Climate Change and Food Security with Emphasis on Wheat is the first book to present the full scope of research in wheat improvement, revealing the correlations to global issues including climate change and global warming which contribute to food security issues. Wheat plays a key role in the health of the global economy. As the world population continuously increases, economies modernize, and incomes rise, wheat production will have to increase dramatically to secure it as a reliable and sustainable food source. Since covering more land area with wheat crops is not a sustainable option, future wheat crops must have consistently higher yields and be able to resist and/or tolerate biotic and abiotic stresses that result from climate change. Addressing the biophysical and socioeconomic constraints of producing high-yielding, disease-resistant, and good quality wheat, this book will aid in research efforts to increase and stabilize wheat production worldwide. Written by an international team of experts, Climate Change and Food Security with Emphasis on Wheat is an excellent resource for academics, researchers, and students interested in wheat and grain research, especially as it is relevant to food security. Covers a wide range of disciplines, including plant breeding, genetics, agronomy, physiology, pathology, quantitative genetics and genomics, biotechnology and gene editing. Explores the effect of climate change on biotic stresses (stripe rust, stem rust, leaf rust, Karnal bunt, spot blotch) on wheat production and utilization of biotechnology. Focuses on whole genome sequencing and next-generation sequencing technologies to improve wheat quality and address the issue of malnutrition in developing world. This title includes a number of Open Access chapters. Climate change will severely impact the world’s food supply unless steps are taken to increase crop resilience. Otherwise, the negative effects on both the yield and the quality of crop plants are predicted to be immense. Plant genomics is a potentially powerful defense against this looming threat. This compendium volume offers a global perspective on the topic, with contributions from 42 eminent researchers from 12 nations around the world. The editor is a respected and published scientist in the bioinformatics field, who has chosen articles in the following topics: An overview of the genetic challenges presented by climate change A genomic toolkit for crop-related research Specific
methods of improvement for specific crop by means of genomic applications. The hand-picked up-to-date research makes this volume an excellent reference not only for university-level academics, but also for policymakers and stakeholders who must tackle the challenge of the world’s food security. This book explores the impact of climate change on agriculture and our future ability to produce the crops which are the foundation of the human diet. Specifically, individual chapters explore the potential for genomics assisted breeding of improved crops with greater yield and tolerance to the stresses associated with predicted climate change scenarios. Given the clear and unmet challenge to mitigate climate changing events, this book will be of wide interest from plant breeders and environmental scientists, government bodies through to a more general audience who are interested in the likely impact of climate change on agriculture.

The soybean is an economically important leguminous seed crop for feed and food products that is rich in seed protein (about 40 percent) and oil (about 20 percent); it enriches the soil by fixing nitrogen in symbiosis with bacteria. Soybean was domesticated in northeastern China about 2500 BC and subsequently spread to other countries. The enormous two major challenges to continued global food security are the ever increasing demand for food products, and the unprecedented abiotic stresses that crops face due to climate change. Wild relatives of domesticated crops serve as a reservoir of genetic material, with the potential to be used to develop new, improved varieties of crops. Crop Wild Relative and Climate Change integrates crop evolution, breeding technologies and biotechnologies, improved practices and sustainable approaches while exploring the role wild relatives could play in increasing agricultural output. Crop Wild Relative and Climate Change begins with overviews of the impacts of climate change on growing environments and the challenges that agricultural production face in coming years and decades. Chapters then explore crop evolution and the potential for crop wild relatives to contribute novel genetic resources to the breeding of more resilient and productive crops. Breeding technologies and biotechnological advances that are being used to incorporate key genetic traits of wild relatives into crop varieties are also covered. There is also a valuable discussion on the importance of conserving genetic resources to ensure continued successful crop production. A timely resource, Crop Wild Relative and Climate Change will be an invaluable resource for the crop science community for years to come.

