



**DISASTER RISK, RESILIENCE,
RECONSTRUCTION AND RECOVERY**

SERIES EDITORS: HELEN JAMES · ANNA LUKASIEWICZ

Disaster Risk Reduction in Asia Pacific

Governance, Education and Capacity

Edited by

Helen James · Rajib Shaw · Vinod Sharma
Anna Lukasiewicz



palgrave
macmillan

Disaster Risk, Resilience, Reconstruction and Recovery

Series Editors

Helen James, Australian National University, Canberra, ACT, Australia
Anna Lukasiewicz, Disaster Risk Science Institute, Australian National
University, Canberra, ACT, Australia

This Palgrave Macmillan book series takes an interdisciplinary integrated approach to disaster risk, resilience and reconstruction. It brings together the multi-disciplinary expertise in the physical sciences and social sciences necessary for effective disaster risk reduction and recovery. With a broad focus on disaster risk science and sustainability, the series affords significant attention to those areas of the world which experience large scale societal and economic losses from disaster events. It includes disasters arising from climate change impacts and those from geological processes and tectonic movements, poor governance and emergency management practices. It takes into account both rural and urban environments in developing and developed countries and the ecological impacts of disasters.

By taking an integrated approach to the four research communities – poverty alleviation, development, climate change and disasters – this series brings new perspectives to the global disaster policy and practice communities. The series connects people and technology and examines the roles and contributions of multiple stakeholders across scale and their interactions with policy development and implementation. It provides significant inclusion of and acknowledgment of the importance of indigenous knowledge and cultural practices in shaping disaster risk reduction from numerous countries. By bringing together the multiple facets of disaster preparedness, response, recovery and reconstruction, the series opens new vistas on achieving reduced societal and economic losses from disasters around the world.

The series was founded by Prof. Helen James of the Disaster Risk Science Institute, at the Australian National University.

More information about this series at
<https://link.springer.com/bookseries/16455>

Helen James · Rajib Shaw · Vinod Sharma ·
Anna Lukasiewicz
Editors

Disaster Risk Reduction in Asia Pacific

Governance, Education and Capacity

palgrave
macmillan

Editors

Helen James
Disaster Risk Science Institute
Australian National University
Canberra, ACT, Australia

Vinod Sharma
Indian Institute of Public
Administration
New Delhi, Delhi, India

Rajib Shaw
Graduate School of Media &
Governance
Keio University
Fujisawa, Japan

Anna Lukasiewicz
Institute for Climate, Energy &
Disaster Solutions
Australian National University
Canberra, ACT, Australia

ISSN 2662-5660

ISSN 2662-5679 (electronic)

Disaster Risk, Resilience, Reconstruction and Recovery

ISBN 978-981-16-4810-6

ISBN 978-981-16-4811-3 (eBook)

<https://doi.org/10.1007/978-981-16-4811-3>

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer
Nature Singapore Pte Ltd. 2022

This work is subject to copyright. All rights are solely and exclusively licensed by the
Publisher, whether the whole or part of the material is concerned, specifically the rights
of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on
microfilms or in any other physical way, and transmission or information storage and
retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology
now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc.
in this publication does not imply, even in the absence of a specific statement, that such
names are exempt from the relevant protective laws and regulations and therefore free for
general use.

The publisher, the authors and the editors are safe to assume that the advice and informa-
tion in this book are believed to be true and accurate at the date of publication. Neither
the publisher nor the authors or the editors give a warranty, expressed or implied, with
respect to the material contained herein or for any errors or omissions that may have been
made. The publisher remains neutral with regard to jurisdictional claims in published maps
and institutional affiliations.

Cover illustration: @FC_Italy/Alamy Stock Photo

This Palgrave Macmillan 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

Series Dedication

The *Disaster Risk, Resilience, Reconstruction and Recovery* book series is dedicated to the late Prof Helen James, who is its founding editor. Helen was an internationally ranked expert on Southeast Asia, especially Thailand and Myanmar. She was a true polymath, blending knowledge from a wide range of disciplines and always seeking practical solutions. She believed that collaboration—between disciplines, nationalities and institutions was the only way to advance knowledge and she built an international community of scholars and practitioners who are dedicated to preventing and mitigating disasters.



Prof. Helen James (1947–2020)

This series takes an interdisciplinary, integrated approach to disaster risk, resilience and reconstruction. It brings together the multi-disciplinary expertise in the physical sciences and social sciences necessary for effective disaster recovery. With a broad focus on disaster risk science and sustainability, the series is global in scope and includes disasters arising from climate change impacts and those from geological processes and tectonic movements, poor governance and emergency management practices. It provides significant inclusion of and acknowledgment of the importance of Indigenous knowledge and cultural practices in shaping disaster risk reduction from numerous countries. By bringing together the multiple facets of disaster preparedness response, recovery and reconstruction, the series will open new vistas on achieving reduced societal and economic losses from disasters around the world.

