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## Preface

*Come forth into the light of things. Let Nature be your teacher.*

William Wordsworth

Phytoremediation technologies use green plants and their associated microbial communities to remove, degrade, or stabilize inorganic and organic contaminants entering the air, water, and soil of a multitude of ecosystems. In some cases phytoremediation applications can serve as one of several useful components in the overall management and control of contaminants using relatively low-cost solar-driven physiological/biochemical mechanisms common to most plants. Many phytoremediation applications have the added value of providing a remediation option that offers a minimum disruption to the ecosystem or habitat under repair.

Different forms of basic ecological restoration including phytoremediation have been used for centuries around the globe and reflect part of what the philosopher Immanuel Kant described as the need for people to consider the potential effects of their actions on the welfare of all of humankind for all time. Typically an ecosystem restoration project aims to restore an impacted area to a state that is as close as possible to the conditions that existed prior to the disturbance. In the case of phytoremediation, one good way to achieve that goal involves a contaminant management process that assures a good match of the phytoremediation application to the type and concentration of contaminants and the critical site-specific characteristics of the area under remediation.

The chapters in this book provide a diverse account of selected phytoremediation research projects and case histories from specific sites and/or laboratories on four continents around the world. Volume 1 provides a diverse global perspective and includes observations and data collected from multiple sites in fifteen countries in Africa, Asia, South America, Europe, and the USA. Organic and inorganic contaminants covered include BTEX, PAHs, RDX, hydrocarbons including petroleum, and heavy metals/metalloids. Chapters in Volume 1 also discuss the influence of key factors on the general management of contaminants in soil and water such as bio-availability, landscape design, and process amendments including biochar.

All forms of ecosystem restoration including phytoremediation will have to be reexamined in the broad context of climate change. The editors and contributing authors hope that one result of publishing this book will be to provide a wide range of useful experimental data derived from global applications of phytoremediation. Hopefully, this book can also provide new insights about the advantages and disadvantages of using phytoremediation to manage the continuing threat of ecosystem degradation resulting from the interaction of contaminants and climate change.

Tabul, USA  
Rohtak, INDIA  
Rohtak, INDIA  
Syracuse, NY  
Syracuse, NY

Abib A. Ansari  
Sarvajeet S. Gill  
Ritu Gill  
Guy R. Lanza  
Lee Newman

Phytoremediation

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Ansari, A.A.; Gill, S.S.; Gill, R.; Lanza, G.R.; Newman, L.

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