

Earthworm Vermicompost A Sustainable Alternative To Chemical Fertilizers For Organic Farming Agriculture Issues And Policies

A rapidly growing population, industrialization, modernization, luxury life style, and overall urbanization are associated with the generation of enhanced wastes. Inadequate management of the ever-growing amount of waste has degraded the quality of the natural resources on a regional, state, and country basis, and consequently threatens public health as well as global environmental security. Therefore, there is an existent demand for the improvement of sustainable, efficient, and low-cost technologies to monitor and properly manage the huge quantities of waste and convert these wastes into energy sources. Innovative Waste Management Technologies for Sustainable Development is an essential reference source that discusses management of different types of wastes and provides relevant theoretical frameworks about new waste management technologies for the control of air, water, and soil pollution. This publication also explores the innovative concept of waste-to-energy and its application in safeguarding the environment. Featuring research on topics such as pollution management, vermicomposting, and crude dumping, this book is ideally designed for environmentalists, policymakers, professionals, researchers, scientists, industrialists, and environmental agencies.

This book provides updated and comprehensive information on the effective functioning of earthworms used alone or in combination with other biological systems/microbes, as well as factors affecting the process and performance of vermiremediation under a range of conditions. It also compares earthworm assisted vermifiltration with other conventional biochemical methods. Presenting cutting-edge research on the earthworm assisted remediation of industrial and municipal effluents and sludges, along with its role in solid waste management (SWM), the book will benefit readers from the research community and industrial sector alike by familiarizing them with the latest remediation techniques for wastewater and different types of solid waste.

Advanced Organic Waste Management: Sustainable Practices and Approaches provides an integrated holistic approach to the challenges associated with organic waste management, particularly related to sustainability, lifecycle assessment, emerging regulations, and novel approaches for resource and energy recovery. In addition to traditional techniques, such as anaerobic digestion, composting, innovative and emerging techniques of waste recycling like hydrothermal carbonization and vermicomposting are included. The book combines the fundamentals and practices of sustainable organic waste management with successful case studies from developed and developing countries, highlighting practical applications and challenges. Sections cover global organic waste generation, encompassing sources and types, composition and characteristics, focus on technical aspects related to various resource recovery techniques like compo

and vermicomposting, cover various waste-to-energy technologies, illustrate various environmental management tools for organic waste, present innovative organic waste management practices and strategies complemented by detailed case studies, introduce the circular bioeconomy approach, and more. Presents the fundamentals and practices of sustainable, organic waste management, with emerging regulatory and up-to-date analysis on environmental management tools such as lifecycle assessment in a comprehensive manner Offers the latest information on novel concepts and strategies for organic waste management, particularly zero waste and the circular bioeconomy Includes the latest research findings and future perspectives of innovative and emerging techniques of waste recycling, such as hydrothermal carbonization and vermicomposting

Phytoremediation has evolved into an important tool to improve the bioremediation process since it is an innovative green technology that uses a wide variety of plants to remediate radioactive metals and elements, organics, and chemicals from soil, sediment, surface water, and groundwater environmental pollutants. Together, bioremediation and phytoremediation technologies provide an effective approach to contaminant abatement. Volume 3 of the four-volume set identifies and draws a fresh image of existing developments in theoretical and functional implementation systems from recent scientific research studies that consider different facets of bioremediation. It also discusses the latest technology and prospects of new soil bioremediation technology and analyzes their domains, along with their associated challenges and consequences. Other volumes in the 4-volume set: • Volume 1: Fundamental Aspects and Contaminated Sites • Volume 2: Microbial Approaches and Recent Trends • Volume 4: Degradation of Pesticides and Polychlorinated Biphenyls Together, these four volumes provide in-depth coverage of the mechanisms, advantages, and disadvantages of the bioremediation and phytoremediation technologies for safe and sustainable soil management. The diverse topics help to arm biologists, agricultural engineers, environmental and soil scientists and chemists with the information and tools they need to address soil toxins that are a dangerous risk to plants, wildlife, humans and, of course, the planet itself.

