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KEY=SUSTAINABLE - BURGESS FRIEDMAN

SUSTAINABLE AGRICULTURE

Springer Science & Business Media Sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs. Starving people in poor nations, obesity in rich nations, increasing food prices, on-going climate changes, increasing fuel and transportation costs, flaws of the global market, worldwide pesticide pollution, pest adaptation and resistance, loss of soil fertility and organic carbon, soil erosion, decreasing biodiversity, desertification, and so on. Despite unprecedented advances in sciences allowing to visit planets and disclose subatomic particles, serious terrestrial issues about food show clearly that conventional agriculture is not suited any longer to feed humans and to preserve ecosystems. Sustainable agriculture is an alternative for solving fundamental and applied issues related to food production in an ecological way. While conventional agriculture is driven almost solely by productivity and profit, sustainable agriculture integrates biological, chemical, physical, ecological, economic and social sciences in a comprehensive way to develop new farming practices that are safe and do not degrade our environment. In that respect, sustainable agriculture is not a classical and narrow science. Instead of solving problems using the classical painkiller approach that treats only negative impacts, sustainable agriculture treats problem sources. As most actual society issues are now intertwined, global, and fast-developing, sustainable agriculture will bring solutions to build a safer world. This book gathers review articles that analyze current agricultural issues and knowledge, then propose alternative solutions. It will therefore help all scientists, decision-makers, professors, farmers and politicians who wish to build a safe agriculture, energy and food system for future generations.

PRINCIPLES OF AGRONOMY FOR SUSTAINABLE AGRICULTURE

Springer This textbook explains the various aspects of sustainable agricultures to undergraduate and graduate students. The book first quantifies the components of the crop energy balance, i.e. the partitioning of net radiation, and their effect on the thermal environment of the canopy. The soil water balance and the quantification of its main component (evapotranspiration) are studied to determine the availability of water to rain fed crops and to calculate crop water requirements. Then it sets the limitations of crop production in relation to crop phenology, radiation interception and resource availability (e.g. nutrients). With that in mind the different agricultural techniques (sowing, tillage, irrigation, fertilization, harvest, application of pesticides, etc.) are analyzed with special emphasis in quantifying the inputs (sowing rates, fertilizer amounts, irrigation schedules, tillage plans) required for a given target yield under specific environmental conditions (soil & climate). For all techniques strategies are provided for improving the ratio productivity/resource use while ensuring sustainability. The book comes with online practical focusing on the key aspects of management in a crop rotation (collecting weather data, calculating productivity, sowing rates, irrigation programs, fertilizers rates etc).

TROPICAL SOILS

PROPERTIES AND MANAGEMENT FOR SUSTAINABLE AGRICULTURE

Oxford University Press Agricultural ecology, or agroecology, deals in general with the structure and function of agroecosystems at different levels of resolution. In this text/reference, the authors describe in terms of agroecology the tropical environments of sub-Saharan Africa, Southeast Asia, and Latin and Central America, focusing on production and management systems unique to each region.

SUSTAINABLE AGRICULTURE

DEFINITIONS AND TERMS

SUSTAINABLE AGRICULTURE REVIEWS 14

AGROECOLOGY AND GLOBAL CHANGE

Springer Sustainable agriculture is a rapidly growing field aiming at producing food and energy in a sustainable way for humans and their children. Sustainable agriculture is a discipline that addresses current issues such as climate change, increasing food and fuel prices, poor-nation starvation, rich-nation obesity, water pollution, soil erosion, fertility loss, pest control, and biodiversity depletion. Novel, environmentally-friendly solutions are proposed based on integrated knowledge from sciences as diverse as agronomy, soil science, molecular biology, chemistry, toxicology, ecology, economy, and social sciences. Indeed, sustainable agriculture decipher mechanisms of processes that occur from the molecular level to the farming system to the global level at time scales ranging from seconds to centuries. For that, scientists use the system approach that involves studying components and interactions of a whole system to address scientific, economic and social issues. In that respect, sustainable agriculture is not a classical, narrow science. Instead of solving problems using the classical painkiller approach that treats only negative impacts, sustainable agriculture treats problem sources. Because most actual society issues are now intertwined, global, and fast-developing, sustainable agriculture will bring solutions to build a safer world.

