
PREFACE

From the earliest days of cultivation to the modern agricultural landscape, farming has evolved alongside humanity, sustaining our existence and shaping our civilizations. As we stand on the tip of a new era, one marked by profound technological advances and the ever-pressing challenges of a changing climate and growing global population, the time has come to reimagine agriculture, to equip it with the tools and innovations needed to ensure our future prosperity.

The book 'Farming for the Future: Smart Agriculture Innovation' is a testament to the profound transformations occurring within the agricultural sector. This book takes you on a journey through the dynamic world of agriculture advancement, revealing how innovation and technology are revolutionizing the way we grow, harvest, and process food. It explores the intersection of traditional wisdom and innovative science, presenting a comprehensive view of the opportunities and challenges facing farmers and the broader agricultural community in this rapidly evolving landscape. Today, more than ever, we face the urgent need to produce more food with fewer resources while minimizing environmental impact. Smart agriculture, with its blend of data-driven decision-making, precision farming techniques, and sustainable practices, is not just a concept but a compelling solution to these complex challenges. From the application of artificial intelligence to the integration of big data analytics and climate-smart practices, this bunch of chapters showcases the innovations that are redefining the way we farm. This book delves into the incredible potential of vertical farming to reduce water usage and increase crop yields in urban areas, explores the role of blockchain technology in enhancing transparency and traceability in the supply chain, and examines the impact of climate-resilient crop varieties on food security. The book is written with the hope of providing you with knowledge and inspiration but also igniting a sense of urgency and purpose. The future of agriculture hinges not solely on what we grow but on how we grow it. Within these pages, you will uncover the incredible potential for a future that is characterized by greater sustainability, resilience, and prosperity, all through the lens of smart agriculture.

Welcome to the future of farming—a future that is both smart and promising.

— *Editors*

About the Editors



Dr. Santosh D.T. working as an Assistant Professor in the Department of Agricultural Engineering, School of Agricultural and Bio-Engineering, Centurion University of Technology and Management, Odisha. He earned his Ph.D. in December 2019 from the Agricultural and Food Engineering Department at IIT Kharagpur under the supervision of Professor K.N. Tiwari. He worked as a Research Associate at Precision Farming Development Centre, IIT Kharagpur for a decade (2010-2020), which was funded by the Ministry of Agriculture and Farmers Welfare. His area of research is micro-irrigation, greenhouse technology, protected cultivation techniques, and hydroponics. He has a number of publications in National and International peer-reviewed journals. Additionally, He had four years of industrial experience as a marketing professional at TAFE Tractor, GEA Farm Technologies, and HDFC Bank.



Dr. Bibhuti Bhusan Sahoo currently holds the position of Assistant Professor in Agricultural Engineering at Centurion University of Technology & Management, Odisha. He obtained his Ph.D. in Civil Engineering, specializing in Water Resources Engineering, from the National Institute of Technology, Patna in 2018. Dr. Sahoo's extensive research interests encompass various aspects of hydrologic modeling, statistical modeling, non-stationary flood frequency analysis, climate change impacts on water resources, and the application of artificial intelligence and machine learning in hydrology. His strong dedication to advancing the fields of hydrology and water resources is not only reflected in his role as an educator but also through his active contributions to addressing global water and environmental challenges.



Dr. Sagar Maitra, a Doctorate in Agronomy, specialization in crop husbandry engaged in research activities on cropping system, nutrient management of field crops, crop physiology, precision farming and sustainable agriculture. Dr. Maitra is presently working as Professor and Head, Department of Agronomy and Agroforestry at M.S. Swaminathan School of Agriculture, Centurion University of Technology and Management. Besides, he has exposure to print and electronic media. He is a dynamic professional with versatile

experience in academics and developmental activities including field exposure, project support and monitoring and transfer of technologies to the farming community. Previously he worked as Senior Producer in a National Electronic Media Network for dissemination of farming technologies for about 16 years and as SMS (Agronomy) in KVK for three years. He published more than 163 articles in different national and international journals, contributed more than 79 chapters in books published by reputed national and international publishers and authored and edited nine books.