Disruptive Technologies for Big Data and Cloud Applications

Microbes in Agriculture and Environmental Development

Principles, Monitoring and Remediation

Bioremediation and Phytoremediation Technologies in Sustainable Soil Management

Volume 2: Rhizobacteria in Biotic Stress Management

Research Anthology on Strategies for Achieving Agricultural Sustainability

The main aim of this book is to bridge the gap between aerobic and anaerobic waste treatments by concentrating on studies of earthworms. In particular, vermicomposting is being discussed as well as its properties and applications. Other subjects touch on the treatment of palm oil mill effluents, the various importance of earthworms, its scope and future aspects of earthworm research, and the impact of

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waste management practices on human health.

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This book provides a written record of the synergy that already exists among the research communities and represents a solid framework in the advancement of big data and cloud computing disciplines from which new interaction will result in the future. This book is a compendium of the International Conference on Big Data and Cloud Computing (ICBDCC 2021). It includes recent advances in big data analytics, cloud computing, the Internet of nano things, cloud security, data analytics in the cloud, smart cities and grids, etc. This book primarily focuses on the application of knowledge that promotes ideas for solving the problems of society through cutting-edge technologies. The articles featured in this book provide novel ideas that contribute to the growth of world-class research and development. The contents of this book are of interest to researchers and professionals alike.

Earthworm Vermicompost A Sustainable Alternative to Chemical Fertilizers for Organic Farming Nova Novinka

Current Developments in Biotechnology and Bioengineering
Waste to Wealth

Advances in Composting and Vermicomposting Technology

Agroforestry and Climate Change

Industrial and Municipal Sludge

Innovative Waste Management Technologies for Sustainable Development

Since the publication of the highly-successful first edition of Earthworm Ecology, there were two international symposia and an increased number of publications on the subject, demanding a revision of the book that addresses the most rapidly developing areas of earthworm research. Earthworm Ecology, Second Edition updates the most comprehens

Sustainability of environment is an emerging global issue at present. Unsustainable or deteriorating environment is a matter of concern as it has threatened the survival of living creatures. Recently, climate change has been a matter of great concern at a global platform owing to imbalances in natural environment.

Increasing population has increased the demand for energy, which has ultimately put pressure on natural resources and caused a paradigm shift from resource generation to exploitation. Emerging Energy Alternatives for Sustainable Environment aims to address the role of sustainable technologies in energy generation options for clean environment. It covers a wide spectrum of energy generation approaches, with an emphasis on five key topics: (i) renewable energy sources and recent advances, (ii) emerging green technologies for sustainable development, (iii) assessment of biomass for sustainable bioenergy production, (iv) solid waste management and its potential for energy generation, and (v) solar energy applications, storage system, and heat transfer. This book provides essential and comprehensive knowledge of green energy technologies with different aspects for engineers, technocrats and researchers working in the industry, universities, and research institutions. The book is also very useful for

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undergraduate and graduate students of science and engineering who are keen to know about the development of renewable energy products and their corresponding processes. Please note: This volume is Co-published with The Energy and Resources Institute Press, New Delhi. Taylor & Francis does not sell or distribute the Hardback in India, Pakistan, Nepal, Bhutan, Bangladesh and Sri Lanka

Composting and vermicomposting are widely used biological processes for the management of the wastes produced by the communities and agricultural activities, which have experienced substantial growth during the last few years. *Advances in Composting and Vermicomposting Technology* summarizes the most important work conducted during the last few years under one cover. The book includes conventional and recent advancements in composting and vermicomposting technologies, information regarding mitigation of greenhouse gases emission and resistant genes, and finally recovery of "Value-Added Materials" in the composting sectors. Furthermore it includes models and available upgradation, global case studies, opportunities and challenges (technical constraints, Institutional constraints and social constraints) associated with the composting technology advancement and finally, application of LCA and considerations in economic evaluation of composting technologies and other organic waste treatment strategies. First book on the use of composting technology for process development within organic waste recycling and management Critically discusses development of industrial composting processes and market demand of compost as cleaner products Includes industrial application of cleaner composting technology towards valorization of high value of compost Provides recent knowledge on research and applications by integration of sustainable cleaner composting technologies