SUSTAINABLE AGRICULTURE REVIEWS 27

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SUSTAINABLE AGRICULTURE FOR CLIMATE CHANGE ADAPTATION

MDPI The Anthropocene, the time of humans. Never has human influence on the functioning of the planet been greater or in more urgent need of mitigation. Climate change, the accelerated warming of the planet's surface attributed to human activities, is now at the forefront of global politics. The agriculture sector not only contributes to climate change but also feels the severity of its effects, with the water, carbon and nitrogen cycles all subject to modification as a result. Crop production systems are each subject to different types of threat and levels of threat intensity. There is however significant potential to both adapt to and mitigate climate change within the agricultural sector and reduce these threats. Each solution must be implemented in a sustainable manner and tailored to individual regions and farming systems. This Special Issue evaluates a variety of potential climate change adaptation and mitigation techniques that account for this spatial variation, including modification to cropping systems, Climate-Smart Agriculture and the development and growth of novel crops and crop varieties.

PLANT, SOIL AND MICROBES

VOLUME 1: IMPLICATIONS IN CROP SCIENCE

Springer The interactions between the plant, soil and microbes are complex in nature. Events may be antagonistic, mutualistic or synergistic, depending upon the types of

microorganisms and their association with the plant and soil in question. Multi-trophic tactics can therefore be employed to nourish plants in various habitats and growth conditions. Understanding the mechanisms of these interactions is thus highly desired in order to utilize the knowledge in an ecofriendly and sustainable way. This holistic approach to crop improvement may not only resolve the upcoming food security issues, but also make the environment greener by reducing the chemical inputs. Plant, soil and microbe, Volume 1: Implications in Crop Science, along with the forthcoming Volume 2: Mechanisms and Molecular Interactions, provide detailed accounts of the exquisite and delicate balance between the three critical components of agronomy. Specifically, these two titles focus on the basis of nutrient exchange between the microorganisms and the host plants, the mechanism of disease protection and the recent molecular details emerged from studying this multi-tropic interaction. Together they aim to provide a solid foundation for the students, teachers, and researchers interested in soil microbiology, plant pathology, ecology and agronomy.

SUSTAINABLE AGRICULTURE REVIEWS

VOLUME 15

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SUSTAINABLE INTENSIFICATION

INCREASING PRODUCTIVITY IN AFRICAN FOOD AND AGRICULTURAL SYSTEMS

Routledge Continued population growth, rapidly changing consumption patterns and the impacts of climate change and environmental degradation are driving limited resources of food, energy, water and materials towards critical thresholds worldwide. These pressures are likely to be substantial across Africa, where countries will have to find innovative ways to boost crop and livestock production to avoid becoming more reliant on imports and food aid. Sustainable agricultural intensification - producing more output from the same area of land while reducing the negative environmental impacts - represents a solution for millions of African farmers. This volume presents the lessons learned from forty sustainable agricultural intensification programmes in twenty countries across Africa, commissioned as part of the UK Government's Foresight project. Through detailed case studies, the authors of each chapter examine how to develop productive and sustainable agricultural systems and how to scale up these systems to reach many more millions of people in the future. Themes covered include crop improvements, agroforestry and soil conservation, conservation agriculture, integrated pest management, horticulture, livestock and fodder crops, aquaculture, and novel policies and partnerships.

FARMING FOR FOOD AND WATER SECURITY

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SOCIOLOGY, ORGANIC FARMING, CLIMATE CHANGE AND SOIL SCIENCE

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MODELING FOR SUSTAINABLE MANAGEMENT IN AGRICULTURE, FOOD AND THE ENVIRONMENT

CRC Press Recent developments in computer science, data mining and big data analytics have resulted in new operational frameworks in agriculture, food and the environment, which in fact, share a strong link between them. A key challenge for researchers is to extract new data patterns and utilize them in decision making. Managers, policy makers, and practitioners have to be aware of these methodologies in order to establish efficient and effective working groups for the tasks to be resolved. The book reviews the complexity of the interrelationship between agriculture, food production and processing, and environmental issues. It also highlights the prospects of modeling in various cases of problem solving in these sectors, and reviews the new and future challenges. Consumer awareness in food production and processing practices is continually increasing and the necessity for advanced behavioural tools follows the same trend. Furthermore, the value chain management challenge is becoming one of the most crucial tasks due to the increased importance of new parameters like the origin of products, its environmental footprint and the enhancement of local production, etc. The book addresses these topics in a holistic approach, merging modeling with advanced marketing practices in a coherent and innovative manner, being an effective tool in a continuously demanding world.

