

Biotechnology For Conservation And Utilization Of

The practice of biotechnology, though different in style, scale and substance in globalizing science for development involves all countries. Investment in biotechnology in the industrialised, the developing, and the least developed countries, is now amongst the widely accepted avenues being used for economic development. The simple utilization of kefir technology, the detoxification of injurious chemical pesticides e.g. parathion, the genetic tailoring of new crops, and the production of a first of a kind of biopharmaceuticals illustrate the global scope and content of biotechnology research endeavour and effort. In the developing and least developed nations, and in which the 9 most populous countries are encountered, problems concerning management of the environment, food security, conservation of human health resources and capacity building are important factors that influence the path to sustainable development. Long-term use of biotechnology in the agricultural, food, energy and health sectors is expected to yield a windfall of economic, environmental and social benefits. Already the prototypes of new medicines and of prescription fruit vaccines are available. Gene based agriculture and medicine is increasingly being adopted and accepted. Emerging trends and practices are reflected in the designing of more efficient bioprocesses, and in new research in enzyme and fermentation technology, in the bioconversion of agro industrial residues into bio-utility products, in animal healthcare, and in the bioremediation and medical biotechnologies. Indeed, with each new day, new horizons in biotechnology beckon.

This anchor volume to the series Managing Global Genetic Resources examines the structure that underlies efforts to preserve genetic material, including the worldwide network of genetic collections; the role of biotechnology; and a host of issues that surround management and use. Among the topics explored are in situ versus ex situ conservation, management of very large collections of genetic material, problems of quarantine, the controversy over ownership or copyright of genetic material, and more.

Biodiversity includes different animals, plants, micro-organisms and their genes, water ecosystems, terrestrial and marine ecosystems. Conservation of this biological diversity which includes the variety of the whole species present on earth is important for our future, for human food to feed people on Earth. Biodiversity: Monitoring, Management & Utilization has been designed primarily for students studying biodiversity on a range of courses in botany, zoology, biotechnology, microbiology, environment and ecology. It is beneficial for teachers, as well as generalists and amateurs interested in exploring the fundamentals, uses, threats and conservation of biodiversity. It is also essential reading for anyone requiring an overview of the vast literature on this topic. This volume contains several contributions that illustrate the state of the art of the academic research in the field of biological interactions in its widest sense. The purpose is to increase understanding, awareness and appreciation of the diverse values of biodiversity, necessary to create the willingness to undertake the behavioural changes required to conserve and sustainably use biodiversity. The book has managed to present most of the critical issues surrounding debates over and relations between biodiversity, biotechnology, intellectual property and traditional knowledge. It underscores the ways in which our future is tied to that of Earth's threatened species and demonstrates exactly why conservation is so vitally important for us.

Plants have been a source of medicines and have played crucial role for human health. Despite tremendous advances in the field of synthetic drugs and antibiotics, plants continue to play a vital role in modern as well as traditional medicine across the globe. In even today, one-third of the world's population depends on traditional medicine because of its safety features and ability to effectively cure diseases. This book presents a comprehensive guide to medicinal plants, their utility, diversity and conservation, as well as biotechnology. It is divided into four main sections, covering all aspects of research in medicinal plants: biodiversity and conservation; ethnobotany and ethnomedicine; bioactive compounds from plants and microbes; and biotechnology. All sections cover the latest advances. The book offers a valuable asset for researchers and graduate students of biotechnology, botany, microbiology and the pharmaceutical sciences. It is an equally important resource for doctors (especially those engaged in Ayurveda and allopathy); the pharmaceutical industry (for drug design and synthesis); and the agricultural sciences.

Animal biotechnology is a broad field including polarities of fundamental and applied research, as well as DNA science, covering key topics of DNA studies and its recent applications. In Introduction to Pharmaceutical Biotechnology, DNA isolation procedures followed by molecular markers and screening methods of the genomic library are explained in detail. Interesting areas such as isolation, sequencing and synthesis of genes, with broader coverage of the latter, are also described. The book begins with an introduction to biotechnology and its main branches, explaining both the basic science and the applications of biotechnology-derived pharmaceuticals, with special emphasis on their clinical use. It then moves on to the historical development and scope of biotechnology with an overall review of early applications that scientists employed long before the field was defined. Additionally, this book offers first-hand accounts of the use of biotechnology tools in the area of genetic engineering and provides comprehensive information related to current developments in the following parameters: plasmids, basic techniques used in gene transfer, and basic principles used in transgenesis. The text also provides the fundamental understanding of stem cell and gene therapy, and offers a short description of current information on these topics as well as their clinical associations and related therapeutic options.