Written by researchers representing six countries and 28 institutions, this book highlights the development of the genus Populus as a model organism for tree genomics. Reflecting an impressive depth of coverage, the contributors’ thorough reviews and analyses of Populus genomics provide insight into future discoveries about the basic biology of this fascinating genus and paves the way for applied breeding and genetic improvement of poplars. This book reviews the latest advances in multiple fields of plant biotechnology and the opportunities that plant genetics, genomics and molecular biology have offered for agriculture improvement. Advanced technologies can dramatically enhance our capacity in understanding the molecular basis of traits and utilizing the available resources for accelerated development of high yielding, nutritious, input-use efficient and climate-smart crop varieties. In this book, readers will discover the significant advances in plant genetics, structural and functional genomics, trait and gene discovery, transcriptomics, proteomics, metabolomics, epigenomics, nanotechnology and analytical & decision support tools in breeding. This book appeals to researchers, academics and other stakeholders of global agriculture. This book highlights modern methods and strategies to improve cereal crops in the era of climate change, presenting the latest advances in plant molecular mapping and genome sequencing. Spectacular achievements in the fields of molecular breeding, transgenics and genomics in the last three decades have facilitated revolutionary changes in cereal- crop-improvement strategies and techniques. Since the genome sequencing of rice in 2002, the genomes of over eight cereal crops have been sequenced and more are to follow. This has made it possible to decipher the exact nucleotide sequence and chromosomal positions of agroeconomic genes. Most importantly, comparative genomics and genotyping-by-sequencing have opened up new vistas for exploring available biodiversity, particularly of wild crop relatives, for identifying useful donor genes. Forage crops include several species of grasses and legumes that are widely used as animal fodder in the form of hay, pasturage and silage, as well as for turf and erosion control. Some forage grasses are also being considered for bio-energy generation.
book leading researchers review the latest advances in molecular genetics and genomics; they also examine the success of breeding programs for forage grasses and legume species. The book will be useful for students and young researchers with an interest in forage, turf and bio-energy crops improvements.

Eucalypts are used for the production of paper products, firewood, charcoal, potential feedstocks for bioenergy and biomaterials, as ornamentals and landscape trees, and in land rehabilitation. Eucalypt breeding is at an early stage with many plantings being only at the first stages of domestication. The relatively small genomes of these species make the application of molecular genetics approaches attractive. The application of modern genomics will accelerate the development of improved eucalypts for a wide range of uses. This book brings together diverse information on the genetics, genomics, and breeding of these important forest species.

This volume covers the advances in the study of tomato diversity and taxonomy. It examines the mapping of simple and complex traits, classical genetics and breeding, association studies, molecular breeding, positional cloning, and structural and comparative genomics. The contributors also discuss transcriptomics, proteomics, metabolomics, and bioinformatics. The information in this book will be useful to researchers working on other Solanaceous crops as well as those interested in using the tomato as a model crop species.

Climate change is expected to have a drastic impact on agronomic conditions including temperature, precipitation, soil nutrients, and the incidence of disease pests, to name a few. To face this looming threat, significant progress in developing new breeding strategies has been made over the last few decades. The second volume of Genomics and Breeding for Climate-Resilient Crops describes various genomic and breeding approaches for the genetic improvement of the major target traits. Topics covered include: flowering time; root traits; cold, heat and drought tolerance; water use efficiency; flooding and submergence tolerance; disease and insect resistance; nutrient use efficiency; nitrogen fixation; carbon sequestration; and greenhouse gas emissions. This edited book provides a comprehensive overview of modern strategies in fruit crop breeding in the era of climate change and global warming. It demonstrates how advances in plant molecular and genomics-assisted breeding can be utilized to produce improved fruit crops with climate-smart traits. Agriculture is facing a number of challenges in the 21st century, as it has to address food, nutritional, energy and environmental security. Future fruit varieties must be adaptive to the varying scenarios of climate change, produce higher yields of high-quality food, feed, and fuel and have multiple uses. To achieve these goals, it is imperative to employ modern tools of molecular breeding, genetic engineering and genomics for ‘precise’ plant breeding to produce ‘designed’ fruit crop varieties. This book is of interest to scientists working in the fields of plant genetics, genomics, breeding, biotechnology, and in the disciplines of agronomy and horticulture.

