

Working With Dynamic Crop Models Second Edition Methods Tools And Examples For Agriculture And Environment

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Landscape Modelling and Decision Support - Wilfried Mirschel 2020-03-02

This book contributes to a deeper understanding of landscape and regional modelling in general, and its broad range of facets with respect to various landscape parameters. It presents model approaches for a number of ecological and socio-economic landscape indicators, and also describes spatial decision support systems (DSS), frameworks, and model-based tools, which are prerequisites for deriving sustainable decision and solution strategies for the protection of comprehensively functioning landscapes. While it mainly focuses on the latest research findings in regional modelling and DSS in Europe, it also highlights the work of scientists from Russia. The book is intended for landscape modellers, scientists from various fields of landscape research, university teaching staff, and experts in landscape planning and management, landscape conservation and landscape policy.

Agent-Based Modeling for Archaeology - Iza Romanowska 2021-08-02

To fully understand not only the past, but also the trajectories, of human societies, we need a more dynamic view of human social systems. Agent-based modeling (ABM), which can create fine-scale models of behavior over time and space, may reveal important, general patterns of human activity. Agent-Based Modeling for Archaeology is the first ABM textbook designed for researchers studying the human past. Appropriate for scholars from archaeology, the digital humanities, and other social sciences, this book offers novices and more experienced ABM researchers a modular approach to learning ABM and using it effectively. Readers will find the necessary background, discussion of modeling techniques and traps, references, and algorithms to use ABM in their own work. They will also find engaging examples of how other scholars have applied ABM, ranging from the study of the intercontinental migration pathways of early hominins, to the weather-crop-population cycles of the American Southwest, to the trade networks of Ancient Rome. This textbook provides the foundations needed to simulate the complexity of past human societies, offering researchers a richer understanding of the past—and likely future—of our species.

How Asia Works - Joe Studwell 2013-07-02

“A good read for anyone who wants to understand what actually determines whether a developing economy will succeed” (Bill Gates, “Top 5 Books of the Year”). An Economist Best Book of the Year from a reporter who has spent two decades in the region, and who The Financial Times said “should be named chief myth-buster for Asian business.” In How Asia Works, Joe Studwell distills his extensive research into the economies of nine countries—Japan, South Korea, Taiwan, Indonesia, Malaysia, Thailand, the Philippines, Vietnam, and China—into an accessible, readable narrative that debunks Western misconceptions, shows what really happened in Asia and why, and for once makes clear why some countries have boomed while others have languished. Studwell’s in-depth analysis focuses on three main areas: land policy, manufacturing, and finance. Land reform has been essential to the success of Asian economies, giving a kick-start to development by utilizing a large workforce and providing capital for growth. With

manufacturing, industrial development alone is not sufficient, Studwell argues. Instead, countries need “export discipline,” a government that forces companies to compete on the global scale. And in finance, effective regulation is essential for fostering, and sustaining growth. To explore all of these subjects, Studwell journeys far and wide, drawing on fascinating examples from a Philippine sugar baron’s stifling of reform to the explosive growth at a Korean steel mill. “Provocative . . . How Asia Works is a striking and enlightening book . . . A lively mix of scholarship, reporting and polemic.” —The Economist

Modeling Physiology of Crop Development, Growth and Yield - Afshin Soltani 2012

Model studies focus experimental investigations to improve our understanding and performance of systems. Concentrating on crop modelling, this book provides an introduction to the concepts of crop development, growth, and yield, with step-by-step outlines to each topic, suggested exercises and simple equations. A valuable text for students and researchers of crop development alike, this book is written in five parts that allow the reader to develop a solid foundation and coverage of production models including water- and nitrogen-limited systems.

Drawdown - Paul Hawken 2017-04-18

• New York Times bestseller • The 100 most substantive solutions to reverse global warming, based on meticulous research by leading scientists and policymakers around the world “At this point in time, the Drawdown book is exactly what is needed; a credible, conservative solution-by-solution narrative that we can do it. Reading it is an effective inoculation against the widespread perception of doom that humanity cannot and will not solve the climate crisis. Reported by-effects include increased determination and a sense of grounded hope.” —Per Espen Stoknes, Author, What We Think About When We Try Not To Think About Global Warming “There’s been no real way for ordinary people to get an understanding of what they can do and what impact it can have. There remains no single, comprehensive, reliable compendium of carbon-reduction solutions across sectors. At least until now. . . . The public is hungry for this kind of practical wisdom.” —David Roberts, Vox “This is the ideal environmental sciences textbook—only it is too interesting and inspiring to be called a textbook.” —Peter Kareiva, Director of the Institute of the Environment and Sustainability, UCLA In the face of widespread fear and apathy, an international coalition of researchers, professionals, and scientists have come together to offer a set of realistic and bold solutions to climate change. One hundred techniques and practices are described here—some are well known; some you may have never heard of. They range from clean energy to educating girls in lower-income countries to land use practices that pull carbon out of the air. The solutions exist, are economically viable, and communities throughout the world are currently enacting them with skill and determination. If deployed collectively on a global scale over the next thirty years, they represent a credible path forward, not just to slow the earth’s warming but to reach drawdown, that point in time when greenhouse gases in the atmosphere peak and begin to decline. These measures promise cascading benefits to human health,

security, prosperity, and well-being—giving us every reason to see this planetary crisis as an opportunity to create a just and livable world.