Does extinction have to be forever? As the global extinction crisis accelerates, conservationists and policy-makers increasingly use advanced biotechnologies such as reproductive cloning, polymerase chain reaction (PCR) and bioinformatics in the urgent effort to save species. Mendel's Ark considers the ethical, cultural and social implications of using these tools for wildlife conservation. Drawing upon sources ranging from science to science fiction, it focuses on the stories we tell about extinction and the meanings we ascribe to nature and technology. The use of biotechnology in conservation is redrawing the boundaries between animals and machines, nature and artifacts, and life and death. The new rhetoric and practice of de-extinction will thus have significant repercussions for wilderness and for society. The degree to which we engage collectively with both the prosaic and the fantastic aspects of biotechnological conservation will shape the boundaries and ethics of our desire to restore lost worlds.

This book is a printed edition of the Special Issue "Plant Genetics and Biotechnology in Biodiversity" that was published in Diversity. The title provides an overview of the current knowledge about the diversity of the living world and the various problems associated with its conservation and sustainable use. Covering both the fundamentals of the subject, along with the latest research, Biodiversity presents key conservation issues within a framework of global case studies. Starting with a summary of the concept of biodiversity, the text then explores such subjects as species richness, ecological systems, the consequences of human activities, diversity and human health, genetic resources, biotechnology and conservation. Comprehensive introduction to key issues surrounding the study of biodiversity. Extensive bibliography and references to numerous relevant websites. Introduces current research in the field within a framework of useful case studies.

This is the first report of the DNA Bank-Net, an organization whose goal is to encourage the conservation, collection, and preservation of plant genes. DNA banking and gene retrieval Oligonucleotides from endangered/extinct species Operation of a DNA banking facility The impact of intellectual property rights in developing countries Interim preservation of plants for DNA use Cryopreservation of fruit stocks Critical review of international conservation efforts Plant Biotechnology And Plant Genetic Resources, which boasts a truly international list of contributors with a variety of expertise, thoroughly explores all the major contemporary concerns. It discusses the strategies for the best use of

modern biotechnology and precious plant genetic resources to alleviate components associated with global constraints in hunger, environment and health. This book is a valuable resource for scientists and policy makers as the world faces unprecedented challenges in the sustainability and productivity of the global food and fibre system.

Advances in molecular and cell biology have led to the development of a whole range of techniques for manipulating genomes, collectively termed "biotechnology". Although much of the focus in the plant sciences has been on the direct manipulation of plant genomes, biotechnology has also catalyzed a renewed emphasis on the importance of biological and genetic diversity and its conservation. The methods of biotechnology now permit a greater understanding of both species and genetic diversity in plants, the mechanisms by which that variation is generated in nature, and the significance of that variation in the adaptation of plants to their environment. They allow the development of rapid methods for screening germplasm for specific characters and promote more effective conservation strategies by defining the extent of genetic diversity. Tissue culture-based techniques are available for conserving germplasm that cannot be maintained by more traditional methods. Also sophisticated informatics systems enable information on plant genetics and molecular biology to be cross-related to systematic, ecological and other data through international networks.

Transgenic crops offer the promise of increased agricultural productivity and better quality foods. But they also raise the specter of harmful environmental effects. In this new book, a panel of experts examines: • Similarities and differences between crops developed by conventional and transgenic methods • Potential for commercialized transgenic crops to change both agricultural and nonagricultural landscapes • How well the U.S. government is regulating transgenic crops to avoid any negative effects. *Environmental Effects of Transgenic Plants* provides a wealth of information about transgenic processes, previous experience with the introduction of novel crops, principles of risk assessment and management, the science behind current regulatory schemes, issues in monitoring transgenic products already on the market, and more. The book discusses public involvement and public confidence in biotechnology regulation. And it looks to the future, exploring the potential of genetic engineering and the prospects for environmental effects.

