



Tsugihiko Watanabe • Selim Kapur •
Mehmet Aydın • Rıza Kanber • Erhan Akça
Editors

Climate Change Impacts on Basin Agro-ecosystems



Climate Change Impacts on Basin Agro-ecosystems

- ❑ The chapters of this book are based on the outcomes of a Turkish-Japanese bilateral project ICCAP “Impacts of Climate Change on Agricultural Production in Arid Area”, dealing with the impacts of climate change on a basin agro-ecosystem.
- ❑ The book provides unique knowledge for the developing world, and has been updated with more recent information.
- ❑ The chapters are related to:
 - a) the development and improvement of a regional climate model for more accurate prediction with higher resolution of future changes in regional climate,
 - b) the structure of land and water management in agricultural production systems in arid areas, especially to evaluate quantitatively the relationships between cropping systems, the hydrological cycle and water balance in farmland and its environs,
 - c) the assessment of impacts of climate change and adaptations on agricultural production systems, mainly with regard to land and water management, and
 - d) the vulnerability of agricultural production systems to natural changes and the measures for enhancing the sustainability of agriculture.

Contents

1 An Integrated Approach to Climate Change Impact Assessment on Basin Hydrology and Agriculture

Tsugihiko Watanabe, Takanori Nagano, Rıza Kanber and Selim Kapur

Part I: Projections of Future Climate Change

2 Climate Change Projection over Turkey with a High-Resolution Atmospheric General Circulation Model

Akio Kitoh

3 Development of Precise Precipitation Data for Assessing the Potential Impacts of Climate Change

Akiyo Yatagai, Vinay Kumar and T.N. Krishnamurti

4 The Atmospheric Moisture Budget over the Eastern Mediterranean Based on the Super-High-Resolution Global Model – Effects of Global Warming at the End of the 21st Century

Pinhas Alpert and Fengjun Jin

Contents

Part II: Climate Change Impacts on Basin Hydrology and Agricultural Water Management

5 Impacts of Climate Change on Basin Hydrology and the Availability of Water Resources

Kenji Tanaka, Yoichi Fujihara, Fatih Topaloğlu, Slobodan P. Simonovic and Toshiharu Kojiri

6 Evaluation of the Impact of Climate Changes in the Lower Seyhan Irrigation Project Area, Turkey

Keisuke Hoshikawa, Takanori Nagano, Takashi Kume and Tsugihiko Watanabe

7 Adaptation of Contemporary Irrigation Systems to Face the Challenges of the Future Climate Changes in the Mediterranean Region: A Case Study of the Lower Seyhan Irrigation System

Rıza Kanber, Mustafa Ünlü, Burçak Kapur, Bülent Özekici and Sevgi Donma

Part III: Climate Change Impacts on Land Use and Vegetation

8 Impacts of Agriculture on Coastal Dunes and a Proposal for Adaptation to Climate Change: The Case of the Akyatan Area in the Seyhan Delta

Tuluhan Yılmaz, Didem Harmanci, Yüksel Ünlükaplan, Levent Tezcan and Hakan Alphan

9 Estimating Spatio-Temporal Responses of Net Primary Productivity to Climate Change Scenarios in the Seyhan Watershed by Integrating Biogeochemical Modelling and Remote Sensing

Suha Berberoğlu, Fatih Evrendilek, Cenk Dönmez and Ahmet Çilek

10 Prediction of Vertical and Horizontal Distribution of Vegetation Due to Climate Change in the Eastern Mediterranean Region of Turkey

Junji Sano, Shigenobu Tamai, Makoto Ando and Tuluhan Yılmaz

11 Climate Change and Animal Farming

Nazan Koluman (Darcan), Hasan Rüştü Kutlu and İnanç Güney

Part IV: Climate Change Impacts on Soil-Water and Crop Interactions

12 Interactive Effects of Elevated CO₂ and Climate Change on Wheat Production in the Mediterranean Region

Burcak Kapur, Mehmet Aydın, Tomohisa Yano, Müjde Koç and Celaleddin Barutçular

13 Enhanced Growth Rate and Reduced Water Demand of Crops Due to Climate Change in the Eastern Mediterranean Region

Jiftah Ben-Asher, Tomohisa Yano, Mehmet Aydın and Axel Garcia y Garcia

14 Sensitivity of Reference Evapotranspiration and Soil Evaporation to Climate Change in the Eastern Mediterranean Region

Mehmet Aydın, Tsugihito Watanabe and Selim Kapur

Part V: Climate Change Impacts on Regional Agricultural Production

15 The Role of Efficient Management of Water Users Associations for Adapting to Future Water Scarcity under Climate Change

Chieko Umetsu, Sevgi Donma, Takanori Nagano and Ziya Coşkun

16 An Econometric and Agro-meteorological Study on Rain-fed Wheat and Barley in Turkey under Climate Change

Hiroshi Tsujii and Ufuk Gultekin

17 Response of Farm Households to Climate Change with Social Customs on Female Labour Participation in the Mediterranean Region of Turkey

Takeshi Maru and Motoi Kusadokoro

18 Cost Impact of Climate Change on Agricultural Production in Turkey

Nejat Erk, Sinan Fikret Erk and İnanç Güney

On the Editors

On the Authors

Climate Change Impacts on Basin Agro-ecosystems

- This book elaborates on the methodologies for the assessment of climate change impacts on agricultural production and adaptation.
- In this book, the concepts and processes of an integrated approach are outlined, and its application in a case project is introduced.
- The approaches described in the chapters would be applicable in different situations and could be improved with experience and the introduction of advanced techniques.