Ecosystem-based Disaster Risk Reduction

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IUCN Headquarters Gland, Switzerland
Protection Forests and Avalanche modelling
Chile
Swiss Snow and Avalanche Research Institute

Storm surges and Mangrove Restoration
Thailand
Mangrove Action Project

Stabilising slopes with vegetation for Landslides
China
CIRAD - INRA

Droughts, floods and salinization using vegetation regeneration and traditional practices
Burkina Faso & Senegal
Centre de Suivi Ecologique

Restoration of slopes and bioengineering for landslide and sediment runoff
Nepal
University of Lausanne
Collating scientific evidences from the field and credible documentation of Eco-DRR processes and impacts

Implementation of interventions through community action and partnerships

Governments, local communities, NGOs, research institutes, private sector

Mainstreaming into relevant national and subnational policies, capacity development

Science & Knowledge

Practice

Policy

Global

Local
Practice/Implementation
Community action for desalinization and floods (Burkina Faso)

- Participatory vulnerability
- Identification of priority disaster risks
- Identification of local solutions
Science, Knowledge, Advocacy
Example – Policy brief based on Nepal Research

Ecosystems Protecting Infrastructure and Communities (EPIC)- NEPAL

Policy Brief

October 2016

EPIC is a global Project involving six countries (Nepal, China, Thailand, Senegal, Chile and Burkina Faso). This project aims to demonstrate the multiple benefits and effectiveness of environmental management as a potentially important "insurance-based disaster risk reduction (DRR)" strategy by reducing climate and other vulnerabilities of vulnerable communities especially through practical action. In the best research by leading bio-engineering and risk analysis experts was combined with on-the-ground livelihood strengthening actions in selected vulnerable communities based upon good practices from DRR and livelihood security. All the national EPIC Working with a multi-stakeholder approach advocating for joint participatory actions, EPIC involves in Ecosystem activities, such as soil bio-engineering. This policy brief summarises key findings from the University of Florida (UFV) experts and support recommendations for greater mainstreaming of Ecosystem, including greater uptake of the concept of "Eco-Safe Roads" in Nepal.

Project Duration: September 2012 to August 2017

Project Sites: Kaski, Parbat and Syangja Districts of Western Development Region, Nepal

Purpose

The main purpose of the project is to catalyse and quantify the role of ecosystems in protecting vulnerable communities against the risks associated with climate change and natural hazards. In Nepal, the project falls within the specific context of rural earthen roads, especially erosion and landslide risk in the Panchase area.

Quick facts

- The number of road construction in Nepal has increased from around 200 km in 1968 to over 450 km in 2015.
- In Phewa Lake watershed, there were 178 mini-earthen roads which contributed huge amount of eroded soil estimated to 335 km4 in 2014 to less than 2 mm in 2015.
- 126 community people trained by EPIC Nepal project.
- 1.5% of all road budgets are earmarked for environmental protection (DOLKU) policy but seldom implemented.
- 1 million NPK is an average budget for 1 km of bi-engineering roads, while 5 km of roads designed and monitored in Madhyalai.
- 10 km of roads were constructed in Jharsana and 24 km of roads which is matching 2 km of landslide-affected roads over 13,700 households. Credit: I. Parah, UNIL.

Context

- Rural earthen roads or "unmanaged roads" are constructed by communities themselves without any design, drainage or grading and environmental considerations and are community-eroded during heavy monsoon rains.
- Such roads require costly cleaning with heavy equipment and are a leading cause of erosion, shallow landslides, erosion-related losses to agriculture fields, and forests.
- Instead, low-cost and environmentally friendly soil bio-engineering along roadsides or "eco-safe roads" using local resources (e.g., locally available deep rooted grasses and cheap soil-stabilisation structures) can significantly reduce erosion losses and environmental degradation.

Results

1. Gather empirical evidence on the value of ecosystem-based approaches to landslide and erosion reduction through three pilot sites.

- Three soil-based greening pilot sites were established in Western Development Region of Nepal: Syangja, Kaski and Parbat districts to demonstrate the effectiveness of low cost community-based roadside bio-engineering in collaboration with the District Soil Conservation Office (DSCO) (Figure 2). All these sites were designed, implemented and maintained in partnership with each community, using local knowledge of most appropriate plant species and techniques for low cost soil bio-engineering such as drainage and dry wall construction.

Figure 2: Three pilot sites in Syangja, Kaski and Parbat districts

- Two studies document the role of road earthen roads in contributing to increased erosion and landslides.
  - The study completed in 2015 by UNIL documented over 178 earthen roads along 132 km of roads surveyed (or 345 km2) according to an estimated 100 m² of soil released to the watershed. An erosion area around 73% corresponded to landslides in Phewa Lake watersheds.
  - A second study focused on land-use changes in Phewa Lake watershed over 30 years documenting an increase in roads from 23 km to 340 km in 2016. The study was on-going when an intense coastal event (115 mm) occurred over 24 hours on July 26-28, 2015, killing nine persons in the study area due to a landslide. As a result of this event, UNIL documented 174 landslides (as compared to 14 landslides before the event), of which 98 landslides were situated either at the top or bottom of a road.

Figure 3. Phewa Lake Watershed study of land use changes 1978-2016 illustrates the 2015 road network and 174 landslides after July 26, 2015. Small event and the 14 landslides pre-existing landslides in 2014. Credit: W. Zoell, C. Niklou, UNIL.