International authors review achievements, new developments, trends and challenges in the field of plant mutation breeding, across the scientific community and the private sector. Chapters highlight specific challenges, such as emerging transboundary threats to crop production, and assess the overall importance of mutation breeding to food security.”–Breeding Oilseed Crops for Sustainable Production: Opportunities and Constraints presents key insights into accelerating the breeding of sustainable and superior varieties. The book explores the genetic engineering/biotechnology that has played a vital role in transforming economically important traits from distant/wild species to cultivated varieties, enhancing the quality and quantity of oil and seed yield production. Integrated nutrient management, efficient water management, and forecasting models for pests diseases outbreaks and integrated pest and pest management have also added new dimensions in breeding for sustainable production. With the rise in demand, the scientific community has responded positively by directing a greater amount of research towards sustainable production both for edible and industrial uses. Covering the latest information on various major world oil crops including rapeseed mustard, sunflower, groundnut, sesame, oilpalm, cotton, linseed/flax, castor and olive, this book brings the latest advances together in a single volume for researchers and advanced level students. Describes various methods and systems to achieve sustainable production in all major oilseed crops Addresses breeding, biology and utilization aspects simultaneously including those species whose information is not available elsewhere Includes information on modern biotechnological and molecular techniques and production technologies Relevant for international
government, industrial and academic programs in research and developmentGlobal population is mounting at an alarming stride to surpass 9.3 billion by 2050, whereas simultaneously the agricultural productivity is greatly affected by climate changes resulting in increased biotic and abiotic stresses. The genus Brassica belongs to the mustard family whose members are known as cruciferous vegetables, cabbages or mustard plants. Rapeseed-mustard is world’s third most important source of edible oil after soybean and oil palm. It has worldwide acceptance owing to its rare combination of health promoting factors. It has very low levels of saturated fatty acids which make it the healthiest edible oil that is commonly available. Apart from this, it is rich in antioxidants by virtue of tocopherols and phytosterols presence in the oil. The high omega 3 content reduces the risk of atherosclerosis/heart attack. Conventional breeding methods have met with limited success in Brassica because yield and stress resilience are polygenic traits and are greatly influenced by environment. Therefore, it is imperative to accelerate the efforts to unravel the biochemical, physiological and molecular mechanisms underlying yield, quality and tolerance towards biotic and abiotic stresses in Brassica. To exploit its fullest potential, systematic efforts are needed to unlock the genetic information for new germplasms that tolerate initial and terminal state heat coupled with moisture stress. For instance, wild relatives may be exploited in developing introgressed and resynthesized lines with desirable attributes. Exploitation of heterosis is another important area which can be achieved by introducing transgenics to raise stable CMS lines. Doubled haploid breeding and marker assisted selection should be employed along with conventional breeding. Breeding programmes aim at enhancing resource use efficiency, especially nutrient and water as well as adoption to aberrant environmental changes should also be considered. Biotechnological interventions are essential for altering the biosynthetic pathways for developing high oleic and low linolenic lines. Accordingly, tools such as microspore and ovule culture, embryo rescue, isolation of trait specific genes especially for aphid, Sclerotinia and alternaria blight resistance, etc. along with identification of potential lines based on genetic diversity can assist ongoing breeding programmes. In this book, we highlight the recent molecular, genetic and genomic interventions made to achieve crop improvement in terms of yield increase, quality and stress tolerance in Brassica, with a special emphasis in Rapeseed-mustard.Due to their diversity, vegetable Brassicas are of great economic import and offer unique opportunities to enrich our knowledge about plant growth, development, and rapid phenotypic evolution. By applying emerging genomic technologies, we may greatly increase our understanding of the Brassica biology and breeding efficiency. This volume contains 11 chapters contributed by 34 specialists with extensive experience in genetics, molecular breeding, and genomics of vegetable Brassicas. Recent achievements and new technologies presented in this book will provide support to further research the genetics and genomics of vegetable Brassica crops and facilitate their genetic improvement.Developing Climate-Resilient Crops: Improving Global Food Security and Safety is timely, as the world is gradually waking up to the fact that a global food crisis of enormous proportions is brewing. Climate change is creating immense problems for agricultural productivity worldwide, resulting in higher food prices. This book elucidates the causative aspects of climate modification related to agriculture, soil, and plants, and discusses the relevant resulting mitigation process and also how new tools and resources can be used to develop climate-resilient crops. Features: Addresses the limits of the anthropogenic global warming theory advocated by the Intergovernmental Panel on Climate Change Presents the main characters (drought tolerance, heat tolerance, water-use efficiency, disease resistance, nitrogen-use efficiency, nitrogen fixation, and carbon sequestration) necessary for climate-resilient agriculture Delivers both theoretical and practical aspects, and serves as baseline information for future research Provides valuable resource for those students engaged in the field of environmental sciences, soil sciences, agricultural microbiology, plant pathology, and agronomy Highlights factors that are threatening future food productionSorghum is one of the hardiest crop plants in modern agriculture and also one of the most versatile. Its seeds provide calorie for food and feed, stalks for building and industrial materials and its juice for syrup. This book provides an in-depth review of the cutting-edge knowledge in sorghum genetics and its applications in sorghum breeding. EachMusa is one of three genera in the family of Musaceae. Over 50 species of Musa exist, including bananas and plantains. This book