Advances in Animal Experimentation and Modeling - Ranbir Chander Sobti 2021-12-17

Exploration in Laboratory Animal Sciences Understanding Life Phenomena updates our knowledge about the newer technologies such as molecular biology, genomics including sequencing, proteomics, transcriptomics, cell culture, stem cell culture, transgenesis and their translation to understand systematics and phylogeny of laboratory animals at molecular level. In seven sections Exploration in Laboratory Animal Sciences Understanding Life Phenomena resolves issues of conservation, applications in environment monitoring, production of drugs and others. Comparative research has enabled use of domestic animal models that translate the advances in basic biosciences to the schemes for human welfare including medicine. Molecular geneticists are unravelling the complexities of mammalian genes and the field of biotechnology is maturing at a fast pace. Additionally, research focused on immunology and animal behavior offer new insight into ways of enhancing animal welfare. The rise in consumption of animal proteins in addition to the challenges of sustaining our natural resources has given animal scientists a vast array of opportunities to engage in integrative systems-based research for meeting the challenges that behold us. Exploration in Laboratory Animal Sciences Understanding Life Phenomena also discusses the manipulation of animals as factories for the production of safe foods, drugs, and sensors and others to meet the contemporary challenges faced by mankind in the new world order created by pandemic of Covid 19. It also includes several chapters on the causation and management of certain diseases and impact of microbes on life. Provides insight to newer and futuristic technologies to understand disease process and drug design by animal models Addresses a wide variety of species and covers a wide variety of topics (such as animal species, the laboratory setting, regulatory guidelines, and ethical considerations) to fully prepare for work with all types of animals Gives a perspective on laboratory animal use that allows to explain the benefits of animal use as required by veterinary technology program accreditation procedure Includes examples of animal bio-technological techniques (including stem cell and tissue engineering) for their applications to humanity Offers new insight into ways of enhancing animal welfare by the inclusion of research results focused on immunology and laboratory animal behavior

Agricultural Salinity Assessment and Management - K.K. Tanji 2012

Encyclopedia of Systems Biology - Werner Dubitzky 2013-06-05

Systems biology refers to the quantitative analysis of the dynamic interactions among several components of a biological system and aims to understand the behavior of the system as a whole. Systems biology involves the development and application of systems theory concepts for the study of complex biological systems through iteration over mathematical modeling, computational simulation and biological experimentation. Systems biology could be viewed as a tool to increase our understanding of biological systems, to develop more directed experiments, and to allow accurate predictions. The Encyclopedia of Systems Biology is conceived as a comprehensive reference work covering all aspects of systems biology, in particular the investigation of living matter involving a tight coupling of biological experimentation, mathematical modeling and computational analysis and simulation. The main goal of the Encyclopedia is to provide a complete reference of established knowledge in systems biology - a 'one-stop shop' for someone seeking information on key concepts of systems biology. As a result, the Encyclopedia comprises a broad range of topics relevant in the context of systems biology. The audience targeted by the Encyclopedia includes researchers, developers, teachers, students and practitioners who are interested or working in the field of systems biology. Keeping in mind the varying needs of the potential readership, we have structured and presented the content in a way that is accessible to readers from wide range of backgrounds. In contrast to encyclopedic online resources, which often rely on the general public to author their content, a key consideration in the development of the Encyclopedia of Systems Biology was to have subject matter experts define the concepts and subjects of systems biology.

Advances in Crop Modelling for a Sustainable Agriculture - Kenneth Boote 2019-10-22

Crop modelling has huge potential to improve decision making in farming. This collection reviews advances in next-generation models focused on user needs at the whole farm system and landscape scale.

Hyperspectral Remote Sensing of Vegetation, Second Edition, Four Volume Set - Prasad S.

Thenkabil 2022-07-30

Written by leading global experts, including pioneers in the field, the four-volume set on Hyperspectral Remote Sensing of Vegetation, Second Edition, reviews existing state-of-the-art knowledge, highlights advances made in different areas, and provides guidance for the appropriate use of hyperspectral data in the study and management of agricultural crops and natural vegetation. Volume I, Fundamentals, Sensor Systems, Spectral Libraries, and Data Mining for Vegetation introduces the fundamentals of hyperspectral or imaging spectroscopy data, including hyperspectral data processes, sensor systems, spectral libraries, and data mining and analysis, covering both the strengths and limitations of these topics. Volume II, Hyperspectral Indices and Image Classifications for Agriculture and Vegetation evaluates the performance of hyperspectral narrowband or imaging spectroscopy data with specific emphasis on the uses and applications of hyperspectral narrowband vegetation indices in characterizing, modeling, mapping, and monitoring agricultural crops and vegetation. Volume III, Biophysical and Biochemical Characterization and Plant Species Studies demonstrates the methods that are developed and used to study terrestrial vegetation using hyperspectral data. This volume includes extensive discussions on hyperspectral data processing and how to implement data processing mechanisms for specific biophysical and biochemical applications such as crop yield modeling, crop biophysical and biochemical property characterization, and crop moisture assessments. Volume IV, Advanced Applications in Remote Sensing of Agricultural Crops and Natural Vegetation discusses the use of hyperspectral or imaging spectroscopy data in numerous specific and advanced applications, such as forest management, precision farming, managing invasive species, and local to global land cover change detection.

