Agricultural Biotechnology offers great potential to contribute to sustainable agricultural growth, food security and poverty alleviation in developing countries. Yet there are economic and institutional constraints at national and international levels that inhibit the poor people’s access to appropriate biotechnological innovations. A agricultural Biotechnology in Developing Countries: Towards Optimizing the Benefits for the Poor addresses the major constraints. Twenty-three chapters, written by a wide range of scholars and stake-holders, provide an up-to-date analysis of agricultural biotechnology developments in Latin America, Africa and Asia. Besides the expected economic and social impacts, the challenges for an adjustment of the international research structure are discussed, with a special focus on intellectual property rights and the roles of the main research organizations. Harnessing the comparative advantages of the public and private sectors through innovative partnerships is the only way forward to optimize the benefits of biotechnology for the poor. The book will be an invaluable resource for both academics and policy-makers concerned with agricultural biotechnology in context of developing-countries.
"Biotechnology offers the potential for more environmentally-friendly agriculture but the conditions for developing countries to take advantage of that potential should be created." Policy intervention is needed to ensure that biotechnology responds to the priorities set for agriculture. Decisions are urgently needed in two policy areas specific to biotechnology: biosafety and intellectual property rights. Public funding restrictions demand innovative approaches and public/private partnerships. Flexibility and long-term commitment are essential if donor-supported biotechnology initiatives are to succeed.

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, presents 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.

A nalyzes the nature, scope & impact of initiatives being undertaken to stimulate the development of agricultural biotechnology applications in developing countries. Chapters include biotechnology in the context of a national innovation system; international initiatives in agricultural biotechnology; bilateral aid programmes; & implications for planning & policy. Charts & tables.

Brings the literature of agriculture (biotechnology - international affairs) to the interested user who could not access it by any other means.

Obtaining world food security and food self-reliance for the developing nations is a complex and difficult task, but with increased research and education, agricultural production in developing countries can be improved. Biotechnology applications, integrated into traditional systems, hold much promise in this respect. Realizing the positive impact of biotechnology will depend upon the ability of developing countries to access and generate technology which is suitable to their needs. However, government policies may not encourage investment in public sector agricultural research and the private sector is often underdeveloped. This book is the product of a conference, held in California in April 1997, under the auspices of the Agricultural Biotechnology for Sustainable Productivity (ABSP) project. It provides a broad overview of the latest research and applications and policy requirements for biotechnology in developing countries. The issues of food security, capacity building, intellectual property rights, technology transfer, biosafety and the need for private sector enterprise are addressed. This book is essential reading for policy makers, researchers in agricultural biotechnology, economists, and extension workers.

Crop biotechnology could boost global food production in a sustainable way. However, the economic repercussions of biotechnology for developing countries are largely unknown and have been the subject of acute controversy over the last few years. This study deals with the topic and provides some preliminary empirical results. An analytical framework for the ex ante evaluation of biotechnology in smallholder agriculture is developed, which is then used within three different case studies in Kenya and Mexico. It is shown that biotechnology holds great potentials for poor agricultural producers and consumers. Yet appropriate institutional adjustments are required to capitalize on these potentials. Implications for national and international biotechnology policies are discussed.

The principal message of this book is that thermodynamics and statistical mechanics will benefit from replacing the unfortunate, misleading and mysterious term "entropy" with a more familiar, meaningful and appropriate term such as information, missing information or uncertainty. This replacement would facilitate the interpretation of the "driving force" of many processes in terms of informational changes and dispel the mystery that has always enshrouded entropy. It has been 140 years since Clausius coined the term "entropy"; almost 50 years since Shannon developed the mathematical theory of "information"—Subsequently renamed "entropy." In this book, the author advocates replacing "entropy" by "information," a term that has become widely used in many branches of science. The author also takes a new and bold approach to thermodynamics and statistical mechanics. Information is used not only as a tool for predicting distributions but as the fundamental cornerstone concept of thermodynamics, held until now by the term "entropy." The topics covered include the fundamentals of probability and information theory; the general concept of information as well as the particular concept of information as applied in thermodynamics; the re-derivation of the Sackur-Tetrode equation for the entropy of an ideal gas from purely informational arguments; the fundamental formalism of statistical mechanics; and many examples of simple processes the "driving force" for which is analyzed in terms of information.

This study concludes by suggesting that the psychometric, cultural, and moral models do not account for the risk perception of farmers in India. It proposes that any theory or model that purports to explain and predict risk perception of agricultural biotechnology in the developing world may need to include economic benefits, safety concerns and accountability as key variables.
This publication presents the report of the first six e-mail conferences hosted by the FAO Electronic Forum on Biotechnology in Food and Agriculture from March 2000 to May 2001. Each conference was moderated, lasted approximately two months and focused on agricultural biotechnology in developing countries. Four of the conferences dealt with the appropriateness of currently available biotechnologies in the crop, fishery, forestry and livestock sectors for food and agriculture in developing countries; two dealt with the implications of agricultural biotechnology for hunger and food security and the impact of intellectual property rights on food and agriculture in developing countries.