GENETIC ENGINEERING, BIOFERTILISATION, SOIL QUALITY AND ORGANIC FARMING

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SUSTAINABLE AGRICULTURE REVIEWS

VOLUME 17

Springer Sustainable agriculture is a rapidly growing field aiming at producing food and energy in a sustainable way for humans and their children. Sustainable agriculture is a discipline that addresses current issues such as climate change, increasing food and fuel prices, poor-nation starvation, rich-nation obesity, water pollution, soil erosion, fertility loss, pest control and biodiversity depletion. Novel, environmentally-friendly solutions are proposed based on integrated knowledge from sciences as diverse as agronomy, soil science, molecular biology, chemistry, toxicology, ecology, economy and social sciences. Indeed, sustainable agriculture decipher mechanisms of processes that occur from the molecular level to the farming system to the global level at time scales ranging from seconds to centuries. For that, scientists use the system approach that involves studying components and interactions of a whole system to address scientific, economic and social issues. In that respect, sustainable agriculture is not a classical, narrow science. Instead of solving problems using the classical painkiller approach that treats only negative impacts, sustainable agriculture treats problem sources. Because most actual society issues are now intertwined, global and fast-developing, sustainable agriculture will bring solutions to build a safer world.

SUSTAINABLE AGRICULTURE IN THE ERA OF CLIMATE CHANGE

Springer Nature Under ongoing climate changes, natural and cultivated habitats of major crops are being continuously disturbed. Such conditions impose and exacerbate abiotic and biotic stressors. Drought, salinity, flood, cold, heat, heavy metals, metalloids, oxidants, irradiation, etc. are important abiotic stressors, while diseases and infections caused by plant pathogens, such as fungal agents, bacteria and viruses, are major biotic stresses. In many instances, stresses have become the major limiting factor for agricultural productivity and exert detrimental role on growth and yield of the crops. To help feed an ever increasing world population and to ensure global food security, concerted efforts from scientists and researchers have identified strategies to manage and mitigate the impacts of climate-induced stresses. This book, summarizing their findings, is aimed at crop improvement beyond such kind of barriers, by agronomic practices (genetics, breeding, phenotyping, etc.) and biotechnological applications, including molecular markers, QTL mapping, genetic engineering, transgenesis, tissue culture, various 'omics' technologies and gene editing. It will cover a wide range of topics under environmental challenges, agronomy and agriculture processes, and biotechnological approaches. Additionally, fundamental mechanisms and applied information on stress responses and tolerance will be discussed. This book highlights problems and offers proper solutions for crop stress management with recent information and up-to-date citations. We believe this book is suitable

for scientists, researchers and students working in the fields of agriculture, plant science, environmental biology and biotechnology.

AGROECOLOGY AND STRATEGIES FOR CLIMATE CHANGE

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INTERCROPPING SYSTEMS IN SUSTAINABLE AGRICULTURE

Frontiers Media SA

SUSTAINABLE AGRICULTURE REVIEWS

CEREALS

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ORGANIC FERTILISATION, SOIL QUALITY AND HUMAN HEALTH

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INNOVATIONS IN SUSTAINABLE AGRICULTURE

Springer This volume is a ready reference on sustainable agriculture and reinforce the understanding for its utilization to develop environmentally sustainable and profitable food production systems. It describes ecological sustainability of farming systems, present innovations for improving efficiency in the use of resources for sustainable agriculture and propose technological options and new areas of research in this very important area of agriculture.