Computational Science - ICCS 2020 - Valeria V. Krzhizhanovskaya 2020-06-19

The seven-volume set LNCS 12137, 12138, 12139, 12140, 12141, 12142, and 12143 constitutes the proceedings of the 20th International Conference on Computational Science, ICCS 2020, held in Amsterdam, The Netherlands, in June 2020.* The total of 101 papers and 248 workshop papers presented in this book set were carefully reviewed and selected from 719 submissions (230 submissions to the main track and 489 submissions to the workshops). The papers were organized in topical sections named: Part I: ICCS Main Track Part II: ICCS Main Track Part III: Advances in High-Performance Computational Earth Sciences: Applications and Frameworks; Agent-Based Simulations, Adaptive Algorithms and Solvers; Applications of Computational Methods in Artificial Intelligence and Machine Learning; Biomedical and Bioinformatics Challenges for Computer Science Part IV: Classifier Learning from Difficult Data; Complex Social Systems through the Lens of Computational Science; Computational Health; Computational Methods for Emerging Problems in (Dis-)Information Analysis Part V: Computational Optimization, Modelling and Simulation; Computational Science in IoT and Smart Systems; Computer Graphics, Image Processing and Artificial Intelligence Part VI: Data Driven Computational Sciences; Machine Learning and Data Assimilation for Dynamical Systems; Meshfree Methods in Computational Sciences; Multiscale Modelling and Simulation; Quantum Computing Workshop Part VII: Simulations of Flow and Transport: Modeling, Algorithms and Computation; Smart Systems: Bringing Together Computer Vision, Sensor Networks and Machine Learning; Software Engineering for Computational Science; Solving Problems with Uncertainties; Teaching Computational Science; UNcErtainty QUantIficatiOn for ComputatiOnAl modeLs *The conference was canceled due to the COVID-19 pandemic. Chapter 'APE: A Command-Line Tool and API for Automated Workflow Composition' is available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.

Crop-soil Simulation Models - William Stephens 2002-07-22

The use of crop-soil modelling has so far been mainly confined to the research community. Practical applications have occurred in the areas of decision tools for irrigation studies and pest management. However, there is potential to increase its applied use. This book reviews progress in crop-soil simulation modelling and assesses its application to agriculture in developing countries. It is based on work sponsored by the Natural Resources Systems Programme of the UK Department for International Development.

Crop Systems Dynamics - YIN Xinyou 2005-03-08

This book presents a generic process-based crop growth model, GECROS (Genotype-by-Environment

interaction on CROp growth Simulator), recently developed in Wageningen. The model uses robust yet simple algorithms to summarize the current knowledge of individual physiological processes and their interactions and feedback mechanisms. It was structured from the basics of whole-crop systems dynamics to embody the physiological causes rather than descriptive algorithms of the emergent consequences. It also attempts to model each process at a consistent level of detail, so that no area is overemphasized and similarly no area is treated in a trivial manner. Main attention has been paid to interactive aspects in crop growth such as photosynthesis-transpiration coupling via stomatal conductance, carbon-nitrogen interaction on leaf area index, functional balance between shoot and root activities, and interplay between source supply and sink demand on reserve formation and remobilization. GECROS combines robust model algorithm, high computational efficiency, and accurate model output with minimum number of input parameters that require periodical destructive sampling to estimate.

The Book of R - Tilman M. Davies 2016-07-16

The Book of R is a comprehensive, beginner-friendly guide to R, the world's most popular programming language for statistical analysis. Even if you have no programming experience and little more than a grounding in the basics of mathematics, you'll find everything you need to begin using R effectively for statistical analysis. You'll start with the basics, like how to handle data and write simple programs, before moving on to more advanced topics, like producing statistical summaries of your data and performing statistical tests and modeling. You'll even learn how to create impressive data visualizations with R's basic graphics tools and contributed packages, like ggplot2 and ggvis, as well as interactive 3D visualizations using the rgl package. Dozens of hands-on exercises (with downloadable solutions) take you from theory to practice, as you learn: -The fundamentals of programming in R, including how to write data frames, create functions, and use variables, statements, and loops -Statistical concepts like exploratory data analysis, probabilities, hypothesis tests, and regression modeling, and how to execute them in R -How to access R's thousands of functions, libraries, and data sets -How to draw valid and useful conclusions from your data -How to create publication-quality graphics of your results Combining detailed explanations with real-world examples and exercises, this book will provide you with a solid understanding of both statistics and the depth of R's functionality. Make The Book of R your doorway into the growing world of data analysis.

