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# Transforming disaster risk reduction through ecosystem management in Asia

GLOBAL ECOSYSTEM MANAGEMENT PROGRAMME

KEY MESSAGES

## Background

Asia is home to 4.2 billion people (about 60% of the world's population). High population densities, especially in coastal areas, and loss and degradation of forests, wetlands and other ecosystems have increased exposure to disaster risks<sup>2</sup>. Asia is one of the most disaster-prone regions in the world<sup>3</sup>. While it occupies 30% of the global land mass, it accounts for 40% of the world's disasters in the past decade, resulting in a disproportionate 80% of the world's disaster related deaths<sup>1</sup>.

4,416 natural disasters were recorded in Asia between 1980 and 2016, resulting in more than 1.2 million deaths and more than 6 billion people needing immediate assistance and leaving about 118 million people homeless<sup>4</sup>. Total economic losses for the same period were estimated to be more than US\$1 trillion<sup>4</sup>. The most significant natural hazards are floods, storms, earthquakes and droughts. The frequent hydro-meteorological hazards are particularly likely to increase in frequency and intensity with climate change.

Greater frequency of natural hazards does not necessarily lead to increased impacts on society.

If communities are resilient and more proactive investments are made towards **managing and reducing disaster risks**, not every hazard will turn into a disaster and harm people.

Recent policy developments including the adoption of the Sendai Framework for Disaster Risk Reduction 2015-2030 which put the focus on managing risks versus managing disasters, present an important opportunity to re-think current and future measures for disaster risk reduction and to invest in risk-informed, proactive and innovative efforts.

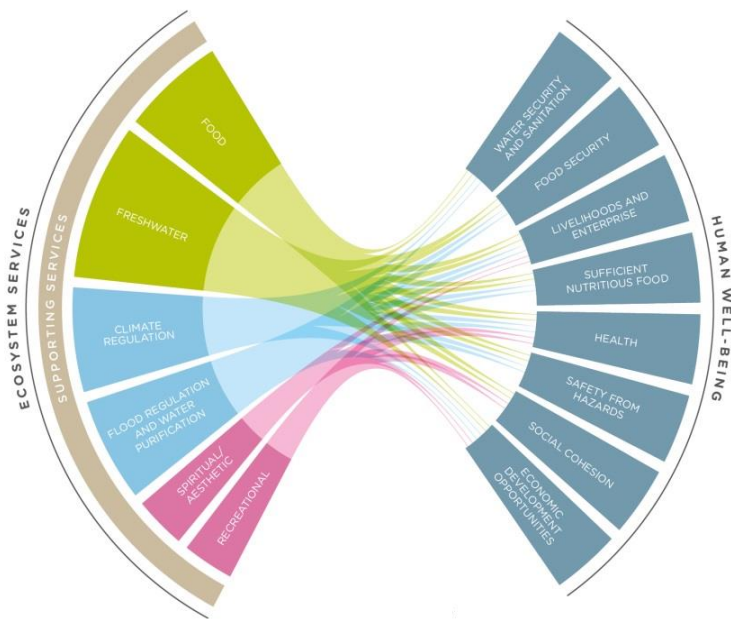
- The Sendai Framework for Disaster Risk Reduction 2015-2030 put the focus on managing disaster risks versus managing disasters and calls for concerted proactive efforts to tackle the underlying disaster risk drivers.
- Ecosystem degradation has long-term costs and aggravates disaster risks as past events in Asia have shown.
- While ecosystem degradation exacerbates risks, healthy ecosystems and sound management can help communities prepare for, cope with and recover from disasters.
- Yet ecosystem management is not easily identified or accepted as an approach towards disaster risk reduction.
- The Sendai Framework and the Asia Regional Plan for its implementation both recognise the role of ecosystem-based approaches in building resilience.
- Investment in ecosystem-based approaches as a response to disaster risks provides a concrete way for countries to demonstrate their disaster risk reduction commitments and can also support regional policy frameworks through coherent actions.

“...Disasters are preventable through environmental protection, proper urban and rural planning, goodwill from government and citizens, and investments to reduce underlying risk factors.”  
UNISDR, 2015

## Nature as a tool for disaster risk reduction

It is now recognised that the state of the environment and the occurrence and extent of impacts of disasters are related. In an ideal situation where ecosystems are maintained in a healthy state, they are able to provide multiple benefits for human well-being, namely ecosystem services which can be harnessed to help people prepare for, cope with and recover from disasters.

However despite increasing evidence and lessons worldwide, inclusion of ecosystem management in disaster risk reduction strategies remains underdeveloped worldwide. Sadly, it also frequently takes a major disaster before countries begin to set in motion plans and actions to reduce environmental degradation and invest in ecosystem management for risk reduction.