GENETICS, BIOFUELS AND LOCAL FARMING SYSTEMS

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EDUCATIONAL AND TRAINING OPPORTUNITIES IN SUSTAINABLE AGRICULTURE

FUTURE OF SUSTAINABLE AGRICULTURE IN SALINE ENVIRONMENTS

CRC Press Food production on present and future saline soils deserves the world's attention particularly because food security is a pressing issue, millions of hectares of degraded soils are available worldwide, freshwater is becoming increasingly scarce, and the global sea-level rise threatens food production in fertile coastal lowlands. Future of Sustainable Agriculture in Saline Environments aims to showcase the global potential of saline agriculture. The book covers the essential topics, such as policy and awareness, soil management, future crops, and genetic developments, all supplemented by case studies that show how this knowledge has been applied. It offers an overview of current research themes and practical cases focused on enhancing food production on saline lands. FEATURES Describes the critical role of the revitalization of salt-degraded lands in achieving sustainability in agriculture on a global scale Discusses practical solutions toward using drylands and delta areas threatened by salinity for sustainable food production Presents strategies for adaptation to climate change and sea-level rise through food production under saline conditions Addresses the diverse aspects of crop salt tolerance and microbiological associations Highlights the complex problem of salinity and waterlogging and safer management of poor-quality water, supplemented by case studies A PDF version of this book is available for free in Open Access at www.taylorfrancis.com. It has been made available under a Creative Commons Attribution-Non Commercial-No Derivatives 4.0 license.

CLIMATE CHANGE, INTERCROPPING, PEST CONTROL AND BENEFICIAL MICROORGANISMS

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SUSTAINABLE FOOD AND AGRICULTURE

AN INTEGRATED APPROACH

Academic Press Sustainable Food and Agriculture: An Integrated Approach is the first book to look at the imminent threats to sustainable food security through a cross-sectoral lens. As the world faces food supply challenges posed by the declining growth rate of agricultural productivity, accelerated deterioration of quantity and quality of natural resources that underpin agricultural production, climate change, and hunger, poverty and malnutrition, a multi-faced understanding is key to identifying practical solutions. This book gives stakeholders a common vision, concept and methods that are based on proven and widely agreed strategies for continuous improvement in sustainability at different scales. While information on policies and technologies that would enhance productivity and sustainability of individual agricultural sectors is available to some extent, literature is practically devoid of information and experiences for countries and communities considering a comprehensive approach (cross-sectoral policies, strategies and technologies) to SFA. This book is the first effort to fill this gap, providing information on proven options for enhancing productivity, profitability, equity and environmental sustainability of individual sectors and, in addition, how to identify opportunities and actions for exploiting cross-sectoral synergies. Provides proven options of integrated technologies and policies, helping new programs identify appropriate existing programs Presents mechanisms/tools for balancing trade-offs and proposes indicators to facilitate decision-making and progress measurement Positions a comprehensive and informed review of issues in one place for effective education, comparison and evaluation

SUSTAINABLE AGRICULTURE

ADVANCES IN TECHNOLOGICAL INTERVENTIONS

CRC Press This new volume looks at the evolution and challenges of sustainable agriculture, a field that is growing in use and popularity, discussing some of the important ideas, practices, and policies that are essential to an effective sustainable agriculture strategy. The book features 25 chapters written by experts in crop improvement, natural resource management, crop protection, social sciences, and product development. The volume provides a good understanding of the use of sustainable agriculture and the sustainable

management of agri-horticultural crops, focusing on eco-friendly approaches, such as the utilization of waste materials. Topics include ecofriendly plant protection measures, climate change and natural resource management, tools to mitigate the effect of extreme weather events, agrochemical research and regulation, soil carbon sequestration, water and nutrient management in agricultural systems, and more. Key features: Discusses sustainable agriculture within the framework of recent challenges in agriculture Looks at the development and diversification of crops and cultural practices to enhance biological and economic stability Discusses innovative nanotechnologies in research and production technologies Highlights the development of new varieties in agri-horticultural crops Discusses use of recent technologies for soil-plant-microbe-environment interactions.

SUSTAINABLE AGRICULTURE REVIEWS

Springer This book features articles that analyze current agricultural issues and knowledge. It also proposes novel, environmentally friendly solutions that are based on integrated information from such fields as agronomy, soil science, molecular biology, chemistry, toxicology, ecology, economics and the social sciences. Coverage examines ways to produce food and energy in a sustainable way for humans and their children. Inside, readers will find articles that explore climate change, increasing food and fuel prices, poor-nation starvation, rich-nation obesity, water pollution, soil erosion, fertility loss, pest control and biodiversity depletion. Instead of solving problems using the classical painkiller approach, which seeks to limit negative impacts, sustainable agriculture treats challenges at their source. Because most societal issues are in fact intertwined, global, and fast-developing, sustainable agriculture will bring solutions that have the potential to build a more peaceful world. This book will help scientists, decision-makers, professors, farmers and politicians build safer agriculture, energy and food systems for future generations.