[Handbook of Probabilistic Models](#) - Pijush Samui 2019-10-05

Handbook of Probabilistic Models carefully examines the application of advanced probabilistic models in conventional engineering fields. In this comprehensive handbook, practitioners, researchers and scientists will find detailed explanations of technical concepts, applications of the proposed methods, and the respective scientific approaches needed to solve the problem. This book provides an interdisciplinary approach that creates advanced probabilistic models for engineering fields, ranging from conventional fields of mechanical engineering and civil engineering, to electronics, electrical, earth sciences, climate, agriculture, water resource, mathematical sciences and computer sciences. Specific topics covered include minimax probability machine regression, stochastic finite element method, relevance vector machine, logistic regression, Monte Carlo simulations, random matrix, Gaussian process regression, Kalman filter, stochastic optimization, maximum likelihood, Bayesian inference, Bayesian update, kriging, copula-statistical models, and more. Explains the application of advanced probabilistic models encompassing multidisciplinary research Applies probabilistic modeling to emerging areas in engineering Provides an interdisciplinary approach to probabilistic models and their applications, thus solving a wide range of practical problems

Strategic Modelling and Business Dynamics - John D. W. Morecroft 2015-05-27

Insightful modelling of dynamic systems for better business strategy The business environment is constantly changing and organisations need the ability to rehearse alternative futures. By mimicking the interlocking operations of firms and industries, modelling serves as a 'dry run' for testing ideas, anticipating consequences, avoiding strategic pitfalls and improving future performance. Strategic Modelling and Business Dynamics is an essential guide to credible models; helping you to understand modelling as a creative process for distilling and communicating those factors that drive business success and sustainability. Written by an internationally regarded authority, the book covers all stages of model building, from conceptual to analytical. The book demonstrates a range of in-depth practical examples that

vividly illustrate important or puzzling dynamics in firm operations, strategy, public policy, and everyday life. This updated new edition also offers a rich Learners' website with models, articles and videos, as well as a separate Instructors' website resource, with lecture slides and other course materials (see Related Websites/Extra section below). Together the book and websites deliver a powerful package of blended learning materials that: Introduce the system dynamics approach of modelling strategic problems in business and society Include industry examples and public sector applications with interactive simulators and contemporary visual modelling software Provide the latest state-of-the-art thinking, concepts and techniques for systems modelling The comprehensive Learners' website features models, microworlds, journal articles and videos. Easy-to-use simulators enable readers to experience dynamic complexity in business and society. Like would-be CEOs, readers can re-design operations and then re-simulate in the quest for well-coordinated strategy and better performance. The simulators include a baffling hotel shower, a start-up low-cost airline, an international radio broadcaster, a diversifying tyre maker, commercial fisheries and the global oil industry. "Much more than an introduction, John Morecroft's Strategic Modelling and Business Dynamics uses interactive 'mini-simulators and microworlds' to create an engaging and effective learning environment in which readers, whatever their background, can develop their intuition about complex dynamic systems." John Sterman, Jay W. Forrester Professor of Management, MIT Sloan School of Management "Illustrated by examples from everyday life, business and policy, John Morecroft expertly demonstrates how systems thinking aided by system dynamics can improve our understanding of the world around us." Stewart Robinson, Associate Dean Research, President of the Operational Research Society, Professor of Management Science, School of Business and Economics, Loughborough University

Creativity, Inc. - Ed Catmull 2014-04-08

From a co-founder of Pixar Animation Studios—the Academy Award-winning studio behind *Coco*, *Inside Out*, and *Toy Story*—comes an incisive book about creativity in business and leadership for readers of Daniel Pink, Tom Peters, and Chip and Dan Heath. NEW YORK TIMES BESTSELLER | NAMED ONE OF THE BEST BOOKS OF THE YEAR BY The Huffington Post • Financial Times • Success • Inc. • Library Journal Creativity, Inc. is a manual for anyone who strives for originality and the first-ever, all-access trip into the nerve center of Pixar Animation—into the meetings, postmortems, and “Braintrust” sessions where some of the most successful films in history are made. It is, at heart, a book about creativity—but it is also, as Pixar co-founder and president Ed Catmull writes, “an expression of the ideas that I believe make the best in us possible.” For nearly twenty years, Pixar has dominated the world of animation, producing such beloved films as the *Toy Story* trilogy, *Monsters, Inc.*, *Finding Nemo*, *The Incredibles*, *Up*, *WALL-E*, and *Inside Out*, which have gone on to set box-office records and garner thirty Academy Awards. The joyousness of the storytelling, the inventive plots, the emotional authenticity: In some ways, Pixar movies are an object lesson in what creativity really is. Here, in this book, Catmull reveals the ideals and techniques that have made Pixar so widely admired—and so profitable. As a young man, Ed Catmull had a dream: to make the first computer-animated movie. He nurtured that dream as a Ph.D. student at the University of Utah, where many computer science pioneers got their start, and then forged a partnership with George Lucas that led, indirectly, to his co-founding Pixar in 1986. Nine years later, *Toy Story* was released, changing animation forever. The essential ingredient in that movie's success—and in the thirteen movies that followed—was the unique environment that Catmull and his colleagues built at Pixar, based on leadership and management philosophies that protect the creative process and defy convention, such as: • Give a good idea to a mediocre team, and they will screw it up. But give a mediocre idea to a great team, and they will either fix it or come up with something better. • If you don't strive to uncover what is unseen and understand its nature, you will be ill prepared to lead. • It's not the manager's job to prevent risks. It's the manager's job to make it safe for others to take them. • The cost of preventing errors is often far greater than the cost of fixing them. • A company's communication structure should not mirror its organizational structure. Everybody should be able to talk to anybody.

