



Book Review: *The Role of Ecosystems in Disaster Risk Reduction*

P. Tarolli

Department of Land, Environment, Agriculture and Forestry, University of Padova, Agripolis, viale dell'Università 16, 35020 Legnaro (PD), Italy

Correspondence to: P. Tarolli (paolo.tarolli@unipd.it)

THE ROLE OF ECOSYSTEMS IN DISASTER RISK REDUCTION, BY: FABRICE G. RENAUD, KAREN SUDMEIER-RIEUX AND MARISOL ESTRELLA, UNITED NATIONS UNIVERSITY PRESS, SHIBUYA-KU, TOKYO, 2013, 486 PAGES, ISBN 978-92-808-1221-3, PRICE: US \$40.00.

This is a very interesting book that every student, scholar, policymaker, and economist should have in their library as a basis to better understand how ecosystems (and not only man-made structural measures) play a useful role in the disaster risk reduction. The book is perfectly in line with the challenges that our society is facing in this century: increasing of coastal hazards (e.g., sea level rise, tropical cyclones), water resources management, land use planning (e.g., deforestation), and population growth in highly vulnerable regions. A foreword given by Margareta Wahlström, the Special Representative of the Secretary General for Disaster Risk Reduction and Head of the UN Office for Disaster Risk Reduction, is proposed at the beginning of the chapters. The book contains 18 chapters, grouped in the following five main sections: (i) why do ecosystems matter in the disaster risk reduction?; (ii) ecosystems and coastal disaster risk reduction; (iii) water resource management for disaster risk reduction; (iv) sustainable land management for disaster risk reduction; (v) policy, planning and future perspectives. In order to give a quick guide to the contents of these five parts, I provide here a brief explanation of the case studies presented.

i. Part I

This is the introductory section of the entire volume. The Editors of the book present here the first chapter on the relevance of ecosystems for disaster risk reduction, the objectives and structure of the book itself. The second chapter is an overview about Ecosystem-based Disaster Risk Reduction (Eco-DRR), where detailed tables, boxes, and clear figures are provided. The readers will find Table 2.1 and Fig. 2.3 very

useful. In the Table 2.1 four ecosystems are considered (mountain forests/vegetation on hillsides, wetland/floodplains, coastal ecosystem, and drylands), and for each of these different hazard mitigation illustrated. The Fig. 2.3 explain the Eco-DRR, that combines DRR, climate change adaptation, and ecosystem management for overall sustainable development.

ii. Part II

This section starts with an analysis of the performance of coastal ecosystems for hazard mitigation. Considering the measures that mitigate the impact of the hazards, engineered methods are compared with the natural features that can play the same role. A specific case study about the impact of a tsunami wave passing through coastal vegetation in a waterlogged condition is also analyzed. The second chapter highlights the role of the mangroves in DRR, that are more than just a coastal defense. The mangroves are ecosystems that are also extremely important for the silviculture, non-timber forest products, fisheries, sediment trapping, carbon sequestration and biodiversity. The other chapters present site specific case studies: risk and vulnerability assessment methodology development project in Negril (Jamaica), the supporting decisions in New York and Connecticut for increasing the resilience of human and natural communities to coastal hazards, a coastal adaptation strategy for Cape Town, and local initiatives on ecosystem-based climate change in Tonga.

iii. Part III

In this section three chapters are provided. The first discusses a very interesting topic: the role of floods that can become hazards but also can be necessary for healthy wetlands, and drought regulation. The second underlines the role of the integrated water resource management (IWRM) approaches to support

DRR; Table 10.1 shows that IWRM and DRR have common objectives and approaches. According to the authors of this chapter “*the natural infrastructure solutions may be politically and socioculturally harder to implement than built infrastructure, but they are more cost-effective*”. The third chapter is related to the role of capacity development in DRR aiming for a sustainable water supply and sanitation.

iv. Part IV

The land use management for DRR is the topic treated in this fourth section. In detail, it is analyzed the role of vegetation in reducing the landslide hazard and risk, and the role of protection forests (e.g., avalanche and rock fall protection forest) in integrated risk management in the Alps. The Fig. 12.3, that is the same showed in the book cover, clearly shows how the soil erosion and shallow landsliding processes can be easily triggered when the root cohesion of trees (or shrubs) is not provided. Then a site-specific case study in central-eastern Nepal is presented, where forest cover and landslide trends are analyzed over the period 1992–2009. In this analysis less gully erosion and a decrease of shallow landsliding have been observed in parallel with a large increase of forest cover.

v. Part V

The last section of the book starts with an explanation of the role of the protected areas in preventing or mitigating natural disaster (see Table 15.1). The protected areas can continue to “offer” their mitigation role, only if they are well managed, integrated with surrounding landscapes, and supported by local communities. Chapter 16 highlights the critical issue related to population growth, in particular in urbanized areas. Many urban areas have been affected by several natural hazards. A better management of these, and a better planning of urban green areas, may help in risk reduction (see Table 16.2). In the chapter 17 it is discussed how to apply the environmental impact assessment and strategic environmental assessment to the disaster management. According to the author the current environmental impact, and strategic environmental assessment practices do not adequately reflect or incorporate the disaster risk and disaster mitigation. The last chapter of the book is reserved for describe the opportunities, challenges, and future perspectives for ecosystem-based DRR. The Editors underline the fact that ecosystem-based and engineered measures may be combined as hybrid solutions, and that it is necessary to involve local communities in decision making. It is necessary to focus more on the land use planning and ecosystem investments, and there is a need for more research to better understand the effectiveness of

ecosystems under natural hazards of different magnitude and frequency.

All the chapters are generally well written, and illustrated with numerous clear color photographs, diagrams, tables, boxes, and maps. The readers will find this book very easy to read. In my opinion the chapters related to the role of vegetation in DRR (mangroves and forests in mountain areas, vegetation in urban areas) are one of the addressed values of this book. Vegetation can really play a key role in the risk reduction in different environments (e.g., coastal and mountainous areas, densely populated cities), and for different natural hazards (e.g., erosion, landslide, rockfall, avalanche, drought, pollution). Vegetation is involved in carbon sequestration, and can help the maintenance of biodiversity of vulnerable environments. A forest, when it is sustainably managed, thanks to its derived-products can also contribute to the development of local economy without the negative effects of deforestation. The scientific community and policy-makers have to spend more effort along this line. The only limit of the book is the fact that hazards such wildfires, drought and desertification are not addressed. Which could be, for example, the role of ecosystems in reducing the desertification? The Editors recognized that the book does not provide an exhaustive review, since not all the natural hazards have been considered. Having said that, I totally agree with them when they say that “*this book is a starting point for what we hope to be a continuing dialogue between scientists, practitioners and, ultimately, policy-makers and development planners*”.

Overall this book really provides a unique multidisciplinary analysis about a challenging topic that can be summarized in an intriguing question: can “nature” help in disaster risk reduction? The case studies analyzed and practical solutions proposed not only provide to answer to this question, but also indicate a first guideline to follow for a sustainable development of our society.