Chapter 1
Sustainable Agriculture and Sustainable Development Goals (SDGs)

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ABSTRACT

Sustainable agriculture plays a crucial role in achieving the United Nations Sustainable Development Goals (SDGs) by 2030. This chapter analyzes the linkages between sustainable agriculture practices and specific SDGs, examining the potential of eco-friendly farming techniques to address socio-economic and environmental issues. It provides an overview of prominent goals directly influenced by agriculture like zero hunger, climate action, and responsible production and consumption. Additionally, it highlights innovative case studies that demonstrate how principles of regeneration and agroecology can drive progress on interlinked SDGs spanning poverty alleviation, clean water access, gender equality, and reduced inequalities. By synthesizing research on sustainable techniques like conservation agriculture, integrated farming systems, and organic agriculture, this chapter offers actionable recommendations for agricultural stakeholders to align with the 2030 agenda for sustainable development. It emphasizes the need for evidence-based, context-specific approaches that balance productivity, resilience, and environmental protection across local and global scales.

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INTRODUCTION

Sustainable agriculture has become an increasingly important concept in recent decades as the world grapples with the challenges of feeding a growing population while protecting the environment (Sarker et al., 2019). The concept of sustainable agriculture encompasses a range of practices and goals that aim to meet current and future societal needs for food and other agricultural products, while ensuring profitable farm incomes and supporting the sustainable use of natural resources. As illustrated in Figure 1, the three pillars of sustainability in agriculture include economic, social and environmental sustainability (Fischer et al., 2020). Achieving truly sustainable agriculture requires taking a holistic systems approach that integrates economic profitability, social equity and environmental health. It aligns agricultural production with long-term economic social and environmental sustainability. Sustainable agriculture considers the health of the entire agro-ecosystem including the people who live and work on farms. Economic sustainability in agriculture means that farms are financially viable and contribute to robust local and regional economies (Berti & Mulligan, 2016). Farmers need access to fair markets, reasonable profits and wages, financial planning tools, and support during hard times (Valkila, 2009). Value can be added through processing, marketing, agritourism and farm-to-table initiatives. Infrastructure like storage facilities, roads and broadband internet enable market access.

Social sustainability in agriculture promotes justice, equity and quality of life for all. Safe and ethical working conditions, fair wages, farmer autonomy, land tenure rights, access to education and community development are important social sustainability goals (Petrescu-Mag et al., 2019). Empowering women, indigenous groups, youth and other marginalized populations contributes to social sustainability in farming systems around the world. Environmental sustainability in agriculture involves maintaining natural resources and ecosystem services like soil fertility, clean water, pollinators, and biological pest control (Power, 2010). Practices like crop rotation, cover cropping, reduced tillage, integrated pest management, and habitat conservation support environmental sustainability (Redlich et al., 2021). Farmers aim to minimize pollution, preserve biodiversity, improve resilience to climate change, and reduce dependence on non-renewable inputs. Technologies like precision agriculture, drought-tolerant crops, and renewable energy help reduce agriculture's environmental footprint (Zhao et al., 2023). The united nation SDGs, adopted in 2015, expanded upon this concept of sustainable development by providing 17 goals and 169 targets to guide inclusive social and economic progress while protecting the environment (Halkos & Gkampoura, 2021; Leal Filho et al., 2019). Although not one of the 17 official SDGs, sustainable agriculture is considered an important component for achieving many of the goals. Countries around the world have committed to achieving the SDGs by 2030 through partnerships, policy and investment. Advancing sustainable agriculture is key to accomplishing these ambitious global sustainability targets.

This chapter aims to discuss how sustainable agriculture promotes SDGs and examines the challenges and recommendations to achieving SDGs globally. Agricultural productivity must substantially increase to provide for population and income growth, urbanization, and changing diets (Fróna et al., 2019). This must be achieved while adapting to climate change impacts and reducing the environmental footprint of agriculture. A transformation to sustainable agriculture will depend on system-level changes that integrate socioeconomic and environmental considerations across food systems (Wezel et al., 2020). This includes sustainable intensification of production and closing yield gaps through ecologically-based practices, use of well-adapted crop varieties and livestock breeds, and efficient water management. Diversified agricultural systems, such as integrated systems and agroforestry, can enhance productivity (Shennan et al., 2017). Loss and waste of food must be minimized through investments in storage, transport, pro-