CONTENTS

1	Disaster Risk Reduction and Resilience: Practices and Challenges in Asia Pacific	1
	Rajib Shaw, Helen James, Vinod Sharma, and Anna Lukasiewicz	
Part I Governance		
2	Policy Learning for Disaster Risk Reduction	19
	Stephen Dovers	
3	Na Ara Ahurea: Envisioning Collaborative Governance in Disaster Risk Reduction in Aotearoa	37
	Christine M. Kenney	
4	Improving Multi-Agency Governance Arrangements for Preparedness Planning and Response: Implementing the <i>Integrated Approach</i> in Australia	55
	Alan Ryan	

5	‘Blackfella Way, Our Way of Managing Fires and Disasters Bin Ignored but “Im Still Here”’: Australian Aboriginal Governance Structures for Emergency Management	71
	Bevlyne Sithole, David Campbell, and Steve Sutton with contributions from O. Campion, C. Brown, G. Daniels, A. Daniels, C. Brian, J. Campion, D. Yibarbuk, E. Phillips, G. Daniels, K. Daniels, B. Hedley, M. Radford, A. Campion, H. Hunter-Xenie, I. Sutton, and S. Pickering	
Part II Education and Capacity		
6	Facilitating Effective DRR Education and Human Survival: Intentionally Engaging the Transformative Education-Paradigm Shift Spiral	97
	Petra Buergelt and Douglas Paton	
7	All Singing from the Same Song Sheet: DRR and the Visual and Performing Arts	123
	Douglas Paton, Petra Buergelt, Etan Pavavalung, Kirby Clark, Li-Ju Jang, and Grace Kuo	
8	High Expectations, Low Recognition: The Role of Principals and Teachers in Disaster Response and Recovery in the Asia-Pacific	147
	Carol Mutch	
9	Planning and Capability Requirements for Catastrophic and Cascading Events	175
	Andrew Gissing, Michael Eburn, and John McAneney	
10	Development and Implementation of Disaster Risk Management Specialization Program: Philippine School of Business Administration-Manila and Quezon City Government Collaboration Towards Sustainable Development Solutions	187
	Tabassam Raza, Jose F. Peralta, Thess Khaz S. Raza, and Carmelita R. E. U. Liwag	

Part III Science Technology, Risk Assessment, Communities

- | | | |
|-----------|---|------------|
| 11 | Vulnerability and Resilience Science: Concepts, Tools,
and Practice | 213 |
| | Susan L. Cutter | |
| 12 | Flood Hazards and Disciplinary Silos | 233 |
| | Robert J. Wasson and Daryl Lam | |
| 13 | Theorizing Disaster Communitas | 251 |
| | Steve Matthewman and Shinya Uekusa | |
| 14 | Use of Scientific Knowledge and Public Participation
in Disaster Risk Reduction and Response in the State
of Sikkim, India | 271 |
| | Vinod Sharma | |

Part IV Recovery

- | | | |
|-----------|--|------------|
| 15 | Post-Disaster Recoveries in Indonesia and Japan:
Building Back Better | 291 |
| | Minako Sakai | |
| 16 | Housing Continuum: Key Determinants Linking
Post-Disaster Reconstruction to Resilience
in the Long Term | 323 |
| | Mittul Vahanvati | |
| 17 | Disaster Risk Reduction and Recovery in Samoa | 347 |
| | Tautala Mauala | |
| 18 | Towards a Resilient Asia Pacific Region | 369 |
| | Vinod Sharma, Helen James, Rajib Shaw,
and Anna Lukasiewicz | |

- | | |
|--------------|------------|
| Index | 377 |
|--------------|------------|

NOTES ON CONTRIBUTORS

Assist. Prof. Petra Buergelt is a transdisciplinary social scientist. For over 15 years, she has been qualitatively exploring holistically, in-depth and cross-culturally the nexus between disaster risk reduction; Indigenous worldviews, knowledges and practices; and transformation to contribute to a paradigm shift.

David Campbell is an emergency management and educational specialist working extensively across the public and private sectors. He works on a range of projects and delivers programs that focus on building individual, team and community disaster and organizational resilience capabilities.

Kirby Clark completed her honours thesis on the relationship between song lyrics, disaster risk reduction and disaster recovery. She is now working as an organizational psychologist in Australia.

Prof. Susan L. Cutter has authored or edited 15 books, 150+ plus peer-reviewed articles and book chapters, and mentored more than 60 masters and doctoral candidates. Her research focuses on vulnerability and resilience science with specific reference to methods, models, and metrics.

Em Prof. Stephen Dovers focuses on the generic policy and institutional dimensions of sustainable development, disasters and climate adaptation, combining contemporary and historical perspectives, across a diverse range of sectors and issues including climate adaptation, emergency

management and disasters, biodiversity, water, urban studies, forests, coastal management and others.

Hon Assoc. Prof. Michael Eburn is the leading researcher in the area of emergency services, emergency management, and the law. He is the author or co-author of three books and has made over 80 other contributions as book chapters, journal articles, professional publications, and conference and professional development presentations. His blog, Australian Emergency Law, is widely read and respected throughout the sector.

Dr. Andrew Gissing is a Director of Risk Frontiers. He is an emergency and risk management expert. Andrew has performed senior executive roles in the emergency management and social services sectors, including as the Deputy Chief Officer of the Victoria State Emergency Service. He is an Adjunct Fellow of Macquarie University.

Dr. Li-Ju Jang is a professor of social work. She specializes in disaster social work. She has researched social impact and recovery following large scale disasters in Taiwan, including the 921 earthquake and Typhoon Morakot. She advises government and NGO agencies on DRR practices.