This volume offers a much-needed compilation of essential reviews on diverse aspects of plant biology, written by eminent botanists. These reviews effectively cover a wide range of aspects of plant biology that have contemporary relevance. At the same time they integrate classical morphology with molecular biology, physiology with pattern formation, growth with genomics, development with morphogenesis, and classical crop-improvement techniques with modern breeding methodologies. Classical botany has been transformed into cutting-edge plant biology, thus providing the theoretical basis for plant biotechnology. It goes without saying that biotechnology has emerged as a powerful discipline of Biology in the last three decades. Biotechnological tools, techniques and information, used in combination with appropriate planning and execution, have already contributed significantly to economic growth and development. It is estimated that in the next decade or two, products and processes made possible by biotechnology will account for over 60% of worldwide commerce and output. There is, therefore, a need to arrive at a general understanding and common approach to issues related to the nature, possession, conservation and use of biodiversity, as it provides the raw material for biotechnology. More than 90% of the total requirements for the biotechnology industry are contributed by plants and microbes, in terms of goods and services. There are however substantial plant and microbial resources that are waiting for biotechnological exploitation in the near future through effective bioprospection. In order to exploit plants and microbes for their useful products and processes, we need to first understand their basic structure, organization, growth and development, cellular process and overall biology. We also need to identify and develop strategies to improve the productivity of plants. In view of the above, in this two-volume book on plant biology and biotechnology, the first volume is devoted to various aspects of plant biology and crop improvement. It includes 33 chapters contributed by 50 researchers, each of which is an expert in his/her own field of research. The book begins with an introductory chapter that gives a lucid account on the past, present and future of plant biology, thereby providing a perfect historical foundation for the chapters that follow. Four chapters are devoted to details on the structural and developmental aspects of the structures of plants and their principal organs. These chapters provide the molecular biological basis for the regulation of morphogenesis of the form of plants and their organs, involving control at the cellular and tissue levels. Details on biodiversity, the basic raw material for biotechnology, are discussed in a separate chapter, in which emphasis is placed on the genetic, species and ecosystem diversities and their conservation. Since fungi and other microbes form an important component of the overall biodiversity, special attention is paid to the treatment of fungi and other microbes in this volume. Four chapters respectively deal with an overview of fungi, arbuscularmycorrhizae and their relation to the sustenance of plant wealth, diversity and practical applications of mushrooms, and lichens (associated with a photobiont). Microbial endosymbionts associated with plants and phosphate solubilizing microbes in the rhizosphere of plants are exhaustively treated in two separate chapters. The reproductive strategies of bryophytes and an overview on Cycads form the subject matter of another two chapters, thus fulfilling the need to deal with the non-flowering Embryophyte group of plants. Angiosperms, the most important group of plants from a biotechnological perspective, are examined exhaustively in this volume. The chapters on angiosperms provide an overview and cover the genetic basis of flowers development, pre-and post-fertilization reproductive growth and development, seed biology and technology, plant secondary metabolism, photosynthesis, and plant volatile chemicals. A special effort has been made to include important topics on crop improvement in this volume. The importance of pollination services, apomixes, male sterility, induced mutations, polyploidy and climate changes is discussed, each in a separate chapter. Microalgalnutra-pharmaceuticals, vegetable-oil-based nutraceuticals and the importance of alien crop resources and underutilized crops for food and nutritional security form the topics of three other chapters in this volume. There is also a special chapter on the applications of remote sensing in the plant sciences, which also provides information on biodiversity distribution. The editors of this volume believe the wide range of basic topics on plant biology that have great relevance in biotechnology covered will be of great

interest to students, researchers and teachers of botany and plant biotechnology alike.

This book looks at the current state of food security and climate change, discusses the issues that are affecting them, and the actions required to ensure there will be enough food for the future. By casting a much wider net than most previously published books—to include select novel approaches, techniques, genes from crop diverse genetic resources or relatives—it shows how agriculture may still be able to triumph over the very real threat of climate change. Food Security and Climate Change integrates various challenges posed by changing climate, increasing population, sustainability in crop productivity, demand for food grains to sustain food security, and the anticipated future need for nutritious quality foods. It looks at individual factors resulting from climate change, including rising carbon emission levels, increasing temperature, disruptions in rainfall patterns, drought, and their combined impact on planting environments, crop adaptation, production, and management. The role of plant genetic resources, breeding technologies of crops, biotechnologies, and integrated farm management and agronomic good practices are included, and demonstrate the significance of food grain production in achieving food security during climate change. Food Security and Climate Change is an excellent book for researchers, scientists, students, and policy makers involved in agricultural science and technology, as well as those concerned with the effects of climate change on our environment and the food industry.

