

Preface

Climate change poses an immense challenge to governments, societies and entities. Evidence collated by the Intergovernmental Panel on Climate Change (IPCC) depicts a grim picture of the trends in climate variables. These indicate an unprecedented rise in global average land and ocean temperatures, the melting of glaciers, rising sea levels, increased frequency and intensity of natural calamities, and so on. If current lifestyles and economic activities continue, average global air temperature is likely to rise by between 2 and 4.5 °C or even more by the end of this century. If this happens it will have disastrous consequences on ecosystems, species, lives and livelihoods. Poor and marginalized people, developing countries and small island states are most vulnerable to the risks posed by climate change. Climate change may also lead to transboundary conflicts (e.g. over access to and use of shrinking water resources) or movement of environmental refugees. Greenhouse gas (GHG) emissions, especially those of CO₂ caused by anthropogenic factors, are held responsible for global warming. Atmospheric concentration of carbon dioxide crossed 400 ppm in 2015 compared with 280 ppm during the pre-industrial period. If these trends persist there is a 50 per cent risk of a global temperature increase of 5 °C by the end of this century. Temperature rise also won't be even over the globe, and hot and semi-arid regions might even witness rises of above 5 °C. The Stern Review of 2007 suggests that, with a 5–6 °C warming, an average of 5 to 10 per cent loss in global GDP is possible, with poor countries suffering losses of more than 10 per cent of GDP. Keeping the average rise in global temperature to below 2 °C above pre-industrial levels, and if possible below 1.5 °C above pre-industrial levels, has been accepted as a goal by 195 countries that approved the Paris Climate Agreement in December 2015. However, prospects for this are dim given the current pledges for reducing emission levels.

In this context it is important for governments, societies and entities to build resilience to face the risks posed by climate change and extreme weather events. This book seeks to address the challenges and opportunities in building a climate resilient economy and society. The chapters included in this volume cover a broad range of topics, such as: vulnerability, adaptation and resilience; challenges and prospects for building climate

resilience in different sectors such as agriculture, marine ecosystems, urban areas, drought prone areas, and energy; carbon pricing and financing; REDD+; climate policies and governance; and so on. The chapters include those that have a global or regional focus as well as case studies drawn from a cross-section of countries in Africa, Asia, Europe and North America. The contributors to this book are leading experts from around the world who have made a significant contribution to the literature in this area. Some of them have also been part of IPCC Assessments. For convenience, the discussion in the book is organized in three parts: I, 'Vulnerability, adaptation and resilience'; II, 'Climate resilience: Sectoral perspectives'; and III, 'Incentives, governance and policy'.

At the outset we would like to express our sincere thanks to all the contributing authors for readily responding to our invitation to contribute a chapter to this book, and for putting up with our frequent emails reminding them about the timely submission of their chapters and revised chapters in the light of reviewers' comments, as well as responding to our queries and clarifications. But for their unstinted cooperation and support this volume would not have been possible.

The book has undergone a rigorous review process. Besides the editors, most chapters were reviewed by two or more reviewers. We are extremely grateful to the following contributing authors for sparing their valuable time and giving several useful comments on the chapters. They are: Patrick ten Brink, Anandi van Diepen, Carlo Fezzi, Ced Hesse, Craig Johnson, Abrar Juhar Mohammed, Dominic Moran, Architesh Panda, Ramón Pichs-Madruga, Vivek Shandas, U. Rashid Sumaila, David Timmons, Clem Tisdell and Jackson Voelkel. In addition to the contributing authors, we are also grateful to the following external reviewers for reviewing the chapters and giving several suggestions and comments which were useful to the authors for improving the rigor and quality of their chapters. They are: Luke Brander (IVM, Amsterdam), M.G. Chandrakanth (University of Agricultural Sciences, Bangalore), Johane Dikgang (University of Johannesburg), Charles Howe (Colorado State University), Rohit Jindal (MacEwan University, Canada), Elumalai Kannan (JNU, New Delhi), K.S. Kavi Kumar (MSE, Chennai), Andreas Kontoleon (Cambridge University), Parmod Kumar (ISEC, Bangalore), Eric Mungatana (University of Pretoria), Sunil Nautiyal (ISEC, Bangalore), Jyothi Parikh (Iraed, New Delhi), M.V. Ramana (Princeton University), Jyothis Satyapalan (CESS, Hyderabad) and David Simpson (US EPA, Washington).

We are also grateful to the following authors and publishers (Nature Publishing Group and Elsevier) for permission to publish the following articles in this book:

- Fezzi, C., A.R. Harwood, A.A. Lovett and I.J. Bateman (2015), 'The environmental impact of climate change adaptation on land use and water quality', *Nature Climate Change*, **5**, 255–260, doi:10.1038/nclimate2525.
- Panda, A., U. Sharma, K.N. Ninan and A. Patt (2013), 'Adaptive capacity contributing to improved agricultural productivity at the household level: Empirical findings highlighting the importance of crop insurance', *Global Environmental Change*, **23**, 782–790.
- Costanza, R. (2015), 'Claim the sky!', *Solutions*, January–February, 18–21.

We are most grateful to Sir Robert T. Watson for finding time to write a foreword to this book. His dedication and leadership in the IPCC earlier and now in the IPBES have been an inspiration for many.

Finally we would like to express our sincere thanks to Edward Elgar Publishing for readily agreeing to publish this book and to the editors and entire Edward Elgar staff for the unstinted support provided for publishing this book.

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