EXTENSION AND EDUCATION MATERIALS FOR SUSTAINABLE AGRICULTURE

A PROJECT OF THE NORTH CENTRAL REGION SUSTAINABLE AGRICULTURE RESEARCH AND EDUCATION AND AGRICULTURE IN CONCERT WITH THE ENVIRONMENT

DEVELOPING SUSTAINABLE AGRICULTURE IN PAKISTAN

CRC Press Agriculture plays a pivotal role in the economy and development of Pakistan providing food to consumers, raw materials to industries, and a market for industrial goods. Unfortunately, agricultural production is stagnant due to several barriers including a fixed cropping pattern, reliance on a few major crops, a narrow genetic pool, poor seed quality, and a changing climate. In addition, the high cost of production, weak phytosanitary compliance mechanisms, and a lack of cold chain facilities makes Pakistan agriculturally uncompetitive in export markets. Despite all these issues, agriculture is the primary industry in Pakistan and small farmers continue to dominate the business. Small farmers grow crops for subsistence under a fixed cropping pattern and a holistic approach is required to develop agriculture to improve the livelihoods of the rural populace. This book presents an exhaustive look at agriculture in Pakistan. Chapters provide critical analyses of present trends, inadequacies in agriculture, strategic planning, improvement programs and policies while keeping in view the natural resources, plant- and animal-related agricultural production technologies, input supplies, population planning, migration and poverty, and balanced policies on finance, credit, marketing, and trade.

ALTERNATIVE FARMING SYSTEMS, BIOTECHNOLOGY, DROUGHT STRESS AND ECOLOGICAL FERTILISATION

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BIODIVERSITY, BIOFUELS, AGROFORESTRY AND CONSERVATION AGRICULTURE

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SUSTAINABLE AGRICULTURE AND THE ENVIRONMENT IN THE HUMID TROPICS

National Academies Press Rain forests are rapidly being cleared in the humid tropics to keep pace with food demands, economic needs, and population growth. Without proper management, these forests and other natural resources will be seriously depleted within the next 50 years. Sustainable Agriculture and the Environment in the Humid Tropics provides critically needed direction for developing strategies that both mitigate land degradation, deforestation, and biological resource losses and help the economic status of tropical countries through promotion of sustainable agricultural practices. The book includes A practical discussion of 12 major land use options for boosting food production and enhancing local economies while protecting the natural resource base. Recommendations for developing technologies needed for sustainable agriculture. A strategy for changing policies that discourage conserving and managing natural resources and biodiversity. Detailed reports on agriculture and deforestation in seven tropical countries.

ECOLOGICAL INTENSIFICATION OF NATURAL RESOURCES FOR SUSTAINABLE AGRICULTURE

Springer Nature Ecological intensification involves using natural resources such as land, water, soil nutrients, and other biotic and abiotic variables in a sustainable way to achieve high performance and efficiency in agricultural yield with minimal damage to the agroecosystems. With increasing food demand there is high pressure on agricultural systems. The concept of ecological intensification presents the mechanisms of ensuring high agricultural productivity by restoration the soil health and landscape ecosystem services. The approach involves the replacement of anthropogenic inputs with eco-friendly and sustainable alternates. Effective ecological intensification requires an understanding of ecosystems services, ecosystem's components, and flow of resources in the agroecosystems. Also, awareness of land use patterns, socio-economic factors, and needs of the farmer community plays a crucial role. It is therefore essential to understand the interaction of ecosystem constituents within the extensive agricultural landscape. The editors critically examined the status of ecological stress in agroecosystems and address the issue of ecological intensification for natural resources management. Drawing upon research and examples from around the world, the book is offering an up-to-date account, and insight into the approaches that can be put in practice for poly-cropping systems and landscape-scale management to increase the stability of agricultural production systems to achieve 'Ecological resilience'. It further discusses the role of farmer communities and the importance of their awareness about the issues. This book will be of interest to teachers, researchers, climate change scientists, capacity builders, and policymakers. Also, the book serves as additional reading material for undergraduate and graduate students of agriculture, forestry, ecology, agronomy, soil science, and environmental sciences. National and international agricultural scientists, policymakers will also find this to be a useful read for green future.

