Chapter 3
Agriculture Supply Chains

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ABSTRACT

This chapter explores the emerging issues in the agriculture supply chain. The chapters also aims to address the following objectives: (1) to examine sustainable agriculture practices that can reduce the environmental footprint, (2) to examine the environmental, logistical, and market-related challenges faced by agricultural supply chains, (3) to determine the role of digitalization and data analytics, including IoT applications and precision agriculture, and blockchain technology within agriculture supply chains, (4) to explore the future trends and opportunities in agriculture supply chain. The chapter employed a critical review of academic journals and other articles, with content analysis as the analytical approach. This chapter serves as a comprehensive resource for stakeholders, facilitating informed decision-making and promoting sustainability and resilience.

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INTRODUCTION

Approximately one-third of the world's population faces malnutrition, hunger, micronutrient deficiencies, overweight, and obesity (Negra et al., 2020). They also asserted that global health issues and chronic non-infectious diseases are caused by poor diet. In response to this, agricultural supply chains (ASCs) have become critical in countries that produce agricultural products (Guritno, 2018; Boyabatlı et al., 2018; 2022). This chapter is a timely response to the Sustainable Development Agenda of the United Nations as outlined in the Sustainable Development Goals (SDGs). For example, SDG 2 focuses on ending hunger, achieving food security, improving nutrition, and promoting sustainable agriculture. Considering this goal, this chapter will educate farmers and other policymakers on how to address challenges in agricultural value chains to ensure food security and promote sustainability.

The SDG 13 aims to address climate change and its effects. This chapter examines how agricultural value chains are influenced by climate change and various policy imperatives that can be suggested to mitigate its effects. Furthermore, SDG 15 seeks to protect and promote the sustainability of terrestrial ecosystems. Therefore, this chapter advocates for the adoption of sustainable agriculture practices (such as organic agriculture) to protect terrestrial ecosystems. Furthermore, this chapter identifies areas for growth and innovation in ASCs.

1. BACKGROUND TO THE STUDY

The history of agriculture (which dates back to the Neolithic period) represents a dynamic story of development change that spans a millennium. The Third Agricultural Revolution (1950-1960s) was acknowledged as a significant turning point in the history of agriculture (Jing et al. 2020). This period was characterized by research and development (RD) and technological advances aimed at increasing agricultural production. Genetic engineering, biotechnology, and information technology have been shown to significantly influence crop yield, quality, and diversity. Additionally, the use of mechanization, irrigation systems, precision agriculture (involving the use of drones, sensor technology and global positioning systems), and genetically modified organisms (GMOs) has increased crop yields (Goodwin & Piggott, 2020; Kedisso et al., 2022; Amari, 2023; Grits, Rostovtsev & Dichensky, 2023; Elashmawy & Uysal, 2023). Despite the impact of these technologies and practices on crop yield, the extent of their adoption remains low in developing countries.

To intensify efforts vital for low carbon development, a global treaty was endorsed during the 2015 COP21 Climate Conference (Rhodes, 2017). The Paris Agreement stresses a reduction in carbon emissions using evolving technologies and capturing