerized ones under the digitalization program. Some states have also asked to use drones for the purpose but the clearance has to be provided by the home ministry. The final element of the plan involves seeding of data with the Aadhaar numbers. This will enable precise
identification of the true owner of the land and would help in the growth of farmers. The Big Data Analytics (BDA) has the latent to change the way agriculture is conducted in India. The BDA architecture will generate and maintain the data repository of all plots with updated values.

4.2 Farmer Suicides

The prime reasons for farmer suicides are the reduction of profit margins realized, skyrocketing of prices of farm inputs, increased cost of cultivation, floods, droughts, debts and loan waiving. Digital technology can help in advancement in agriculture for production of crops of high yield potential. The technology be utilized to avail consolidated bank loans at soft interest rates and subsidies instead of relying on informal sources of funding. There is a dire need for establishing a government app to give information to the farmers about crops that can be tried in drought prone areas and to provide them with seeds that help to sustain even when the adverse whether situations. The National Agricultural Research System constituting State Agricultural Universities, Indian Council of Agricultural Research (ICAR) have developed flood or drought tolerant crop varieties for different areas of the country, astonishingly none of the websites/apps inform about to the farmers. There is a need for selling these kinds of seeds online. Many of ecommerce websites are to be developed to supply the quality seeds to the farmers.

5. Limitations of Digital Technology

There are substantial challenges in transforming the power of digital technologies into farmer friendly technological revolution. Generation of reliable up-to-date information for diverse agricultural sector is a big challenge. There is a need for spreading digital literacy as to how to choose and use apps available in regional languages. Digital technology can steer crop and input selection, make easy credit insurance, give weather adversaries, disease and pest related support and real time data on domestic and export markets. The Government of India is investing in mapping aquifers using modern technology, quantifying rainfall and groundwater levels. Though new technologies can stimulate augmentation, equity and sustainability, but are not alternates for human and institutional development. Inadequate connectivity in rural areas, high costs for services and lack of basic computer knowledge and literacy hamper rapid development of e-agriculture. Significant investment is needed in physical infrastructure, power, broadband and transportation. Digital divide be addressed appropriate. Larger investments are required in poorer regions.

References


http://www.icrisat.org/digitalagriculture


http://www.ibef.org/industry/agricultureindia.aspx