In *Soil Not Oil*, Vandana Shiva explains that a world beyond dependence on fossil fuels and globalization is both possible and necessary. Condemning industrial agriculture as a recipe for ecological and economic disaster, Shiva champions the small, independent farm: their greater productivity, their greater potential for social justice as they put more resources into the hands of the poor, and the biodiversity that is inherent to the traditional farming practiced in small-scale agriculture. What we need most in a time of changing climates and millions who are hungry, she argues, is sustainable, biologically diverse farms that are more resistant to disease, drought, and flood. "The solution to climate change," she observes, "and the solution to poverty are the same." *Soil Not Oil* proposes a solution based on self-organization, sustainability, and community rather than corporate power and profits.

Volume 3: Inventive Techniques, Research Methods, and Case Studies

Soil Health Restoration and Management

Organic Agriculture

Current Developments in Solid-state Fermentation

Bioremediation and Biotechnology

Emerging Concerns and Scope for Resource Recovery

Our Earth is considered as a natural system which organizes and controls itself. However, the present scale of anthropogenic activity is unprecedented in the history of mankind compelling the intelligentia to ponder over the scientific causes of the problems, processes and sustainable and pragmatic solutions. The current rate of

resource use and consumption pattern are depleting the planet's finite resources and damaging life-supporting ecosystems. A large number of toxic substances are increasingly found in air, water, soil, and flora and fauna. We are in the midst of a period of increasing interconnected and complex global challenges that seek action across temporal and spatial scales, diverse sectors, and concerted efforts from global citizens. The environment on account of human's action has been experiencing imbalances and ecological catastrophe. Environmental issues like global climate change, biodiversity loss, the rapid depletion of natural resources, degradation of global commons, stratospheric ozone depletion have been restricting the safe operating space and transgressing the planetary boundaries endangering the existence of human societies. The global environmental problems if not scientifically managed may end up in the civilizational collapse. Nevertheless, the underlying commonality among these environmental issues is interrelatedness, complexity, and difficulty in identifying and implementing solutions. The global environmental challenges can be managed by adopting sustainable green technologies which dovetails the principles of environmental sustainability with social and ecological sustainability. Green growth is construed as a new development paradigm that sustains economic growth while at the same time ensuring environmental sustainability.

Over the period of last two decades, there has been significant resurgence in solid-state fermentation due to the numerous benefits it offers, especially in the engineering and environmental aspects. SSF has shown much promise in the development of several bioprocesses and products. This resurgence gained further momentum during the last 5-6 years with the developments in fundamental and applied aspects. A good deal of information has been generated in published literature and patented information. Several commercial ventures have come up based on SSF in different parts of the world. The contents are organized into four parts: Part 1 deals with the General and Fundamentals aspects of SSF; Part 2 deals with the production of bulk chemicals and products such as enzymes, organic acids, spores and mushrooms in SSF; Part 3 is on the use of SSF for specialty chemicals such as gibberellic

acid, antibiotics and other pharmaceutically valuable secondary metabolites, pigments, and aroma compounds; Part 4 deals with the use of SSF miscellaneous application such as SSF for food and feed applications, agro-industrial residues as substrates in SSF and the production of silage and vermicompost.

Earthworm's vermicompost is a nutritive organic fertiliser rich in NKP, micronutrients, and beneficial soil microbes. They are scientifically proven to be excellent growth promoters and protectors for crop plants. In experiments with corn and wheat crops it displayed excellent growth performances in terms of height of plants, colour and texture of leaves, as well as the appearance of fruiting structures. There is also less incidences of pest and disease attack and reduced demand of water for irrigation. This book discusses and presents data which suggest that the vermicompost of earthworms contributes to an increase in the yield of crops when used as a fertiliser.

