

**DISASTER RISK REDUCTION  
IN INDONESIA**



# DISASTER RISK REDUCTION IN INDONESIA

Environmental, Social and Cultural Aspects

*Edited by*

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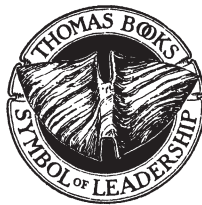
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## PREFACE

Indonesia and its citizens face many challenges from diverse, complex and evolving hazards. The risk posed emanates from geological (e.g., earthquake, volcanic), terrestrial (e.g., forest fire, environmental degradation) and hydro-meteorological (e.g., storm surge, flooding, typhoon) hazards and from climate change. The human context is also changing. Human activity (e.g., urban development, population growth, etc.) is elevating the risk posed by these natural processes, and will do so in ways that will create considerable diversity in how the nature and consequences of the associated risk is distributed throughout Indonesia. To manage this risk, disaster risk reduction (DRR) strategies will make increasingly important contributions to facilitating the adaptive and transformative activities required to sustain the social, economic, environmental and cultural well-being of Indonesian peoples. In the context of adopting an all-hazards approach, this book discusses several ways in which strategies utilizing environmental, livelihood, social, and cultural resources can be used to develop effective disaster risk reduction strategies designed to sustain social, cultural and economic life in Indonesia. A key focus is on understanding the capabilities, processes and relationships that underpin everyday life and developing them to ensure, as far as possible, that disaster risk reduction strategies can be incorporated into mainstream community life in urban, rural and island settings. This book also highlights the importance of strategies that encompass multiple levels of analysis (local, regional, national) and that seek to ensure that all stakeholders play complementary roles in the development and implementation of disaster risk reduction strategies. Adopting an integrative approach will develop the functional beliefs, knowledge, relationships and actions that Indonesia and its citizens need to thrive and prosper in increasingly hazardous times.

DOUGLAS PATON  
SAUT SAGALA



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**DISASTER RISK REDUCTION  
IN INDONESIA**



## Chapter 1

### DISASTER RISK REDUCTION: DEVELOPING AN INDONESIAN PERSPECTIVE

*Saut Sagala and Douglas Paton*

#### GEOGRAPHY AND SITUATION ANALYSIS

Indonesia is prone to many geological and hydro-meteorological hazards. Flooding is frequent in Jakarta, West Java, East Java; landslides are common in West Java and Central Java; and drought is a common occurrence in East Nusa Tenggara (West Timor, Flores and Sumba Islands) and in several places in Java. Climate change is increasing the risk posed by forest fire, with the fire of 2015 being the largest in the recorded history of Indonesia. Between 2004 and 2017, Indonesia experienced several large-scale geological hazards, including the Indian Ocean Tsunami (2004); the Pangandaran Tsunami (2006); the Nias (2005), Yogyakarta (2006), West Sumatra (2009) and West Java (2009) Earthquakes; and volcanic eruptions at Merapi (2006 & 2010), Kelud (2007 & 2014) and Sinabung Volcanoes (2011–2018) (Pribadi et al., 2014).

Located in the Pacific Ring of Fire, Indonesia has more than 100 active volcanoes (SI-USGS, 2009). The slopes of most of these are inhabited as residents seek to take advantage of the economic benefits that accompany volcanism (e.g., fertile land, cold climate, tourism). However, if they are to live with the periodic hazards that accompany living on a volcano, residents must act to manage the risk to their lives, property, belongings and livelihoods (e.g., damages to houses, crops, cattle, etc.). Disaster Risk Reduction (DRR) will thus play an increasingly important role in promoting public safety and environ-

mental sustainability in Indonesia. Developing effective DRR starts with understanding the sources and distribution of hazards.

According to DIBI (Indonesian Disaster Data and Information) data, between 1815 and 2015, most disasters occurred in Java and Sumatra, and to lesser extent in Kalimantan, Sulawesi, and Nusa Tenggara Islands (BNPB, 2016). This pattern matches the distribution of the population in the country. Correspondingly, because disaster risk is concentrated in the Java islands, where mega-urbanization is taking place, DRR must have a strong focus on facilitating urban resilience in this region. The National Planning Board identified the rapid growth of cities, and the consequent increase in risk from natural and climate-related hazards interacting with ever growing populations, as a major source of risk. This risk is further heightened by the numerous ways hazards interact with infrastructure, economic activity, social-cultural practices, the built and natural environment, governance processes, and rural-urban linkages (Bappenas, 2014).

