Miscanthus For Energy And Fibre Pdf

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Bioenergy Research: Advances and Applications - Vijai G. Gupta 2013-12-05
Bioenergy Research: Advances and Applications brings biology and engineering together to address the challenges of future energy needs. The book consolidates the most recent research on current technologies, concepts, and commercial developments in various types of widely used biofuels and integrated biorefineries, across the disciplines of biochemistry, biotechnology,

phytology, and microbiology. All the chapters in the book are derived from international scientific experts in their respective research areas. They provide you with clear and concise information on both standard and more recent bioenergy production methods, including hydrolysis and microbial fermentation. Chapters are also designed to facilitate early stage researchers, and enables you to easily grasp the concepts, methodologies and application of bioenergy technologies. Each chapter in the book describes the merits and drawbacks of each technology as well as its usefulness. The book provides information on recent approaches to graduates, post-graduates, researchers and practitioners studying and working in field of the bioenergy. It is an invaluable information resource on biomass-based biofuels for fundamental and applied research, catering to researchers in the areas of bio-hydrogen, bioethanol, bio-methane and biorefineries, and the use of microbial processes in the conversion of biomass into biofuels. Reviews all existing and promising technologies for production of advanced biofuels in addition to bioenergy policies and research funding Cutting-edge research concepts for biofuels production using biological and biochemical routes, including microbial fuel cells Includes production methods and conversion processes for all types of biofuels, including bioethanol and biohydrogen, and outlines the pros and cons of each

Industrial Crops and Uses - Bharat P.

Singh 2010
The demand for plant-based industrial raw materials has increased as well as research into expanding the utility of plants for current and future uses. Plants are renewable, have limited or positive environmental impact and have the potential to yield a wide range of products in contrast to petroleum-based materials. Plants can be used in a variety of different industries and products including bioenergy, industrial oil and starch, fibre and dye, rubber and related compounds, insecticide and land rehabilitation. This title offers a comprehensive coverage of each of these uses. Chapters discuss the identification of plant species with desired traits, their cultivation to obtain the needed raw materials, methods utilized in producing different finished products, current and future research in crop production and processing and the present state and future prospects for the industry. Providing the first systematic review of industrial crops and their uses, this book will be an important resource for students and researchers of crop science and agricultural policy makers.

Mineral Nutrition of Higher Plants - Horst Marschner 1995
This text presents the principles of mineral nutrition in the light of current advances. For this second edition more emphasis has been placed on root water relations and functions of micronutrients as well as external and internal factors on root growth and the root-soil interface.

Horticultural Reviews - Jules Janick

2012-01-25
Horticultural Reviews presents state-of-the-art reviews on topics in horticultural science and technology covering both basic and applied research. Topics covered include the horticulture of fruits, vegetables, nut crops, and ornamentals. These review articles, written by world authorities, bridge the gap between the specialized researcher and the broader community of horticultural scientists and teachers.

Renewable Fuel Standard - National Research Council 2012-01-29
In the United States, we have come to depend on plentiful and inexpensive energy to support our economy and lifestyles. In recent years, many questions have been raised regarding the sustainability of our current pattern of high consumption of nonrenewable energy and its environmental consequences. Further, because the United States imports about 55 percent of the nation's consumption of crude oil, there are additional concerns about the security of supply. Hence, efforts are being made to find alternatives to our current pathway, including greater energy efficiency and use of energy sources that could lower greenhouse gas (GHG) emissions such as nuclear and renewable sources, including solar, wind, geothermal, and biofuels. The United States has a long history with biofuels and the nation is on a course charted to achieve a substantial increase in biofuels. Renewable Fuel Standard evaluates the economic and environmental consequences of increasing biofuels production as a

result of Renewable Fuels Standard, as amended by EISA (RFS2). The report describes biofuels produced in 2010 and those projected to be produced and consumed by 2022, reviews model projections and other estimates of the relative impact on the prices of land, and discusses the potential environmental harm and benefits of biofuels production and the barriers to achieving the RFS2 consumption mandate. Policy makers, investors, leaders in the transportation sector, and others with concerns for the environment, economy, and energy security can rely on the recommendations provided in this report.

Miscanthus - Michael Jones 2013-11-05

Miscanthus is a promising non-food crop yielding high quality lignocellulosic material which can be used in a number of ways, including energy and fibre production, thatching, and industrial use. This book encompasses the results and recommendations arising from extensive trials and experiments carried out by the leading European research organisations and institutions in the field. Much of the research was performed under the auspices of the Miscanthus Productivity Network, established under European Union's Directorate General for Agriculture (DG VI). This book presents expert guidance to growth conditions and breeding of Miscanthus, potential productivity and economics, environmental aspects, and harvesting, storage and utilisation. A guide to this increasingly important subject is long overdue and will be welcomed by

all those involved in biomass production and renewable energies, or assessing the potential of Miscanthus as a non-food crop.

