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FOR MOUNTAINS AND PEOPLE

Key messages

1. Biodiversity is a key determinant of forests' ability to effectively provide ecosystem services and resilience in the context of climate change and other pressures.
2. Appropriate approaches (and adaptation) for implementing REDD+ activities are key to optimum outcomes for biodiversity, carbon, and other ecosystem service benefits.
3. Community forestry can provide an opportunity for REDD+ strategies to enhance biodiversity conservation and ecosystem-based adaptation measures while simultaneously mitigating carbon dioxide.
4. Emerging knowledge on interactions among biodiversity, carbon, and human activities is essential to inform management and policy decisions.

Integrating Biodiversity in REDD+

Background

The reducing emissions from the deforestation and forest degradation (REDD+) approach is a potential response to addressing greenhouse gas (GHG) emissions and climate change. Enormous effort is being put into testing and promoting REDD+ activities in order to reduce carbon emissions in the forestry sector in many developing countries. To date, millions of hectares of forest are under protection through REDD+ projects and many of these have been validated under the Climate, Community and Biodiversity Standards (Ci, 2013). However, concerns about environmental and social risks from REDD+ activities remain, and there is growing awareness among REDD+ promoters and practitioners to have appropriate "safeguards" explicitly for REDD+ activities.

Highlights

- Deforestation and forest degradation are a major cause of global biodiversity loss.
- REDD+ as an incentive-based mechanism can be aligned with biodiversity conservation goals to finance conservation.
- Biodiversity usually recovers more slowly than carbon.

Box 1: **REDD+ Standards**

It is agreed that REDD+ programs should maintain and enhance biodiversity and ecosystem services and that all REDD+ standard programs should:

1. identify, prioritize, and map biodiversity and ecosystem services potentially affected by the REDD+ programs
2. maintain and enhance the identified biodiversity and ecosystem services priorities
3. avoid the conversion or degradation of natural forests or other areas that are important for biodiversity and ecosystem service priorities
4. conduct a transparent assessment of environmental impacts of the REDD+ programs; and
5. adapt program parameters based on assessment of predicted and actual impacts in order to mitigate negative environmental impacts and enhance positive impacts

Source: REDD+ SES 2012

Safeguarding biodiversity

According to the IUCN, "Ecosystem-based Adaptation (EbA) integrates the use of biodiversity and ecosystem services into an overall strategy to help people adapt to the adverse impacts of climate change. EbA includes the sustainable management, conservation, and restoration of ecosystems to provide services that help people adapt to both current climate variability, and climate change" (Colls et al. 2009). When the EbA approach is applied in REDD+, one of the most notable co-benefits is the complementary relationship between mitigation and adaptation activity which also enhances biodiversity conservation.

A large part of the world's terrestrial biodiversity exists in forest ecosystems. Deforestation and forest degradation in these areas are a major cause of global biodiversity loss. In addition to its carbon objectives, REDD+ programs should also conserve biodiversity and enhance the provision of other forest ecosystem services.

Biodiversity in any ecosystem is critical for maintaining its productivity and ecosystem services. In agricultural systems of mountain regions, such as the Hindu Kush Himalaya (HKH), non-timber forest products and bio-resources from the forests and rangelands play an important role in supporting livelihood and food security. Among the many ecosystem services that forests provide (such as pollination, disease regulation, biological pest control, and cultural services), many are strongly linked to biodiversity (Parrotta et al. 2012). Destruction of forests resulting from fragmentation, forest fires, and unsustainable forest management can seriously affect the capacity of forest ecosystems to help mitigate climate change and provide the goods and services that sustain livelihoods. All ecosystems have biodiversity thresholds, which if crossed can result in irreversible damage to ecosystem health and services.

The role of forests in biodiversity

Forests vary considerably in species richness and their capacity to sequester and store carbon. Primary forests store more carbon while growing forests sequester carbon more rapidly. Both carbon and biodiversity in general increase over time in recovering forests, although the rate of recovery generally diminishes over time. Biodiversity usually recovers more slowly than carbon.

Human-managed forests, such as community forests in Nepal, possess less biodiversity than natural forests in the vicinity. For example, the forest inventory of ICIMOD's pilot REDD project sites reveals that plant diversity in three sites ranged between 15% and 64% of potential diversity. However, community forests still play an important role, particularly those in the vicinity of national parks and other protected areas. These community forests are regenerating into feeding habitats and corridors for wildlife movement and becoming important wildlife habitats outside of protected areas scattered across the country.