Medicinal plants are globally valuable sources of herbal products. Plant-based remedies have been used for centuries and have had no alternative in the western medicine repertoire, while others and their bioactive derivatives are in high demand and have been the central focus of biomedical research. As Medicinal plants move from fringe to mainstream with a greater number of individuals seeking treatments free of side effects, considerable attention has been paid to utilize plant-based products for the prevention and cure of human diseases. An unintended consequence of this increased demand, however, is that the existence of many medicinal plants is now threatened, due to their small population size, narrow distribution area, habitat specificity, and destructive mode of harvesting. In addition, climate change, habitat loss and genetic drift have further endangered these unique species. Although extensive research has been carried out on medicinal and aromatic plants, there is relatively little information available on their global distribution patterns, conservation and the associated laws prevailing. This book reviews the current status of threatened medicinal plants in light of increased surge in the demand for herbal medicine. It brings together chapters on both wild (non-cultivated) and domestic (cultivated) species having therapeutic values. Thematically, conventional and contemporary approaches to conservation of such threatened medicinal plants with commercial feasibility are presented. The topics of interest include, but not limited to, biotechnology, sustainable development, in situ and ex situ conservation, and even the relevance of IPR on threatened medicinal plants. We believe this book is useful to horticulturists, botanists, policy makers, conservationists, NGOs and researchers in the academia and the industry sectors.

Genetic erosion, that is, the loss of native plant and genetic diversity has been exponential from the Mediterranean Basin through the Twentieth century. This careless eradication of species and genetic diversity as a result of human activities from a 'hot-spot' of diversity threatens sustainable agriculture and food security for the temperate regions of the world. Since the early 1900s there has been a largely ad hoc movement to halt the loss of plant diversity and enhance its utilisation. The Convention on Biological Diversity and Food and Agriculture Organisation of the United Nations International Undertaking on Plant Genetic Resources, both highlight the need to improve conservation methodologies and enhance utilisation techniques. It has been argued that the most important component of biodiversity is the genetic diversity of crop and forage species used to feed humans and livestock. These cultivated and related wild species provides the raw material for further selection and improvement. Leguminosae species are of major economic importance (peas, chickpeas, lentils and faba beans, as well as numerous forage species) and provide a particularly rich source of protein for human and animal foods. Their distribution is concentrated in the Mediterranean region and therefore the improvement of their conservation and use in the region is critical. This text is designed to help ensure an adequate breadth of legume diversity is conserved and to help maximise the use of that conserved diversity. The subjects of conservation and use of legume diversity, the Mediterranean ecosystem and taxonomy of legumes are introduced. Generic reviews of the taxonomy, centre of diversity, ecogeographic distribution, genetic diversity distribution, conservation status, conservation gaps and future research needs are provided, along with a discussion of the importance of rhizobia to the maintenance of legume diversity. Current ex situ and in situ conservation activities as well current legume uses are reviewed. In conclusion future priorities for ex situ and in situ plant genetic conservation and use of Mediterranean legumes are highlighted. All contributors look forward rather than simply reviewing past and current activities and therefore it is hoped that the identification of genetic erosion, location of taxonomic and genetic diversity and promotion of more efficient utilisation of conserved material will be enhanced.

Biotechnology, genetic engineering: the ethical issues from the public perspective. Ethics and equity in the use of genetic resources. Benefit-sharing. The farmers. The private sector.

The book is designed to provide a review on the methods and current status of conservation of the tropical plant species. It will also provide the information on the richness of the tropical plant diversity, the need to conserve, and the potential utilization of the genetic resources. Future perspectives of conservation of tropical species will be discussed. Besides being useful to researchers and graduate students in the field, we hope to create a reference for a much wider audience who are interested in conservation of tropical plant diversity.