Co-edited by international earthworm expert Clive A. Edwards, *Vermiculture Technology: Earthworms, Organic Wastes, and Environmental Management* is the first international, comprehensive, and definitive work on how earthworms and microorganisms interact to break down organic wastes on a commercial basis. Many books cover the importance of composting

Sustainable Approaches to Pollution Degradation

Biology of Earthworms

Plant Growth Promoting Rhizobacteria for Sustainable Stress Management

Handbook on Vermicomposting: Requirements, Methods, Advantages and Applications

Sustainable Green Technologies for Environmental Management

An Introduction to Sustainable Agriculture

The collection of essays in *Microbes in Agriculture and Environmental Development* explores the applications of microbes for the improvement of environmental quality and agricultural productivity through inoculants and enzymes. These are useful for the conservation and restoration of degraded natural and agricultural ecosystems, crop yield extension, soil health improvement, and other aspects of agriculture and the environment. It discusses the effective use of microbial technology, wastewater treatment, and recycling of agricultural and industrial wastes. It provides detailed

accounts of recent trends in microbial application in plant growth promotion, soil fertility, microbial biomass and diversity, and environmental sustainability through bioremediation, biodegradation, and biosorption processes
Features: Discusses microbes and their applications for sustainable agriculture and environmental protection in agro-environmental circumstances Presents innovative and eco-friendly approaches for the remediation of contaminated soil and wastewater Focuses on green technologies and sustainability Includes chapters on sustainable agriculture development through increasing soil fertility, physico-chemical properties and soil microbial biomass in nutrient-deprived soils Defines the role of microbial bio formulation-based consortia in the productivity improvement of agricultural crops It will be an invaluable addition to the bookshelves of researchers and graduate students in agriculture and environmental engineering, soil science; microbiology, sustainable agriculture, and ecosystems. Dr. Chhatarpal Singh is presently the President of Agro Environmental Development Society (AEDS), Majhra Ghat, Rampur, Uttar Pradesh, India. Dr. Tiwari is currently working in the field of methanotrophs ecology (methane oxidizing bacteria), which is sole entity responsible for the oxidation of potent greenhouse gas CH₄. Dr. Jay Shankar Singh is presently working as a faculty member in the Department of Environmental Microbiology at Babasaheb Bhimrao Ambedkar University in Lucknow, India. Dr. Ajar Nath Yadav is currently serving as an assistant professor in the Department of Biotechnology, Akal College of Agriculture, Eternal University, Baru Sahib, Himachal Pradesh, India. The earth's biodiversity is a degree of ecosystem health which is vital to ecology and environmental sustainability. The microbial world is the largest unexplored reservoir. The agro-ecosystem enriched with rhizosphere implicit abundant and species-rich component of microbial diversity. Its global exploration designs a worldwide framework for agricultural sustainability adjoining benefits in its conservation. Agricultural sustainability requires a major share from ecosystem management which is better paid by microbial diversity and conservation. Diversity of bacteria influences plant productivity providing nutrient convenience from soil instead altering per se community and diversity in the rhizosphere where they may influence mechanistic competent and antagonistic micro-flora. The potential species among the

diversity are therefore, essential subjective to their maintenance for use around the globe. Microbial population in agro-ecosystem is influenced by stresses, reduce functionality as a component. It is therefore, important to explore secrets of planned strategy so as to unravel the microbial diversity and conservation in agricultural development. Microorganisms are minute, pervasive in nature and alleged as disease host instead tiny recognize as employee of agro-ecosystem, indulge in agricultural development and potential contributor in world of ecological and economical wealth creation. This step pertinently would help to launch scientific motivation needed to support the refrain of microbial diversity and conservation. Toxic substances threatens aquatic and terrestrial ecosystems and ultimately human health. The book is a thoughtful effort in bringing forth the role of biotechnology for bioremediation and restoration of the ecosystems degraded by toxic and heavy metal pollution. The introductory chapters of the book deal with the understanding of the issues concerned with the pollution caused by toxic elements and heavy metals and their impacts on the different ecosystems followed by the techniques involved in monitoring of the pollution. These techniques include use of bio-indicators as well as modern techniques for the assessment and monitoring of toxicants in the environment. Detailed chapters discussing the role of microbial biota, aquatic plants, terrestrial plants to enhance the accumulation efficiency of these toxic and heavy metals are followed by remediation techniques involving myco-remediation, bio-pesticides, bio-fertilizers, phyto-remediation and rhizo-filtration. A sizable portion of the book has been dedicated to the advanced bio-remediation techniques which are finding their way from the laboratory to the field for revival of the degraded ecosystems. These involve bio-films, micro-algae, genetically modified plants and filter feeders. Furthermore, the book is a detailed comprehensive account for the treatment technologies from unsustainable to sustainable. We believe academicians, researchers and students will find this book informative as a complete reference for biotechnological intervention for sustainable treatment of pollution.

