Ecosystems Protecting Infrastructure and Communities (EPIC)
Technical brief
Burkina Faso, Chile, China, Nepal, Senegal, Thailand

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EPIC is building community resilience by implementing nature based solutions to disaster risk reduction and climate change adaptation through:

- *Documenting scientific evidence*
- *Building capacities to understand vulnerabilities and take action by using best practices*
- *Promoting effective policies for integrated approaches to disasters, climate change and environment management.*

Key messages

✓ Climate change is increasing the frequency and intensity of climate-related hazards

✓ While degraded ecosystems *exacerbate* the impacts of disasters on populations, and especially on the poor and the vulnerable, healthy, well-functioning ecosystems *enhance* natural resilience to the adverse impacts of climate change and disasters.

✓ Investing in the protection, sustainable use and restoration of nature as a solution for disasters and climate change can meet multiple national commitments simultaneously, such as the Sustainable Development Goals, Aichi Targets and climate change mitigation-adaptation objectives.

Frequencies and intensities of natural hazards are increasing

Since 1990, the Inter-governmental Panel on Climate Change (IPCC) has provided evidence that human induced climate change has immense effects on human societies and ecosystems[1]. Climate change is expected to increase the frequency and intensity of various climate-related hazards in the future, including heat waves, intense rainfall events, floods and tropical cyclones. This will degrade ecosystem services that society depends on (e.g. fisheries and protection of coastline), which in turn will exacerbate a society's vulnerability to future climatic events, weakening efforts to reduce poverty[2].

Proactive risk reduction is required

There is an urgent need to prioritise proactive risk reduction over reacting to disaster events. While preparedness, relief, recovery and reconstruction continue to be critical aspects of managing the impacts of climate induced disasters, a strong commitment to and higher investments in risk reduction, including underlying risks such as poverty, social inequity and environmental degradation, are urgently needed.

Nature has an important role to play in disaster risk reduction

Nature can play a strong role in tackling these challenges. Healthy ecosystems are fundamental to societal and economic resilience, and can be a cost-effective investment for disaster risk reduction. Past and recent disasters such as Hurricane Katrina[3] and Typhoon Haiyan have shown the critical role nature plays in disasters. Wetlands help regulate floodwaters, slope vegetation help stabilise soil and reduce landslide risks, coastal vegetation and natural features such as dunes mitigate impacts of storm surges and coastal winds. The Economics of Ecosystems and Biodiversity (TEEB) study[4] clearly demonstrates the significant contribution that biodiversity and ecosystem services make to national and global economies.

Key facts and Figures

➔ Over **700,000** people lost their lives, over **1.4 million** were injured, and around **23 million** were made homeless as a result of disasters in the last 10 years.

➔ In the past 20 years, **90%** of major disasters have been caused by weather related events such as heatwaves, storms, floods and droughts.

➔ According to SwissRe, damages in Barbados from wind, storm surge and inland flooding already amount to **4 to 6%** of GPD per year. By 2030, in a high climate change scenario, expected losses could rise by **1 to 3%** of GPD per year (USD 279 million).

➔ Following the Hurricane Katrina, which claimed **1,836 lives** and caused damages to the US economy worth **USD 81 billion,** the US Congress approved **USD 500 million** for the restoration of ecosystems on the coast of New Orleans.

➔ In Thailand, the net economic value of mangrove forests in Krabi River Estuary for coastline protection and stabilization was estimated at **USD 390,609** per year. Add to that the carbon sequestration benefit of **USD 22,466** per year.

The Ecosystems Protecting Infrastructure and Communities (EPIC) project works with local communities, national governments and global policy processes to advocate for and implement nature based solutions for disaster risk reduction. EPIC is demonstrating that the investments in such solutions will also provide climate change adaptation benefits in the longer term, making them no-regret measures. Using pilot projects in 6 countries, EPIC strengthens the evidence base on the effectiveness of nature as a solution to disasters and climate change. Working with multiple stakeholders, it informs policy and builds capacities for a better integration of environment into disasters and climate change management strategies.

3 Key lessons from EPIC for effective ecosystem-based adaptation

1. Learning from local people

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Participatory mapping and analysis of vulnerabilities are important in ensuring that the nature based solutions to be implemented are aligned with the needs of the local community. Consultative workshops were conducted so as to assess the main threats that people are facing due to climate change as well as for identifying local adaptation strategies. Using the *'Climate Resilience Evaluation for Adaptation through Empowerment'* (CREATE)[5] tool, IUCN worked with local communities and partners to identify the vulnerabilities of communities and sectors **in Fatick, Senegal** and **Ouahigouya, Burkina Faso.**

Local strategies to cope with droughts, floods and saline intrusion, such as soil restoration through indigenous techniques (Zaï, stone bunds and anti-salt bunds) and replanting were identified. It was also critical to document options for livelihood diversification/income generation while restoring ecosystems, regenerating forests and reducing

soil degradation. **Lessons showed** that involving communities in defining priorities for action (solutions) and not just defining their vulnerabilities (problems) has ensured a strong commitment for implementation from all stakeholders involved in the project. Using traditional knowledge also helps to reach higher level for making the case for ecosystem-based solutions for climate change.

2. Science and research for informing effective strategies

Scientific evidence on the role of nature based solutions for DRR is increasingly being strengthened by researchers around the world. EPIC in **Krabi, Thailand** is contributing to these efforts by testing *Community-based Ecological Mangrove Restoration* (CBEMR) method to effectively restore mangrove ecosystems. High levels of failure rates in mangroves restoration campaigns demonstrate the importance (and lack) of scientifically rigorous knowledge. Developed by Mangrove Action Project (MAP), CBEMR teaches local stakeholders how to restore and sustain the underlying hydrology of former mangrove sites, allowing degraded areas to be returned to healthy ecosystems that act as bio-shields, while providing multiple economic, social and ecological benefits.

In **Yunnan, China**, EPIC investigates the use of eco-engineering for the stabilisation of steep slopes in the Salween River valley, which is

experiencing slope degradation through recent road building, leading to massive soil runoff and landslides. The French National Institute for Agricultural Research (INRA) analyses the root structures of relevant plant species on steep slopes that can alleviate the risk of shallow landslides and reduce soil particle runoff and erosion. The findings will inform bio-engineering solutions to prevent or recover from superficial landslides while allowing construction to proceed.

3. Working with authorities to inform national policies

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In ensuring the scaling up of nature based solutions in the longer term, EPIC's results are being used to inform and influence policy at local, national and global levels.

In Parbat, Syangja and Kaski, Nepal, where the project focuses on building resilience to landslide risk and more specifically on 'eco-safe roads', ecosystem-based approaches are being mainstreamed in policies related to road construction, land management and disaster risk reduction at the national level. The concept of 'eco-safe roads', where road construction does not increase landslide frequencies and preserves natural features of a landscape that help reduce landslide risks, was established within the project. Through relevant policies and a guidance manual it will be applied to other parts of Nepal. The 'eco-safe roads' concept has also been integrated into Nepal's Nature Conservation National Strategic Framework for Sustainable Development.

In Chillan, Chile, EPIC has been working with forest management authorities to promote protection forest policies for avalanche risk management. The national Plan for Adaptation to Climate Change in Biodiversity, prepared by the Ministry of Environment, considers EPIC to be an exemplary measure of adaptation to climate change that contributes to the strengthening of the National System of Protected Areas Furthermore, lessons from the project will be used by the Ministry of Environment to incorporate nature based solutions to disasters and climate change into the new national Territorial Planning (under revision).

Revision of the national Rural Development policy also incorporated considerations of nature based solutions to DRR due to engagement with EPIC.

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