
Precision Agriculture Technology For Crop Farming

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*Precision
Agriculture
Technology
For Crop
Farming*

2023-09-05

DIAMOND RORY

*Precision Agriculture:
Technology and
Economic Perspectives*
Springer

Remote Sensing in Precision Agriculture: Transforming Scientific Advancement into Innovation compiles the latest applications of remote sensing in agriculture using spaceborne, airborne and drones' geospatial data. The book presents case studies, new algorithms and the latest methods surrounding crop sown area estimation, determining crop health status, assessment of vegetation dynamics, crop diseases identification, crop yield estimation, soil properties, drone image analysis for crop damage assessment, and other issues in precision agriculture. This book is ideal for those seeking to explore and implement remote sensing in an

effective and efficient manner with its compendium of scientifically and technologically sound information. Presents a well-integrated collection of chapters, with quality, consistency and continuity Provides the latest RS techniques in Precision Agriculture that are addressed by leading experts Includes detailed, yet geographically global case studies that can be easily understood, reproduced or implemented Covers geospatial data, with codes available through shared links *Precision Agriculture for Sustainability* Springer Nature Agricultural automation is the core technology for computer-aided agricultural production management and

implementation. An integration of equipment, infotronics, and precision farming technologies, it creates viable solutions for challenges facing the food, fiber, feed, and fuel needs of the human race now and into the future.

Agricultural Automat
Precision Agriculture in
the 21st Century

Elsevier

Sensors, satellite photography, and multispectral imaging are associated with futuristic space and communications science. Increasingly, however, they are considered part of the future of agriculture. The use of advanced technologies for crop production is known as precision agriculture, and its rapid emergence means the potential for

revolutionary change throughout the agricultural sector. Precision Agriculture in the 21st Century provides an overview of the specific technologies and practices under the umbrella of precision agriculture, exploring the full implications of their adoption by farmers and agricultural managers. The volume discusses how precision agriculture could dramatically affect decisionmaking in irrigation, crop selection, pest management, environmental issues, and pricing and market conditions. It also examines the geographical dimensions--farm, regional, national--of precision agriculture and looks at how

quickly and how widely the agricultural community can be expected to adopt the new information technologies. Precision Agriculture in the 21st Century highlights both the uncertainties and the exciting possibilities of this emerging approach to farming. This book will be important to anyone concerned about the future of agriculture: policymakers, regulators, scientists, farmers, educators, students, and suppliers to the agricultural industry.

Intelligent

Environmental Sensing

Springer

Sensors, satellite photography, and multispectral imaging are associated with futuristic space and communications science. Increasingly,

however, they are considered part of the future of agriculture. The use of advanced technologies for crop production is known as precision agriculture, and its rapid emergence means the potential for revolutionary change throughout the agricultural sector.

Precision Farming John Wiley & Sons

Developing environmental sensing and monitoring technologies become essential especially for industries that may cause severe contamination.

Intelligent environmental sensing uses novel sensor techniques, intelligent signal and data processing algorithms, and wireless sensor networks to enhance environmental sensing

and monitoring. It finds applications in many environmental problems such as oil and gas, water quality, and agriculture. This book addresses issues related to three main approaches to intelligent environmental sensing and discusses their latest technological developments. Key contents of the book include: Agricultural monitoring Classification, detection, and estimation Data fusion Geological monitoring Motor monitoring Multi-sensor systems Oil reservoirs monitoring Sensor nodes Water quality monitoring Wireless sensor network protocol.

Precision Agriculture in the 21st Century

Joseph Henry Press
Climatic variations

often tend to have adverse effect on the yield and production of crops. Efforts have, therefore, been on for harnessing this natural resource through artificial means for increasing crop productivity. One such technology is protected cultivation. This technique is well adopted in Europe and USA and now China and Japan are leading in controlled sphere production of horticultural crops. In India, the technology is making breakthrough in Karnataka and Maharashtra in protected cultivation of pepper, tomato, cucumber, muskmelon, baby corn etc. Precision farming is defined as the cultivation by adopting technologies which give maximum

precision in production of a superior crop with a desired yield levels and quality at competitive production. These include use of genetically modified crop varieties, micropropagation, integrated nutrient, water and pest managements, protected cultivation, organic farming, hi-tech horticulture, and post harvest technology. Post-harvest sector needs lot of precision. Peels, rags, etc. go waste. Many times, peels being rich in polyphenols, colouring pigment, nutrients etc are richer in antioxidant than what we actually eat. Here, we need precision. Precision in management, precision in product

diversification, precision in value addition are much sought after aspect. Women in Precision Agriculture Springer Science & Business Media