Professor Helen James was a specialist in Mainland Southeast Asia, especially Thailand and Myanmar (Burma). She has held academic appointments in a number of universities including the University of Pittsburgh, Thammasat and Chulalongkorn Universities, Bangkok, as well as the University of Canberra, the Australian Catholic University and The Australian National University.

Assoc. Prof. Christine M. Kenney is a Māori social scientist and researcher in disaster governance, risk reduction, recovery and resilience. She chairs the joint UNDRR/ISC/IRDR Indigenous science caucus and has expertise in research with Indigenous peoples and governments in Canada, Australia and New Zealand. Christine is also a contributing author to the GAR, and an expert advisor to the Warsaw International Mechanism for Loss and Damage.

Grace Kuo works develop and manage art exhibitions. She was involved in developing artworks covering disaster recovery in Linali Village in Taiwan and curating exhibitions of artworks addressing disaster recovery and environmental reintegration in displaced populations.

Dr. Daryl Lam is a waterway scientist who works with companies, academics and policy makers to address environmental concerns. Daryl specialized in locating and analyzing fluvial sedimentary evidence of palaeofloods but has worked across various environmental research and consultancy projects including urban hydrology, coastal processes, fluvial geomorphology, and flood management.

Prof. Carmelita R. E. U. Liwag is an Assistant Professor in the School of Urban and Regional Planning, University of the Philippines and an Adjunct Professor of PSBA, Manila. She has more than 20 years of local and international consultancy work experience in the field of Environmental Planning. She has locally and internationally published a substantial number of researches.

Dr. Anna Lukasiewicz researches issues at the interface of justice and natural resource management. This includes: working on concepts of social justice (resource distribution, decision-making processes, the environment as a stakeholder, and stakeholder-decision-maker interactions); as well as disaster justice (disaster management policy and disaster preparedness, mitigation, response and recovery).

Assoc. Prof. Steve Matthewman is an associate professor in Sociology at the University of Auckland. His current research focuses on the rebuilding of Christchurch following the 2010 and 2011 earthquakes. He is particularly interested in how a city gets put back together and what the barriers to building back better.

Tautala Mauala better known as Tala, has been the Secretary General for Samoa Red Cross Society (SRCS) for the past 20 years. She represents the SRCS on Samoa's Disaster Advisory Committee (DAC), Health Programs Advisory Council (HPAC) and the Steering Committee for Samoa's Water and Sanitation Sector.

Professor John McAneney is a Non-executive Director of Risk Frontiers, a company that models and prices natural catastrophe risks for the insurance and government sectors and advises on the management of such risks including adaptation to Global Climate Change. John was formerly the Managing Director of Risk Frontiers and oversaw its spin out from Macquarie University in 2017. His academic background is in physics and mathematics and has published over 100 peer-reviewed articles on different aspects of natural hazard risks and environmental physics. John

is also a novelist; you can find his books at https://www.amazon.com/John-McAneney/e/B008D2ZKUC/ref=aufs_dp_mata_dsk.

Prof. Carol Mutch is a professor of Critical Studies in Education in the Faculty of Education and Social Work. She is also the Education Commissioner for UNESCO New Zealand. Dr. Mutch came to The University of Auckland following many years as a primary teacher, teacher educator and policy advisor.

Prof. Douglas Paton researched cross-cultural theories of disaster readiness, response and recovery based on research mostly in the Asia Pacific region. The findings are used to develop community engagement and professional training programs for communities and for social services and emergency professions.

Etan Pavavalung is a Taiwanese aboriginal of Paiwan ethnicity. His artistic creations are diverse as he works with cloth, poetry, prose, graphic design, painting, carving, installation art and video recording. In terms of visual art, Etan has decided to use “line laying carving” as his personal style of expression.

Jose F. Peralta is President, CEO, CAO, and Dean of Undergraduate Studies and Graduate School of Business, PSBA-Manila. He has served the Rotary Club of San Juan District 3800 as Past District Governor. President Peralta has written books on accounting and done substantial researches. He has more than 50 years experience of Academic leadership.

Dr. Tabassam Raza is Dean (External Education) of Graduate School of Business (GSB) and Director of Disaster Risk Management Unit, GSB, PSBA- Manila, Philippines. He is also a Professor in UP-SURP and has more than 25 years of experience working internationally and locally as Government Adviser, Senior Director, Associate Dean, and Technical Director.

Thess Khaz S. Raza is an Environmental Management Specialist II, under Task Force on Solid Waste Management, Environmental Protection and Waste Management Department, Quezon City Government, Philippines. She has published a substantial number of Disaster Risk Reduction and Climate Change Adaptation research papers locally and internationally.

Dr. Alan Ryan is the Executive Director of the Australian Civil-Military Centre. He was previously the Principal of the Centre for Defence and Strategic Studies at the Australian Defence College. Prior to this appointment he was the Senior Adviser to the Minister for Defence.

Dr. Minako Sakai is an Associate Professor at the School of Humanities and Social Sciences, the University of New South Wales (UNSW) Canberra. Her research interests include just and fair development, disaster relief, gender, Islamic economy with a focus on Indonesia. She has co-edited *Disaster Relief in Asia Pacific* (Routledge).