Introduction to Information Retrieval - Christopher D. Manning 2008-07-07

Class-tested and coherent, this textbook teaches classical and web information retrieval, including web search and the related areas of text classification and text clustering from basic concepts. It gives an up-to-

date treatment of all aspects of the design and implementation of systems for gathering, indexing, and searching documents; methods for evaluating systems; and an introduction to the use of machine learning methods on text collections. All the important ideas are explained using examples and figures, making it perfect for introductory courses in information retrieval for advanced undergraduates and graduate students in computer science. Based on feedback from extensive classroom experience, the book has been carefully structured in order to make teaching more natural and effective. Slides and additional exercises (with solutions for lecturers) are also available through the book's supporting website to help course instructors prepare their lectures.

Multifunctional Agriculture - Roger Leakey 2017-04-14

In a world increasingly challenged by the need to integrate and understand highly specialized knowledge in a multidisciplinary way, this book is innovative and perhaps unique in addressing this challenge. It focuses on ideas, strategies, techniques and practices spanning many disciplines at the interface of agriculture with: forestry, horticulture, plant physiology, genetics, ecology, soil science, food science, economics, and the social and environmental sciences as delivered by intensified and enriched agroforestry. Multifunctional Agriculture addresses this complexity, using case studies and insights from the needs of African farmers whose livelihoods are constrained by complex interactions between social, environmental and economic factors and problems underlying agricultural sustainability in Africa. This book, therefore, provides an important resource for those trying to understand the role of agriculture in the achievement of the new Sustainable Development Goals by providing easily implementable, practical and effective methodologies and practices. Provides a single-source, comprehensive insight into agroforestry/ multifunctional agriculture, it's potential, challenges, and progress Helps readers understand and assess potential opportunity through implementation Includes case studies and real-world insights that address common situations and the practical application of best practices Explores the role of multi-functional agriculture in mitigating climate change impacts, providing value-story beyond crop production

Project Management - Harold Kerzner 2013-01-22

A new edition of the most popular book of project management case studies, expanded to include more than 100 cases plus a "super case" on the Iridium Project Case studies are an important part of project management education and training. This Fourth Edition of Harold Kerzner's Project Management Case Studies features a number of new cases covering value measurement in project management. Also included is the well-received "super case," which covers all aspects of project management and may be used as a capstone for a course. This new edition: Contains 100-plus case studies drawn from real companies to illustrate both successful and poor implementation of project management Represents a wide range of industries, including medical and pharmaceutical, aerospace, manufacturing, automotive, finance and banking, and telecommunications Covers cutting-edge areas of construction and international project management plus a "super case" on the Iridium Project, covering all aspects of project management Follows and supports preparation for the Project Management Professional (PMP®) Certification Exam Project Management Case Studies, Fourth Edition is a valuable resource for students, as well as practicing engineers and managers, and can be used on its own or with the new Eleventh Edition of Harold Kerzner's landmark reference, Project Management: A Systems Approach to Planning, Scheduling, and Controlling. (PMP and Project Management Professional are registered marks of the Project Management Institute, Inc.)

Crop Modeling and Decision Support - Weixing Cao 2010-07-10

"Crop Modeling and Decision Support" presents 36 papers selected from the International Symposium on Crop Modeling and Decision Support (ISCMDs-2008), held at Nanjing of China from 19th to 22nd in April, 2008. Many of these papers show the recent advances in modeling crop and soil processes, crop productivity, plant architecture and climate change; the rests describe the developments in model-based decision support systems (DSS), model applications, and integration of crop models with other information technologies. The book is intended for researchers, teachers, engineers, and graduate students on crop modeling and decision support. Dr. Weixing Cao is a professor at Nanjing Agricultural University, China.