Secondary forests are of significant value to both carbon and biodiversity conservation although their ecosystem services value may not be as high as that of undisturbed primary forests. Conversion of naturally regenerating forest or non-forest ecosystems to plantation forests can have negative biodiversity impacts. As seen in Table 1, the existing biodiversity in community forests in ICIMOD's REDD+ pilot project sites is only about one-fourth of the potential biodiversity. Plantations of introduced species may provide large and rapid carbon benefits with minimum or even negative impact on local biodiversity. Land use planning processes need to take these differences into account when addressing biodiversity and carbon objectives. Since most community-managed forests are naturally regenerated forest on degraded forest lands, as opposed to large-scale afforestation activity, species richness is reflected which can further improve over time.

While REDD+ activities are expected to contribute to reductions of carbon emissions and/or increases in carbon sinks, biodiversity outcomes can vary greatly depending on the types of activities, the prior ecosystem state, and the wider landscape context. Protection and proper management of forest and non-forest land can contribute significantly to increasing the carbon pool in terrestrial ecosystem. Forest management actions, such as control of forest fires, improved protection and restoration of existing forests, execution of ecologically responsible harvesting methods, and regeneration of forests on degraded land can improve both the carbon and biodiversity value of forests, as well as many other forest ecosystem services.

Way forward

1. Overall, REDD+ activities are likely to bring positive impacts for both carbon and biodiversity. Activities that maintain existing carbon and biodiversity by reducing deforestation and forest degradation are comparatively more likely to provide immediate benefits for carbon and biodiversity.
2. Different REDD+ activities will have variable impacts on carbon and biodiversity, depending on location, history, initial status, forest type, and scale of implementation. Different actions will be required at different time periods to deliver optimum benefits for carbon and biodiversity.
3. In some cases, REDD+ activities may fail to deliver biodiversity benefits. Trade-offs between carbon and biodiversity outcomes can occur both locally and at wider spatial scales.

Table 1: **Forest cluster classification and species diversity in ICIMOD project sites**

Watershed (ecoregion)	Cluster	Main tree species	Vegetation type	Potential number of species	Current number of species
Kayarkhola (low hill)	1	Lagerstroemia, Mallotus, mixed broadleaf	Mixed broadleaved forest	300	50
	2	Shorea, Schima, mixed broadleaf	Mixed broadleaved forest	300	46
	3	Shorea, Lagerstroemia, mixed broadleaf	Mixed broadleaved forest	300	48
	4	Pure Shorea	Hill sal forest	187	31
Charnawati (midhills)	1	Schima, Alnus, Pinus, mixed	Mixed Schima-Castanopsis forest	343	65
	2	Quercus, Kamali, Chimal, mixed	Temperate mountain oak forest	197	66
	3	Rhododendron, Kholme, Lyonia, Alnus, mixed	Rhododendron forest	110	70
	4	Rhododendron, Schima, Pinus, mixed	Rhododendron forest	110	63
Ludikhola (hills)	1	Shorea, Schima, mixed	Hill sal forest	187	46
	2	Shorea, Schima, mixed	Hill sal forest	187	40

Source: Shrestha et al., 2002

4. There are gaps in current knowledge about links between carbon emission and biodiversity, particularly at landscape and regional scales. However, there are windows of opportunity to enhance biodiversity and carbon benefits through properly designed REDD+ activities.
5. The ecosystem-based adaptation approach will be a strategy that dovetails climate benefits (mitigation and adaptation) with biodiversity conservation, provided sufficient social and environmental safeguards are integrated into the REDD strategy.
6. The monitoring, reporting, and verification (MRV) systems for carbon must be linked with biodiversity monitoring so that REDD+ approaches contribute positively to the conservation of biodiversity.

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For Further Information

Bhaskar S Karky bhaskar.karky@icimod.org
Nabin Bhattarai nabin.bhattarai@icimod.org
Trishna S Bhandari trishna.bhandari@icimod.org
Shuvani Thapa shuvani.thapa@icimod.org

Photos: Jitendra Raj Bajracharya

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International Centre for Integrated Mountain Development
GPO Box 3226, Kathmandu, Nepal, **Tel** +977 1 5003222
Email info@icimod.org **Web** www.icimod.org

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NORWEGIAN MINISTRY OF FOREIGN AFFAIRS