Prof. Vinod Sharma is the First Professor of Disaster Management in India and one of the pioneers of DRR in South Asia. He is the Founder Coordinator of the National Centre of Disaster Management (now National Institute of Disaster Management). He was founder Chairman of SEEDS India from 1995 to 2020. He is a member of the National Science Technology and Innovation Policy 2020. He is also the Vice-Chair of the Sikkim State Disaster Management Authority.

Prof. Rajib Shaw apart from being a professor in Keio University, is also a Senior Fellow of the Institute of Global Environmental Strategies (IGES) Japan, and the Chairperson of SEEDS Asia and CWS Japan, two Japanese NGOs. He is also co-founder of a Delhi (India) based social entrepreneur startup Resilience Innovation Knowledge Academy (RIKA). His expertise includes disaster risk governance, technology and innovation, community-based disaster risk management, climate change adaptation, urban risk management, and risk communication.

Dr. Bevlyne Sithole is a social scientist and experienced participatory research practitioner who has worked in community development and action research for over 20 years. Her broader professional experience is informed by leadership roles key indigenous research and evaluation products undertaken with the Aboriginal Research Practitioners' Network (ARPNNet) which she founded in 2007.

Steve Sutton is a Ph.D. candidate at Charles Darwin University and directs a research project with the Bushfire and Natural Hazards CRC. His research focuses on enablers and barriers to effective preparation for natural hazard events, particularly in remote communities with limited service delivery from centralized government agencies.

Dr. Shinya Uekusa is an assistant professor in global studies at Aarhus University. His main research interests are in the sociology of disasters, particularly social vulnerability and resilience to disasters and climate change, focussing on the socially disadvantaged groups such as (im)migrants, refugees and linguistic minorities.

Dr. Mittul Vahanvati has done research which focuses on the theory and practice of resilience, both, after the disaster, through housing reconstruction projects, or pre-disaster, through resilience action planning and resilient public space design. She adopts community-led or co-production approaches. Her field of research sits at the intersection of built environment, human geography and sustainable design.

Prof. Robert J. Wasson is a geomorphologist with a Ph.D. from Macquarie University, and has held positions at the University of Auckland, the Australian National University (ANU), Charles Darwin University and the National University of Singapore. He has done research in Australia, New Zealand, Singapore, Indonesia, Timor-Leste, Malaysia, India, Nepal, Pakistan, China, Myanmar and Thailand.

LIST OF FIGURES

Fig. 3.1	Potential framework for Iwi engagement with CDEM regional disaster governance structures (<i>Source</i> Adapted from Resource Legislation Amendment Act, 2017)	44
Fig. 3.2	Draft Māori emergency management governance model showing potential relationships with other stakeholders (© This figure is not to be used or reproduced without the permission of the author Dr C. Kenney)	51
Fig. 5.1	Aboriginal leadership and decision-making structure	80
Fig. 5.2	Essential Aboriginal leadership skills	81
Fig. 5.3	Components identified as key knowledge areas for decision-making pathways	82
Fig. 7.1	A depiction of traditional Taiwanese beliefs regarding the cause of earthquakes (a) and a painting of depicting the relationship between traditional beliefs and an activity used to mitigate risk (b) (<i>Source</i> Douglas Paton)	132
Fig. 7.2	The wind on the slope is very fragrant (<i>Source</i> Etan Pavavalung, 2014)	136
Fig. 7.3	Labored breathing at another foothill (<i>Source</i> Etan Pavavalung, 2013)	137
Fig. 10.1	Ranking results of the candidate cities (<i>Source</i> Raza, 2015)	196
Fig. 10.2	Location of the Quezon City selected as pilot urban area (<i>Source</i> Raza, 2015)	196
Fig. 10.3	Institutional Coping Capacity of QCG Barangays, QCG and NGOs	197
Fig. 10.4	Institutional Adaptive Capacity	198

Fig. 10.5	Personnel Coping Capacity Level of QCG Barangays, QCG and NGOs	199
Fig. 10.6	Personnel Adaptive Capacity Level of QCG Barangays, QCG and NGOs	199
Fig. 10.7	Framework for Developing Formal Education Program (<i>Source</i> PSBA, 2017)	202
Fig. 11.1	SoVI® for the U.S. using 2010–2014 data by census tract (top) using a three-class categorization, and by county (bottom) using a five-class categorization	220
Fig. 11.2	SoVI® coupled with FEMA verified loss counts tells the story of where resources are needed to support flood recovery in the aftermath of the 2015 flooding in South Carolina (<i>Source</i> South Carolina Disaster Recovery Office [SCDRO], South Carolina Action Plan for Disaster Recovery [Columbia: South Carolina Department of Commerce, 2016, p. 18], https://www.sccommerce.com/sites/default/files/hud_submittal_action_plan_160719.pdf)	225
Fig. 14.1	Map of Sikkim	272
Fig. 14.2	Ruins of a house in 2011 earthquake	275
Fig. 14.3	Options for the post-disaster reconstruction in Sikkim of residential housing	276
Fig. 14.4	Layout of a typical house	278
Fig. 14.5	Earthquake-resistant features	280
Fig. 15.1	Map of case study sites	300
Fig. 15.2	Foundation Stone, an example funded by the Dompeth Dhuafa Foundation in the Merapi Slopes, listing the projects sponsored by the foundation	303
Fig. 15.3	Banner of a new snack (<i>keripik</i>) business placed along a major roadside	306
Fig. 15.4	Kesennuma City Mascot, Hoya Boya the Ocean Boy	310
Fig. 16.1	Detailed conceptual framework for post-disaster reconstruction and recovery projects in a spatial and temporal systems' context, with feedback (and feed-forward), loops between past experiences and future expectations. (<i>Source</i> Vahanvati 2017)	332