The Global Industrial Complex: Systems of Domination, is a groundbreaking collection of essays by leading scholars from wide scholarly and activist backgrounds who examine the entangled array of contemporary industrial complexes—what

the editors refer to as "the power complex"—that was first analyzed by C. Wright Mills in his 1956 classic work, *The Power Elite*.

Contaminants and Clean Technologies

Earthworms

Beneficial Microbes for Sustainable Agriculture and Environmental Management

Sustainable Development Research and Practice in Mexico and Selected Latin American Countries

Earthworm Ecology

Agriculture has been an enduring human tradition key to survival and civilization. However, after the advent of industrialization and agricultural growth, the industry has been met with several challenges including pollution, land use, and food insecurity. With the agricultural industry contributing to pollution and emissions, many have found it imperative to investigate the causes and seek out solutions. The Research Anthology on Strategies for Achieving Agricultural Sustainability discusses the issues that the agricultural industry currently faces and the technological opportunities that can be explored to help protect and predict crop growth and achieve more resilient agricultural processes. It analyzes the impact of agricultural pollution and food insecurity on a global scale, but also proposes solutions to promote agricultural sustainability. Covering topics such as bio-farming, smart farming, and population growth, this book is an indispensable resource for government officials, agricultural scientists, farmers, students and professors of higher education, activist groups, researchers, and academicians.

Microbes are the most abundant organisms in the biosphere and regulate many critical elemental and biogeochemical phenomena. Because microbes are the key players in the carbon cycle and in related biological reactions, microbial ecology is a vital research area for understanding the contribution of the biosphere in global warming and the response of the natural environment to climate variations. The beneficial uses of microbes have enabled constructive and cost-effective responses that have not been possible through physical or chemical methods. This new volume reviews the multifaceted interactions among microbes, ecosystems, and their pivotal role in maintaining a more balanced environment, in order to help facilitate living organisms coexisting with the natural environment. With extensive references, tables, and illustrations, this book provides valuable information on

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microbial utilization for environmental sustainability and provides fascinating insights into microbial diversity. Key features include: Looks at enhancing plant production through growth-promoting arbuscular mycorrhizae, endophytic bacteria, and microbiome networks Considers microbial degradation and environmental management of e-wastes and azo dyes Explores soil-plant microbe interactions in metal-contaminated soils Examines radiation-resistant thermophiles for engineered bioremediation Describes potential indigenous/effective microbes for wastewater treatment processes Presents research on earthworms and microbes for organic farming

Advantage of vermicomposting is that it composts the wastes of rural areas. They clean our villages by using unnecessary organic and non-organic materials. Improves the texture of the soil and its ability to store water. Improves root growth and the multiplication of beneficial soil microorganisms by providing optimum aeration to the soil. Vermicompost (vermicompost) is a mixture of decomposing vegetable or food waste, bedding materials, and vermicast created by the decomposition process using various species of worms, usually red wigglers, white worms, and other earthworms. This is known as vermicomposting, and the practise of raising worms for this purpose is known as vermiculture. Sewage treatment can also be done with vermicomposting. The Global Vermicompost Market is reach growing at a CAGR of 16.74%. The Growth of the global vermicompost market is caused by various factors, such as improved soil aeration, improved water holding capacity, better nutrient cycle, and enriched soil with micro-organism, helps in plant root growth and structure, enhanced germination. The vermicomposting method is used in organic farming. Increasing the use of sustainable agricultural practices, such as vermicomposting along with Government support for organic farming is significantly contributing to the global vermicompost market growth. Vermicompost offers plants with necessary nutrients and helps in plant diseases suppression. Worm castings often comprise 7 times more phosphorus, 11 times more potassium, and 5 times more nitrogen than ordinary soil, which are crucial minerals required for plant growth. Vermiculture and Vermicompost (Earthworm), as well as their manufacturing methods, are all covered in depth in this book. It also offers photos of equipment as well as contact information for industrial providers. This book is a one-stop shop for everything you need to know about the Vermiculture and Vermicompost (Earthworm) industry, which is ripe for manufacturers, merchants, and entrepreneurs. This is the only book that goes into great detail about Vermiculture and

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Vermicompost. It's a genuine feast of how-to material, from concept to equipment buying.