Ecosystem Services and Human well-being (©IUCN Water)

Indeed the Indian Ocean tsunami in 2004 was the catalyst for the growing attention given to the relationship between ecosystems and disaster risk reduction providing examples on the on the role ecosystems play in protecting people, property and economic investments.

In South East Asia, wide-scale clearing of coastal mangrove forests for aquaculture ponds together with ground water withdrawal has led to significant coastal erosion, damage to coastal infrastructure and salt-water intrusion<sup>5</sup>. Once production collapses, mainly due to pollution and disease, ponds are abandoned, leaving the coastlines significantly exposed to damages. Countries such as Thailand, Indonesia and Philippines are now undertaking large scale coastal ecosystems restoration in order to reverse the effects of such degradation, especially considering the increasing risks of coastal hazards. These efforts can be extremely expensive and highlight those short-term profits from unsustainable production systems can be significantly outweighed by longer-term costs to local communities and the government<sup>6</sup>.

In Viet Nam, it was estimated that investing in 12,000 hectares of mangroves to protect the coast is much cheaper, being about US\$ 1.1 million compared to what it would cost for the maintenance of dykes, i.e. US\$ 7.3 million<sup>6</sup>.

Increasing resilience in urban areas is a priority in Asia with rising risks of urban disasters due to rapid urbanisation coupled with destruction of natural infrastructure like wetlands<sup>2</sup>. Ecosystem degradation has been linked to the exacerbated impacts of widespread flooding in Chennai in December, 2015<sup>2</sup>. Ecosystem-based disaster risk reduction (Eco-DRR) through protection and/or restoration of ecosystems thus has a key role to play in building socio-ecological resilience.

## What is Ecosystem-based Disaster Risk Reduction?

Ecosystem-based disaster risk reduction (Eco-DRR) can be defined as the “Sustainable management, conservation and restoration of ecosystems to reduce disaster risk, with the aim of achieving sustainable and resilient development”<sup>7</sup>. It promotes the use of ecosystem management approaches in reducing risks through one or more of the following:

- Sustainably using and managing natural resources to derive services;
- Protecting and conserving intact ecosystems that can play a critical role in risk reduction;
- Restoring degraded ecosystems in order to reduce risks.

## Eco-DRR: a mean to translate the Sendai Framework commitment into actions

With seven global targets and four priorities for action, a key feature of the Sendai Framework is the shift in focus from managing the aftermaths of disasters to managing the causes of disasters. It also recognises and promotes the role of ecosystem management in disaster risk reduction for example by highlighting poor land management, unsustainable use of natural resources and degrading ecosystems as underlying drivers of disaster risk. Ecosystems will now need to be taken into account in undertaking risk assessments (Priority Action 1), in addressing risk governance (Priority Action 2) and investing in resilience (Priority Action 3)<sup>8</sup>.

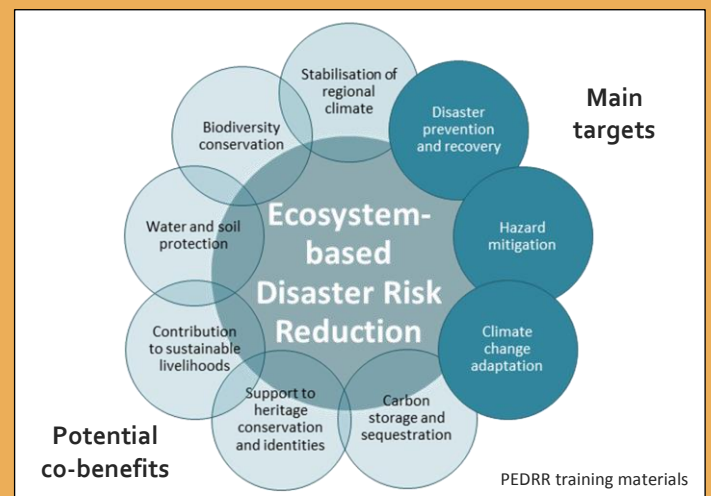
In 2016, Asian states adopted the Asia Regional Plan for Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030 which recognised that exploitation of natural resources are among the main factors increasing disaster risks. The plan also calls to “Mainstream ecosystem-based approaches through transboundary cooperation to build resilience”.

**Investments in Eco-DRR actions can not only form part of disaster risk reduction solutions but they can be used as indicators of countries’ progress against the Sendai Framework for DRR.**

## DRR+: the added benefits of ecosystem-based disaster risk reduction

Some of the biggest barriers to the uptake of Eco-DRR are a lack of trust in these approaches and the need for immediate results. Eco-DRR is indeed not a solution that fits all contexts; benefits may take time to manifest and as there are multiple drivers of disaster risks, it needs to be part of a larger strategy that can consist of a combination of approaches. However ecosystem management are too easily dismissed in risk reduction strategies, even when ecosystem degradation is one of the root causes of vulnerability. It is important to value Eco-DRR investment as an approach towards DRR and one that also provide multiple benefits:

- Eco-DRR as a cross-cutting theme can provide multiple co-benefits beyond disaster risk reduction including livelihoods, food and water security and biodiversity conservation;
- Eco-DRR for disaster risk reduction can simultaneously contribute to conservation efforts, risk reduction, sustainable development, gender equity, climate change adaptation and food security. It can thus ensure the achievement of multiple goals and commitments in a more cost-effective way;
- Eco-DRR is a “no regrets” option that can provide multiple benefits, regardless of a disaster occurrence.