Energy Economics - Subhes C. Bhattacharyya 2019-11-02

This book provides an updated and expanded overview of basic concepts of energy economics and explains

how simple economic tools can be used to analyse contemporary energy issues in the light of recent developments, such as the Paris Agreement, the UN Sustainable Development Goals and new technological developments in the production and use of energy. The new edition is divided into four parts covering concepts, issues, markets, and governance. Although the content has been thoroughly revised and rationalised to reflect the current state of knowledge, it retains the main features of the first edition, namely accessibility, research-informed presentation, and extensive use of charts, tables and worked examples. This easily accessible reference book allows readers to gain the skills required to understand and analyse complex energy issues from an economic perspective. It is a valuable resource for students and researchers in the field of energy economics, as well as interested readers with an interdisciplinary background.

Understanding Options for Agricultural Production - G.Y. Tsuji 2013-03-14

The first premise of this book is that farmers need access to options for improving their situation. In agricultural terms, these options might be management alternatives or different crops to grow, that can stabilize or increase household income, that reduce soil degradation and dependence on off-farm inputs, or that exploit local market opportunities. Farmers need a facilitating environment, in which affordable credit is available if needed, in which policies are conducive to judicious management of natural resources, and in which costs and prices of production are stable. Another key ingredient of this facilitating environment is information: an understanding of which options are viable, how these operate at the farm level, and what their impact may be on the things that farmers perceive as being important. The second premise is that systems analysis and simulation have an important role to play in fostering this understanding of options, traditional field experimentation being time-consuming and costly. This book summarizes the activities of the International Benchmark Sites Network for Agrotechnology Transfer (IBSNAT) project, an international initiative funded by the United States Agency for International Development (USAID). IBSNAT was an attempt to demonstrate the effectiveness of understanding options through systems analysis and simulation for the ultimate benefit of farm households in the tropics and subtropics. The idea for the book was first suggested at one of the last IBSNAT group meetings held at the University of Hawaii in 1993.

Functional Diversity of Mycorrhiza and Sustainable Agriculture - Michael J. Goss 2017-05-19

Functional Diversity of Mycorrhiza and Sustainable Agriculture is the first book to present the core concepts of working with Arbuscular mycorrhizal fungi to improve agricultural crop productivity. Highlighting the use of indigenous AM fungi for agriculture, the book includes details on how to maintain and promote AM fungal diversity to improve sustainability and cost-effectiveness. As the need to improve production while restricting scarce inputs and preventing environmental impacts increases, the use of AMF offers an important option for exploiting the soil microbial population. It can enhance nutrient cycling and minimize the impacts of biotic and abiotic stresses, such as soil-borne disease, drought, and metal toxicity. The book offers land managers, policymakers, soil scientists, and agronomists a novel approach to utilizing soil microbiology in improving agricultural practices. Provides a new approach to exploiting the benefits of mycorrhizas for sustainable arable agricultural production using indigenous AMF populations and adopting appropriate crop production techniques Bridges the gap between soil microbiology, including increasing knowledge of mycorrhiza and agronomy Presents real-world practical insights and application-based results, including a chapter focused primarily on case studies Includes extensive illustrative diagrams and photographs

Introduction to Mathematical Modeling of Crop Growth - Christopher B. S. Teh 2006

Learning mathematical modeling need not be difficult. Unlike other books, this book not only lists the equations one-by-one, but explains in detail how they are each derived, used, and finally assembled into a computer program for model simulations. This book shows how mathematics is applied in agriculture, in particular to modeling the growth and yield of a generic crop. Topics covered are agriculture meteorology, solar radiation interception and absorption, evapotranspiration, energy and soil water balance, soil water flow, photosynthesis, respiration, and crop growth development. Rather than covering many modeling approaches but in superficial detail, this book selects one or two widely-used modeling approaches and discusses about them in depth. Principles learned from this book equips readers when they encounter other modeling approaches or when they develop their own crop models.

Plant Ecology - Ernst-Detlef Schulze 2005-02-18

This textbook covers Plant Ecology from the molecular to the global level. It covers the following areas in unprecedented breadth and depth: - Molecular ecophysiology (stress physiology: light, temperature, oxygen deficiency, drought, salt, heavy metals, xenobiotica and biotic stress factors) - Autecology (whole plant ecology: thermal balance, water, nutrient, carbon relations) - Ecosystem ecology (plants as part of ecosystems, element cycles, biodiversity) - Synecology (development of vegetation in time and space, interactions between vegetation and the abiotic and biotic environment) - Global aspects of plant ecology (global change, global biogeochemical cycles, land use, international conventions, socio-economic interactions) The book is carefully structured and well written: complex issues are elegantly presented and easily understandable. It contains more than 500 photographs and drawings, mostly in colour, illustrating the fascinating subject. The book is primarily aimed at graduate students of biology but will also be of interest to post-graduate students and researchers in botany, geosciences and landscape ecology. Further, it provides a sound basis for those dealing with agriculture, forestry, land use, and landscape management.

Precision Agriculture '21 - John V. Stafford 2021-07-12

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.00These edited proceedings contain peer 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.00The 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.0.

