



Ecosystem-based Disaster Risk Reduction (Eco-DRR): Toward Better Restoration of Coastal Environments, Resources and Livelihoods from big earthquake and tsunamis

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Three quarters of the world's population live in vulnerable coastal areas. Despite the hazardous risks posed upon the coastal communities, the benefits of natural ecosystems bring food security, commercial fishery, and protection of human livelihoods. Coastal ecosystem consists of diverse habitats such as reed salt marshes, mangrove swamps, tidal-flats, river deltas, sea grass fields, seaweed grounds, coral reefs, sandy and rocky-shore beaches and other coastal marine habitats that harbor both biodiversity and abundance of coastal lives. These complex coastal ecosystems are sustained by the function of land-sea linkage. Coastal ecosystems provide wide ranges of ecosystem services and processes among natural environments, fisheries, and human livelihoods. Protecting coastal ecosystems secure material cycle, which is fundamental for sustainable human livelihood in coastal communities prone to disasters. In addition, bio-diverse coastal species such as sea grasses, function as nursery areas for commercially important seafood species such as fishes, clams and shrimps. Coastal ecosystems provide natural infrastructure for both prevention and reduction from hazardous events, known as ecosystem-based disaster risk reduction (eco-DRR). For establishing concept of eco-DRR, we need to collect good practices such as ecosystem-associated marine sciences, disaster risk researches and educations and coastal eco-DRR. For example, mangrove swamps play a role as 'green wall' against Tsunamis. Coral reef and wide tidal flat also play 'blue wall' reducing the impact by Tsunamis. Mangrove, and sandy and rocky shore are natural barriers for storms, waves and surges.

Earthquakes and Tsunamis give damages to coastal lives and coastal ecosystems. Together with the conventional hard-infrastructure measures, we have witnessed in previous disasters, that eco-DRR is both affordable and sustainable solution. Eco-DRR should be further promoted, not only in the preparedness and mitigation, but also for the better reconstruction from the disasters so to "Build Back Better". In order to scale up and promote eco-DRR, we further need to work in an interdisciplinary manner among science/technology and social/human science community, starting from understanding the role of ecosystems through monitoring and analysis, providing appropriate solutions, and raising awareness for community and policy makers for the better implementation of the eco-DRR.