To systematically understand and manage the associated risk, the National Disaster Management Authority (BNPB) (2013) issued the Indonesian Disaster Risk Index (*IndeksRisikoBencana Indonesia*). This device categorizes districts and cities into one of three level of risk; high, medium and low. Based on a calculation of the total score derived from historical multi hazard data and the total population exposed, 136 districts and cities have been categorized as high risk. This highlights how Indonesia's huge and growing urban population is making a social contribution to creating risk. The latter risk is further heightened by the lack of preparedness to deal with natural hazard consequences. This is changing.

Indonesia's history of disasters, and particularly the Indian Ocean Tsunami of 2004, triggered numerous changes not only to Indonesian disaster management and its associated legislative frameworks, but also to its community-based initiatives. The issuance of Law No 24/2007 marked the establishment of the National Disaster Management Agency (BNPB), whose focus was pushing DRR agendas through all level of Indonesian governance. Following the establishment of the BNPB in 2008, this has become the lead agency in developing DRR regulations, programs and projects.

Both the Government of Indonesia and its several local governments have, through the Regional Disaster Management Agency district level (BPBD), invested extensively in DRR activities through



establishing several nonstructural measures such as training and capacity building, as well as resourcing structural measures such as early warning systems, evacuation shelters, and flood controls. Despite this apparent move towards greater emphasis on DRR activities, Marfai et al. (see Chapter 7) contests that, regarding flood management in Indonesia, policy and management initiatives are still geared towards emergency response.

Nonetheless, the establishment of BPBD has been pivotal to creating more proactive approaches to DRR. As Indonesian governance has progressively endorsed decentralization since 2004, district governments have increasingly played key roles in the front line of disaster management. However, in some areas, the BPBDs have only been in existence since 2010, and in such locations government intervention in DRR and response has prevailed at the district level. Consequently, other stakeholders, particularly communities and NGOs, have stepped in to formulate and implement disaster risk reduction activities in at-risk areas.

Many international development agencies and international and national NGOs have made additional contributions to DRR in Indonesia (Sagala, 2010). Long-term projects, such as Safer Communities through Disaster Risk Reduction (SCDRR I and SCDRR II) have contributed to DRR outcomes. At the city level, World Bank Indonesia has been active in providing risk diagnostic approaches to managing city-level risk. Also at the city level, Mercy Corps has initiated ACCCRN (Asian Cities Climate Change Resilience Network), taking two cities in Indonesia as case studies: Bandar Lampung and Semarang.

If the benefit of these DRR initiatives is to be fully realized, the cumulative knowledge generated and the lessons learned from them must be integrated and critically reviewed. This book provides this critical overview through examining several case studies that cover issues such as climate change adaptation, the application of local wisdom and social capital, enhancing community risk perception, and community-based disaster recovery. The contents provide a cogent argument for DRR becoming an important strategy in the management of natural hazards whose intensity and consequences will escalate over the coming decades.

The nature and benefits of adopting DRR principles and practices is discussed across diverse hazards, such as drought, floods, and earth-

quakes and volcanic hazards, as well as hazards emerging from changes in land use in urban and rural settings. Indonesia's position on the Ring of Fire, and the concentration of its population along the coasts adds a need for DRR to be directed to managing coastal hazards and adaptation, and to managing the consequences of land use changes that have increased risk from rain water run-off, flooding and landslides in both urban and rural settings.

## **DRR IN INDONESIA**

This book offers answers the question: "To what extent has and can disaster risk reduction facilitate managing natural hazards in Indonesia." The answers encompass hydro-meteorological and geological hazards and their implications in rural, urban and island settings. The chapters collectively illustrate recent advancements in DRR and their role in facilitating adaptation to natural hazard and climate change consequences. The value of this volume as a DRR resource is heightened by its focus on how people, communities and institutions play interdependent roles in both the origins of the contemporary issues faced by Indonesia and its citizens and in finding sustainable to solutions to the problems natural hazard and climate change consequences create.

### **Understanding DRR in Indonesia**

To describe the key issues in Indonesian DRR, four thematic areas are discussed. First, the impact of climate change on community resilience is discussed. Prior to the establishments of BPBD and government intervention for DRR, the communities—in many cases with the help of NGOs—had to learn about how to cope with disasters and in the process developed disaster resiliency. Likewise, in coping with climate change impacts, some community members had to rely on their own resources and knowledge. How these capacities developed is discussed in Chapter 2 where Rianawati et al. explore how farmers, individually and collectively (particularly through the Farmers Union), developed ways to adapt to flooding and drought in Indramayu District, one of the poorest districts in West Java. This finding is corroborated by Sagala et al. in Chapter 3, who add to understanding how community social organizations (CSOs) in Indramayu district