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Genetic Engineering Intervention to Build Crop Plants for Combating Harsh Environments; 2.4.1 Transcription Factors; 2.4.2 bZIP Transcription Factors; 2.4.3 DREB/ERF Transcription Factors; 2.4.4 MYB Transcription Factors; 2.4.5 NAC Transcription Factors; 2.4.6 WRKY Transcription Factors; 2.4.7 ZF Transcription Factors; 2.5 Other Protein Respondents; 2.5.1 LEA Proteins; 2.5.2 Protein Kinases 2.5.3 Osmoprotectants (Osmolytes) 2.5.4 Polyamines and Stress Tolerance; 2.6 Conclusions; References; 3 Climate Change and Abiotic Stress Management in India; 3.1 Introduction; 3.2 Impact of Climate Change and Associated Abiotic Stresses on Agriculture; 3.2.1 Trend of Change and Impact on Agricultural Production; 3.2.2 Impact on Water and Soil; 3.2.2.1 Water; 3.2.2.2 Soil; 3.3 CSA: Technologies and Strategies; 3.3.1 Sustainable Productivity Enhancement; 3.3.2 Adaptation; 3.3.2.1 Rice-Wheat System; 3.3.2.2 Stress-Tolerant Varieties; 3.4 National Initiative on Climate Resilient Agriculture 3.4.1 Mitigation 3.5 Policy and Institutions; 3.5.1 Mainstreaming CSA in National Policy; 3.5.2 CSV; 3.5.3 Agricultural Insurance and Risk Management; 3.5.4 Information and Communication Technology for Climate Change Management; 3.6 Partnership; References; Part Two: Abiotic Stress Tolerance and Climate Change; 4 Plant Environmental Stress Responses for Survival and Biomass Enhancement; 4.1 Introduction; 4.2 Stomatal Responses in the Control of Plant Productivity; 4.2.1 ABA Biosynthesis and Transport; 4.2.2 Signal Mediation of Stomatal Aperture; 4.2.3 Guard Cell Development 4.3 Signaling and Transcriptional Control in Water Stress Tolerance 4.3.1 Signaling Mediation by Membrane-Localized Proteins; 4.3.2 Stress-Responsive Transcription; 4.3.3 Key Transcription Factors; 4.4 Protection Mechanisms of Photosynthesis During Water Stress; 4.5 Metabolic Adjustment During Water Stress; 4.5.1 Metabolomic Study of Primary Metabolites; 4.5.2 Cell Wall Compounds; 4.6 Future Perspective; References; 5 Heat Stress and Roots; 5.1 Roots, Heat Stress, and Global Warming: An Overview of the Problem; 5.2 Effects of Heat Stress on Root Growth and Root versus Shoot Mass and Function 5.2.1 Root Growth

Sommario/riassunto

In this ready reference, a global team of experts comprehensively cover molecular and cell biology-based approaches to the impact of increasing global temperatures on crop productivity. The work is divided into four parts. Following an introduction to the general challenges for agriculture around the globe due to climate change, part two discusses how the resulting increase of abiotic stress factors can be dealt with. The third part then outlines the different strategies and approaches to address the challenge of climate change, and the whole is rounded off by a number of specific examples