Phytotechnology with Biomass Production - Larry E. Erickson 2021-06-15

This book explains the concept of using phytotechnology with biomass production to improve soil quality and restore contaminated sites to a useful state that has economic and social value. Phytotechnology with Biomass Production: Sustainable Management of Contaminated Sites focuses on the application of second-generation biofuel crops, primarily Miscanthus, to slightly contaminated or marginal postmilitary and postmining soils. Based on recent and ongoing research from the United States, Ukraine, the Czech Republic, and Germany, along with case studies from other countries, this is the first comprehensive book on using phytotechnology with biomass production at contaminated sites at a global level. FEATURES Focuses on an important topic of a growing global activity: soil improvement through biomass production Includes case studies and success stories from different countries on application of Miscanthus phytotechnology to sites differently contaminated by trace elements, pesticides, and petroleum products Discusses the peculiarities of Miscanthus production on postmilitary and postmining contaminated lands and the impact of plant growth regulators, soil amendments, fertilizers, and biochar to the process Introduces soil fauna as indicators of soil health during

Miscanthus phytotechnology application Presents Miscanthus value chain associated with the processing of Miscanthus biomass to different bioproducts While written primarily for faculty, students, research scientists, environmental and agricultural professionals, gardeners, farmers, landowners, and government officials, this book has value for all who are working on phytotechnology projects and phytomining to reduce risk and/or improve soil quality at contaminated sites. Phytotechnology with Biomass Production: Sustainable Management of Contaminated Sites is also a great new resource for those who are new to the topic and want to learn to apply phytotechnologies and biomass production with further conversion into energy and bioproducts.

Handbook of Bioenergy Crops - Nasir El Bassam 2010

This completely revised second edition includes new information on biomass in relation to climate change, new coverage of vital issues including the "food versus fuel" debate, and essential new information on "second generation" fuels and advances in conversion techniques. The book begins with a guide to biomass accumulation, harvesting, transportation and storage, as well as conversion technologies for biofuels. This is followed by an examination of the environmental impact and economic and social dimensions, including prospects for renewable energy. The book then goes on to cover all the main potential energy crops.

Phytotechnology with Biomass

Production - Larry E. Erickson 2021-06-15

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Biomass as Feedstock for a Bioenergy and Bioproducts Industry - 2005

The U.S. Department of Energy (DOE) and the U.S. Department of Agriculture (USDA) are both strongly committed to expanding the role of biomass as an energy source. In particular, they support biomass fuels and products as a way to reduce the need for oil and gas imports; to support the growth of agriculture, forestry, and rural economies; and to foster major new domestic industries--biorefineries--making a variety of fuels, chemicals, and other products. As part of this effort, the Biomass R AND D Technical Advisory Committee, a panel established by the Congress to guide the future direction of federally funded biomass R AND D, envisioned a 30 percent replacement of the current U.S. petroleum consumption with biofuels by 2030. Biomass--all plant and plant-derived materials including animal manure, not just starch, sugar, oil crops already used for food and energy--has

great potential to provide renewable energy for America s future. Biomass recently surpassed hydropower as the largest domestic source of renewable energy and currently provides over 3 percent of the total energy consumption in the United States. In addition to the many benefits common to renewable energy, biomass is particularly attractive because it is the only current renewable source of liquid transportation fuel. This, of course, makes it invaluable in reducing oil imports--one of our most pressing energy needs. A key question, however, is how large a role could biomass play in responding to the nation's energy demands. Assuming that economic and financial policies and advances in conversion technologies make biomass fuels and products more economically viable, could the biorefinery industry be large enough to have a significant impact on energy supply and oil imports? Any and all contributions are certainly needed, but would the biomass potential be sufficiently large to justify the necessary capital replacements in the fuels and automobile sectors?

EU Climate Policy Explained - Jos Delbeke 2015-10-05

The EU has been the region of the world where the most climate policies have been implemented, and where practical policy experimentation in the field of the environment and climate change has been taking place at a rapid pace over the last twenty-five years. This has led to considerable success in reducing pollution, decoupling emissions from economic growth and fostering global

technological leadership. The objective of the book is to explain the EU's climate policies in an accessible way, to demonstrate the step-by-step approach that has been used to develop these policies, and the ways in which they have been tested and further improved in the light of experience. The book shows that there is no single policy instrument that can bring down greenhouse gas emissions, but the challenge has been to put a jigsaw of policy instruments together that is coherent, delivers emissions reductions, and is cost-effective. The book differs from existing books by the fact it covers the EU's emissions trading system, the energy sector and other economic sectors, including their development in the context of international climate policy. Set against the backdrop of the 2015 UN Climate Change conference in Paris, this accessible book will be of great relevance to students, scholars and policy makers alike.