LIST OF TABLES

Table 2.1	Policy learning: who learns what and to what effect	23
Table 8.1	The role of schools in disaster preparedness, response and recovery	151
Table 8.2	Participants, settings and disaster types across the study	153
Table 10.1	Verbal interpretation of level of expertise	194
Table 11.1	Selected BRIC Scores by Capital and Change from 2010 to 2015	223
Table 16.1	Various meanings of the resilience concept—from the narrow to an integrated socio-ecological systems' interpretation	327
Table 16.2	Characteristics and dimensions of disaster resilience from a socio-ecological systems (SES) perspective	328
Table 16.3	A summary of multi-scalar reconstruction efforts post-2001 and 2008 disasters	335
Table 16.4	Short-term outcomes post-2001 and 2008 reconstruction efforts	337
Table 16.5	Long-term impacts of post-disaster reconstruction projects after 2001 and 2008 disasters, from SES resilience perspective	338
Table 16.6	A novel framework for ODHR projects to enhance the disaster resilience of communities in the long term	339
Table 17.1	Stakeholders' roles in prevention and preparedness	353
Table 17.2	Stakeholders' roles in response and recovery	357



Disaster Risk Reduction and Resilience: Practices and Challenges in Asia Pacific

*Rajib Shaw, Helen James, Vinod Sharma,
and Anna Lukasiewicz*

INTRODUCTION

The concept of disaster risk reduction has evolved over years. Back in 1990, when we had the first International Decade of Natural Disaster Reduction (IDNDR: 1990–1999), it was proposed as “international decade on hazard reduction” (as appeared in the proposal of Frank Press, then President of the National Academy of Sciences of USA, who proposed the decade). Also, the decade name was “natural disaster”. Two

R. Shaw
Keio University, Tokyo, Japan
e-mail: shaw@sfc.keio.ac.jp

H. James · A. Lukasiewicz (✉)
Australian National University, Canberra, ACT, Australia
e-mail: anna.lukasiewicz@anu.edu.au

V. Sharma
Indian Institute of Public Administration, New Delhi, India

concepts have been changed significantly: we do not reduce the hazard, rather, we reduce the risks or vulnerability. And, there is no “natural” disaster, we call it a natural hazard, and the consequence is a disaster. Also, the “disaster reduction” concept has evolved to disaster “risk” reduction, and gradually to resilience building. From one disaster, we now talk about systemic risks and cascading disasters, which is happening in different parts of the world. NATECH (natural hazards induced technological disaster) is also observed recently. Thus, the whole disaster risk reduction issues are becoming complex with climate change adaptation as well as biological hazards like the global pandemic COVID-19.

The Asia Pacific region always bears the maximum brunt of the disasters due to its higher population exposures as well as occurrences of different types of hazards. Urbanization rate in Asia Pacific is the highest in the world, and migration from rural and urban areas is very prominent. This adds to the already vulnerable and fragile urban ecosystem putting pressure on the system. Thus, while we talk about urban resilience, we need to think of urban rural collective resilience and ensure sustainable resource flow, be it food, water, energy, or human resources and livelihood supports.

This introductory chapter covers four parts which the book is divided into. Those are: disaster risk governance, education and capacity, science technology, and disaster recovery. These are four major pillars of different types of interventions in the Asia Pacific region.

DISASTER RISK GOVERNANCE

Disaster risk governance is one of the four Sendai priorities. At the national, regional, and global levels, it is very crucial for prevention, mitigation, preparedness, response, recovery, and rehabilitation. It also fosters collaboration and partnership. Risk governance depends on the legal and institutional aspects (Djalante et al., 2017; Pal & Shaw, 2017).

At the regional level, proper risk governance is quite challenging. It needs inter-governmental processes. Possibly two classic examples are that of ASEAN (Association of South East Asian Nations) and EU (European Union). All ten ASEAN Member States have law and policy frameworks for national disaster preparedness and response. However, there are varying types of disaster response systems in ASEAN Member States. It has been an important goal of ASEAN to share implementation of the ASEAN Agreement on Disaster Management and Emergency

Response (AADMER) through identifying and analyzing them individually and regionally in order to jointly respond to disasters. The adoption and implementation of AADMER has facilitated the enhancement of regional mechanisms on preparedness and response. “One ASEAN, One Response” was developed to build upon AADMER in order to have a collective strength of all stakeholders in ASEAN collaborating together during a natural disaster. Similarly, The EU Civil Protection Mechanism brings together a total of 34 countries: 27 EU Member States, 6 Participating States (Norway, Iceland, Montenegro, North Macedonia, Serbia, and Turkey), and the UK during the transition period. This European Civil Protection “family” shares operational challenges and similar approaches to managing disaster, while the structure and composition of emergency services in the 33 countries varies considerably from country to country.

