



Hyperautomation in Precision Agriculture

Advancements and Opportunities for Sustainable Farming

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Chapter 1 - A global overview and the fundamentals of sustainable agriculture

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Abstract

Sustainable agriculture (SA) is an approach to farming that aims to meet the current and future needs of the growing global population while minimizing negative environmental impacts. It encompasses various practices and principles that focus on conservation of natural resources, biodiversity preservation, soil health and fertility, water management, organic farming, agroecology and agroforestry, integrated pest management, economic viability and social equity, education and knowledge sharing, policy and market support, and technology and innovation. SA embraces the use of appropriate technologies and innovations to improve farming practices such as precision agriculture, digital farming tools, genetic engineering, and innovative farming systems that optimize resource use, reduce waste, and increase productivity while minimizing environmental impacts. By integrating these fundamentals, SA aims to create resilient and productive farming systems that can meet the global demand for food while safeguarding the environment and ensuring the well-being of present and future generations. SA is gaining increasing attention around the world as a way to meet the challenges of climate change, population growth, and food security. The United Nations Food and Agriculture Organization has identified SA as one of the key pillars of the 2030 Agenda for Sustainable Development. There are many opportunities and challenges to the widespread adoption of SA. Therefore this chapter intends to report the fundamentals of

SA, global overview, and current developments in SA globally to the scientists and students who are working in the field to use this chapter as reference material.

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