"Biotechnology provides invaluable tools for meeting the world's needs in food, health care and environmental protection and its enormous potential encompasses key assets for competitiveness in today's global markets. UNIDO, in its capacity as task manager for Chapter 16 of Agenda 21, offers an array of services through its programme in Environmentally Sound Management of Biotechnology. These services focus on: safety assurance concerning contained and environmental applications of biotechnology; the sustainable utilization of genetic resources through bioprospecting and conservation; and biotechnology transfer through research networks and enterprise partnerships" - pg. 3.

Many developing countries are exploring whether biotechnology has a role in addressing national issues such as food security and environmental remediation, and are considering whether the putative benefits of the technology—for example, enabling greater agricultural productivity and stability in the food supply—outweigh concerns that the technology might pose a danger to biodiversity, health, and local jobs. Some policy leaders worry that their governments are not prepared to take control of this evolving technology and that introducing it into society would be a risky act. Others have suggested that taking no action carries more risk, given the dire need to produce more food. This book reports on an international workshop held to address these issues. Global Challenges and Directions for Agricultural Biotechnology: Mapping the Course, organized by the National Research Council on October 24-25, 2004, in Washington, DC, focused on the potential applications of biotechnology and what developing countries might consider as they contemplate adopting biotechnology. Presenters at the workshop described applications of biotechnology that are already proving their utility in both developing and developed countries.

This book covers a range of important topics on crop and animal genetics, breeding and genomics, as well as biodiversity and genetic resources conservation and utilization reflecting three thematic sections of working groups of the Biotechnology Society of Nigeria. The topics range from agricultural biotechnology including genetically-modified organisms and gene-editing for agronomically-important traits in tropical crops, to Nigeria's mega biodiversity and genetic resources conservation. This book will engender a deeper understanding of underpinning

mechanisms, technologies, processes and science - policy nexus that has placed Nigeria as a leader in biotechnology in Africa. The book will be a useful reference material for scientists and researchers working in the fields of food and agricultural biotechnology, bioinformatics, plant and animal genetics, breeding and genomics, genetic resources conservation and enhancement.

The purpose of this book is to assess the potential effects of biotechnological approaches particularly genetic modification on biodiversity and the environment. All aspects of biodiversity such as ecological diversity, species diversity and genetic diversity are considered. Higher organisms contain a specific set of linear DNA molecules called chromosomes and a complete set of chromosomes in an organism comprises its genome. The collection of traits displayed by any organism (phenotype) depends on the genes present in its genome (genotype). The appearance of any specific trait also will depend on many other factors, including whether the gene(s) responsible for the trait is/are turned on (expressed) or off, the specific cells within which the genes are expressed and how the genes, their expression and the gene products interact with environmental factors. The primary biotechnology which concerns us is that of genetic manipulation, which has a direct impact on biodiversity at the genetic level. By these manipulations, novel genes or gene fragments can be introduced into organisms (creating transgenics) or existing genes within an organism can be altered. Transgenics are a major area of concern, combining genes from different species to effectively create novel organisms. Current rates of disappearance of biological and cultural diversity in the world are unprecedented. Intensive resource exploitation due to social and economic factors has led to the destruction, conversion or degradation of ecosystems. Reversing these trends requires time to time assessment to integrate conservation and development.

The need for exploration, conservation, and sustainable utilization of bioresources is undeniable for the survival and growth of mankind. This new book throws light on new and recent research on and development of effective strategies for sustainable utilization of bioresources using modern tools and techniques to help meet this challenge. This volume addresses the utilization of bioresources in therapeutics, in biofuel, in agriculture, and in environmental protection. Beginning with the diverse potential applications of bioresources in food, medicine, and cosmetics, the volume goes on to address the various different underutilized bioresources and their sustainable uses. It discusses important advances in biofuel and patents that highlight recent developments that address the energy crises and the continuously fluctuating cost of petroleum. It explores new renewable energy sources from bioresources and their sustainable utilization in the bioenergy and biofuel industry. Several chapters focus on the sustainable utilization of bioresources in the agricultural sector. The volume considers that developing countries have huge agricultural resources that could be employed for production of value-added byproducts for the sustainable development of a bio-based economy. The book discusses efficient use of underexploited natural bioresources, new chemical approaches for the generation of novel biochemicals, and the applications of genetics approaches for bioresource conservation and production of value-added products. Further, strategies for the production of biopesticides utilizing bioresources are also discussed.