Integrated Pest Management - Rajinder Peshin 2009-03-10

Integrated Pest Management – Dissemination and Impact, Volume 2 is a sequel to Integrated Pest Management – Innovation-DevelopmentProcess, Volume 1. The book focuses on the IPM systems in the developed countries of North America, Europe and Australia, and the developing countries of Asia, Latin America and Africa. One of the major impedimentsin the dissemination and adoption of the IPM innovation is the complexity of the technology and reaching the vast population of farmers especially in the developing

countries. The IPM-innovation development process is incomplete without the diffusion and adoption of IPM methods by the end users, and through its consequences. In spite of all the efforts in the developed and developing countries, the adoption of IPM is still low with few exceptions. The book covers the underlying concepts and methodologies of the diffusion of innovation theory and the program evaluation; and reviews the progress and impact of IPM programs implemented in the industrialized, the green revolution and the subsistence agricultural systems of the world. Forty-four experts from entomology, plant pathology, environmental science, agronomy, anthropology, economics and extensioneducationfromAfrica, Asia, Australia, Europe,NorthAmerica and South America have discussed impact of IPM with an interdisciplinary perspective. Each one of the experts is an authority in his or her eld of expertise. The researchers, farmers'education,supportingpolicieso fthegovernmentsandmarketforcesarethe elements of the IPM innovation system to achieve wider adoption of IPM strategy in agriculture.

Sociology, Organic Farming, Climate Change and Soil Science - Eric Lichtfouse 2009-12-01

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. This book series 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.

The Biomass Assessment Handbook - Frank Rosillo-Calle 2012-04-27

The increasing importance of biomass

as a renewable energy source has lead to an acute need for reliable and detailed information on its assessment, consumption and supply. Responding to this need, and overcoming the lack of standardized measurement and accounting procedures, this handbook provides the reader with the skills to understand the biomass resource base, the tools to assess the resource, and explores the pros and cons of exploitation. Topics covered include assessment methods for woody and herbaceous biomass, biomass supply and consumption, remote sensing techniques as well as vital policy issues. International case studies, ranging from techniques for measuring tree volume to transporting biomass, help to illustrate step-by-step methods and are based on field work experience. Technical appendices offer a glossary of terms, energy units and other valuable resource data.

Engineering and Science of Biomass Feedstock Production and Provision - Yogendra Shastri 2014-02-10

The biomass based energy sector, especially the one based on lignocellulosic sources such as switchgrass Miscanthus, forest residues and short rotation coppice, will play an important role in our drive towards renewable energy. The biomass feedstock production (BFP) subsystem provides the necessary material inputs to the conversion processes for energy production. This subsystem includes the agronomic production of energy crops and the physical handling and delivery of biomass, as well as other enabling

logistics. Achieving a sustainable BFP system is therefore paramount for the success of the emerging bioenergy sector. However, low bulk and energy densities, seasonal and weather sensitive availability, distributed supply and lack of commercial scale production experience create unique challenges. Moreover, novel region specific feedstock alternatives continue to emerge. Engineering will play a critical role in addressing these challenges and ensuring the techno-economic feasibility of this sector. It must also integrate with the biological, physical and chemical sciences and incorporate externalities, such as social/economic considerations, environmental impact and policy/regulatory issues, to achieve a truly sustainable system.

Tremendous progress has been made in the past few years while new challenges have simultaneously emerged that need further investigation. It is therefore prudent at this time to review the current status and capture the future challenges through a comprehensive book. This work will serve as an authoritative treatise on the topic that can help researchers, educators and students interested in the field of biomass feedstock production, with particular interest in the engineering aspects.□ □

Biorefinery - Michele Aresta 2012-08-31

This book provides an introduction to the basic science and technologies for the conversion of biomass (terrestrial and aquatic) into chemicals and fuels, as well as an

overview of innovations in the field. The entire value chain for converting raw materials into platform molecules and their transformation into final products are presented in detail. Both cellulosic and oleaginous biomass are considered. The book contains contributions by both academic scientists and industrial technologists so that each topic combines state-of-the-art scientific knowledge with innovative technologies relevant to chemical industries.