In the national level, disaster management law/regulation is the key pillar of disaster risk governance. After the 2004 Indian Ocean Tsunami, most countries of the Asia Pacific region have introduced their national disaster management law/ legislation at the national level. Disaster Response fund has been set up in many countries. This is also related to the resource allocation, especially for the pre-disaster mitigation aspects. Philippines is a classic example where 5% off the budget from national to local can be used as calamity fund, which is usually post disasters, but can also be used for pre-disaster preparedness measures. Science-based decision making is another aspect of good risk governance. In different countries, there exist a science policy forum in the form of advisory group (Shaw, 2020).

At the local level, risk governance becomes critical, and there often exists a strong gap between the national and local level governance. Resources at the local government level becomes critical. As mentioned above, the Philippines is a great example of uniform local level resource distribution. Even in case of Japan, local governments, especially in the small cities and towns are resources constrained. Thus, the Japanese government has started a national resilience program, which enhances the capacities of the local governments through allocation of resources (DeWit et al., 2020). Capacity and trained professionals at the local governance is also a challenging issue. As per the Indonesian disaster management law, each local government needs to have a disaster risk reduction office, however availability of required numbers of trained professional is a challenge.

In the community level, community governance becomes an important issue (Shaw, 2014). Trust in the community, local leadership, participation of communities in different events become critical factors to enhance community governance. Indigenous or local governance does exist in different communities and become effective in case of disaster response as well as recovery.

EDUCATION AND CAPACITY

Disaster risk reduction education is a two-way learning process. For effective risk communication, there needs to be a balance of expert knowledge and local knowledge (Kikkawa, 1999). The end product is enhanced knowledge at both levels. The role of facilitators is also quite critical. Shiwaku et al. (2016) argued for experiential learning, and it is found that school community and home linkage is very important for disaster risk reduction education. Shaw and Oikawa et al. (2014) argued that education for sustainable development (ESD) and DRR education have lots of overlap, and both these concepts are linked to school community linkages. This has been also demonstrated in two cities namely Kesennuma and Kamaishi, where ESD and DRR education were implemented. Both these cities were affected by the Great East Japan Earthquake Tsunami of 2011, and no casualties in the schools were observed.

Disaster education (2009) discussed a model called KIDA (Knowledge Interest Desire Action) as a part of the disaster education model, where it is argued that the education is more as a process than a product, and DRR education can be a lifelong learning. In Japan, three types of help are considered important for DRR: self-help, mutual help, and public help. There is another help, called network help with links these three types of helps and make it workable for DRR actions. DRR education enhances these types of helps. Edutainment (education with entertainment) can also be used effectively to disaster education, which can be linked to songs, fold art, drama, music etc.

Higher education is another area which needs to be focused. Izumi et al. (2020) in a recent survey have highlighted the importance of higher education management, SOPs (standard operation procedures) and campus safety are important pillars of education continuity in case of the disaster. Campus safety programs help the students and teachers from different disciplines to enhance their understanding and perception on disaster risks and can facilitate risk reduction actions.

Capacity building or training for enhancing DRR skills is an integral part of education programs. There are several regional, national and local specialized agencies for capacity enhancement. Capacity enhancement needs for government officials, non-government professionals as well as corporate sector members. Community volunteers often play vital role before, during, and after disasters. Examples include local urban volunteers in many cities, fire volunteers, first aid and rescue volunteers, flood/forest volunteers etc. Enhancing the capacities of community volunteers is very critical.

SCIENCE TECHNOLOGY AND DISASTER RISK REDUCTION

Science and technology have been the core of DRR over many years. Shaw (2020) did a review of the evolution of science and technology in DRR over last thirty years. The year 2020 marks thirty years from the formal international disaster decade in 1990. Thus, it is argued that thirty year is a good number of years for a disciplinary evolution of the subject “disaster management”.

At the global, regional, and national level there exists advisory groups, which provide expert advices to the countries for evidence-based decision making. At the global level, the Science Technology Advisory Group (STAG) provides critical advices to the UN and other global bodies. At the regional level similar regional STAGs exist, and there are regional science technology conferences held with the presence of science technology and other related stallholders, including governments, UN agencies, media, non-government agencies, and private sectors. At the global level, in 2019, a Science and Technology Roadmap to Support the Implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030 was evolved, which includes four expected outcomes and 58 actions under four Priorities of Sendai Framework. There are specific governance-related actions which are linked to: (1) assessing and updating data and knowledge, (2) dissemination, (3) monitoring and review, and (4) capacity building. All these four outcomes become crucial elements of disaster risk governance, which is linked to enabling environment of technology development and its implementation.

At the national level, as mentioned in the governance section, national science technology advisory group exist. Malaysia is a classic example where the national disaster management agency is advised by a science

technology group at the apex level. In the Philippines, national government, academia, and private sectors form national resilience council. However, the key challenge is science technology advices in the local level, where the local governments and local research institutes/ university or specialized agency partnership is critical. Thus, for effective application of science and technology, a techno-legal regime is very much required (Shaw et al., 2017).

The role of new and emerging technologies in DRR is often discussed. Both the emerging and disruptive technologies play an important role. Japan put forward a vision of human centric technology-based society called “Society 5.0”, where the technology divide can be minimized through different types of disruptive technology usages (Mavrodieva & Shaw, 2020). Social innovation in disaster risk reduction is an area which needs additional support (SIOH, 2020). Several countries are supporting innovation or start-up ecosystem; however, these start-ups are mainly implemented in technology or education or health-based areas. DRR start-ups are still few in numbers, and they need proper supporting ecosystem with links to funding agencies, mentorship, market opening, etc. That would lead to new innovations in the field of disaster risk reduction.

