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From Agriculture to Agritech | *Global growth megatrends and digital disruption challenges*

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Executive Summary

This study examines the agricultural industry and how technology can generate new growth through digital technologies. The current global food system does not provide food for all, and the world as a whole need to balance sustainability and increase food security. Today, millions of people are living in poverty, and the planet encounters the need to feed itself over the decades ahead, as the world's population is predicted to exceed 10 billion by 2050. At this time of immense global challenges, from climate change to economic crisis, to inequalities in wealth, resources and power, agricultural stakeholders must step up their efforts to defeat hunger and malnutrition. This is essential to the achievement of the Sustainable Development Goals and to the creation of a more prosperous world.

Bearing in mind that agriculture has far more impact on poverty reduction and ensuring food security than other areas of the economy, the aim of this study is to identify megatrends that will shape the future global food value chain. The structure of the food system is dynamic and driven by complex and varied megatrends such as urbanization, population growth, climate change, and key drivers, like technological change and innovation.

On the basis of the challenges faced by agriculture, the introduction of new technologies at global level could potentially increase production while at the same time addressing sustainability. The introduction of digital technologies along food value chains (FVCs), assisted by the integration of small farmers into global value chains (GVCs), creates a data-intensive transformation of the agricultural sector. This transition enables a rising demand for knowledge through the development of digital data for both agricultural assets and supply chains. However, the real effect of these digital frontier technologies on agricultural production and trade will become more apparent in the coming years when their use reaches a critical stage.

Digital technologies have a high potential to enable further growth of the agricultural sector, significantly reshape food value chains (FVCs) and build value for the agricultural sector. It is clear that a rapidly evolving food security climate must include more and more diverse players in the management of food systems and has to develop a strategy to promote and encourage more stakeholder participation.

Key Findings

- **The world's population is increasing at a significant pace and is projected to reach almost 10 billion people in 2050.** According to the FAO (2017), by 2050, the agri-food sector would have to produce 50% more food and feed to meet the growing demand for food. Specifically, as regards the Global Food Security, if food demand continues to rise as predicted, by 2050 we will need 120 percent more water supply, 42 percent more cropland, 14 percent more forest and 77 percent more GHG emissions.

- **Climate change has a huge effect on the agricultural sector.** It would lead to higher undernutrition rates due to the availability of fewer calories per capita. Food insecurity will grow as the global warming increases the amount of adverse climate events affecting development.

- **As the United Nations reports, 21.3 percent (144 million)** of children under the age of 5 were stunted, the World Health Organization, indicates that 38 million children under 5 years of age were overweight or obese in 2019.

- **The United Nations noted that 6.9 percent (47 million) of children under the age of 5 are affected by wasting (2019).**

- **In line with the 2020 Global Report on Food Crises (GRFC),** war, climate shocks, and economic downturns have caused acute hunger among 135 million people worldwide in 2019 (the data and the analyses in this report were prepared before the global crisis of the COVID-19 pandemic).

- **The pandemic is bringing a new global hunger crisis that is a further threat to food systems.** Small-scale food producers are struck badly by the crisis and represent 40 to 85 percent of all food producers in developing regions.

- **International trade costs decreased by 15 percent between 1996 and 2014.** New technologies would help to further reduce it. According to the World Trade Report 2018 projections, trade will increase by an additional 1.8-2 percent per year until 2030 as a result of falling trade rates, with a total increase of 31 to 34 percent over 15 years.

Study Scope

This study focuses on agriculture industry and food security, given the current fundamental need that food production should reach the appropriate level to feed all populations in the long term and play a central role in the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs). Ensuring food security has become a key issue for countries with varying degrees of economic development, while the agricultural sector plays a strategic role in improving the availability of food. Breakthrough digital technologies offer an opportunity to create major positive impacts across food system by delivering more resource-efficient food systems and ground-breaking techniques, such as precision agriculture, gene editing and traceability-enhancing technologies. The aim of this study is to understand how the world will consume food in a changing environment influenced by a number of key drivers of change and trends, like climate change and patterns of consumption, and to explore the potential of digital technologies that can unlock value and contribute to more efficient food value chains.

