Innovations in Agronomy and Smart Farming

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Preface

Agriculture is undergoing a profound transformation driven by rapid advances in science, engineering, and digital technologies. As the global population continues to grow and climate variability intensifies, the need for sustainable, efficient, and resilient agricultural systems has become more urgent than ever. Innovations in agronomy, combined with smart farming technologies, are reshaping traditional farming practices by enabling data-driven decision-making, precision resource management, and environmentally responsible production.

Innovations in Agronomy and Smart Farming presents a comprehensive overview of emerging technologies and modern agronomic practices that are redefining the future of agriculture. The book explores key topics including precision agriculture, Internet of Things (IoT), artificial intelligence, machine learning, robotics, drones, remote sensing, blockchain, digital twins, big data analytics, climate-smart agriculture, and sustainable crop management. It also highlights the integration of advanced sensing systems, automation, and predictive analytics to improve productivity, resource efficiency, and food security.

Designed for students, researchers, academicians, agricultural professionals, and policymakers, this book bridges the gap between agronomic principles and technological innovation. Each chapter combines theoretical foundations with practical applications, supported by recent developments and real-world examples that demonstrate the transformative potential of smart farming.

It is our hope that this book will serve as a valuable resource for understanding the evolving landscape of digital agriculture and inspire readers to contribute to the development of intelligent, sustainable, and resilient farming systems. Through innovation, collaboration, and scientific advancement, agriculture can successfully meet the challenges of the twenty-first century while ensuring food security and environmental sustainability for future generations.

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