POST DISASTER RECOVERY

While there has been extensive work to focus on pre-disaster mitigation and preparedness activities, post disaster recovery is the time, when significant attention is gained. Also, resources pour in after the disasters, new innovations happen, and new partnership is emerged. Thus, the recovery process becomes a pillar to future risk reduction activities, and disaster is often termed as a used or misused development opportunity (Shaw, 2013).

The key question is: even though lots of effort is put into disaster recovery programs, why have some communities carried out faster (in terms of time frame) and more satisfying (in terms of holistic and participatory) recovery programs while others have not? Where do such differences come from? There is possibly no straightforward answer, since it is a complex mixture of social, economic, religious, political, and other issues. Disaster recovery is thus, often characterized based on cultural aspects. People plays an important role in the recovery process, and it is community participation and ownership of the people which makes it

a sustainable recovery. Social capital plays an important role in disaster recovery. Nakagawa and Shaw (2004) in their landmark paper, compared two communities in Kobe and urged that the one with higher social capital, especially in terms of both bridging and bonding capital can be evolved as a better recovered community. Aldrich (2012) with empirical data from disasters showed that regardless of the quality of governance, different neighborhoods under the same leadership come back at different rates over the medium to a longer time.

During the negotiation period for the Sendai Framework, the concept of “Build Back Better” was proposed by the Japanese delegation as a holistic concept which states: “The principle of ‘Build Back Better’ is generally understood to use the disaster as a trigger to create more resilient nations and societies than before. This was through the implementation of well-balanced disaster risk reduction measures, including physical restoration of infrastructure, revitalization of livelihood and economy/industry, and the restoration of local culture and environment”. The concept was fully agreed as one of the most important concepts among each state’s delegates and embedded into the Sendai Framework. Thus, the focus on recovery has now become widely recognized as one of the four Sendai priorities.

There are different arguments on sustainable recovery or ecosystem-based recovery. In a recent intervention, Mukherjee et al. (2020) argued for an eco-centric recovery from COVID-19, and suggested ten principles under people, process, facility, and technologies. Cluster concept, graduated adoption, and scalability are suggested as three key pillars of eco-centric recovery.

Local governance plays the most critical role in recovery. It is the direct interface with the communities to incorporate their view and priorities. Often, local government officials themselves are the victims of the disasters, and often bear the brunt while supporting affected people. Capacity of local governments in post disaster scenarios often becomes a challenging issue. Local governments are also the focal points of media attention and have additional pressure to cope with the complex technical, social, political processes.

GLOBAL PANDEMIC AND RESILIENCE BUILDING

The global pandemic (COVID-19) has shaken the whole world from early 2020, with its deep impacts on every aspects of the society, impacting

all of the SDG (sustainable development goals). The Sendai Framework for Disaster Risk Reduction 2015–2030 reinforced the scope of disaster risk management by including biological hazards such as outbreaks, epidemics, and pandemics in addition to natural, technological and other hazards as a key area of focus for disaster risk management. The Sendai Framework (UN, 2015) also places a strong emphasis on resilient health systems through the integration of disaster risk management into health care provision at all levels. In particular, it aims “to enhance cooperation between health authorities and other relevant stakeholders to strengthen country capacity for disaster risk management for health.”

The Health Emergency and Disaster Risk Management (HEDRM) Framework of the World Health Organization (WHO, 2019) aims to provide a common language and a comprehensive approach that can be adapted and applied in health and other sectors for reducing health risks and consequences of emergencies and disasters. It is founded on the core principles of comprehensive emergency management, whole-of-health system, multi-sectoral and multi-disciplinary collaboration, people & community-centric, risk-based & all-hazards approach with due focus on ethical considerations. The International Conference on the Implementation of the Health Aspects of the Sendai Framework (held in Bangkok 2016) resulted in Bangkok Principles, which call for developing or revising multi-sectoral disaster risk reduction plans and policies to include the health sector. It also recommends greater participation of health sector representatives in disaster risk reduction platforms and committees at all levels.

Analysis of the past cases of pandemics and public health emergencies of international concern (PHEIC) and the experience of countries in managing COVID-19 point toward the need for evidence-based decision making supported by technology and innovations to develop early warning and risk assessment tools. The direct, indirect, and wider impacts of a health emergency are sector-specific and vary across economies. The COVID-19 pandemic will have a lasting impact on all aspects of development planning in the years to come. The pandemic brought into light the need for effective risk management to safeguard development and the implementation of the International Health Regulations (IHR), SDGs, the Sendai Framework, Paris Agreement, and New Urban Agenda as well as other global, regional, and national frameworks.

ABOUT THE BOOK

This book has nineteen chapters, including the introduction and conclusion, and the rest of the seventeen chapters are divided into four parts. Part 1 focuses on governance, Part 2 focuses on education and capacity, Part 3 on science technology, risk assessment, and community, and Part 4 on disaster recovery.

