**Disaster Risk Reduction**
Methods, Approaches and Practices

Joy Jacqueline Pereira
Mohd Khairul Zain
Rajib Shaw *Editors*

# Climate Change Adaptation in Southeast Asia

Springer

# Disaster Risk Reduction

## Methods, Approaches and Practices

**Series Editor**

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## About the Series

Disaster risk reduction is a process that leads to the safety of communities and nations. After the 2005 World Conference on Disaster Reduction, held in Kobe, Japan, the Hyogo Framework for Action (HFA) was adopted as a framework for risk reduction. The academic research and higher education in disaster risk reduction has made, and continues to make, a gradual shift from pure basic research to applied, implementation-oriented research. More emphasis is being given to multi-stakeholder collaboration and multi-disciplinary research. Emerging university networks in Asia, Europe, Africa, and the Americas have urged process-oriented research in the disaster risk reduction field. With this in mind, this new series will promote the output of action research on disaster risk reduction, which will be useful for a wide range of stakeholders including academicians, professionals, practitioners, and students and researchers in related fields. The series will focus on emerging needs in the risk reduction field, starting from climate change adaptation, urban ecosystem, coastal risk reduction, education for sustainable development, community-based practices, risk communication, and human security, among other areas. Through academic review, this series will encourage young researchers and practitioners to analyze field practices and link them to theory and policies with logic, data, and evidence. In this way, the series will emphasize evidence-based risk reduction methods, approaches, and practices.

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ISSN 2196-4106 ISSN 2196-4114 (electronic)
Disaster Risk Reduction
ISBN 978-981-16-6087-0 ISBN 978-981-16-6088-7 (eBook)
https://doi.org/10.1007/978-981-16-6088-7



This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd.
The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

# Foreword

The ASEAN Working Group on Climate Change (AWGCC) and the ASEAN-India Green Fund supported the project on "Enhancing Local Level Climate Change Adaptation in Southeast Asia" (Phase 1) to conduct a needs assessment and scoping study of ASEAN Member States (AMS) with respect to climate change adaptation and to develop a regional climate change adaptation work programme and network. Administered by the ASEAN Secretariat, the initial phase of the ASEAN-India Green Fund Project consisted of an inception workshop and a final planning workshop, with the needs assessment and scoping study in between. I had the pleasure of jointly leading the Project with Prof. Joy Jacqueline Pereira from Universiti Kebangsaan Malaysia's Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM).

The Inception Workshop on Enhancing Climate Change Adaptation was held in February 2015 in Bangi, Selangor in Malaysia, and the Final Planning Workshop was held in October 2015 in Manila, The Philippines. Representatives of the National Focal Points of the AWGCC participated in both the workshops. The final report on needs assessment and scoping study and establishment of the ASEAN Partner Institutions on Climate Change Adaptation (ASEANadapt) was endorsed by the AWGCC in 2016. Since then, all ASEAN Member States have ratified the Paris Agreement and communicated their Nationally Determined Contributions (NDCs) to the United Nations Framework Convention on Climate Change (UNFCCC).

I am proud to note that members of the ASEANadapt have continued to collaborate over the years to advance local level climate change adaptation in the region, with support from SEADPRI-UKM, the Asian Network on Climate Science and Technology (ANCST) and other partners. Members exchange information on good practices and communication on a regular basis and several have engaged with the Intergovernmental Panel on Climate Change (IPCC). Clearly, the capacity of researchers in the region is expanding. This book is an outcome of that continuous collaboration. It provides a current snapshot of science, policy and challenges related to climate change adaptation in the region. The findings of the stakeholder consultations that were conducted in each AMS under the ASEAN-India Green Fund Project have highlighted potential local level pilots for further funding. This is now more relevant in the post-Paris Agreement context and fast changing climate change scenario.

In 2018, the IPCC reported that Southeast Asia is projected to be challenged by extreme climate temperatures and precipitation as well as disaster risks associated with this change. Climate change and disaster risk reduction tend to be deliberated separately in international platforms. This has contributed to the disconnect that is currently prevalent in national systems within the region. The reality is that at the local level, the issues are interlinked and connected to sustainable development. We are all aware that there are many adaptation options that can benefit and be synergistic with climate change mitigation and also serve disaster risk reduction. By focusing on the local level, as done by each AMS under the ASEAN-India Green Fund Project, there is an opportunity to implement integrated responses that link these aspects as well as other societal objectives related to sustainable development. We have laid a foundation for AMS to be a resilient and sustainable. This book is a valuable one-stop resource that documents our efforts. I would like to personally complement Prof. Joy Jacqueline Pereira for providing leadership and coordinating ASEANadapt beyond the ASEAN-India Green Fund Project.

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Project Leader, ASEAN-India Green
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# Preface

Climate change adaptation is a means to adjust to the long-term impacts of climate change, while disaster risk reduction is critical for managing the near-term effects of climate variability. Both climate change adaptation and disaster risk reduction are essential for building community resilience. Climate change adaptation can be enhanced through complementary actions across all levels, from national, state or provincial governments to local administrations. Stakeholder engagement is critical at all levels. The role of national governments is to provide strong coordination for adaptation efforts at the sub-national levels and ensure that all relevant stakeholders are engaged at each stage. National governments can facilitate adaptation actions by providing a comprehensive policy framework, legal support, adequate resources and appropriate information. Local governments, academia, civil society, non-government organizations and the private sector have to play an increasingly important role in advancing climate change adaptation and linking it to disaster risk reduction.