This book is a compendium of knowledge, experience and insight on agriculture, biotechnology and development. Beginning with an account of GM crop adoptions and attitudes towards them, the book assesses numerous crucial processes, concluding with detail.

Plant biotechnology has become a priority area for technology transfer in developing countries where production of food, feed, and fiber is of vital concern. Many programs now have sufficient experience to permit an in-depth examination of approaches, achievements, controversies, and anticipated benefits. Developing countries are showcased for leading-edge advances, as represented by contributions from South Africa, Kenya, Indonesia, Malaysia, Thailand, China, Mexico, Brazil, and Peru with a foreword form World Food Prize Laureate M S. Swaminathan. These presentations are augmented by reviews from organizations facilitating plant biotechnology transfer, including philanthropic foundations, bilateral and multilateral organizations, and other new initiatives. Introductory chapters address the subjects of sustainable development, accessibility of resources, environmental issues, and socio-economic research.

There are currently many controversial socioeconomic issues concerned with the development and implementation of agricultural biotechnology. This book presents selected revised and edited papers from the fourth and fifth meetings of the International Consortium on Agricultural Biotechnology Research, held in Italy in 2000 and 2001.

This book looks at the application of a variety of biotechnologies to agricultural development. It addresses recent concerns about the sterile-seed terminator technology and about the biosafety of genetically modified foods/crops, and assesses the potential of apomixis as a possible countervailing strategy to the adverse effects of the terminator. For some crops, the book introduces the concepts of participatory plant breeding and diversified site-of-field potential to meet the needs of small-scale farmers in developing countries whose traditional wisdom and indigenous knowledge can be put to good use through inputs from modern biotechnology for the benefit of humanity. The text provides a valuable source of recent information not only to researchers of agriculture and biotechnology but also meets the course requirements of students in agriculture, genetics and plant breeding, crop physiology and related disciplines in agriculture, biotechnology, food processing, nutrition and home science. Contents: Chapter 1: General Introduction; Definition and Perspective of Biotechnology, New Technologies, Scope, Potential & Achievements, Introduction to Agriculture, Effects of Biotechnology on Agriculture, Biotechnology for Agriculture, Genetic Manipulation in Plant Breeding, Crop Plants, Dangers of Genetic Uniformity, Preservation and Exchange of Genetic Resources, Use of Transgenic Plants in Industry, Agriculture and Medicine, Safeguarding Domestic Animal Diversity Through Animal Husbandry, Advances in Animal Breeding Technology, Animal Byproducts, Transgenic Livestock, Transgenic Sheep and Wool Growth, Genetically-modified Food, Biotechnology and Sustainable Development, References; Chapter 2: Techniques; Introduction, Plant Tissue Culture and Its Impact on Agriculture, Genetic Transfer to Plants, Direct Gene Transfer, Germplasm Storage, Transgenic Plants for Non-Transgenic Crops, Tilling-A Non-Transgenic Approach to Wheat Improvement, Applications of Bioluminescence and Chemiluminescence, Proprietary Technologies, Genetic Use Restriction Technologies (Gurts), Apomixis, the Plant Biotechnology Tools for Developing World, References; Chapter 3: Biodiversity and Agriculture; Introduction, Crop Diversity, the Struggle for Genetic Resources, Double-Green Revolution, Hormones and Green Revolution, Global Climate Change and Biodiversity, Complementarity As Biodiversity Indicator, Genetic Diversity and Gene Control in Rice, Genetic Improvement in Rice, Golden Rice, Reference; Chapter 4: Crop Genetic Resource and Plant Breeding, Introduction, The Genealogical Approach, Two Approaches, Farmer Rights, Convention on Biological Diversity, Trips, Environmental Rights, Resistance Breeding, Participatory Plant Breeding, Seed Regulation and Local Seed Systems, References; Chapter 5: Biological Nitrogen Fixation; Introduction, Forage Legumes, Nodule Function, Cereals, Crop Residues, Biocatalysts, Plant-Microbe Signalling, Nodule, and Symbiotic Nitrogen Fixation, The Oxygen Paradox, Nodulation of Cereals, References; Chapter 6: Transgenic Crops and Biosafety; Introduction, Genetically Modified Crops, Improvement of Grain Quality, Carbon Storage in Seeds, Transgenic Corn, Transgenic Oilseed Rape, Transgenic Linum, Field Testing and Commercialization of Transgenic Plants, Balancing Risks and Benefits of GM Crops, Restrictions On the Right Of Farmers To Save Seed, Crop Genomics, Cereal Improvement Through Genomics, Transgenics, Transgenic Crops, Transgenic Plants for Tropical Regions, Biosafety, Biosafety and National Priorities, Contains Use and Release of Modified Organisms, Forest Tree Biotechnology, Transgenic Trees, References; Chapter 7: Food and Nutrition; Introduction, Biotechnology and Food Security, Global Food Security, Food Politics, Diversity and Food Security, In Situ Conservation, Sustainable Food Security, Eradication of World Hunger, Food Safety, Future Food Supply Prospects, Global Food Prospects To 2025, Organic Food, Butter, Milk and Dairy Farming, New Biotechnologies For Food Production and Processing, Biotechnology For Alleviating Malnutrition, Community Gene Banks and Sustainable Food Security, Epidemiology of Malnutrition, Engineering Solutions To Malnutrition, Diversification and Human Nutrition, Soybean in Argentina, References; Chapter 8: Management;
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, D.C., 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.

