

PREFACE

Climatic change has emerged as a major environmental threat of the modern times. All the living forms irrespective fauna and flora have been affected by the rapid climatic changes seen during last few decades. Vegetation dynamics have shown drastic changes in response to altered climatic conditions. Rise in temperature, increase in concentration of carbon dioxide (a greenhouse gas), alteration in rainfall pattern and other related abiotic stresses such as drought/water scarcity, change in soil conditions and nutrient status have brought significant changes in the composition of terrestrial vegetation present all over the globe, while changes in the characteristics of water such as warming, increase in water level and turbidity, change in depth, nutrient loading and salinity produce profound changes in the aquatic plant communities and pose threat to wetlands. The effects on the growth and productivity of plants are mainly caused by changes in the physio-chemical characteristics of environment such as air, water and soil. The changes in the distribution of vegetation caused due to climatic changes can significantly affect the survival of other life forms dependent on them. Since vegetation forms a major and crucial part of ecosystem because it provides essential services such as food, habitat and shelter, hence it becomes mandatory that even slight changes caused by climatic variations should be assessed critically. The plant communities are supposed to show variable responses to climate change, hence each type of vegetation needs to be evaluated critically so that strategies can be developed and measures can be taken to save them from the threat of climate change. The genetic engineering technology and biotechnological approaches can prove as useful tool in raising plants with enhanced capacity for tolerating various abiotic and biotic stresses such as drought, salinity and flooding that might get induced by climate

change. The present book is an effort to provide information about responses of vegetation to climate change. The book provides information about the responses of various plant forms including trees, crop plants, weeds, grasses and aquatic macrophytes to major climatic changes such as rise in temperature, CO₂ seen during the last few decades and also evaluates the responses of plants to other related environmental stresses such as drought and changing soil status. The adaptive strategies that might play a significant role in escape and hence survival of plants under adverse climatic conditions has also been discussed. The vast information provided in this book will prove useful to researchers, students, ecologists and the whole scientific community working in the relevant area.

The present book provides vast information about the very recent topic of plant responses to climate change. Climate change has emerged as a major environmental constraint affecting the growth and survival of fauna and flora all over the globe. Vegetation forms a vital component of the ecosystem, and so any change in the plant species can lead to serious consequences on other life forms and alter the ecosystem composition, leading to ecological imbalance. Climatic alterations such as global warming, increase in atmospheric carbon dioxide concentration, and changes in the water availability due to alterations in precipitation pattern adversely affect the growth and distribution of vegetation. The present book is a compilation of the information and available literature regarding the changes in the plant forms responding to climate change. The book covers seven chapters. Chapter One discusses the response of different types of vegetation ranging from forest communities, grasslands, crop plants, weeds and aquatic plants. Separate chapters are allocated to each vegetation type so that detailed information about the topic can be included. The information provided in this book will provide challenges to the scientific community to find out ways to counter the negative effects of climate change on vegetation and suggest measures to protect them, as well as ensure their sustenance for future generations. The book will serve as a valuable reference resource for students, academia educationists, researchers and policy makers that have interest in the field of environmental sciences, plant sciences, agronomy, ecology and climate change.