Biochar for Environmental Management - Johannes Lehmann 2012-05-16

Biochar is the carbon-rich product when biomass (such as wood, manure or crop residues) is heated in a closed container with little or no available air. It can be used to improve agriculture and the environment in several ways, and its stability in soil and superior nutrient-retention properties make it an ideal soil amendment to increase crop yields. In addition to this, biochar sequestration, in combination with sustainable biomass production, can be carbon-negative and therefore used to actively remove carbon dioxide from the atmosphere, with major implications for mitigation of climate change. Biochar production can also be combined with bioenergy production through the use of the gases that are given off in the pyrolysis process. This book is the first to synthesize the expanding research literature on this topic. The book's interdisciplinary approach, which covers engineering, environmental sciences, agricultural sciences, economics and policy, is a

vital tool at this stage of biochar technology development. This comprehensive overview of current knowledge will be of interest to advanced students, researchers and professionals in a wide range of disciplines.

Bioprocessing Technologies in Biorefinery for Sustainable Production of Fuels, Chemicals, and Polymers - Shang-Tian Yang 2013-05-24 For researchers already familiar with biomass conversion technologies and for professionals in other fields, such as agriculture, food, and chemical industries, here is a comprehensive review of the emerging biorefinery industry. The book's content has been conveniently organized according to technologies (biomass feedstock and pretreatment, hydrolytic enzymes in biorefinery, and biofuels), with each chapter highlighting an important biobased industrial product. For undergraduate and graduate students, the book is a thorough introduction to biorefinery technologies.

Bioenergy - Anju Dahiya 2020-04-09 Bioenergy: Biomass to Biofuels and Waste to Energy, 2nd Edition presents a complete overview of the bioenergy value chain, from feedstock to end products. It examines current and emerging feedstocks and advanced processes and technologies enabling the development of all possible alternative energy sources. Divided into seven parts, bioenergy gives thorough consideration to topics such as feedstocks, biomass production and utilization, life-cycle analysis, energy return on invested, integrated sustainability assessments,

conversions technologies, biofuels economics, business, and policy. In addition, contributions from leading industry professionals and academics, augmented by related service-learning case studies and quizzes, provide readers with a comprehensive resource that connect theory to real-world implementation. Bioenergy: Biomass to Biofuels and Waste to Energy, 2nd Edition provides engineers, researchers, undergraduate and graduate students, and business professionals in the bioenergy field with valuable, practical information that can be applied to implementing renewable energy projects, choosing among competing feedstocks, technologies, and products. It also serves as a basic resource for civic leaders, economic development professionals, farmers, investors, fleet managers, and reporters interested in an organized introduction to the language, feedstocks, technologies, and products in the biobased renewable energy world. • Includes current and renewed subject matter, project case studies from real world, and topic-specific sections on the impacts of biomass use for energy production from all sorts of biomass feedstocks including organic waste of all kinds. • Provides a comprehensive overview and in-depth technical information of all possible bioenergy resources: solid (wood energy, grass energy, waste, and other biomass), liquid (biodiesel, algae biofuel, ethanol, waste to oils, etc.), and gaseous/electric (biogas, syngas, biopower, RNG), and cutting-edge topics such as advanced fuels. •

Integrates current state of art coverage on feedstocks, cost-effective conversion processes, biofuels economic analysis, environmental policy, and triple bottom line. • Features quizzes for each section derived from the implementation of actual hands-on biofuel projects as part of service learning.

Selected Papers from 27th European Biomass Conference & Exhibition (EUBCE 2019) - David Baxter 2021-09-02

This book draws together a small selection of full-length papers based on presentations given at the 27th European Biomass Conference and Exhibition held in Lisbon, Portugal in 2019. The topics covered, which reflect the breadth of the program of the EUBCE conference itself, include biomass sources, various aspects of technologies used for the conversion of biomass to bioproducts and bioenergy, as well as different approaches to assessing environmental impacts, which include case studies based on different technologies in use in a range of countries.

Biomass and Biofuels - Shibu Jose 2015-04-22

The long-held tenets of the energy sector are being rewritten in the twenty-first century. The rise of unconventional oil and gas and of renewables is transforming our economies and improving our understanding of the distribution of the world’s energy resources and their impacts. A complete knowledge of the dynamics underpinning energy markets is necessary for decision-makers reconciling economic, energy,

and environmental objectives. Those that anticipate global energy developments successfully can derive an advantage, while those that fail to do so risk making poor policy and investment decisions. Focused on solving the key challenges impeding the realization of advanced cellulosic biofuels and bioproducts in rural areas, Biomass and Biofuels: Advanced Biorefineries for Sustainable Production and Distribution provides comprehensive information on sustainable production of biomass feedstock, supply chain management of feedstocks to the biorefinery site, advanced conversion processes, and catalysts/biocatalysts for production of fuels and chemicals using conventional and integrated technologies. The book also presents detailed coverage of downstream processing, and ecological considerations for refineries processing lignocellulosic and algal biomass resources. Discussions of feedstock raw materials, methods for biomass conversion, and its effective integration to make biorefinery more sustainable – economically, environmentally, and socially – give you the tools to make informed decisions.