The product of research sponsored by the UK Department for International Development and a May 2000 workshop held in Rome, Italy, this book comprises 11 contributions from experts affiliated with the International Plant Genetic Resources Institute (Rome, Italy) and the Institute for Plant Biology (U. of Zurich, Switzerland), and from academics in agriculture, food economics, law, and land economy affiliated with universities in the UK, US, and Italy. They investigate ways in which industrial changes implicit in new biotechnologies will affect modern agriculture; analyze industrial and distribution impacts, including consequences for developing countries; and look at genetic use restriction technologies and their implications for global agricultural production. A notation copyrighted by Book News, Inc., Portland, OR.

Following on from earlier titles in this series, this volume presents further material generated by the World Bank/ISNAR/Australian government biotechnology study. It covers the present status and future prospects for the application of biotechnology to solve agricultural and environmental problems in a number of developing countries. Particular focus is given on to developments that have taken place over the last decade.

As the oldest and largest human intervention in nature, the science of agriculture is one of the most intensely studied practices. From manipulation of plant gene structure to the use of plants for bioenergy, biotechnology interventions in plant and agricultural science have been rapidly developing over the past ten years with immense forward leaps on an annual basis. This book begins by laying the foundations for plant biotechnology by outlining the biological aspects including gene structure and expression, and the basic procedures in plant biotechnology of genomics, metabolomics, transcriptomics and proteomics. It then focuses on a discussion of the impacts of biotechnology on plant breeding technologies and germplasm sustainability. The role of biotechnology in the improvement of agricultural traits, production of industrial products and pharmaceuticals as well as biomaterials and biomass provide a historical perspective and a look to the future. Sections addressing intellectual property rights and sociological and food safety issues round out the holistic discussion of this important topic. Includes specific emphasis on the inter-relationships between basic plant biotechnologies and applied agricultural applications, and the way they contribute to each other. Provides an updated review of the major plant biotechnology procedures and techniques, their impact on novel agricultural development and crop plant improvement. Takes a broad view of the topic with discussions of practices in many countries.

For more than a century, plant breeders in government-funded research centers have sought out crop varieties with characteristics that might help poor farmers in developing countries grow more food. They have painstakingly bred and cross-bred these varieties through generations to achieve a desirable mix of characteristics. At an accelerating pace in the 1960s and 1970s the work of these breeders changed the developing world—the higher yielding varieties of wheat, rice, and other food staples they produced helped avert catastrophic famine in Asia—and their work continues to improve the lives and livelihoods of millions of people. Now, however, critics of the newest tool in the agricultural researchers' toolbox—genetic engineering—argue that the new environment for agricultural research may leave farmers in the developing countries out in the cold. The largely misplaced concerns that patents and other forms of intellectual property are currently severely constraining the freedom to operate in developing countries is diverging attention from more crucial issues for agricultural researchers working on staple food crops.

Based on the first scientific conference convened at the Library of Alexandria, 'Biotechnology and Sustainable Development: Voices of the South and North', which was held in Alexandria, Egypt, in
March 2002, this book contains overviews of agriculture, health, ethics and the environment. It discusses how dramatic improvements in food security, health, and lifestyle could accrue to the poor people of developing countries through the applications of new technologies.

This book addresses the continuing controversy over the potential impact of genetically modified (GM) crops in developing countries. Supporters of the technology claim it offers one of the best hopes for increasing agricultural production and reducing rural poverty, while opponents see it as an untested intervention that will bring corporate control of peasant farming. The book examines the issues by reviewing the experience of GM, insect-resistant cotton, the most widely grown GM crop in developing countries. The book begins with an introduction to agricultural biotechnology, a brief examination of the history of cotton production technology (and the institutions required to support that technology), and a thorough review of the literature on the agronomic performance of GM cotton. It then provides a review of the economic and institutional outcomes of GM cotton during the first decade of its use. The core of the book is four country case studies based on original fieldwork in the principal developing countries growing GM cotton (China, India, South Africa and Colombia). The book concludes with a summary of the experience to date and implications for the future of GM crops in developing countries. This review challenges those who have predicted technological failure by describing instances in which GM cotton has proven useful and has been enthusiastically taken up by smallholders. But it also challenges those who claim that biotechnology can take the lead in agricultural development by examining the precarious institutional basis on which these hopes rest in most countries. The analysis shows how biotechnology’s potential contribution to agricultural development must be seen as a part of (and often secondary to) more fundamental policy change. The book should be of interest to a wide audience concerned with agricultural development. This would include academics in the social and agricultural sciences, donor agencies and NGOs.

Advances in biotechnology are beginning to have a major impact on agricultural productivity in developed countries. This book reviews the prospects for effective application of biotechnology in developing countries and its potential impact on North-South trade.

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