## Transforming disaster risk reduction with ecosystem management: where do I start?

**Integrating knowledge on ecosystem status in risk and vulnerability assessments:** understanding risks and vulnerability assessments are the essential steps towards the implementation of effective DRR. Given that ecosystem degradation is a key driver of disaster risk, it is also important to integrate ecosystem assessments in efforts to understand risk (Priority Action 1) by identifying:

1. Which ecosystems provide important services for disaster risk reduction?
2. What is the health status of these critical ecosystems?
3. What are the current and future threats to these ecosystems?

The knowledge generated will help identify where Eco-DRR is an important investment for effective disaster.

## Recommendations for Eco-DRR actions:

- ▶ Eco-DRR actions need to be mobilised and scaled-up in priority areas where disaster risks and ecosystem degradation overlap.
- ▶ Multi-sectoral engagement and collaboration need to be promoted and strengthened to enable mainstreaming of DRR and Eco-DRR in other sectors for joint and cost-effective actions.
- ▶ It is important to establish and enforce mechanisms to protect healthy ecosystems that provide regulatory ecosystem services so as to avoid the creation of new disaster risks.
- ▶ Disaster risk reduction and management efforts including engineered grey infrastructure, recovery and reconstruction processes need be implemented without affecting the integrity of natural ecosystems.

## Eco-DRR in practice

**Country:** Thailand.

**Hazards addressed:** Storm surges and coastal floods.

**Ecosystem-based approach:** Community-based mangrove ecological restoration (CBEMR) method to restore abandoned aquaculture ponds.

**Field interventions:**

The CBEMR method was implemented in two mangrove demonstration sites successfully establishing two hectares and involving 25 community members.

**Lessons learned:** The CBEMR is an effective method for successfully restoring abandoned aquaculture ponds back to a healthy, biodiverse mangrove bio-shield, which will help protect communities, infrastructure and agricultural lands from tropical storms and erosion hazards<sup>9</sup>.



## References

- <sup>1</sup>Saikia, A. and Rana, S. 2016. *Regional Assessment on Ecosystem-based Disaster Risk Reduction and Biodiversity in Asia*. International Union for Conservation of Nature.
- <sup>2</sup>United Nations Economic and Social Commission for Asia and the Pacific, UNESCAP. 2015. *Overview of Natural Disasters and their Impacts in Asia and the Pacific, 1970–2014*. United Nations.
- <sup>3</sup>Asia-Pacific Disaster Report. 2015. *Disasters without Borders - Regional Resilience for Sustainable Development*. United Nations Publications
- <sup>4</sup>EM-DAT: The Emergency Events Database - Universite catholique de Louvain (UCL) - CRED, D. Guha-Sapir - [www.emdat.be](http://www.emdat.be), Brussels, Belgium [Accessed 25 October 2017].
- <sup>5</sup>van Wesenbeeck, B.K., Balke, T., van Eijk, P., Tonneijck, F., Siry, H.Y., Rudianto, M.E. and Winterwerp, J.C. 2015. Aquaculture induced erosion of tropical coastlines throws coastal communities back into poverty. *Ocean & Coastal Management*, 116, pp.466-469.
- <sup>6</sup>Monty, F., Murti, R. and Furuta, N. *Helping nature help us: Transforming disaster risk reduction through ecosystem management*. Gland, Switzerland: IUCN. vi + 82 pp.
- <sup>7</sup>Estrella, M. and N. Saalismaa. 2013. 'Ecosystem-based Disaster Risk Reduction (Eco-DRR): An Overview', in Renaud, F., Sudmeier-Rieux, K. and M. Estrella (eds.) *The role of ecosystem management in disaster risk reduction*. Tokyo: UNU Press, pp. 26-54.
- <sup>8</sup>PEDRR. 2016. Advancing implementation of the Sendai Framework for Disaster Risk Reduction (2015-2030) through Ecosystem Solutions. Briefing Paper
- <sup>9</sup>Monty, F., Murti, R., Miththapala, S. and Buyck, C. (eds). 2017. *Ecosystems protecting infrastructure and communities: lessons learned and guidelines for implementation*. Gland, Switzerland: IUCN. x + 108pp.



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## Contact IUCN ARO:

Regional Office, Bangkok: +66(2) 662 4029

E-mail: [asia@iucn.org](mailto:asia@iucn.org)

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