Perennial Biomass Crops for a Resource-Constrained World - Susanne Barth 2016-11-18

This book presents a flavour of activities focussed on the need for sustainably produced biomass to support European strategic objectives for the developing bioeconomy. The chapters cover five broad topic areas relating to the use of perennial biomass crops in Europe. These are:

‘Bioenergy Resources from Perennial Crops in Europe’, ‘European Regional Examples for the Use of Perennial Crops for Bioenergy’, ‘Genotypic Selection of Perennial Biomass Crops for Crop Improvement’, ‘Ecophysiology of Perennial Biomass Crops’ and ‘Examples of End-Use of Perennial Biomass Crops’. Two major issues relating to the future use of biomass energy are the identification of the most suitable second generation biomass crops and the need to utilise land not under intensive agricultural production, broadly referred to as ‘marginal land’. The two main categories of plants that fit these needs are perennial rhizomatous grasses and trees that can be coppiced. The overarching questions that are addressed in the book relate to the suitability of perennial crops for providing feedstocks for a European bioeconomy and the need to exploit environments for biomass crops which do not compete with food crops. Bioenergy is the subject of a wide range of national and European policy measures. New developments covered are, for example, the use of perennial grasses to produce protein for animal feed and concepts to use perennial biomass crops to mitigate carbon emissions through soil carbon sequestration. Several chapters also show how prudent selection of suitable genotypes and breeding are essential to develop high yielding and sustainable second generation biomass crops which are adapted to a wide range of unfavourable conditions like chilling and freezing, drought, flooding and salinity. The final chapters also emphasise the need to

be kept an eye out for potential new end-uses of perennial biomass crops that will contribute further to the developing bioeconomy.

Plant Biomass Conversion - Elizabeth E. Hood 2011-03-22

A whole host of motivations are driving the development of the “renewables” industry– ranging from the desire to develop sustainable energy resources to the reduction of dangerous greenhouse gases that contribute to global warming. All energy utilized on the earth is ultimately derived from the sun through photosynthesis–the only truly renewable commodity. As concerns regarding increasing energy prices, global warming and renewable resources continue to grow, so has scientific discovery into agricultural biomass conversion. Plant Biomass Conversion addresses both the development of plant biomass and conversion technology, in addition to issues surrounding biomass conversion, such as the affect on water resources and soil sustainability. This book also offers a brief overview of the current status of the industry and examples of production plants being used in current biomass conversion efforts.

Bioeconomy - Iris Lewandowski 2017-12-11

This book is open access under a CC BY 4.0 license. This book defines the new field of "Bioeconomy" as the sustainable and innovative use of biomass and biological knowledge to provide food, feed, industrial products, bioenergy and ecological services. The chapters highlight the importance of bioeconomy-related

concepts in public, scientific, and political discourse. Using an interdisciplinary approach, the authors outline the dimensions of the bioeconomy as a means of achieving sustainability. The authors are ideally situated to elaborate on the diverse aspects of the bioeconomy. They have acquired in-depth experience of interdisciplinary research through the university's focus on "Bioeconomy", its contribution to the Bioeconomy Research Program of the federal state of Baden-Württemberg, and its participation in the German Bioeconomy Council. With the number of bioeconomy-related projects at European universities rising, this book will provide graduate students and researchers with background information on the bioeconomy. It will familiarize scientific readers with bioeconomy-related terms and give scientific background for economists, agronomists and natural scientists alike.

Encyclopedia of Applied Plant Sciences - 2016-08-27

Encyclopedia of Applied Plant Sciences, Second Edition presents both foundational and applied information on plants used by humans as sources of food, raw materials, and amenity purposes. It highlights how the underlying science and information links through to applications in practical situations. Since the last edition was published, the role of applied science in agricultural production has been brought into greater focus as fluctuations in global food production feed through into prices

and availability to consumers. At the same time, technological advances are changing the way plant science is done. This Second Edition has been expanded to include specific chapters on the leading crops and crop-types, as well as updated chapters on plant development, photosynthesis, metabolism, nutrition, reproduction, seed biology, plant pests and diseases, weed biology, and responses to environmental stresses. The updated chapters reflect progress, particularly in genome sequencing and molecular genetics and biotechnology, including genetic modification, that have taken place since the first edition was published. In addition, the book places these developments in the wider context of biodiversity, food security, intellectual property, and ethical considerations. Presents complete, up-to-date, authoritative information on over 25 separate areas of plant science, covering both theory and applications Edited and written by a distinguished international group of editors and contributors Provides concise, easy to read gateway entries to topics, each supplemented with a further reading list that allows practitioners, students, and researchers to delve deeper into each topic