assembles the latest information on the genomic research of this genus. A group of leading experts in Musa genetics, genomics, and breeding provide basic as well as advanced information for those interested in learning more about the banana genome. The accessible style is easily understood by students and researchers, making the book an ideal springboard for those looking to do expanded research into this crop. Sequencing of the maize genome has opened up new opportunities in maize breeding, genetics and genomics research. This book highlights modern trends in development of hybrids, analysis of genetic diversity, molecular breeding, comparative and functional genomics, epigenomics and proteomics in maize. The use of maize in biofuels, phytoremediation andWith contributions by internationally reputed researchers in the field, this book presents the implications of the genomic revolution for conifers—promoting a better understanding of the evolution of these organisms as well as new knowledge about the molecular basis of quantitative trait variation. Both of these discoveries play important roles in their domestication. Topics include cytogenetics, patterns of nucleotide diversity, genetic mapping, integration of molecular markers in breeding, transcriptomics, advances in proteomics and metabolomics in gymnosperms, and economic importance.Recent interest in the health-related, culinary, and biological properties of berries is stimulating new initiatives in berry breeding and production. Breakthroughs in molecular technologies allow genomics-enabled approaches to augment research efforts. This volume documents the basic botany and culture of four major berry crops and follows the scientific milestones that have ushered these systems into the modern genomics era. Leading researchers in each crop system detail the recent findings in genetics, genomics, and breeding that seek to improve sustainable cultivation, fruit quality, and availability. Peanut, an amphidiploid, is an important food and oil crop and has an interesting evolutionary history. This book provides a glimpse of the advances in genetic resources and genomics research of peanut made during the last decade. It contains an overview of germplasm, advances in genetic and genomic resources, genetic and trait mapping, proteomic and transcriptomic analyses, functional and comparative genomics studies, and molecular breeding applications. This book should prove useful to students, teachers, and young researchers as a ready reference to the latest information on peanut genetics and genomics. The oil palm is a remarkable crop, producing around 40% of the world’s vegetable oil from around 6% of the land devoted to oil crops. Conventional breeding has clearly been the major focus of genetic improvement in this crop. A mix of improved agronomy and management, coupled with breeding selection have quadrupled the oil yield of the crop since breeding began in earnest in the 1920s. However, as for all perennial crops with long breeding cycles, oil palm faces immense challenges in the coming years with increased pressure from population growth, climate change and the need to develop environmentally sustainable oil palm plantations. In Oil Palm: Breeding, Genetics and Genomics, world leading organizations and individuals who have been at the forefront of developments in this crop, provide their insights and experiences of oil palm research, while examining the different challenges that face the future of the oil palm. The editors have all been involved in research and breeding of oil palm for many years and use their knowledge of the crop and their disciplinary expertise to provide context and to introduce the different research topics covered. Climate change affects agricultural productivity worldwide. Increased prices of food commodities are the initial indication of drastic edible yield loss, which is expected to increase further due to global warming. This situation has compelled plant scientists to develop climate change-resilient crops, which can withstand broad-spectrum stresses such as drought, heat, cold, salinity, flood, submergence and pests, thus helping to deliver increased productivity. Genomics appears to be a promising tool for deciphering the stress responsiveness of crop species with adaptation traits or in wild relatives toward identifying underlying genes, alleles or quantitative trait loci. Molecular breeding approaches have proven helpful in enhancing the stress adaptation of crop plants, and recent advances in high-throughput sequencing and phenotyping platforms have transformed molecular breeding to genomics-assisted breeding (GAB). In view of this, the present review elaborates the progress and prospects of GAB for improving climate change resilience in crops, which is likely to play an ever increasing role in the effort to ensure global food security. This book presents state-of-the-art, authoritative chapters on contemporary issues in the broad areas of quantitative genetics,
genomics and plant breeding. Section 1 (Chapters 2 to 12) emphasizes the application of genomics, and genome and epigenome editing techniques, in plant breeding; bioinformatics; quantitative trait loci mapping; and the latest approaches of examining and exploiting genotype-environment interactions. Section 2 (Chapters 13 to 20) represents the intersection of breeding, genetics and genomics. This section describes the use of cutting-edge molecular breeding and quantitative genetics techniques in wheat, rice, maize, root and tuber crops and pearl millet. Overall, the book focuses on using genomic information to help evaluate traits that can combat biotic/abiotic stresses, genome-wide association mapping, high-throughput genotyping/phenotyping, biofortification, use of big data, orphan crops, and gene editing techniques. The examples featured are taken from across crop science research and cover a wide geographical base.