Sustainable Resource Recovery and Zero Waste Approaches covers waste reduction, biological, thermal and recycling methods of waste recovery, and their conversion into a variety of products. In addition, the social, economic and environmental aspects are also explored, making this a useful textbook for environmental courses and a reference book for both universities and companies. Provides a novel approach on how to achieve zero wastes in a society Shows the roadmap on achieving Sustainable Development Goals Considers critical aspects of municipal waste management Covers recent developments in waste biorefinery, thermal processes, anaerobic digestion, material recycling and landfill mining

Advanced Organic Waste Management

The Global Industrial Complex

Emerging Energy Alternatives for Sustainable Environment

The Ecological Engineers of Soil

Soil Not Oil

Bacterial Diversity in Sustainable Agriculture

Earthworms, which belong to the order Oligochaeta, comprise roughly 3,000 species grouped into five families. Earthworms have been called 'ecosystem engineers'; much like human engineers, they change the structure of their environments. Earthworms are very versatile and are found in nearly all terrestrial ecosystems. They play an important role in forest and agricultural ecosystems. This Soil Biology volume describes the various facets of earthworms, such as their role in soil improvement, soil structure, and the biocontrol of soil-borne plant fungal diseases. Reviews discuss earthworms' innate immune system, molecular markers to address various issues of earthworm ecology, earthworm population dynamics, and the influences of organic farming systems and tillage. Further topics include the characteristics of vermicompost, relationships between soil earthworms and enzymes, the role of spermathecae, copulatory behavior, and adjustment of the donated sperm volume.

Contaminants and Clean Technologies provides valuable information on environmental contaminants such as industrial pollutants, micropollutants, pesticides, endocrine disruptors, pharmaceuticals, toxins, and hormones. It focuses on the various types of environmental contaminants discharged from various sources; their toxicological effects in environments, humans, animals, and plants; and their removal methods. It also covers, comprehensively, information on the contaminants released by various industries and agricultural practices, which cause severe threats to the environment. Features of the book: Elucidates systematic information on various types of environmental contaminants, and their fate and consequences Discusses contaminants such as endocrine disruptors, pharmaceutical waste, and personal care products Provides an overview of physicochemical and biological treatment technologies

for sustainable development Details recent research finding in the area of environmental contaminants and their future challenges

This volume provides an abundance of valuable information on emerging eco-friendly technology and its potential role in combating climate change via agroforestry. The volume begins by describing the recent understanding of the scenario of climate change and its issues and challenges and provides an in-depth analysis of the potential of agroforestry toward climate change mitigation and adaptation. Chapters address a wide range of techniques and methods for mitigating the negative aspects of climate change through agroforestry, such as vermicomposting, carbon sequestration, horticulture techniques, nutrient sequestration and soil sustainability, conservation of medicinal plant resources, silvipastoral systems, phytoremediation techniques, and more. The book also looks at livelihood security and the role of agroforestry. Key features: Provides updated information and recent developments in the field of climate change and agroforestry Looks at a variety of eco-friendly methods being employed to help mitigate climate change through agroforestry Provides recommendations and suggestions to build harmony between agroforestry and climate change Discusses new insights on the role of agroforestry toward combating climate change as well as maintaining the sustainability of ecosystems

This book gives the latest information on advances in organic agriculture which can be used by agroindustry people as well as agricultural engineers and with practical examples for farmers. It provides important information covering multidisciplinary approaches on environmental awareness, organic agricultural production as well as organic fertilizers. The chapters here are prepared by experts in the field who present and discuss the principles of a wide range of practical ideas with examples. This book also presents novel ideas and suggestions for future research in organic agricultural production. The topics included in this book are based on surveys together with literature reviews to enable the academic and industrial readers to evaluate what they see as specific to their own discipline. The chapters include a wide range of topics which will also make it easy to make comparisons between different disciplines.

