

Preface

In the past, the increasing needs of a growing population for food, fuel and fiber were met by cultivating progressively larger areas of land and by intensifying the use of existing cultivated land. Under circumstances with diminishing good-quality lands and stagnating crop yields, the food demands of an increasing population must be met through the reclamation and management of degraded lands, including salt affected lands. Salt-affected soils cover about 6 % of the world's lands, which is mainly due to either natural causes or human-induced causes that affect about 2 % (32 million ha) of dryland farmed areas and 20 % (45 million ha) of irrigated lands globally. In India, about 6.73 million ha of land are affected by salts. To overcome this problem, several researchers have advocated the biological approach to improve these lands for cultivation. Innovative technologies in managing marginal salt affected lands merit immediate attention in view of climate change and its impact on crop productivity and the environment. The management of degraded land on a sustainable basis offers an opportunity for the horizontal expansion of agricultural areas in the India. During the last three decades, a number of strategies to ameliorate different kinds of marginal lands, including salt affected areas, have been developed. Adequate knowledge in diagnosis and management technologies for saline and alkali lands is essential to obtain maximum crop production from these resources. Bioremediation is one of the eco-friendly approaches for improving the productivity of salt affected soils.

This book attempts to gather and discuss the information and technologies developed for the bioremediation and management of salt affected soils. The emphasis in this endeavour was on characterization, reclamation, microbial and vegetative bioremediation and management technologies for salt affected and waterlogged sodic soils. This book contains 14 chapters that highlight the significant environmental and social impacts of different ameliorative techniques for salt affected soils. Bioremediation, including phytoremediation approaches for managing saline, sodic and coastal waterlogged soils, is the major emphasis. Agronomic practices, including agroforestry at different scales, with case studies in India are also part of the book. The book summarizes and updates information about the distribution,

reactions, changes in bio-chemical properties and microbial ecology of salt affected soils in India that can be useful globally. Furthermore, it addresses the environmental and socio-economic impacts of reclamation programs with particular emphasis on the impacts on agricultural production and rehabilitation of degraded lands, vis-a-vis the economics of farmers. The decision-making process related to the reclamation and management of vast areas of salt affected soils involves considerations of the economic viability, environmental sustainability, and social acceptability of different approaches. The book contains the latest case studies and applied techniques of bioremediation of salt affected soils.

Overall, we hope the book facilitates future examinations of large scale adoptions of effective techniques by providing summaries of existing data and research related to the restoration of degraded lands through halophyte plant species, diversification of crops, and introduction of microbes for remediation of salt affected soils, and offering a framework for better understanding and identifying the future challenges.

We are thankful to the authors who are experts in their respective fields, and have written a comprehensive and valuable resource for researchers, academicians and students interested in the fields of soil science, environmental science, microbiology, remediation technology, and plant and soil stresses.

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