Part 1 has four chapters. Chapter 2 focuses on higher-order levels of policy making and general principles and approaches, rather than sub-national policies and local scale practice. However, national policies flow through or are translated into sub-national policies and therefore also to local governance and practice, so the topic of policy learning has implications for those finer scales. The chapter recognizes that although beyond scope of the chapter, but very important is the need to enable communication between scales of governance so that policy lessons are shared between scales of governance, and that such communication is two-way and not simply top down.

Chapter 3 addresses the challenges of disaster policy in New Zealand, creating the first comprehensive Māori disaster management theory and implementation framework. Research findings will innovate New Zealand's disaster management legislation and infrastructure through facilitating the development of a collaborative co-governance framework for managing disaster contexts. The proposed framework, the first partnership between a government and colonized Indigenous peoples to ensure effective disaster preparedness, management, and resilience throughout a nation state, will also be designed to align with core priorities outlined in the Sendai Framework for Disaster Risk Reduction.

Chapter 4 argues that the traditional hierarchical structure of the public sector, in Australia and elsewhere, was optimized for the circumstances of the Industrial Age and for a professional public service model that relied on the concentration of expertise in distinct departments of state. Contemporary pressures for multi-hazard risk reduction, resilience and crisis response require government, civil society, and private sector organizations to coordinate their efforts more effectively. Within the public sector, civilian, military, and police officers and officials must develop systems to build national preparedness, share information, and work across boundaries for both domestic and offshore contingencies. This chapter considers how the lessons of recent offshore operations are

shaping the effort to introduce the concept of the *Integrated Approach* in Australia.

Chapter 5 illustrates Australian aboriginal governance structure and emergency management through conducting participatory workshops. One of the prevailing themes in the workshop was the effectiveness of current governance frameworks and the extent to which they integrate Aboriginal ways of managing fires and disasters. Drawing on the outcomes from these consultative workshops, this chapter challenges the mainstream to gain a deeper understanding of the Blackfella way and become more creative in finding ways to integrate it within the existing governance frameworks or to go further and reconfigure the current systems to recognize and value existing systems.

Part 2 has five chapters on education and capacity. Chapter 6 focuses on the western concept and belief of relationships between humans and nature, disease, and “natural” disasters. It then explores how Indigenous worldviews encompass fundamental beliefs that facilitate ensuring that people live in harmony with nature, thus creating a valuable framework for embedding within the culture and society educational strategies and practices that foster the development of enduring harmonious socio-environmental relationships required for DRR. Living in harmony with nature, self and others, in turn, supports the development and application of DRR outcomes as a result of its fundamental focus on empowering people. The chapter concludes with a discussion of transformative educational pathways that could be adopted to facilitate the adoption of the empowering thinking and action that is implicitly evident in Indigenous beliefs and practices.

Chapter 7 explores one possibility; the potential for the performing (song) and visual arts, prominent socio-cultural media for communication and engagement in all countries, to complement existing approaches to DRR. The chapter examines whether songs and artworks can represent social-environmental contexts which could be used to facilitate the development of DRR beliefs and actions (e.g., understanding warnings, preparedness etc.). Finding evidence of a relationship between arts and DRR outcome would afford opportunities to use arts as a medium to support or complement DRR strategies to foster people’s understanding of their social-environmental-hazard relationships and facilitate their ability to make informed choices about preparing for and/or responding to environmental challenge and change.

Chapter 8 shared findings from across five different disaster settings in the Asia Pacific region, highlighting the role of principals and teachers in post-disaster contexts. Common themes arising across the five settings were that: (a) principals and teachers put their students first when they faced a disaster situation together; (b) principals and teachers returned to work despite often being victims themselves; (c) teachers focused on children's needs more than their own; (d) teachers tried to balance helping children to process their experiences safely with returning to normal school routines; (e) schools also needed to look after their school families and communities; (f) schools continued to provide the best education they could despite limited facilities, lack of resources and insufficient funds; (g) the stress of coping and trying to keep positive through a prolonged recovery period led to the decreased physical and mental wellbeing of teachers and principals; (h) bureaucratic decisions made by government agencies without consideration or consultation added to the stresses that schools were facing; and (i) little acknowledgment was given to principals and teachers of the heavy burden that they carry in post-disaster contexts.

Chapter 9 focuses on catastrophic events in Australia and the unique challenges it poses. Previous reviews have highlighted gaps in Australia's preparedness for catastrophic disasters. Australia has no recent experience of a catastrophe, with the Spanish Flu (1918–1919) and Cyclone Tracey (1974) being perhaps two historic examples that have overwhelmed systems of management. Catastrophic events require the adoption of a whole community, nationwide approach. However, this is challenged by existing frameworks, the culture of emergency services, and wider community apathy. This chapter provides insights into building increased preparedness to reduce the occurrence of catastrophic disasters based upon a review of the global literature and existing disaster plans. Implications for practitioners are discussed.

Chapter 10 talks about a MBA higher education program in the Philippines with focus on disaster risk management (DRM). The MBA specialization in DRM is a distinctive program in the Philippines. Its main objective is to combine the strengths of general MBA core competencies in the areas of economics, finance, project research and development, marketing, production and operations, strategic management, and accounting, along with the intensive exploration of risk management fields, altogether making up an effective DRM toward sustainable development solutions. The curriculum of MBA in DRM can be adopted and