This book has 11 chapters where the first chapter provides an overview of climate change and key linkages to disaster risk reduction in Southeast Asia, while the remaining chapters offer a snapshot of the status of science and policy in each of the ASEAN Members States (AMS) in this context. Each chapter spotlights national policies relevant to climate change adaptation, linkages to disaster risk reduction, vulnerable ecosystems and regions, key measures, priority sectors and challenges in the respective countries. Information from government documents have been supplemented with material from scientific publications. Findings of the stakeholder consultations to delineate adaptation priorities in the respective AMS, which was conducted under the ASEAN-India Green Fund Project on "Enhancing Climate Change Adaptation in Southeast Asia" (Phase 1), are also highlighted. Pilots that were proposed for further funding in each of the AMS are also documented.

The Editors would like to record their gratitude to the ASEAN Working Group on Climate Change, ASEAN-India Green Fund Project Leader from India, Prof. N. H. Ravindranath and the Government of India for their contribution and engagement in enhancing climate change adaptation in Southeast Asia. The support of the ASEAN Secretariat, Asian Network on Climate Science and Technology (ANCST),

Asia Pacific Network for Global Change Research (APN), Asian Science, Technology and Academic Group (ASTAAG), Indian Institute of Science Bangalore (IISc. Bangalore), Universiti Kebangsaan Malaysia's Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM) and other partners, in convening capacity building workshops is also acknowledged. The following reviewers are thanked for their assistance: Prof. Vinod K. Sharma (Indian Institute of Public Administration), Dr. Raman Letchumanan (formerly of the ASEAN Secretariat), Dr. Sugeng Triutomo (Indonesia Defense University), Ms. Antonia Yulo Loyzaga (Manila Observatory), Dr. Takako Izumi (Association of Pacific Rim Universities, APRU), Prof. Shi Peijun (UN-ISDR Asia Science Technology Academia Advisory Group, ASTAAG).

The book is written for students, researchers, academics, policymakers and development practitioners in the field of climate change adaptation and disaster risks studies. We hope that they will find the book beneficial and relevant to their work.

Kuala Lumpur, Malaysia — Joy Jacqueline Pereira
Kuala Lumpur, Malaysia — Mohd Khairul Zain
Kanagawa, Japan — Rajib Shaw

# About This Book

This book provides an overview of climate change adaptation in ten ASEAN Members States (AMS). The chapters have been prepared by members of the ASEAN Partner Institutions on Climate Change Adaptation (ASEANadapt). The ASEANadapt resulted from the ASEAN-India Green Fund Project on "Enhancing Climate Change Adaptation in Southeast Asia" (Phase 1), an initiative under the aegis of the ASEAN Working Group on Climate Change (AWGCC) managed by the ASEAN Secretariat.

The book draws on government documents and scientific publications to spotlight national policies relevant to climate change adaptation, linkages to disaster risk reduction, vulnerable ecosystems and regions, key measures, priority sectors and challenges. Adaptation priorities were delineated through stakeholder consultations in the respective AMS and potential pilots have been highlighted for funding.

Covering aspects of climate change adaptation and disaster risks, this book is a valuable one-stop resource on the status of science and policy in Southeast Asia for students, researchers, academics, policymakers and development practitioners, who will be able to apply the knowledge for informed decision-making.

# Contents

# Editors and Contributors

## About the Editors

**Dr. Joy Jacqueline Pereira** is a professor and Principal Research Fellow at Universiti Kebangsaan Malaysia's Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM) and Fellow of the Academy of Sciences Malaysia. In 2015, she was elected as Working Group II Vice-Chair of IPCC Task Force Bureau. Prof. Pereira was Coordinating Lead Author for the Asia Chapter of the Intergovernmental Panel on Climate Change Fifth Assessment Report (IPCC-AR5) released in March 2014; Review Editor for the 2012 IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (IPCC-SREX); and Lead Author for the IPCC-AR5 Synthesis Report. She is also a Member of the United Nations Office for Disaster Risk Reduction (UNDRR) Asia Pacific Science, Technology and Academic Group (APSTAAG); and Director of the Asian Network on Climate Science and Technology (ANCST). Prof. Pereira has graduated over 40 doctoral and masters candidates and published over two hundred peer-reviewed articles.

**Mohd Khairul Zain** is a Senior Science Officer at Universiti Kebangsaan Malaysia's Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM). He is currently involved in research projects related to disaster risk reduction. He also actively provides input, technical advice and support in the formulation of various government actions and negotiations at national, regional and international platforms. In 2013, Mr. Khairul became involved in the formulation of country's National Platform and Action Plan for Disaster Risk Reduction (MyDRR), which serves to integrate disaster risk reduction and climate change adaptation, engage communities and build resilience at the local level. Mr. Khairul coordinates the ASEAN Partner Institutions on Climate Change Adaptation (ASEANadapt) and founded U-INSPIRE Malaysia, a platform to empower Malaysian youth and young professionals in science, engineering, technology and innovation; to build disaster resilience at the national, regional and global levels.

**Dr. Rajib Shaw** is a professor in Graduate School of Media and Governance in Keio University's Shonan Fujisawa Campus (SFC). Earlier, he was the Executive Director of the Integrated Research on Disaster Risk (IRDR). He is also the Senior Fellow of Institute of Global Environmental Strategies (IGES) Japan and the Chairperson of SEEDS Asia, a Japanese NGO. Previously, he served as a Professor in the Graduate School of Global Environmental Studies of Kyoto University. He is the editor of a book series on disaster risk reduction, published by Springer, and is the Chair of UN ISDR's Global Science Technology Advisory Group (Global STAG) and a Co-chair of UN ISDR's Asia Pacific Science Technology Academic Advisory Group (APSTAAG). Prof. Shaw is also Coordinating Lead Author for the Asia Chapter of the Intergovernmental Panel on Climate Change Sixth Assessment Report (IPCC-AR6). He has published more than 40 books and over 300 academic papers and book chapters.

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