Understanding the Role of Forests in Enhancing Livelihoods and Climate Resilience: Case Studies in the Philippines

PROFOR   WORLD BANK GROUP

This policy brief presents the findings of a recent study to understand two important aspects of forest ecosystems: *How forest ecosystems help enhance people's resilience to climate impacts*, and *How forest ecosystems support livelihood development for the poor.*

KEY MESSAGES

The study conveys two important messages on forests and development:

Forests are relevant to climate resilience.

This means that healthy forests help reduce risks to climate variability by providing high-quality ecosystem services that contribute to more resilient communities.

Forests are vital to income and wealth generation, which means forests serve as a safety net against poverty and potentially increase access to economic opportunities.

The flip side of this reality is that climate change and other threats can render poor people poorer, as they are often more vulnerable to global warming compared to the non-poor. Enhancing community resilience to climate change and consequent shocks to livelihoods and the national economy is therefore a key component of poverty reduction.

Introduction

The Philippines is constantly exposed to extreme weather events, such as typhoons and other climate-related forces. With rising temperatures, increased variability in precipitation, longer dry spells, and more frequent and intensified extreme weather-events, climate change will impact water flow and its availability for domestic use and irrigation, especially in the driest and wettest seasons. In turn, this affects agricultural productivity and household incomes.

Climate change compounds the existing vulnerabilities of poor households by eroding their livelihood assets, which in turn compounds the impacts of climate change.

The Philippine government recognizes this detrimental dynamic, and has taken key steps to build national resilience to climate change – among these are investments in forest resources. The Government's flagship National Greening Program (NGP), which aims to significantly increase the country's forest cover and improve ecosystem services that can enhance the Philippine's climate resilience.

The findings presented here will complement these efforts by providing evidence of the potential benefits of forest for enhancing resilience, and accounting for the benefits of forest in supporting livelihoods.

Study Objectives and Methodology

The study aims to understand how forests and their ecosystem services – provisioning, cultural, and regulating - contribute to poverty alleviation and climate resilience. The findings have important implications for forest land use planning and management.

Undertaken between May 2015 and November 2016, the study completed three analytical tasks: (1) modeling and valuing forest ecosystem services at three study sites; (2) conducting surveys to understand how local communities use forest resources to support their livelihoods; and (3) undertaking participatory scenario development and tradeoff analyses to further determine how the forest communities could be impacted by certain types of landscape development.

Four landscape simulations were developed at the study sites to test ecosystem services under different land cover extent and spatial arrangements:

- "Forested" is a landscape simulation where the majority of the land cover of the watershed consists of closed forests.
- "Conservation" is a landscape simulation where enforcement of regulations regarding forest cover in riparian zones, on slopes greater than or equal to 50%, and on lands 1,000 meters above sea level are maintained.

- "Agricultural" is a landscape simulation with a focus on agriculture within the landscape.
- "Bare-Urban" is a landscape where the watershed is highly urbanized with large-scale conversion of natural vegetation to built-up areas.

In modeling and valuing forest ecosystem services, the study used an ecosystem accounting approach that relies on the System of Environmental-Economic Accounting (SEEA) framework. It specifically draws on the SEEA's concepts, definitions, and classifications to guide the analysis. The study did not produce an ecosystem account.

In analyzing forest use, the study undertook a series of focus group discussions and key informant interviews. Community mapping was also undertaken to uncover the spatial location of the forest from the community where the participants collect forest products.

Finally, the study developed participatory scenarios for UMRBPL to illustrate how data and information on forest ecosystem services could inform local watershed development planning.

STUDY SITES

Three case studies across the Philippines were selected for inclusion in the analysis. The study sites were selected based on specific criteria relating to climate change risk, poverty incidence, extent of forest cover, and information availability to ensure that the findings would be representative of local upland areas.

Upper Marikina River Basin Protected Landscape (UMRBPL), which covers five municipalities of the province of Rizal — Rodriguez, Antipolo, Baras, San Mateo, and Tanay — and is located upstream of Metro Manila

Libmanan-Pulantuna Watershed (LPW), which traverses the provinces of Camarines Sur and Camarines Norte in the Bicol region in Luzon

Umayam, Minor and Agusan Marsh (UMAM) sub-basin in the Agusan River Basin in the Caraga region in the northeastern part of the southern island region of Mindanao

Key Findings

Forests are relevant in building climate resilience. By providing essential ecosystem services in regulating water flow and reducing hazards, forests are a cost effective option to enhance resilience to climate change, both in local communities and nationally.

1. Higher forest cover generates higher water yields in the driest months of the year.

Water yield, for instance, from shallow ground water in the UMRBPL was estimated to be on average 149% to 167% higher under the Forested landscape simulation compared to the Bare-Urban landscape simulation. During the dry months, this helps building resilience in local communities dependent on these water resources for agriculture and subsistence.