Plant Perspectives to Global Climate Changes: Developing Climate-Resilient Plants reviews and integrates currently available information on the impact of the environment on functional and adaptive features of plants from the molecular, biochemical and physiological perspectives to the whole plant level. The book also provides a direction towards implementation of programs and practices that will enable sustainable production of crops resilient to climatic alterations. This book will be beneficial to academics and researchers working on stress physiology, stress proteins, genomics, proteomics, genetic engineering, and other fields of plant physiology. Advancing ecophysiological understanding and approaches to enhance plant responses to new environmental conditions is critical to developing meaningful high-throughput phenotyping tools and maintaining humankind’s supply of goods and services as global climate change intensifies. Illustrates the central role for plant ecophysiology in applying basic research to address current and future challenges for humans. Brings together global leaders working in the area of plant-environment interactions and shares research findings. Presents current scenarios and future plans of action for the management of stresses through various approaches. This book highlights modern strategies and methods to improve oilseed crops in the era of climate change, presenting the latest advances in plant molecular breeding and genomics-driven breeding. Spectacular achievements in the fields of molecular breeding, transgenics and genomics in the last three decades have facilitated revolutionary changes in oilseed crop-improvement strategies and techniques. Since the genome sequencing of rice, as the first crop plant, in 2002, the genomes of about one dozen oilseed crops have been sequenced and more are to follow. This has made it possible to decipher the exact nucleotide sequence and chromosomal positions of agroeconomic genes. Most importantly, comparative genomics and genotyping-by-sequencing have opened up new vistas for exploring available biodiversity, particularly of wild crop relatives, for identifying useful donor genes. This Special Issue on molecular genetics, genomics, and biotechnology in crop plant breeding seeks to encourage the use of the tools currently available. It features nine research papers that address quality traits, grain yield, and mutations by exploring cytoplasmic male sterility, the delicate control of flowering in rice, the removal of anti-nutritional factors, the use and development of new technologies for non-model species marker technology, site-directed mutagenesis and GMO regulation, genomics selection and genome-wide association studies, how to cope with abiotic stress, and an exploration of fruit trees adapted to harsh environments for breeding purposes. A further four papers review the genetics of pre-harvest spouting, readiness for climate-smart crop development, genomic selection in the breeding of cereal crops, and the large numbers of mutants in straw lignin biosynthesis and deposition. Climate change is expected to have a drastic impact on agronomic conditions including temperature, precipitation, soil nutrients, and the incidence of disease pests, to name a few. To face this looming threat, significant progress in developing new breeding strategies has been made over the last few decades. The first volume of Genomics and Breeding for Climate-Resilient Crops presents the basic concepts and strategies for developing climate-resilient crop varieties. Topics covered include: conservation, evaluation and utilization of biodiversity; identification of traits, genes and crops of the future; genomic and molecular tools; genetic engineering; participatory and evolutionary breeding; bioinformatics tools to support breeding; funding and networking support; and intellectual property, regulatory issues, social and political dimensions. Peppers and eggplants are two leading vegetable crops produced and consumed worldwide. To facilitate the breeding for agronomical traits such as disease resistance and quality, diverse
molecular genetic studies have been carried out. Recent achievements on pepper genome sequencing and trait-linked marker development have enabled the cloning of genes involved in useful traits. This book explores the agronomical and evolutionary characteristics of peppers and eggplants and the results of molecular genetic studies. Topics include molecular linkage maps and candidate gene approaches in capsicum and the structure of the pepper genome. This book reviews modern strategies in the breeding of vegetables in the era of global warming. Agriculture is facing numerous challenges in the 21st century, as it has to address food, nutritional, energy and environmental security. Future vegetable varieties must be adaptive to the varying scenarios of climate change, produce higher yields of high-quality food and feed and have multiple uses. To achieve these goals, it is imperative to employ modern tools of molecular breeding, genetic engineering and genomics for 'precise' plant breeding to produce 'designed' vegetable varieties adaptive to climate change. This book is of interest to scientists working in the fields of plant genetics, genomics, breeding, biotechnology, and in the disciplines of agronomy and horticulture.