Faced with challenges of resource scarcity and environmental degradation, it is important to adopt innovative farming systems that maximize resource efficiency while protecting the environment. Soil-Specific Farming: Precision Agriculture focuses on principles and applications of soil-specific farming, providing information on rapidly evolving agricultural technologies. It addresses assessments of soil variability and application of modern innovations to enhance use efficiency of

fertilizers, irrigation, tillage, and pesticides through targeted management of soils and crops. This book provides the technological basis of adopting and promoting precision agriculture (PA) for addressing the issues of resource scarcity, environmental pollution, and climate change. It focuses specifically on PA technologies and discusses historical evolution, soil variability at different scales, soil fertility and nutrient management, water quality, land leveling techniques, and special ecosystems involving small landholders and coastal regions. Highlighting the scale-related issues and concerns of small landholders, the text

details the efficient use of resources on the basis of soil/field variability and site-specific conditions. It examines how PA technology can increase productivity, enhance profitability, and minimize environmental degradation. Woven throughout is the theme of sustainable use of resources.

Handbook of Precision Agriculture John Wiley & Sons

This book presents cases from different countries with a main focus on the perspectives of using precision farming in Europe. Divided into 12 chapters it addresses some of the most recent developments and aspects of precision farming. The intention of this book is to provide an overview

of some of the most promising technologies with precision agriculture from an economic point of view. Each chapter has been put together so that it can be read individually should the reader wish to focus on one particular topic. Precision Farming as a farm technology benefits from large-scale advantages due to relatively high investment costs and is primarily adopted on farms with medium to large field areas.

Precision in Crop Farming Brill

Wageningen Academic Precision agriculture (PA) involves the application of technologies and agronomic principles to manage spatial and temporal variation associated with all aspects of agricultural

production in order to improve crop performance and environmental quality. The focus of this book is to introduce a non-specialist audience to the the role of PA in food security, environmental protection, and sustainable use of natural resources, as well as its economic benefits. The technologies covered include yield monitors and remote sensing, and the key agronomic principles addressed are the optimal delivery of fertilizers, water and pesticides to crops only when and where these are required. As a result, it is shown that both food production and resource efficiency can be maximized, without waste or damage to the environment, such

as can occur from excessive fertilizer or pesticide applications. The authors of necessity describe some technicalities about PA, but the overall aim is to introduce readers who are unfamiliar with PA to this very broad subject and to demonstrate the potential impact of PA on the environment and economy. Chapter 3 of this book is freely available as a downloadable Open Access PDF at <http://www.taylorfrancis.com> under a Creative Commons Attribution-Non Commercial-No Derivatives (CC-BY-NC-ND) 3.0 license.

Precision agriculture '13 Delmar Thomson Learning
HANDBOOK OF INTELLIGENT COMPUTING AND

OPTIMIZATION FOR SUSTAINABLE DEVELOPMENT This book provides a comprehensive overview of the latest breakthroughs and recent progress in sustainable intelligent computing technologies, applications, and optimization techniques across various industries. Optimization has received enormous attention along with the rapidly increasing use of communication technology and the development of user-friendly software and artificial intelligence. In almost all human activities, there is a desire to deliver the highest possible results with the least amount of effort. Moreover, optimization is a very well-known area with a

vast number of applications, from route finding problems to medical treatment, construction, finance, accounting, engineering, and maintenance schedules in plants. As far as optimization of real-world problems is concerned, understanding the nature of the problem and grouping it in a proper class may help the designer employ proper techniques which can solve the problem efficiently. Many intelligent optimization techniques can find optimal solutions without the use of objective function and are less prone to local conditions. The 41 chapters comprising the Handbook of Intelligent Computing and Optimization for

Sustainable Development by subject specialists, represent diverse disciplines such as mathematics and computer science, electrical and electronics engineering, neuroscience and cognitive sciences, medicine, and social sciences, and provide the reader with an integrated understanding of the importance that intelligent computing has in the sustainable development of current societies. It discusses the emerging research exploring the theoretical and practical aspects of successfully implementing new and innovative intelligent techniques in a variety of sectors, including IoT, manufacturing,

optimization, and healthcare. Audience It is a pivotal reference source for IT specialists, industry professionals, managers, executives, researchers, scientists, and engineers seeking current research in emerging perspectives in the field of artificial intelligence in the areas of Internet of Things, renewable energy, optimization, and smart cities.