The Complete Technology Book on Vermiculture and Vermicompost (Earthworm) with Manufacturing Process, Machinery Equipment Details & Plant Layout Sustainable Resource Recovery and Zero Waste Approaches

Food Bioconversion

Earthworm Assisted Remediation of Effluents and Wastes

Sustainable Practices and Approaches

Proceedings of ICBDDC 2021

Meeting the food requirements of an ever-increasing population is a pressing challenge for every country around the globe. Soil degradation has a negative impact on food security by reducing the cultivated land areas, while at the same time the world population is predicted to increase to 9.2 billion in 2050. Soil degradation adversely affects soil function and productivity and degraded soils now amount to 6 billion ha worldwide. The major factors are salinization, erosion, depletion of nutrients due to exhaustive agricultural practices and contamination with toxic metal ions and agrochemicals, which reduces the activity of soil microbe. In addition, poor soil

management also decreases fertility. As such, measures are required to restore the soil health and productivity: organic matter, beneficial microorganisms and nutrient dynamics can all improve the physical, chemical and biological properties of soil. Understanding the role of soil health restoration and management in sustainability and nutritional security calls for a holistic approach to assess soil functions and examine the contributions of a particular management system within a defined timescale. Further, best management practices in cropping systems are important in ensuring sustainability and food and nutritional security without compromising the soil quality and productivity potential. Rational soil management practices must allow environmentally and economically sustainable yields and restoration of soil health.

Attaining sustainable agricultural production while preserving environmental quality, agro-ecosystem functions and biodiversity represents a major challenge for current agricultural practices; further, the traditional use of chemical inputs (fertilizers, pesticides, nutrients etc.) poses serious threats to crop productivity, soil fertility and the nutritional value of farm produce. Given these risks, managing pests and diseases, maintaining agro-ecosystem health, and avoiding health issues for humans and animals have now become key priorities. The use of PGPR as biofertilizers, plant growth promoters, biopesticides, and soil and plant health managers has attracted considerable attention among researchers, agriculturists, farmers, policymakers and consumers alike. Using PGPR as bioinoculants can help meet the expected demand for global agricultural productivity to feed the world's booming population, which is predicted to reach roughly 9 billion by 2050. However, to provide effective bioinoculants, PGPR strains must be safe for the environment, offer considerable plant growth promotion and biocontrol potential, be compatible with useful soil rhizobacteria, and be able to withstand various biotic and abiotic stresses. Accordingly, the book also highlights the need for better strains of PGPR to complement increasing agro-productivity.

This book focuses on value addition to various waste streams, which include industrial waste, agricultural waste, and municipal solid and liquid waste. It addresses the utilization of waste to generate valuable products such as electricity, fuel, fertilizers, and chemicals, while placing special emphasis on environmental concerns and presenting a multidisciplinary approach for handling waste. Including chapters authored by prominent national and international experts, the book will be of interest to researchers, professionals and policymakers alike.

Food Bioconversion, Volume Two in the Handbook of Food Bioengineering series is an interdisciplinary resource of fundamental information on waste recovery and biomaterials under certain environmental conditions. The book provides information on how living organisms can be used to transform waste into compounds that can be used in food, and how specialized living cells in plants, animals and water can convert the most polluting agents into useful non-toxic products in a sustainable way. This great reference on the bioconversion of industrial waste is ideal in a time when food resources are limited and entire communities starve. Presents extraction techniques of biological properties to enhance food's functionality, i.e. functional foods or nutraceuticals Provides detailed information on waste material recovery issues Compares different techniques to help advance research and develop new applications Includes research solutions of different biological treatments to produce foods with

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antibiotic properties, i.e. probiotics Explores how bioconversion technologies are essential for research outcomes to increase high quality food production