Grapevine is a highly valuable crop worldwide, both from a cultural as well as a commercial point of view. One of its major advantages is that it is well adapted to scarce water conditions. The main object of grapevine breeding is to develop varieties that are resistant to pathogens and at the same time well-adapted to a changing environment. Since the beginning of the 21st century, there has been a concerted effort by the international scientific community to develop genomic tools and resources for grapevine, culminating in its complete genome sequence. The book reviews these efforts and their usefulness for grapevine breeding and viticulture improvement.

The sunflower has fascinated mankind for centuries. The oilseed sunflower contributes approximately ten percent of the world’s plant-derived edible oil and the confection type sunflower holds a considerable share of the directly consumed snacks market. In addition, sunflower is also grown as an ornamental for cut flowers, as well as in home gardens. We are now embarking on the age of genomics which will expedite the process of genetic improvement of crops. There has been an explosion of information on genetic markers, DNA sequences, and genomic resources for most major food crops including sunflower. This volume is intended to bridge traditional research with modern molecular investigations on sunflower.

This book describes the current state of international grape genomics, with a focus on the latest findings, tools and strategies employed in genome sequencing and analysis, and genetic mapping of important agronomic traits. It also discusses how these are having a direct impact on outcomes for grape breeders and the international grape research community. While V. vinifera is a model species, it is not always appreciated that its cultivation usually requires the use of other Vitis species as rootstocks. The book discusses genetic diversity within the Vitis genus, the available genetic resources for breeding, and the available genomic resources for other Vitis species. Grapes (Vitis vinifera spp. vinifera) have been a source of food and wine since their domestication from their wild progenitor (Vitis vinifera ssp. sylvestris) around 8,000 years ago, and they are now the world’s most valuable horticultural crop. In addition to being economically important, V. vinifera is also a model organism for the study of perennial fruit crops for two reasons: Firstly, its ability to be transformed and micropropagated via somatic embryogenesis, and secondly its relatively small genome size of 500 Mb. The economic importance of grapes made V. vinifera an obvious early candidate for genomic sequencing, and accordingly, two draft genomes were reported in 2007. Remarkably, these were the first genomes of any fruiting crop to be sequenced and only the fourth for flowering plants. Although riddled with gaps and potentially omitting large regions of repetitive sequences, the two genomes have provided valuable insights into grape genomes. Cited in over 2,000 articles, the genome has served as a reference in more than 3,000 genome-wide transcriptional analyses. Further, recent advances in DNA sequencing and bioinformatics are enabling the assembly of reference-grade genome references for more grape genotypes revealing the exceptional extent of structural variation in the species.

In this volume, world leaders in potato research review historical and contemporary discoveries resulting in a range of advances. Topics include nutritional quality, yield, disease and insect resistance, processing, plant growth and development, and other aspects. The book also examines research yielding significant molecular resources that facilitate the abiotic stresses like drought, temperature, cold, salinity, heavy metals etc. affect a great deal
on the yield performance of the agricultural crops. To cope up with these challenges, plant breeding programs world-wide are focussing on the development of stress tolerant varieties in all crop species. Significant genomic advances have been made for abiotic stress tolerance in various crop species in terms of availability of molecular markers, QTL mapping, genome-wide association studies (GWAS), genomic selection (GS) strategies, and transcriptome profiling. The broad-range of articles involving genomics and breeding approaches deepens our existing knowledge about complex traits. The chapters are written by authorities in their respective fields. This book provides comprehensive and consolidated account on the applications of the most recent findings and the progress made in genomics assisted breeding for tolerance to abiotic stresses in many important major crop species with a focus on applications of modern strategies for sustainable agriculture. The book is especially intended for students, molecular breeders and scientists working on the genomics-assisted genetic improvement of crop species for abiotic stress tolerance. Climate Change and Crop Stress: Molecules to Ecosystems expounds on the transitional period where science has progressed to ‘post-genomics’ and the gene editing era, putting field performance of crops to the forefront and challenging the production of practical applicability vs. theoretical possibility. Researchers have concentrated efforts on the effects of environmental stress conditions such as drought, heat, salinity, cold, or pathogen infection which can have a devastating impact on plant growth and yield. Designed to deliver information to combat stress both in isolation and through simultaneous crop stresses, this edited compilation provides a comprehensive view on the challenges and impacts of simultaneous stresses. Presents a multidisciplinary view of crop stresses, empowering readers to quickly align their individual experience and perspective with the broader context Combines the mechanistic aspects of stresses with the strategic aspects Presents both abiotic and biotic stresses in a single volume Copyright code : c76a2f8e8bd6f271a23339b4e1c78607