Contents: Status of the World's Livestock Genetic Resources: Preparation of the First Report on the State of the World's Animal Genetic Resources, Status of the World's Fishery Genetic Resources, Global Overview of Crop Genetic Resources, Efforts Towards Assessing the Global Status of Forest Genetic Resources, The Potential of Cryopreservation and Reproductive Technologies for Animal Genetic Resources Conservation Strategies, Status of Cryopreservation Technologies in Plants (Crops and Forest Trees), Use of Molecular Markers and Other Information for Sampling Germplasm to Create An Animal Gene Bank, Genetic Characterization of Livestock Populations and its Use in Conservation Decision-making, Genetic Characterization of Populations and its Use in Conservation Decision-making in Fish, Molecular Marker Based Analysis for Crop Germplasm Preservation, Molecular Analysis of Gene Banks for Sustainable Conservation and Increased Use of Crop Genetic Resources, Genetic Characterization and its Use in Decision-making for the Conservation of Crop Germplasm, The Role of Biotechnology in the Conservation, Sustainable Use and Genetic Enhancement of Bioresources in Fragile Ecosystems, Genetic Diversity in Forest Tree Populations and Conservation: Analysis of Neutral and Adaptive Variation, Background Document to the e-mail Conference on the Role of Biotechnology for the Characterization and Conservation of Crop, Forest, Animal and Fishery Genetic Resources in Developing Countries, Summary of Discussion for the e-mail Conference on the Role of Biotechnology for the Characterization and Conservation of Crop, Forest, Animal and Fishery Genetic Resources in Developing Countries.

The American chestnut, whitebark pine, and several species of ash in the eastern United States are just a few of the North American tree species that have been functionally lost or are in jeopardy of being lost due to outbreaks of pathogens and insect pests. New pressures in this century are putting even more trees at risk. Expanded human mobility and global trade are providing pathways for the introduction of nonnative pests for which native tree species may lack resistance. At the same time, climate change is extending the geographic range of both native and nonnative pest species. Biotechnology has the potential to help mitigate threats to North American forests from insects and pathogens through the introduction of pest-resistant traits to forest trees. However, challenges remain: the genetic mechanisms that underlie trees' resistance to pests are poorly understood; the complexity of tree genomes makes incorporating genetic changes a slow and difficult task; and there is a lack of information on the effects of releasing new genotypes into the environment. Forest Health and Biotechnology examines the potential use of biotechnology for mitigating threats to forest tree health and identifies the ecological, economic, and social implications of deploying biotechnology in forests. This report also develops a research agenda to address knowledge gaps about the application of the technology.

Originally published in 1999 The Commercial Use of Biodiversity examines how biodiversity and the genetic material it contains are now as valuable resources. Access to genetic resources and their commercial development involve a wide range of parties such as conservation and research institutes, local communities, government agencies and companies. Equitable partnerships are not only crucial to conservation and economic development but are also in the interests of business and often required by law. In this authoritative and comprehensive volume, the authors explain the provisions of the Convention on Biological Diversity on access and benefit-sharing, the effect of national laws to implement these, and aspects of typical contracts for the transfer of materials. They provide a unique sector-by-sector analysis of how genetic resources are used, the scientific, technological and regulatory trends and the different markets in Pharmaceuticals, Botanical Medicines, Crop Development, Horticulture, Crop Protection, Biotechnology (in fields other than healthcare and agriculture) and Personal Care and Cosmetics Products. This will be an essential sourcebook for all those in the commercial chain, from raw material collection to product discovery, development and marketing, for governments and policy-makers drafting laws on access and for all the institutions, communities and individuals involved in the conservation, use, study and commercialisation of genetic resources.

The present book updates the subject content of biotechnology and biological tools and their applications in the conservation and

management of environment, use of green technology and clean technology is the demand of the era, environmental management through the utilization implementation of biological agents, microbial use to make various useful products for human welfare, Reclaim the ecosystem and remediation of environmental pollutants, research on various fungus and bacteria for environment and agriculture.

This book is a compilation of articles on various aspects of bioresources and the processes employed for its judicious utilization. Biodiversity and conservation, food security, gene banks and repositories, laws governing biodiversity, bioprospecting, bioresources in traditional medicine and biodiversity mining are some of the important topics covered in the book. The unique contents of the book make it an important source of information for conservation scientists, academics, activists and to those who are actively involved in product oriented research from bioresources.