Biofuels - Jonathan R. Mielenz 2009 With the dwindling supplies of fossil fuels and growing concerns regarding climate changes due to green house gasses from these fuels, public opinion has swung dramatically towards favoring the development of renewable energy sources. In Biofuels: Methods and Protocols,

career-long experts explore a full range of methods for bioenergy covering important topics such as biomass production and delivery to the biorefinery, detailed biochemical characterization, as well as biotechnological techniques for converting plant matter into fuels and chemicals. Time is of the essence in this field, and this volume aims to provide direction and assistance to the growing cadre of researchers endeavoring to develop new sources of bioenergy with a solid, easy-to-use collection of tried-and-true methods which will save time and effort in the field and the laboratory. Written in the highly successful Methods in Molecular Biology(TM) series format, chapters include brief introductions to their respective topics, lists of the necessary equipment, materials and reagents, step-by-step, readily reproducible field and laboratory protocols, and notes on troubleshooting and avoiding common pitfalls. Timely and authoritative, Biofuels: Methods and Protocols seeks to help scientists and engineers as they develop and optimize bioenergy technologies needed to drastically change the course of our energy future as soon as possible.

Biomass to Renewable Energy Processes - Jay Cheng 2017-10-05

Biomass to Renewable Energy Processes, Second Edition, explains the theories of biological processes, biomass materials and logistics, and conversion technologies for bioenergy products such as biogas, ethanol, butanol, biodiesel, and synthetic gases. The book discusses anaerobic digestion of waste materials for

biogas and hydrogen production, bioethanol and biobutanol production from starch and cellulose, and biodiesel production from plant oils. It addresses thermal processes, including gasification and pyrolysis of agricultural residues and woody biomass. The text also covers pretreatment technologies, enzymatic reactions, fermentation, and microbiological metabolisms and pathways.

The Ethics of Climate Governance - Aaron Maltais 2015-09-03

A major collection of innovative new work by emerging and established scholars on the critical topic of ethics for climate governance, offering a wholly original proposal for reform to climate governance.

Kenaf: A Multi-Purpose Crop for Several Industrial Applications - Andrea Monti 2013-06-06

Natural plant fibers fibres are being increasingly used in manufacturing industrial products because of their renewable and biodegradable natures. Kenaf is an annual bast fibre crop that can provide fibres for several industrial applications (composites, insulation mats, absorbents, bedding material, etc.) as well as raw material for energy exploitation (solid biofuels). Kenaf: A Multi-Purpose Crop for Several Industrial Applications introduces the physiology and field management of kenaf, agronomy, productivity, harvesting as well as its the industrial and energy uses of this promising non-food crop. Including recent research collected by the BIOKENAF project, Kenaf: A Multi-Purpose Crop for Several Industrial

Applications provides a global picture of state of the art research and developments with Kenaf from Asia, USA and Australia. This thorough introduction if followed up with an assessment of the crops economic viability as well as an the environmental impact assessment of kenaf. Although not a new crop, Kenaf: A Multi-Purpose Crop for Several Industrial Applications provides a comprehensive introduction to this crop and its developing applications for energy engineers, industry managers, politicians and managers working to develop sustainable energy sources and bio-economies.

Photosynthesis and Production in a Changing Environment - D.O. Hall 2013-12-01

The majority of the world's people depend research work should be carried out at the local and regional level by locally trained on plants for their livelihood since they grow them for food, fuel, timber, fodder and people. many other uses. A good understanding Following the success of our earlier book of the practical factors which govern the (Techniques in Bioproductivity and Photo synthesis; Pergamon Press, 1985), which productivity of plants through the process of photosynthesis is therefore of paramount was translated into four major languages, importance, especially in the light of cur the editors and contributors have exten rent concern about global climate change sively revised the content and widened the and the response of both crops and natural scope of the text,· so it now bears a

title ecosystems. in line with current concern over global The origins of this book lie in a series of climate change. · In particular, we have training courses sponsored by the United added chapters on remote sensing, con Nations Environment Programme (Project trolled-environment studies, chlorophyll No. FP/6108-88-0l (2855); 'Environment fluorescence, metabolite partitioning and changes and the productivity of tropical the use of mass isotopes, all of which grasslands'), with additional support from techniques are increasing in their applica many international and national agencies. tion and importance to this subject area.