Yield gap analysis of field crops - Food and Agriculture Organization of the United Nations 2018-06-29

To feed a world population that will exceed 9 billion by 2050 requires an estimated 60% increase over current primary agricultural productivity. Closing the common and often large gap between actual and attainable crop yield is critical to achieve this goal. To close yield gaps in both small and large scale cropping systems worldwide we need (1) definitions and techniques to measure and model yield at different levels (actual, attainable, potential) and different scales in space (field, farm, region, global) and time (short and long term); (2) identification of the causes of gaps between yield levels; (3) management options to reduce the gaps where feasible and (4) policies to favour adoption of sustainable gap-closing solutions. The aim of this publication is to critically review the methods for yield gap analysis, hence addressing primarily the first of these four requirements, reporting a wide-ranging and well-referenced analysis of literature on current methods to assess productivity of crops and cropping systems.

Working with Dynamic Crop Models - Daniel Wallach 2013-11-25

This second edition of Working with Dynamic Crop Models is meant for self-learning by researchers or for use in graduate level courses devoted to methods for working with dynamic models in crop, agricultural, and related sciences. Each chapter focuses on a particular topic and includes an introduction, a detailed explanation of the available methods, applications of the methods to one or two simple models that are followed throughout the book, real-life examples of the methods from literature, and finally a section detailing implementation of the methods using the R programming language. The consistent use of R makes this book immediately and directly applicable to scientists seeking to develop models quickly and effectively, and the selected examples ensure broad appeal to scientists in various disciplines. New to this edition: 50% new content - 100% reviewed and updated Clearly explains practical application of the methods presented, including R language examples Presents real-life examples of core crop modeling methods, and ones that are translatable to dynamic system models in other fields

Conceptual Basis, Formalisations and Parameterization of the Stics Crop Model - Nadine Brisson 2009-01-19

The STICS crop model has been developed since 1996 at INRA in collaboration with other research and technical institutes. The model synthesises, illustrates and concretizes an important part of the French agronomic knowledge as a point of view on the field and cropping systems working. The formalisations of

the STICS crop model presented in this book can be considered as references used in the framework of crop sciences. The book arrangement relies on the way the model designs the crop-soil system functioning, each chapter being devoted to a set of important functions such as growth initiation, yield onset, water uptake, transformation of organic matter etc. One chapter deals with the cropping system and long term simulations and the final chapter is about the involvement of the user in terms of option choices and parameterization. If this book is mainly intended for scientists who use the STICS model, it can also be useful for agronomists, crop modellers, students and technicians looking for elementary formalizations of the crop-soil system functioning.

Environmental Management Handbook, Second Edition - Six Volume Set - Sven Erik Jorgensen 2022-07-30

Bringing together a wealth of knowledge, the Handbook of Environmental Management, Second Edition, gives a comprehensive overview of environmental problems, their sources, their assessment, and their solutions. Through in-depth entries, and a topical table of contents, readers will quickly find answers to questions about pollution and management issues. This six-volume set is a reimagining of the award-winning Encyclopedia of Environmental Management, published in 2013, and features insights from more than 500 contributors, all experts in their fields. The experience, evidence, methods, and models used in studying environmental management is presented here in six stand-alone volumes, arranged along the major environmental systems. Features of the new edition: The first handbook that demonstrates the key processes and provisions for enhancing environmental management. Addresses new and cutting -edge topics on ecosystem services, resilience, sustainability, food-energy-water nexus, socio-ecological systems and more. Provides an excellent basic knowledge on environmental systems, explains how these systems function and offers strategies on how to best manage them. Includes the most important problems and solutions facing environmental management today.

Agricultural Productivity and Producer Behavior - Wolfram Schlenker 2019-11-13

Agricultural yields have increased steadily in the last half century, particularly since the Green Revolution. At the same time, inflation-adjusted agricultural commodity prices have been trending downward as increases in supply outpace the growth of demand. Recent severe weather events, biofuel mandates, and a switch toward a more meat-heavy diet in emerging economies have nevertheless boosted commodity prices. Whether this is a temporary jump or the beginning of a longer-term trend is an open question. Agricultural Productivity and Producer Behavior examines the factors contributing to the remarkably steady increase in global yields and assesses whether yield growth can continue. This research also considers whether such growth will impose significant environmental externalities. Among the topics studied are genetically modified crops; changing climatic factors; farm production responses to government regulations including crop insurance, transport subsidies, and electricity subsidies for groundwater extraction; and the role of specific farm practices such as crop diversification, disease management, and water-saving methods. This research provides new evidence that technological as well as policy choices influence agricultural productivity.

Working with Dynamic Crop Models - Daniel Wallach 2014-02-11

This textbook covers methods for working with dynamic models in crop, agricultural, and related sciences. Each chapter focuses on a particular topic and includes an introduction, a detailed explanation of the available methods, applications of the methods to one or two simple models that are followed throughout the book, real-life examples of the methods from literature, and finally a section detailing implementation of the methods using the R programming language.