Agricultural Internet of Things and Decision Support for Precision Smart Farming

Springer

Precision Agriculture (PA) is an approach to managing the variability in production agriculture in a more economic and environmentally efficient manner. It has been pioneered as a management tool in

the grains industry, and while its development and uptake continues to grow amongst grain farmers worldwide, a broad range of other cropping industries have embraced the concept. This book explains general PA theory, identifies and describes essential tools and techniques, and includes practical examples from the grains industry. Readers will gain an understanding of the magnitude, spatial scale and seasonality of measurable variability in soil attributes, plant growth and environmental conditions. They will be introduced to the role of sensing systems in measuring crop, soil and environment variability, and

discover how this variability may have a significant impact on crop production systems. Precision Agriculture for Grain Production Systems will empower crop and soil science students, agronomy and agricultural engineering students, as well as agronomic advisors and farmers to critically analyse the impact of observed variation in resources on crop production and management decisions.

Precision Agriculture in the 21st Century

Springer

Precision agriculture is a reality in agriculture and is playing a key role as the industry comes to terms with the environment, market forces, quality requirements, traceability, vehicle

guidance and crop management.

Research continues to be necessary, and needs to be reported and disseminated to a wide audience. These proceedings contain reviewed papers presented at the 13th European Conference on Precision Agriculture, held in Budapest, Hungary. The papers reflect the wide range of disciplines that impinge on precision agriculture - technology, crop science, soil science, agronomy, information technology, decision support, remote sensing and others. The broad range of research topics reported will be a valuable resource for researchers, advisors, teachers and professionals in

agriculture long after the conference has finished.

Precision Agriculture
Technology for Crop

Farming Routledge

Precision Agriculture: Evolution, Insights and Emerging Trends presents a complete guide from foundational concepts to the economic, commercial and environmental implications of the approach. Showcasing recent research improvements, future trends, and highlighting innovative use of machine vision, artificial intelligence, UAVs, drones, IoT and data analytics to promote sustainable agriculture, the book brings the reader up-to-date with understanding and implementing this targeted practice. From

the basic elements of agronomy to insights on reflectance and remote sensing indices, chapters use summary abstracts, case studies and real-world examples of implementing the tools of precision agriculture (PA) to demonstrate the latest advances. It includes explanations on the origin of the intra-plot variability of a culture (spatial and temporal), different types of existing sensors, controllers and site-specific management. The book further explores yield monitoring, weed, disease and pest control, automated irrigation systems, PA tools for variable rate application of inputs within the field, and data processing methods. By also exploring the economic

profitability of precision farming approaches, and its utility for sustainable agriculture, Precision Agriculture: Evolution, Insights and Emerging Trends is a truly comprehensive view of this important approach to improving global agriculture production. Scientists, researchers, policymakers, graduate and postgraduate students, and engineers in the related fields of agriculture, computer science and engineering will benefit from this book. Addresses soil, machinery, plants, irrigation, sensors, UAVs and more Explores current and future technologies in the field of Precision Agriculture Details comprehensive cost-benefit analysis for

governments and other policymakers to incentivize and promote precision agriculture technology Precision Agriculture '15 CRC Press The book consists of 32 chapters featuring the concepts and applications of precision farming and protected cultivation broadly covered with theoretical and practical approach. The first 8 chapters are exclusively designed to provide detailed information on concept, need, objectives, benefits, components, applications and limitations of precision farming; laser leveler and its working mechanism, components and functioning; mechanized sowing and types of

mechanical seeders and their use; approaches for mapping of soils and plant attributes; site-specific weed and nutrient management; precision management of insect-pests and diseases; yield mapping in horticultural crops. An attempt has been made to cover the concept and application of protected cultivation in chapters from 9 to 30 characteristically highlighting the concept of greenhouse technology, its principles as well as historical and technological developments, agrivoltaic system, its concept and features, response of plant species under greenhouse conditions, criteria for the

selection of crops and varieties for protected cultivation, basic considerations for site selection, orientation and designing of greenhouse structures, climate control mechanisms for cooling and heating in greenhouses, components, accessories and BIS codes for protected cultivation, types of Irrigation system for greenhouse production system, growing media for greenhouse cultivation, soil pasteurization namely solarization, steam sterilization, chemical sterilization and augmentation with biological agents, checking the suitability of soil and water for greenhouse crops, plug tray nursery raising, basics of fertigation in greenhouse production

system, packages of practice for greenhouse cucumber, bell pepper, tomato and melons, potential of pruning as unconventional alternative for mass multiplication of greenhouse cucumber and tomato, types of soil-less cultures, GAP for protected cultivation and economic analysis of protected cultivation. Note: T&F does not sell or distribute the Hardback in India, Pakistan, Nepal, Bhutan, Bangladesh and Sri Lanka.