ACHIEVING THE SUSTAINABLE DEVELOPMENT GOALS THROUGH SUSTAINABLE FOOD SYSTEMS

Springer Nature This publication offers a systemic analysis of sustainability in the food system, taking as its framework the Sustainable Development Goals of the 2030 Agenda of the United Nations. Targeted chapters from experts in the field cover main challenges in the food system and propose methods for achieving long term sustainability. Authors focus on how sustainability can be achieved along the whole food chain and in different contexts. Timely issues such as food security, climate change and migration and sustainable agriculture are discussed in depth. The volume is unique in its multidisciplinary and multi-stakeholder approach. Chapter authors come from a variety of backgrounds, and authors include academic professors, members of CSO and other international organizations, and policy makers. This plurality allows for a nuanced analysis of sustainability goals and practices from a variety of perspectives, making the book useful to a wide range of readers working in different areas related to sustainability and food production. The book is targeted towards the academic community and practitioners in the policy, international cooperation, nutrition, geography, and social sciences fields. Professors teaching in nutrition, food technology, food sociology, global economics, food systems, agriculture and agronomy, and political science and international cooperation may find this to be a useful supplemental text in their courses.

SUSTAINABLE AGRICULTURE REVIEWS

VOLUME 11

Springer Science & Business Media Sustainable agriculture is a rapidly growing field aiming at producing food and energy in a sustainable way for humans and their children. It is a discipline that addresses current issues: climate change, increasing food and fuel prices, poor-nation starvation, rich-nation obesity, water pollution, soil erosion, fertility loss, pest control and biodiversity depletion. This series gathers review articles that analyze current agricultural issues and knowledge, then proposes alternative solutions.

CUTTING EDGE TECHNOLOGY FOR AGRICULTURAL SUSTAINABILITY

New India Publishing Agency Agricultural Sustainability is a combination of technologies and implementation processes that are used to manage information-related with maintenance of equilibrium condition in the scenario of productivity level in the field of agriculture. Sustainable agriculture is not just about food security, the protection of crops and its cultivation or while it is being processed; it is also about the protection of environment with economic equity and profitability. This is a composite field involving agricultural science, engineering, database and soil-based crop management, user training, and policy issues. A common objective of work in this field is to protect the environment and defend degeneration systems by ensuring resource availability, its integrity, authentication and confidentiality so that the right action can be accessed with the right information and

direction at the right time. The book contains 33 chapters pertaining to sections on (i) water resource management (ii) irrigation water management (iii) soil resource management (iv) sustainability in agriculture and (v) crop management and productivity with the content contributed by eminent researchers throughout the world. The book will come as an important contribution to the latest agricultural technologies in bridging up the gap of scientific information to the researchers and policy makers in different relevant field of specialization.

INTRODUCTION TO AGRONOMY: FOOD, CROPS, AND ENVIRONMENT

Cengage Learning This full-color introduction to agronomy and crop science offers both traditional agricultural students and students with nonagricultural backgrounds a timely look at the principles of crop science, sustainable agriculture, and a host of related societal issues. A must-read text for anyone interested in what are arguably the most profoundly important issues of our time, **INTRODUCTION TO AGRONOMY**, second edition addresses the basics of safe and sustainable food and fiber production as well as big picture topics such as energy, ecology, and environmental quality. Throughout the text, readers will find information and illustrations on the latest agricultural methods, regulations, and practices--and how each is impacting our society and each individual within it. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

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TECHNICAL PROGRESSIONS AND TRANSITIONS

Springer Nature This book discusses a number of recent technological and methodological progressions in achieving sustainable agriculture. It covers innovative and economically viable techniques for growers, laborers, consumers, policymakers, and others working to develop food-secure and ecologically sound agricultural practices to benefit humans and the environment. The key topics addressed include the increasing role of biofertilizers in sustainable agriculture, green synthesized nanoparticles for higher crop production rates, eco-friendly plant-based pesticides as alternatives to synthetic/chemical pesticides, use of genomics for improved plant breeding practices, and the use of biochar to increase the water-holding capacity in soil. The book concludes with an overview of satellite-based soil erosion practices to monitor and control the harmful impacts of land degradation, and a discussion of long-term strategies to reduce crop losses due to pest and insecticide damage. The book will be of interest to students and researchers in the field of environmental science, agriculture science, agronomy, and sustainable development.