

Preface

Sustainable development means that the needs of the present generation should be met without compromising the ability of future generations to meet their own needs. Sustainability is the key to preventing or reducing the effect of environmental issues. Environmental sustainability is the process of making sure current processes of interaction with the environment are pursued with the idea of keeping the environment as pristine as naturally possible based on ideal-seeking behavior. Ecosystems are dynamic interactions between plants, animals, and microorganisms and their environment working together as a functional unit. Ecosystems will fail if they do not remain in balance. No community can carry more organisms than its food, water, and shelter can accommodate. Food and territory are often balanced by natural phenomena such as fire, disease, and the number of predators. Each organism has its own niche, or role, to play. The environment of our planet is degrading at an alarming rate because of non-sustainable urbanization, industrialization and agriculture. Our air, water, land and food are polluted. Pollution rate has exceeded the manageable capacity of nature at many places. Almost 50% of the land is eroded and robbed of its fertility. The extent of damage done to the world's biological diversity and ecosystem cannot be assessed. Our renewable and non-renewable resources are being alarmingly exhausted due to increasing population pressure posing difficulty to manage threat to future generation. Environmental issues are receiving utmost attention and have been debated at various international forums e.g. the first Earth Summit held in Stockholm, Sweden in June 1972; the second one in Rio de Janeiro, Brazil in 1992. The European Council in Göteborg (2001) adopted the first EU Sustainable Development Strategy (SDS). This was complemented by an external dimension in 2002 by the European Council in Barcelona in view of the World Summit on Sustainable Development in Johannesburg (2002), the Montreal and Kyoto Protocols etc. The European Council of June 2006 adopted an ambitious and comprehensive renewed Sustainable Development Strategy (SDS) for an enlarged EU. The European Commission adopted in October 2007 the first progress report on the Sustainable Development Strategy and in July 2009 reviews of EU SDS. Declarations of far reaching consequences were made at these summits. But current approaches in environmental protection have shifted from the end of pipe mitigation to zero emission strategies and to 3 R's: reduce, reuse and recycle waste.

Every nation desires economic growth, and at the same time it craves for eco-conservation and sustainable development. Administrative authorities are required to frame plans, programs and policies for a better scientific and technological development of production, distribution and consumption processes with sustainability. Green technology concepts are emerging as the future strategy for environmental management. It has become a challenge for scientists to devise remedial measures to control pollution levels and safeguard the future.

The book has seventeen chapters and attempts to present balanced accounts on various strategies for sustainable development. Chapter 1 gives an overview of different environmental protection strategies for sustainable development, while Chap. 2 describes the potential of rhizospheric microorganisms in the sustainable plant development in anthropogenic polluted soils. Other chapters deal with bioremediation of pesticides from soil and wastewater, remediation of toxic metals from soil, biological treatment of pulp and paper industry wastewater, sustainable solutions for agro processing waste management, impact of solid waste management on climate change and human health, environmental impact of dyes and its remediation. Various methods for genotoxicity testing of environmental pollutants are also discussed. Separate chapters have been devoted to molecular detection of resistance and transfer genes in the environmental samples, and biofilm formation by the environmental bacteria. Chapters on biochemical attributes to assess soil ecosystem sustainability, application of rhizobacteria in biotechnology, role of peroxidases as a tool for the decolorization and removal of dyes are also included. The role of biopesticides in sustainable agriculture is dealt in detail in the last chapter.

The book is not an encyclopedic review. The chapters incorporate both theoretical and practical aspects, and serve as baseline information for future research through which significant developments can be expected. This book will be of great interest to the research scientists, students, teachers, and environmental engineers working in the area of Environmental microbiology, ecotoxicology, soil microbiology, biotechnology and agricultural microbiology and would also serve as a valuable resource for environmental regulatory and protection agencies.

With great pleasure, we extend our sincere thanks to all our well-qualified and internationally renowned contributors from different countries for providing the important, authoritative and cutting edge scientific information/technology to make this book a reality. All chapters are well illustrated with appropriately placed tables and figures and enriched with up to date information. We are also thankful to the reviewers who carefully and timely reviewed the manuscript.

We are extremely thankful to Springer, Dordrecht, the Netherlands for completing the review process expeditiously to grant acceptance for publication. We appreciate the great efforts of the book publishing team especially Tamara Welschot, Senior Publishing Editor Environmental Sciences and Prof. Ravi Jain, Series Editor, Strategies and Sustainability in responding to all queries very promptly.

We express sincere thanks to our family members for all the support they provided, and regret the neglect and loss they suffered during the preparation of this book.

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Environmental Protection Strategies for Sustainable
Development

Malik, A.; Grohmann, E. (Eds.)

2012, XIV, 606 p., Hardcover

ISBN: 978-94-007-1590-5