
Sustainable Development Goals Series

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World leaders adopted Sustainable Development Goals (SDGs) as part of the 2030 Agenda for Sustainable Development. Providing in-depth knowledge, this series fosters comprehensive research on the global targets to end poverty, fight inequality and injustice and tackle climate change.

Sustainability of Future Earth is currently a major concern for the global community and has been a central theme for a number of major global initiatives viz. Health and Well-being in Changing Urban Environment, Sendai Framework for Disaster Risk Reduction 2015–2030, COP21, Habitat III and Future Earth Initiative. Perceiving the dire need for Sustainable Development, the United Nations and world leaders formulated the SDG targets as a comprehensive framework based on the success of the Millennium Development Goals (MDGs). The goals call for action by all countries, poor, rich and middle-income, to promote prosperity while protecting the planet earth and its life support system. For sustainability to be achieved, it is important to have inputs from all sectors, societies and stakeholders. Therefore, this series on the Sustainable Development Goals aims to provide a comprehensive platform to the scientific, teaching and research communities working on various global issues in the field of geography, earth sciences, environmental science, social sciences and human geosciences, in order to contribute knowledge towards the current 17 Sustainable Development Goals.

Volumes in the Series are organized by the relevant goal, and guided by an expert international panel of advisors. Contributions are welcome from scientists, policy makers and researchers working in the field of any of the following goals:

- No poverty
- Zero Hunger
- Good Health and Well-Being
- Quality Education
- Gender Equality
- Clean Water and Sanitation
- Affordable and Clean Energy
- Decent Work and Economic Growth
- Industry, Innovation and Infrastructure
- Reduced Inequalities
- Sustainable Cities and Communities
- Responsible Consumption and Production
- Climate Action
- Life Below Water
- Life on Land
- Peace, Justice and Strong Institutions
- Partnerships for the Goals

The theory, techniques and methods applied in the contributions will be benchmarks and guide researchers on the knowledge and understanding needed for future generations. The series welcomes case studies and good practices from diverse regions, and enhances the understanding at local and regional levels in order to contribute towards global sustainability.

More information about this series at <http://www.springer.com/series/15486>

Suraj Mal · R.B. Singh
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Climate Change, Extreme Events and Disaster Risk Reduction

Towards Sustainable Development
Goals

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Foreword

Climate Change, Extreme Events, and Disaster Risk Reduction is a timely publication in view of the threats the world is facing today due to climate change and related extreme events and the well-coordinated counterefforts against them, such as Sendai Framework for Disaster Risk Reduction (SFDRR) 2015–2030.

Global climate change is well-established now, as revealed by such international organizations as ICSU, IPCC, and WMO. It has led to the occurrence of many types of extreme events across the world, most important being hydrological and climatic ones. These extreme events have further posed varying levels of threats to lives and livelihoods at global, regional, and local levels. They require multi-level planning linking international agencies such as United Nations and national and local level bodies for disaster risk reduction.

In fact, the quest for disaster risk reduction started way back in 1989, when UN declared the 1990s as the International Decade for Natural Disaster Reduction (IDNDR). The efforts were further taken at international level in 1999 with the establishment of International Strategy for Disaster Reduction (ISDR). The program was adopted by UN and thereafter called UNISDR.

This book is a valuable contribution to the United Nations Sustainable Development Goal (SDG) of Climate Action as well as UNISDR and SFDRR. It contains 20 chapters covering a range of extreme events including hydrological and climatological ones, and their coping mechanisms and strategies across the world. It consists of two sections, viz. 1) Evidence of Climate Change and Extreme Events, and 2) Coping with Extreme Events and Disasters, comprising most relevant case studies from different regional and ecological settings.

Therefore, this book is highly recommended to policy makers, academics, researchers, and disaster managers for enhancing their understanding in the linkages between climate change, their impacts, and risk reduction.

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Preface

The Earth's climate has experienced an accelerated warming of 0.85 °C during the last century, which has resulted in modification of ecosystem processes and occurrences of many extreme events across the globe, including extreme temperatures (cold and hot weather) and rainfall (floods and droughts). Glacial lake out-burst flood events have become quite common in many vulnerable ecosystems such as mountain, coastal, and developing regions of the world. Besides these extreme events, long-term climate change is influencing worldwide glacier recession, sea-level rise, modifications to river regimes, soil erosion and sediment deposition, a reduction in agricultural yield, food security, and vegetation patterns and greenness, etc. These are among the major and visible changes. The level of income, education, health facilities, etc., have further contributed to the vulnerability of poor and developing nations to these extreme events, which have often led to significant damage to local economies, infrastructures, and populations. About 12,000 natural disasters were reported during 1970–2014 across the world (UN-ESCAP 2015), of which hydro-climatic disasters (floods and storms) represent the greater share. Though losses per disaster have declined over the years, due to marginally improved preparedness, coping mechanisms, and disaster responses, an increasing number of disasters have further exposed large populations in less developed countries. More than 1.6 million people have died due to disasters during 1990–2013, of which more than 95% of deaths occurred in developing countries (UNISDR, 2015; IPCC, 2012).

Therefore, in order to cope with extreme events and reduce associated damage, many steps have been taken at the international level, which are well coordinated by the United Nations, etc. The International Decade for Natural Disaster Reduction (IDNDR) (1990–1999) was one of the first international initiatives, which was further developed to form the International Strategy for Disaster Reduction (ISDR) in 1999. The ISDR was adopted by the UN and subsequently called UNISDR. There have been three landmark international conferences dealing with disasters, namely: the 1st World Conference on Natural Disaster Reduction at Yokohama in 1994; the 2nd World Conference on Disaster Reduction at Hyogo in 2005; and the 3rd International Conference on Disaster Risk Reduction (DRR) at Sendai in 2015, which adopted three international landmark frameworks including the Yokohama Strategy (1994), the Hyogo Framework for Action (2005), and the Sendai Framework

(2015), respectively. Besides these, 2015 is considered as one of the most important years for DRR because three important initiatives were taken up during this year, namely, the Sendai Framework, the Sustainable Development Goals, and the Paris Climate Agreement (Poterie and Baudoin 2015; Kelman 2015).

This book focuses on the above stated international efforts as well as considering local case studies. The book contains two parts: Evidence of Climate Change and Extreme Events; and Coping with Extreme Events and Disasters. Chapter 1 summarizes the most important international initiatives, followed by 10 case studies dealing with evidence of climate change and extreme events. Part II contains 9 case studies focusing on coping mechanisms and disaster response. Therefore, the book represents a contribution towards the UN's Sustainable Development Goals and the Sendai Framework of DRR. The book is additionally useful for those involved in DRR research as well as policy makers—such as disaster management authorities, etc.

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