Shradhanjalee Pradhan is a Doctoral Research fellow of the Department of Civil Engineering, Veer Surendra Sai University of Technology Burla, India. She received a post-graduate degree in Water Resources Engineering from the Veer Surendra Sai University of Technology Burla, India in 2019. Her doctoral research topic is Uncertainty analysis of climate change impacts on flood frequency by using hybrid machine learning methods. Her areas of research interest include hydrological models were the dominant source of uncertainty in flood

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Dr. Korla Harshavardhan working as an Assistant Professor in the Department of Agricultural Engineering, School of Agricultural and Bio Engineering, Centurion University of Technology and Management, Odisha. He earned his Ph.D. in May 2022 from the Department of Farm Machinery and Power Engineering, TNAU, Coimbatore under the supervision of Professor S.S. Sivakumar. He became a certified drone pilot and also working as a drone instructor for spraying and surveying drones for the last year which was funded by the Gram Tarang Inclusive Development Services Private

Limited (GTIDS). His area of research is Modern mechanization by using AI, Drone Technology, and Precision farming. He has a number of publications in National and International peer-reviewed journals. Additionally, He trained more than 50 efficient drone pilots for medium-category spraying drones (KRISHAK) in collaboration with General Aeronautics.

Contents

Preface

About the Editors

1. Automation in Agriculture: The Use of Automated Farming Emphasizing Smart Farm Machinery 1
Sharmistha Sahu and Jayshree Jena
2. Weeds Management Strategies in Conservation Agriculture 21
Masina Sairam, Tadiboina Gopala Krishna, Upasana Sahoo, Sarthak Pattanayak, Lalichetti Sagar and Sagar Maitra
3. Advancements in Precision Irrigation Techniques for Sustainable Water Management 43
Mani Bhushan, Pappu Kumar and Bibhuti Bhusan Sahoo
4. Enhancing Water Efficiency in Modern Farming: Innovations for Sustainable Agriculture 61
Shradhanjalee Pradhan and Bibhuti Bhusan Sahoo
5. Modern Farming Techniques for Increased Oil Seeds Production and Productivity 73
Dhanalakshmi, T.N., Shraddanjali Narasannavar and Shashidhara, N.
6. Revolutionizing Agricultural Machinery Design: Discrete Element Modelling (DEM) for Soil Tillage and Fertilizer Application Machinery Simulation 91
Jinukala Srinivas, P. Babu, Korla Harshavardhan and Usha Yadav

7. Empowering Agriculture through Digital Agricultural Extension Services: Opportunities and Challenges 105
Pallavi, G., Shashidhara, N. and Ashoka, N.
8. Unraveling the Impact of Light Wavelengths on Photosynthesis in Spinach Plants 121
Pratyasha Priyadarshini, Santosh, D.T. and Subhasmita Guru
9. Advancing Water Quality Analysis: The Power of App-Based Smart Solutions 135
Priya Khanda and Debarghya De
10. Enhancing Soil Quality Analysis with Windows-Based App and MATLAB Integration 151
Debarghya De and Priya Khanda
11. Urban Hydrology and Water Resource Systems Analysis 161
Pappu Kumar, Mani Bhushan and Bibhuti Bhusan Sahoo
12. Geospatial Technology and its Application in Agriculture 177
Gayatri Mohanty
13. Exploring the Path to Sustainable Energy: A Comprehensive Analysis of Alternative Fuels and Their Role in a Greener Future 185
Digdarshan Kumar
14. Enhancing Human Nutritional Quality through Innovative Plant Breeding Strategies 201
Dhanalakshmi, T.N., Shashidhara, N., Shraddanjali Narasannavar and Vilas, G.M.
15. Fundamentals of Supercritical Fluid Extraction for Food Industry Applications 221
P. Babu, Jinukala Srinivas, Mounika, E., Madhu, B.O. and Vani, G.

16. Revolutionizing Farming Practices: Tractor-Operated Precision Weeding for Enhanced Inter and Intra-Row Weed Management 237
Sharmistha Sahu and Jayshree Jena
17. Nano Fertilizers for Precision Agriculture: Enhancing Nutrient Efficiency and Sustainability 257
Subhasmita Guru, Santosh, D.T. and Pratyasha Priyadarshini
18. Advances in Vertical Farming: Innovations, Challenges, and Sustainable Agriculture for the Future 273
Bishnu Prasad Patra, Abinash Panda, Korla Harshvardhan, Subhasmita Pradhan and Srimaya Mohapatra
19. Transforming Agriculture through Advanced Image Processing Technologies 289
Jyotirmeye Patnaik, Kuralla Sree Ram Nithin Sai, Korla Harshvardhan, Ghanta Sri Venkat Srinivas, Valla Rahul and Deep Joel
20. Conservation Agriculture: Advancing Sustainable and Resilient Farming Practices 305
Ipsita Rath, K. Verma and P.L. Pradhan