Team Topologies - Matthew Skelton 2019-09-17

In Team Topologies DevOps consultants Matthew Skelton and Manuel Pais share secrets of successful team patterns and interactions to help readers choose and evolve the right team patterns for their organization, making sure to keep the software healthy and optimize value streams. Team Topologies will help readers discover: • Team patterns used by successful organizations. • Common team patterns to avoid with modern software systems. • When and why to use different team patterns • How to evolve teams effectively. • How to split software and align to teams.

Crop growth and soil water balance modeling to explore water management options - Ines, A. V.

M.Droogers, P.Makin, I. W.Das Gupta, A. 2001

The study was on the performance of the decision support system for agrotechnology transfer (DSSAT) and the soil water atmosphere plant (SWAP) under an acid sulphate soil. The comparison of these models was done as a prerequisite to the selection of an appropriate model, which is capable of simulating water management scenarios, water balance and crop growth, to be coupled with an adaptive optimization algorithm that can be used to explore water management options.

Working with Dynamic Crop Models - Daniel Wallach 2018-11-13

This second edition of Working with Dynamic Crop Models is meant for self-learning by researchers or for use in graduate level courses devoted to methods for working with dynamic models in crop, agricultural, and related sciences. Each chapter focuses on a particular topic and includes an introduction, a detailed explanation of the available methods, applications of the methods to one or two simple models that are followed throughout the book, real-life examples of the methods from literature, and finally a section detailing implementation of the methods using the R programming language. The consistent use of R makes this book immediately and directly applicable to scientists seeking to develop models quickly and effectively, and the selected examples ensure broad appeal to scientists in various disciplines. New to this edition: 50% new content - 100% reviewed and updated Clearly explains practical application of the methods presented, including R language examples Presents real-life examples of core crop modeling methods, and ones that are translatable to dynamic system models in other fields

Agroclimatology - Jerry L. Hatfield 2020-01-22

Can we unlock resilience to climate stress by better understanding linkages between the environment and biological systems? Agroclimatology allows us to explore how different processes determine plant response to climate and how climate drives the distribution of crops and their productivity. Editors Jerry L. Hatfield, Mannava V.K. Sivakumar, and John H. Prueger have taken a comprehensive view of agroclimatology to assist and challenge researchers in this important area of study. Major themes include: principles of energy exchange and climatology, understanding climate change and agriculture, linkages of specific biological systems to climatology, the context of pests and diseases, methods of agroclimatology, and the application of agroclimatic principles to problem-solving in agriculture.

Plant and Crop Modelling - J. H. M. Thornley 2000

This book is a textbook (it includes, for example, exercises and outline solutions). The plant scientist is shown how to express physiological ideas mathematically and how to deduce quantitative conclusions, which can then be compared with experiment. There is little new biology in the book, but it is presented in

a way that will be new to many biologists. The matching of models to experiments means using mathematics for formulating biological concepts and second, using algebra, calculus, or, now more frequently, computers to solve or simulate the resulting model; and finally, comparing, qualitatively or quantitatively, prediction to measurement. Computers are the important enabling technology that makes it all possible: solving equations, assembling models of increasing sophistication and complexity, and comparing theory with experiment. The book is divided into three parts. Part I. Covers subjects of wide relevance to modelling and plant biology. Part II. The reader may choose to select topics of particular interest from part II. However, the whole-plant modeller will need to study all chapters, and the plant ecosystem modeller may need to add other material also. Part III. Plant morphology is at an introductory level. It is included because morphological characters may prove to be of equal importance to some physiological traits in determining plant function and performance. "This textbook presents, in an interesting and clearly written fashion, a mathematical approach to a wide range of topics in plant and crop physiology, including light interception, leaf and canopy photosynthesis, respiration, partitioning, transpiration and water relations, branching and phyllotaxis. The biochemistry of plant growth and maintenance is also presented in some detail. I was very pleased with the text, especially with the philosophy presented by the authors that biological models are necessarily simplifications of complex detail. I would strongly recommend it for reading and consultation by graduates and research workers." J. Exp. Botany "The authors' approach succeeds admirably, giving a thorough account of the mathematical toolbox available to researchers and the areas in which those tools have been used." Plant, Cell and Environment "Combining considerable technical cleverness with creativity and the refreshing notion that science is a "common-sense, unpredictable, fascinating and thoroughly human activity." Times Higher Educational Supplement "Exceptionally scholarly volume. Logical and systematic. Authors have assembled a mass of mathematical material in an elegant layout." Agricultural Systems

Mathematical Models in Agriculture - J. H. M. Thornley 2007

Role of mathematical models; Dynamic deterministic models; Mathematical programming; Basic biological processes; Growth functions; Simple dynamic growth models; Simple ecological models; Environment and weather; Plant and crop processes; Crop models; Crop husbandry; Plant diseases and pests; Animal processes; Animal organs; Whole-animal models; Animal products; Animal husbandry; Animal diseases; Solutions exercises; Mathematical glossary.

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