Chapter 1
Digitization in Agriculture:
Insight Into the Networked World

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ABSTRACT

The chapter starts with a focus on the current scenario of the digitalization in agriculture space. It pinpoints the reason behind the need and explains the emergence of new Agtech-based startups that work on new innovative digital technologies. The chapter also tries to discuss the post-COVID implications along with the merits of digitalization in the agricultural domain. Apart from this, it also discusses different aspects of the digitalization on the agriculture space in general that includes the concept of telematics, precision farming, blockchain, artificial intelligence, etc. At last, some of the main challenges like the issue of connectivity, interoperability, portability, and need of public and private sector cooperation were discussed.

INTRODUCTION

Current Scenario

The great demand for food, limited supply of natural resources, and uncertainties in agriculture productivity are some of the key driving trends impacting the food and the agricultural market of today's world. According to the UN Department of Economic and Social Affairs report (DESA, U., 2017), the world is likely to witness a surge in the overall population from 7.6 billion in 2018 to 9.8 billion by 2050. Such a vast growth in the population is expected to come forward as an influential factor for the food demand around the globe. Another key factor for the upcoming growth in food supply demand is the expected 12 percent increase in the urban population of the world from 2014 to 2050. Predictions reported that the world may face water scarcity of 40% along with the deterioration of more than 20 percent cultivable land by 2030. To fulfill the cereal demand in the world by 2050, its production has to be increased by 3 billion tonnes (Alexandratos et al., 2012). Also by 2030, the livestock demand is likely to be increased by a margin of 80 percent and going up to the level of 200 percent by 2050.

There exist around 570 million smallholder farms around the world and 28 percent of the workforce at a global level which comes from the agriculture and food sector. As evident from all these facts and figures, the agriculture industry is a sector which needs the continuous thrust of technological innovations to feed the growing population for the years to come. Even though it has been shown that conventional tools are sufficient to meet the rising food demand, the actual truth comes from the report that estimates that nearly 821 million people still suffer from hunger due to lack of food supply. This fact itself gives rise to a big question of how to meet the food requirements of 9 billion people by 2050 in a sustainable and inclusive manner.

With all these things the world needs introduction of the new scaled-up transformed agricultural ecosystem at a rapid pace as shown in Figure 1. Industry 4.0 (De Clercq,M. et al., 2018) which is also known as the Fourth Industrial Revolution is responsible for transmuting various sectors through bringing in innovations through these disruptive digital technologies. The agricultural industry is also not a special case which is being exempted from this process of digital transformation. This transformation doesn't seem possible in the past only because of the unavailability of the information related to the basic requirements and field challenges that includes inputs like seed, fertilizers, microfinance, or price accessibility from smallholder farmers.

With the technological revolution around the world, the smallholder farmers are getting acquainted with the latest technological advancements in mobile communication through smartphones & other related technologies. All these are contributing to the development of the new digitally driven agrifood systems (UNICEF, A. et al., 2018). All of these implementations being scaled up could bring the revolution in the agriculture sector which is for sure only possible through digitalization.

Rural communities have been the most significant source of the next wave of mobile connections where the majority of the population is occupied in agricultural activities daily (Palmer, T. et al., 2017). Around 70 percent of the poorest 20 percent population of developing countries have access to these mobile technologies (World Bank Group., 2016).

If we see on a global level, 40 percent of the population has access to internet services and there are also ongoing digital initiatives to connect the leftover population especially those from rural areas of developing nations. Over the next 10 years, Industry 4.0 is likely to bring drastic changes in the system of agrifood markets. This is possible only through the revolutionary digital technologies like Artificial

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