Biofuels for Transport - Worldwatch Institute, 2012-05-04

The world is on the verge of an unprecedented increase in the production and use of biofuels for transport. The combination of rising oil prices, issues of security, climate instability and pollution, deepening poverty in rural and agricultural areas, and a host of improved technologies, is propelling governments to enact powerful incentives for the use of these fuels, which is in turn sparking investment. Biofuels for Transport is a unique and comprehensive assessment of the opportunities and risks of the large-scale production of biofuels. The book demystifies complex questions and concerns, such as the food v. fuel debate. Global in scope, it is further informed by five country studies from Brazil, China, Germany, India and Tanzania. The authors conclude that biofuels will

play a significant role in our energy future, but warn that the large-scale use of biofuels carries risks that require focused and immediate policy initiatives. Published in association with BMELV, FNR and GTZ.

Biofuel Crops - Bharat P. Singh 2013

Providing comprehensive coverage on biofuel crop production and the technological, environmental and resource issues associated with a sustainable biofuel industry, this book is ideal for researchers and industry personnel. Beginning with an introduction to biofuels and the challenges they face, the book then includes detailed coverage on crops of current importance or with high future prospects, including sections on algae, sugar crops and grass, oil and forestry species. The chapters focus on the genetics, breeding, cultivation, harvesting and handling of each crop.

Sustainable Urban Design - Adam Ritchie 2013-12-16

By the end of the twenty-first century it is thought that three-quarters of the world’s population will be urban; our future is in cities. Making these cities healthy, vibrant and sustainable is an exceptional challenge which this book addresses. It sets out some of the basic principles of the design of our future cities and, through a series of carefully-selected case studies from leading designers’ experience, illustrates how these ideas can be put into practice. Building on the first edition's original format of design guidance and case studies, this new edition updates the ideas and techniques resulting from further

research and practice by the contributors. This book emphasises the enormous progress made towards exciting new designs that integrate good design with resource efficiency.

Perennial Grasses for Bioenergy and Bioproducts - Efthymia Alexopoulou 2018-01-10

Perennial Grasses for Bioenergy and Bioproducts: Production, Uses, Sustainability and Markets for Giant Reed, Miscanthus, Switchgrass, Reed Canary Grass and Bamboo brings together a team of international authors to explore the current utilization, sustainability and future perspectives of perennial grasses in the bioeconomy. The book begins by examining the role of these crops as feedstock for bioenergy, in particular advanced biofuels and bioproducts. It then offers five chapters, each covering one perennial grass type, namely giant reed, miscanthus, switchgrass, reed canary grass and bamboo. The book covers their breeding, cultivation, harvesting, pre-treatment, economics and characterization. The book goes on to present the thermochemical conversion pathways for different types of feedstock. The last chapter explores issues concerning sustainability of perennial grasses, including their production in marginal lands. This thorough overview is a helpful reference for engineering researchers and professionals in the bioenergy sector, whose understanding of feedstock characterization, sustainability and production is critical in the development of conversion technologies. Those in the

industrial crops sector will benefit from discussion of various issues surrounding crop production, which can guide their feedstock cultivation, harvesting and pre-treatment for specific conversion processes or end use. The book is also a useful resource for instructors and students in Masters and PhD programs in the area of biomass and energy crops. Policy makers and government agents involved in regulating the bioenergy and bioproducts sector will find comprehensive information to guide their decision making. Explores the whole value chain of grassy feedstock for advanced biofuels and bioproducts, from cultivation to end use, including biomass characterization (physical properties, chemical composition, etc.) and conversion and sustainability Examines the sustainability and economic factors related to perennial grasses and their conversion into biofuels and bioproducts Includes a complete list of grasses relevant for energy uses, and tables with their current and expected future uses and markets

The Role of Bioenergy in the Emerging Bioeconomy - Carmen Lago 2018-10-30 The Role of Bioenergy in the Bioeconomy: Resources, Technologies, Sustainability and Policy provides the reader with a complete understanding on how bioenergy technologies fit into the new bioeconomy paradigm. Sections focus on the main resources and technologies for bioenergy and its integration in energy systems and biorefining chains, analyze the

available methodologies for assessing the sustainability of bioenergy, and address and the propose approaches that are demonstrated through concrete case studies. Additionally, the implications of bioenergy in the water-energy and land nexus is presented, along with new challenges and opportunities. This book's strong focus on sustainability of bioenergy, both as a standalone, and in the larger context of a bio-based economy, makes it a useful resource for researchers, professionals and students in the bioenergy field who need tactics to assess the lifecycle and sustainability of bioenergy technologies and their integration into existing systems. Presents a complete overview of the main challenges that bioenergy will have to overcome in order to play a key role in future energy systems Explores sustainability aspects in detail, both qualitatively and by applying proposed methodologies to concrete bioenergy case studies Covers, in detail, the water-energy-land nexus implications and governance aspects

Biorenewable Resources - Robert C. Brown 2013-12-06

Biorenewable Resources: Engineering New Products from Agriculture, 2nd Edition will provide comprehensive coverage of engineering systems that convert agricultural crops and residues into bioenergy and biobased products. This edition is thoroughly updated and revised to better serve the needs of the professional and research fields working with biorenewable resource development and production. Biorenewable resources is

a rapidly growing field that forms at the interface between agricultural and plant sciences and process engineering. Biorenewable Resources will be an indispensable reference for anyone working in the production of biomass or biorenewable resources.