This volume summarizes the current state of knowledge in the economic literature of management of agricultural biotechnology and biodiversity in agricultural and economic development. It identifies key issues confronting policy makers in managing biodiversity and biotechnology and provides a broad, multi-disciplinary analysis of the linkage between the two. It is especially innovative in its use of plant genetic resource management as the basis for its analysis.

Mangroves are typically tropical coastal ecosystems found in the inter-tidal zones of river deltas and back water areas. They represent highly dynamic and fragile ecosystems, yet they are the most productive and biologically diversified habitats of various life forms including plants, animals and microorganisms. Mangroves are a resource of many different products, including; microorganisms that harbor a diverse group of industrially important enzymes, antibiotics, therapeutic proteins and vaccines; timber resistant to rot and insects; and medicinal plants. Divided into three main parts, *Biotechnological Utilization of Mangrove Resources* first provides a broad introduction into mangrove ecology. Subsequent chapters discuss the biodiversity of mangroves, including the diverse nature of the organisms within the mangroves themselves. The final part pays special attention to biotechnological utilization of mangroves. Topics such as antimicrobial activity of mangrove-derived products, anti-oxidant activity of mangrove derived products and pharmaceutical applications, are covered in detail. *Biotechnological Utilization of Mangrove Resources* brings the latest research and technologies in mangrove biology into one platform, providing readers with an up-to-date view on the area. This would serve as an excellent reference book for researchers and students in the field of marine biology especially interested in mangrove ecosystems. Highlights the diversity of different life forms in the mangrove ecosystem, including the importance of mangroves and mangrove-derived products. Focuses on biotechnological utilization of mangrove resources such as antimicrobial and antioxidant properties of microorganisms, and industrial and pharmaceutical applications. Discusses the different modern tools and techniques used for the study of mangrove resources.

This work presents a thorough analysis of the biodiversity concept in international law and commentary on the 1992 United Nations Convention on Biological Diversity which was opened for signature following the 1992 UN Conference on Environment and Development. This Convention is the first international treaty explicitly to address all aspects of biodiversity ranging from the conservation and sustainable use of biological resources, to access to biotechnology and the safety of activities related to modified living organisms. The work extends beyond the ambit of the Convention itself to examine the conservation of biodiversity in international law generally, including measures for the protection of the terrestrial, marine and Antarctic environment and particular features relating to sustainable use of biological resources, ex-situ conservation and plant genetic resources. It further analyses the controversial issue of intellectual property rights, the problems of implementation in the European Union and the United States, differences between developing and developed states and the role of indigenous peoples. This major new work has been written by members of the Committee on Environmental Law of the British Branch of the International Law Association following an earlier study on the subject of International Law and Global Climate Change (Graham & Trotman, 1991). It is the first major study of the Convention of the context in which it was negotiated, and of the prospects for its implementation, following the entry into force of the Convention on 29 December 1993.

Over the past decade the importance of natural resources for sustainable agricultural development has been increasingly discussed at international forums and conferences. Aside from the sustainable management of soil, water, and air, it now seems to be accepted that the sustainable management of genetic resources is one of the four indispensable preconditions for a sustainable agriculture. The discussion on conservation of plant genetic resources for food and agriculture (PGRFA), however, has to reflect the costs of conservation as well. These have not yet been discussed intensively. The study analyzes the conservation costs of plant genetic resources; it also assesses the effectiveness of conservation and the efficiency of the different conservation instruments. It is based on extensive surveys in relevant countries. Following the detailed cost and impact analysis, the results show that the effectiveness of conservation strategies may be increased.

"Chapters 1 to 14 of in this book are based on papers presented at Sessions I, II and IV of an international workshop held from 5 to 7 March 2005 entitled, *The Role of Biotechnology for the Characterisation and Conservation of Crop, Forestry, Animal and Fishery Genetic Resources*, organized by the FAO Working Group on Biotechnology (FAO-WGB), the Fondazione per le Biotechnologie and the Italian Society of Agriculture Genetics (SIGA). The workshop took place at the Villa Gualino Congress Center in Turin, Italy ...The remaining two chapters, 15 and 16, are from the e-mail conference organized by the FAO-WGB roughly three months after the Turin workshop."--P. xi.

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