2. Higher forest cover reduces the volume of floodwater generated in the wettest months of the year.

The regulating function of forests on water flow reduces potential floodwater generation in watersheds and in areas downstream of watersheds. During the wettest months of the year, higher forest cover can help reduce the volume of floodwater generated in a watershed by as much as 47%. This is particularly important to flood-prone areas downstream of watersheds.

3. Higher forest cover protects against erosion and sediment generation to reduce the risk of hazards.

Forests provide important protective functions. A decline in sediment generation reduces the potential for flooding, and lowers treatment costs for people consuming water from streams. Forests on steep slopes (30-50%) help mitigate the risk of erosion on a per hectare basis by 68% to 99%,

and have the potential to reduce annual sediment outflows from watersheds by seven to a hundred times compared to bare soil.
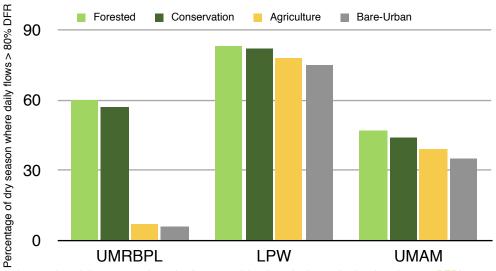
4. Replacing regulating ecosystem services is costly.

Manmade erosion and sediment control services are extremely costly. Reforestation is a lower-cost alternative to securing erosion regulating ecosystem services over the medium term. For example, in comparing results from UMRBPL with the cost of installing cocomats in Rizal, it was found that installing cocomats costs PHP 3 million (US$ 0.06 million)/ha, while reforestation costs on average PHP 15,750 (US$315)/ha.

5. Poor upland communities depend highly on provisioning forest ecosystem services.

Upland communities in UMRBPL, for instance, reported that about 7% of their annual cash income comes from the sale of forest resources like bamboo products, charcoal, fish, and bush meat.

6. Forests provide essential subsistence benefits to poor upland communities through its provisioning and regulating function.

Water is the most important benefit, used for domestic services and to some extent for irrigation. Other benefits include water regulation, wood production, and biodiversity regulation. Forests also supply fuel wood for energy needs and herbal medicines for common ailments.

7. Poorer households in upland communities rely more on forest resources for income and subsistence. Results of analyses using statistical measures of association suggest that the use of forest resources for income and subsistence is more important among poor households compared to others.

Comparison of proportion of dry season where the flow rate of the rivers in the study sites is > the 80% DFR' across the four landscape simulations at the UMRBPL, LPW, and UMAM study sites for the period 2002–2012.

The Way Forward

Forests should be an integral part of the Philippine's resilience strategy. The following policy recommendations are focused on developing a forest landscape that can boost the resilience of local communities vulnerable to climate change.

- *Incorporate ecosystem service modeling and valuation, forest use analysis and scenarios in forest land use planning (FLUP) and forest management.*
A practical application of these tools is the targeting of potential areas for tree plantations, agroforestry, and enrichment planting of protected areas. Better understanding the value of the forest and forestland assets and ecological services can help inform the revision of prices for permits for forest resources, including for water extraction.

- *Use ecosystem service indicators for monitoring the performance of FLUPs and assessing the outcome of the NGP.*
Establishing ecosystem service targets could enhance the monitoring of the impact of forest development on erosion reduction, landslide reduction, and water provisioning.

- *Incorporate the Forest-Poverty Linkages toolkit for deepening analysis and undertaking site specific analysis of how forest dwelling communities use the forest.*
Forest use analysis can be used to deepen the knowledge on how people use and access the forest with qualitative and quantitative site specific data, so that appropriate forest types can be developed and livelihood activities could be appropriately sited.

- *Increase the income derived from forest resources especially for poor upland communities.*
Options for improving the livelihoods of poor upland communities should consider improving forest resources and adding economic value to forest resources. The valuation results from this study can help build the attractiveness of forests for investors. Options include:

1. *Increasing the value of forest resources (non-timber forest products, fruits and other forest foods) by transforming these products through value addition, thus making non-timber forests an asset to poverty reduction.*

2. *Developing community-managed woodlots and plantations that can facilitate the legal harvesting of wood for household consumption to meet energy needs, and provide a sustainable supply of wood for income-generating activities.*

3. *Creating a market for forest services.*

4. *Tapping the support of the Department of Agriculture (DA) and Department of Agrarian Reform (DAR), is critical to the commercialization and value addition of forest commodities.*

Develop a research agenda for forest ecosystem services

Development of a research agenda for forest ecosystem services (FES) may be a useful start to institutionalizing and formulating a coordinated effort for data collection, data sharing and analysis. The Ecosystems Research and Development Bureau of the DENR could be a strategic clearinghouse for FES information that can be used to support planning and decision-making on forest and landscapes.

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