Sustainable Energy--without the Hot Air - David J. C. MacKay 2009

Provides an overview of the sustainable energy crisis that is threatening the world's natural resources, explaining how energy consumption is estimated and how those numbers have been skewed by various factors and discussing alternate forms of energy that can and should be used.

Climate Change, Photosynthesis and Advanced Biofuels - Ashwani Kumar 2020-08-31

The use of fossil fuels results in rising CO2 and other greenhouse gas (GHG) emissions, causing global temperature rise and climate change that will negatively impact human health, the food supply, and eventually worsen hunger and misery. Presently, fossil fuels meet 88% of the energy demand, resulting in rising CO2/GHG emissions at alarming rates. The increased use of biofuels would help to mitigate climate change. Efficiently designing methods for the production of biofuels and plant-derived high-value products requires a deeper understanding of photosynthetic processes as a prerequisite for applying novel biotechnologies. Accordingly, this book provides ample information and a wealth of illustrative examples. The book’s eighteen richly illustrated chapters are divided into three

thematic parts. I: Photosynthesis and Biomass Production under Changing Conditions, II: Microalgae and Engineered Crops for Production of Biofuels and High-value Products, and III: Genetic Resources and Engineering Methods to Improve Crop Plants. Readers will find the latest information on the molecular basis of photosynthetic processes in plants (including the regulatory principles that allow plants to maintain homeostasis under changing conditions), stress resistance and synthetic pathways. In addition, the basic principles of important biotechnologies, as well as examples of specially designed crops capable of growing under stress conditions with improved productivity, are presented. The book sets the course for future research in the field of biofuel development and production and provides both general and specific information for students, teachers, academic researchers, industrial teams, and general readers who are interested in new developments concerning the production of biofuels with value-added properties.

The Selection Process of Biomass Materials for the Production of Bio-Fuels and Co-firing - N. Altawell 2014-03-28

A functional discussion of the crop selection process for biomass energy The Selection Process of Biomass Materials for the Production of Bio-fuels and Co-firing provides a detailed examination and analysis for a number of energy crops and their use as a source for generating electricity and for the production of

bio-fuels. Renowned renewable energy expert and consultant Dr. Najib Altawell begins with the fundamentals of bio-fuels and co-firing and moves on to the main feature, which is the methodology that assists energy scientists and engineers to arrive at the most suitable biomass materials tailored to each company's business and economic environments and objectives. This methodology provides a framework whereby power-generating companies can insert their own values for each factor, whether business factor (BF) or scientific & technical factors (S&T) or both simultaneously. The methodology provides a list of factors related to the biomass energy business. The average values have been obtained from the survey method and laboratory tests. These values are the standard values power companies can use if they need or wish to use them. The Selection Process of Biomass Materials for the Production of Bio-fuels and Co-firing has been designed and compiled for the widest possible range of readers, researchers, businesspeople, and economists who are connected to the renewable energy field in general, and biomass energy in particular. Because of its focus on practical data and applications, the book is also accessible for general readers who may or may not have a technical or scientific background.

Nonwood Plant Fibers for Pulp and Paper - Pratima Bajpai 2021-01-09 Nonwood Plant Fibers for Pulp and Paper examines the use of nonwood plant fibers for pulp and paper, worldwide pulping capacity of nonwood fibers, categories of non-wood raw

materials, problems associated with the utilization of non-wood fibers, pulping, bleaching, chemical recovery and papermaking of nonwood raw materials, the use of nonwood plant fibers in specific paper and paperboard grades, and the advantages and drawbacks of using nonwood fiber for papermaking and future prospects. This book gives professionals in the field the most up-to-date and comprehensive information on the state-of- the-art techniques and aspects involved in pulp and paper making from nonwood plant fibers. Provides comprehensive coverage on all aspects of pulping and papermaking of non-wood fibers Covers the latest science and technology in pulping and papermaking of non-wood fibers Focuses on biotechnological methods, a distinguishing feature of this book and its main attraction Presents valuable references related to the pulp and papermaking industry