- Quantifying the rate of vegetation in reducing erosion rates.
  - Territorial Livelihoods is a state of the art method for monitoring surface changes and vegetation growth. The three pilot sites were measured before any interventions were undertaken, then twice after the 2014 and 2015 monsoon seasons. Plantations were made in strips along the demonstration site roadside terraces, with plants selected from the most common bio-engineering species, in consultation with each community.

- Figure 4 illustrates the steps in Talchandral village before the bio-engineering interventions were installed, where about 30 m² of soil was lost during the monsoon season in 2014. In 2015, the steps were modified with 30 cm wall and planted with four different types of species. Results in 2016 demonstrate that soil loss was reduced to 1.5 m after the 2015 monsoon season (Fig. 5), a 99% reduction in erosion at this site.

Figure 4. Bridgehead village before bio-engineering interventions were installed, where about 30 m² of soil was lost during the monsoon season in 2014. In 2015, the steps were modified with 30 cm wall and planted with four different types of species. Results in 2016 demonstrate that soil loss was reduced to 1.5 m after the 2015 monsoon season (Fig. 5), a 99% reduction in erosion at this site.
Zaï and Assisted natural regeneration
‘Fascines’ (Anti-salt bunds) and Gabions
Mainstreaming, Policy Advocacy
Parallel Efforts for Multiple Levels

• Global
  – Convention on Biological Diversity (2014)
  – Ramsar Convention (2015)

• Regional Mechanisms
  – UNISDR regional platforms
  – Inter-governmental processes
  – IUCN Regional conservation forum
### National and sub-national

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<tr>
<th>Country</th>
<th>Policy</th>
<th>Level</th>
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<tbody>
<tr>
<td>Chile</td>
<td>The revision process of the national territorial planning for biodiversity and conservation</td>
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<td>The national Plan for Adaptation to Climate Change in Biodiversity sector</td>
<td>National</td>
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<td>Integration of hazard maps that promote use of protection forests for avalanche and rockfalls into the regional and local land use planning, in progress.</td>
<td>Local/ BioBio Region</td>
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<td>Road management and planning</td>
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<td>Senegal</td>
<td>Established a commission in charge of prevention and disaster risk management in the department of Foundiougne (in August 2015)</td>
<td>Local/ Department of Foundiougne</td>
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<td>Country</td>
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<td>Nepal</td>
<td>Integration of eco-DRR into the new National Strategic Framework for Nature Conservation (NSFNC)</td>
<td>National</td>
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<td>In 2014, the Department of Soil Conservation and Watershed Management drafted the National Watershed Management Policy Act based on the Eco-DRR pilot, EPIC project</td>
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<tr>
<td>Thailand</td>
<td>Established Marine and Coastal Resources Management Promotion Act</td>
<td>National</td>
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Lessons Learnt

• The need for capacity building, awareness raising and knowledge transfer – local to global levels, inter-ministerial, NGOs of DRR and conservation

• Actively bring together Ministries of Environment and DRR as they may not naturally interact with each other – building trust and establishing mutually beneficial opportunities
  – Territorial issues
  – Replicating rather than sharing mandates
  – Focus on hard infrastructure for which funding (even if loans) can easily be mobilised

• Use existing champions – IUCN focal points in Ministries of Environment

• Time, space and resources to convene across sectors and governance structures
Multi-sectoral, multi-stakeholder, multiple levels!!
Multi-sectoral, multi-stakeholder, multiple levels!!

EPIC Stakeholders in Senegal

Legend:
- Research partners
- Co-financing partners
- Implementation partners
- Beneficiaries and implementers

National
- Senegalese Government
  - Ministries (Home Affairs, Environment, Agriculture, Fisheries)
  - National Platform for DRR management (PIGREG)
  - Civil Protection Directorate (RPC)
- Departmental committees of civil protection (Prefects)
  - Regional Committee on Climatic changes (COMRECC)
  - Support Centre for Local Development (CARL)
  - Regional Commission of Civil Protection (Governors)

Local
- Regional technical services
- Djilor's City Council
- 1 Inter-Village Committee
- 5 village committees

Community
- School of International Agro-development (ISOM)
- National Forestry Research Centre (CNIV)
- Institute of Environmental Sciences (IES)
- RICBEL "BAG" Partnership for Environmental Governance in Africa
Lessons Learnt

• Strong national and sub-national policy engagement, otherwise challenging to scale up from pilot levels
  – Environment management can have a strong national focus (nationally assessed Redlist of Species, nationally designated Protected Areas) OR a very local approach – community based natural resource management
  – DRR can have multiple levels and especially sub-national, municipality, city/town council etc.,...levels which conservation has limited engagement with

• Climate change ≠ environment
  – Focus is on environment as a ‘problem’ due to CC, degradation, unsustainable development, species extinction, exploitation
  – Environment management is a solution
Lessons Learnt

• A more comprehensive approach to DRR
  – Involvement of relief/recovery stakeholders
  – Links with early warning systems, evacuation and preparedness training
  – Capacity development in using weather predictions to plan farming practices

• Improving understanding of coping versus adaptation mechanisms
  – Being able to differentiate coping from adapting (short/long) and values of both
  – Establishing appreciation of benefiting in the future
Gaps and Opportunities

• An Eco-DRR project design framework
  – Involvement of at least 2 Ministries
  – Conducting a social vulnerability and capacity assessment
  – Conducting an ecosystem risk assessment
  – Guidance to develop M & E

• An Eco-DRR Monitoring and Evaluation framework
  – Attribution versus contribution
  – Projected results in absence of an event
  – Projected results due to short project timeframes
  – Overall increased resilience of the local populations
Thank You
Merci

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Tedx talk Radhika/DRR -
https://www.youtube.com/watch?v=AcHT6kJbVFM