Structure of the E-book

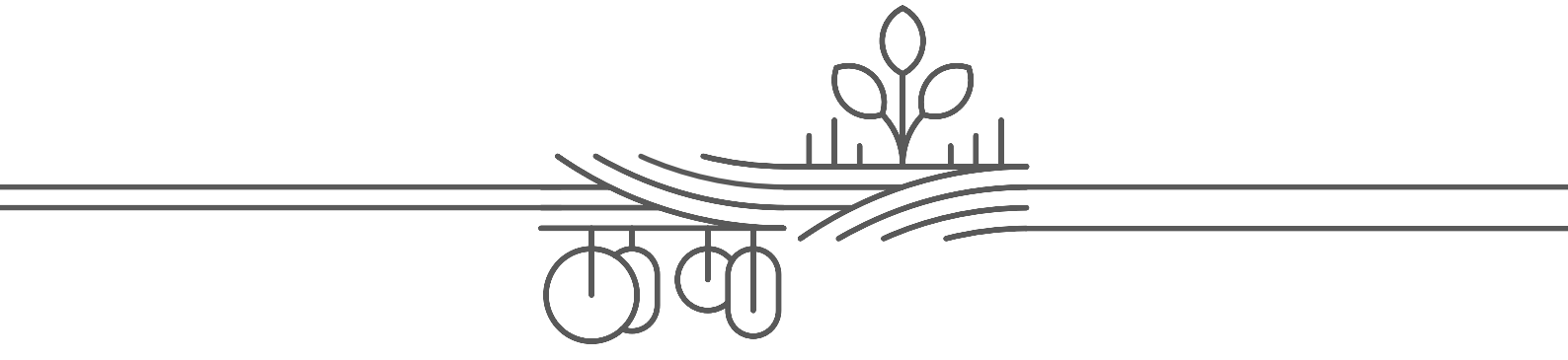
The first section provides an overview of the agriculture sector, a critical analysis of the forces and challenges affecting the sector and the food value chain, enriched by important industry snapshots. Furthermore, section 1 presents the evolution of agriculture that set the stage for the introduction of Agritech or smart agriculture, which signifies the use of technological innovations in this field and refers to the digital agricultural market.

Section 2 aims to identify key factors that are likely to shape the agricultural sector until 2030 Agenda for Sustainable Development time framework. Such long-term driving forces are inevitable and have an enormous impact on every part of the agri-food value chain. These megatrends are technological, economic, environmental and political forces that are interlinked.

Further, section 3 seeks to outline the technologies that have created a substantial disruption in the sector, contributing to more efficient food value chains. It also elaborates on how digital technologies and the term Agritech make it possible to build new business structures.

Section 4 proposes the next steps for business owners to unlock value in food safety, improved labor productivity and transform small farmers into global players through advanced technology.

The **conclusions** are **finally presented along** with an evaluation of the results of the above-mentioned background.



Note on Research Process & Methodology

This secondary research is based on the literature available online, such as the United Nations Food and Agriculture Organization (FAO) study (2020), the working paper on disruptive technologies by ODI, a survey conducted in the book Agriculture & Food Systems to 2050 (2019), and Markets and Markets; and profile development methods are used in this study. Besides, analytical techniques have been used to identify patterns from publicly available online information on enterprises websites. Historical, qualitative and quantitative information is obtained primarily from professional networks, annual reports and expert interviews on key factors such as recent trends in industry performance and factors underlying those trends-drivers, restraints, opportunities, and challenges influencing the growth of the market, for both, the supply and demand sides. Various secondary sources, are referred to identify key drivers in the industry, market size, with respect to growth trends, challenges and digital technologies that can yield new growth.

Introduction

Today, the agricultural sector is undergoing unprecedented changes, such as the pandemic crisis, which demonstrate the volatility and weaknesses of food systems that are already fragile. Accessibility and availability of healthy, sustainably produced food becomes much more difficult in the sense of food scarcity and lack of nutrition. Covid-19, already stressed by increasing climate extremes, was evaluated for food systems. As initiatives are being introduced around the world to slow down the spread of coronavirus disease, we must ensure that sufficient, equally distributed, nutritious food is available to meet basic nutritional needs, particularly for the most vulnerable. The novel virus, in combination with climate change, changes in consumer preferences, rapid digitization, rising land pressures and unequal demographic and economic transformations, demonstrate the urgent need to incorporate nutrition into universal health coverage as an imperative prerequisite for improving diets. This study investigates issues related to the agriculture industry, long-term forces (trends) and challenges, and contributes to a common understanding of key trends and concerns that will shape the future and outlook of the agriculture industry. Significant challenges will have to be addressed in order to achieve the amount of agricultural productivity required to meet the projected global demand for food, feed and fiber in 2050. Moreover, this study introduces the role of Agritech (agricultural innovation) as a result of the long-term forces. These technologies can address many of the key problems facing this industry, from food insecurity to declining productivity. More specifically, adopting these technologies could help create a prosperous, sustainable, modern value chain for digital agriculture. It is clear that developing and sustaining a competitive agriculture requires efficient generational change. Agriculture aims to reduce costs and environmental impacts, improve sustainability and increase crop yields and quality. Improving the production of the sector is essential in order to feed an ever-growing population, help to maintain rural communities through agri-sector employment and promote economic growth. The use of technology is one of the requirements for improving the global food chain, so that the data required can be generated more easily, and the analysis is improved and more valid. These digital technologies can create value and make agriculture more sustainable and efficient and increase the productivity of agriculture.

SECTION ONE

From traditional agriculture to Agritech

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