Satellite Farming
CSIRO PUBLISHING
Precision Agriculture covers in detail the spatial data for recordkeeping, spatial analysis in decision making and modeling prescription maps for variable rate

applications. It provides an overview of precision farming concepts and the tools of precision farming system. This book is not just about precision farming, but it takes one important and difficult aspect of precision farming and puts it into an understandable and teachable format.

Global Navigation Satellite Systems John Wiley & Sons
Precision agriculture (PA) and its suite of information technologies-such as soil and yield mapping using a global positioning system (GPS), GPS tractor guidance systems, and variable-rate input application-allow farm operators to fine-tune their production practices. Access to detailed, within-field

information can decrease input costs and increase yields. USDA's Agricultural Resource Management Survey shows that these PA technologies were used on roughly 30 to 50 percent of U.S. corn and soybean acres in 2010-12. Previous studies suggest that use of PA is associated with higher profits under certain conditions, but aggregate estimates of these gains have not been available. In this report, a treatment-effects model is developed to estimate factors associated with PA technology adoption rates and the impacts of adoption on profits. Labor and machinery used in production and certain farm characteristics, like farm size, are associated with

adoption as well as with two profit measures, net returns and operating profits. The impact of these PA technologies on profits for U.S. corn producers is positive, but small. Keywords: Crop production information technologies, precision agriculture, variable rate technology, soil tests, global positioning system maps, guidance systems. [Precision Agriculture '19](#) Createspace Independent Publishing Platform This book provides a review of precision agriculture technology development, followed by a presentation of the state-of-the-art and future requirements of precision agriculture technology. It presents different styles of precision agriculture

technologies suitable for large scale mechanized farming; highly automated community-based mechanized production; and fully mechanized farming practices commonly seen in emerging economic regions. The book emphasizes the introduction of core technical features of sensing, data processing and interpretation technologies, crop modeling and production control theory, intelligent machinery and field robots for precision agriculture production.

Precision Crop Protection - the Challenge and Use of Heterogeneity

Springer Nature
Precision agriculture (PA) involves the application of

technologies and agronomic principles to manage spatial and temporal variation associated with all aspects of agricultural production in order to improve crop performance and environmental quality. The focus of this book is to introduce a non-specialist audience to the the role of PA in food security, environmental protection, and sustainable use of natural resources, as well as its economic benefits. The technologies covered include yield monitors and remote sensing, and the key agronomic principles addressed are the optimal delivery of fertilizers, water and pesticides to crops only when and where these are required. As a result, it

is shown that both food production and resource efficiency can be maximized, without waste or damage to the environment, such as can occur from excessive fertilizer or pesticide applications. The authors of necessity describe some technicalities about PA, but the overall aim is to introduce readers who are unfamiliar with PA to this very broad subject and to demonstrate the potential impact of PA on the environment and economy. The book shows how farmers can place sustainability of the environment at the centre of their operations and that this is improved with the application of PA. The range of topics described includes

sampling and mapping, weed and pest control, proximal and remote sensing, spatio-temporal analysis for improving management, management zones and water management. These are illustrated with case studies on sampling and mapping, biofuels from sugar cane and maize, paddy rice cultivation, and cotton production. Chapter 3 of this book is freely available as a downloadable Open Access PDF at <http://www.tandfebooks.com/page/openaccess> It has been made available under a Creative Commons Attribution-Non Commercial-No Derivatives 3.0 license. *Precision Agriculture Technologies for Food Security and*

Sustainability CRC
Press

This book investigates new agricultural systems such as organic and green manuring, as well as integrated pest management practices, and looks at how they can improve farm productivity against the enhancements for the environment. Much of the information presented focuses on microinvestigation of the soil, and on the effects of soil variability within fields on yields and nutrient flows.

Precision Agriculture for Sustainability and Environmental Protection Springer

Science & Business
Media

Precision farming is an agricultural management system

using global navigation satellite systems, geographic information systems, remote sensing, and data management systems for optimizing the use of nutrients, water, seed, pesticides and energy in heterogeneous field situations. This book provides extensive information on the state-of-the-art of research on precision crop protection and recent developments in site-specific application technologies for the management of weeds, arthropod pests, pathogens and nematodes. It gives the reader an up-to-date and in-depth review of both basic and applied research developments. The chapters discuss 1) biology and epidemiology of pests,

II) new sensor technologies, III) applications of multi-scale sensor systems, IV) sensor detection of pests in growing crops, V) spatial and non-spatial data management, VI) impact of pest heterogeneity and VII) precise mechanical and chemical pest control.