Earthworm Vermicompost

Prospects of Organic Waste Management and the Significance of Earthworms

Issues and Challenges

The Best Of-- Exploring Sustainable Alternatives

Sustainable Agriculture

A Sustainable Alternative to Chemical Fertilizers for Organic Farming

This edited volume deals with the understanding of the issues concerned with the pollution caused by toxic elements and heavy metals and their impacts on the different agro-ecosystems as well as the techniques involved in sustainable remediation and amelioration of polluted soils. Furthermore, the book is a detailed comprehensive account for the treatment technologies from unsustainable to sustainable which includes chapters prepared by professionals with expertise in environmental microbiology, biotechnology, bioremediation, and environmental engineering. It focuses on the characterization, reclamation, bioremediation, and phytoremediation of polluted soils. The research presented also highlights some of the significantly important plant and microbial species involved in remediation, the physiology, biochemistry, and the mechanisms of remediation by various plants and microbes, and suggestions for future improvement of bioremediation technology. It offers insights into the current focus and recent advances in bioremediation and green technology applications for sustainable soil management. This book provides an essential overview of sustainable development research in Mexico. It discusses the empirical research methods and findings, as well as practical initiatives and projects being pursued in Mexico and other countries in the region. Although a number of Mexican universities are now conducting high-quality research on matters related to sustainable development, there are few publications that offer a multidisciplinary overview of research efforts for a broader audience. This book addresses that gap in the literature, providing researchers at Mexican universities - including those from other countries working in Mexico - with an opportunity to present their work, i.e. curriculum innovations, empirical work, activities, case studies, and practical projects. As such, it fosters the exchange of information, ideas and experiences, successful initiatives and best practices.

Organic crop production is the science and art of growing field crops, fruits, vegetables, and flowers by adopting the essential principles of organic agriculture in soil building and conservation, pest management, and heirloom variety conservation. This book provides detailed insights into organic

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farming in agriculture, biological efficacy in the management of plant diseases, organic nutrient management, socio-economic dimensions of adoption of conservation practices, nonchemical weed control, plant growth promoting fungi for phytostimulation, nanotechnological approaches, and finally vermicomposting. The book primarily focuses on research and development based organic agriculture and horticulture production technologies, and has attempted to abridge information on organic crop production of the major food grain crops. The book also contains comprehensive information on the various related dimensions of organic crop production.

Now-a-days the use of chemical fertilizers and pesticides in agriculture has reached its peak. This harms the human health as well as environment. The process of agricultural modernization has been an important contributing factor towards this. This deprives the land from its fertility and leaves it unfit for further agricultural operations. Hence, a better alternative of such chemical monsters is required to overcome these ill-effects. Therefore, a shift from chemical to organic farming is appreciated. Production efficiency, economic efficiency and employment generation efficiency of any system is a direct measure of its preferability. Therefore, this study deals with the requirements, methods, advantages, etc. of vermicomposting as well as its applications in agriculture. The main purpose of this process is the quick and efficient conversion of the organic waste materials into the nutritious fertilizer for plants.

Vermiculture Technology

Earthworms, Organic Wastes, and Environmental Management Systems of Domination

Introduction and Application of Organic Fertilizers as Protectors of Our Environment

Advances in Bioremediation and Phytoremediation for Sustainable Soil Management

Environmental Justice in an Age of Climate Crisis

Industrial and Municipal Sludge: Emerging Concerns and Scope for Resource Recovery begins with a characterization of the types of sludge and their sources and management strategies. This section is followed by specific chapters that cover Emerging contaminants in sludge (Endocrine disruptors, Pesticides and Pharmaceutical residues, including illicit drugs/controlled substances), Bioleaching of sludge [with an enriched sulfur-oxidizing bacterial community, Recovery of valuable metals (Bioleaching and use of sulfur-oxidizing bacterial community, and Biogas production by continuous thermal hydrolysis and thermophilic anaerobic digestion of waste activated sludge. In addition, the book includes numerous tables and flow diagrams to help users further comprehend the subject matter. Includes numerous tables and flow diagrams to assist in

the comprehension of new and existing sludge treatments and resource recovery technology Covers biogas production by continuous thermal hydrolysis and thermophilic anaerobic digestion of waste activated sludge Presents information on the recovery of valuable metals from sludge (bioleaching and the use of a sulfur-oxidizing bacterial community) Includes opportunities and challenges in the biorefinery-based valorization of pulp and paper sludge
Foundation Course for NEET (Part 3): Biology Class 9