

Enhancement of natural capital through forest and landscape restoration (FLR)

Humans have been using forests to provide the basic materials of life for millennia, but over the last several centuries they have also been clearing forests to establish agricultural land and to make room for growing populations. Global estimates suggest 30% of original forest cover has been converted for other uses and an additional 20% has been degraded.

Forests landscapes particularly benefit the rural poor: Forests provide direct and significant benefits to approximately 1.6 billion of the rural poor. IUCN has estimated the value of these tangible, though often overlooked, benefits at US\$ 130 billion per year—approximately equivalent to the totality of Official Development Assistance. While the global value of the environmental services provided by forests, such as water provision, soil protection, climate regulation and carbon storage, is still unknown, *The Economics of Ecosystems and Biodiversity* review (TEEB) places the annual cost of forest loss at between \$2 trillion and \$5 trillion.

You can have your food and your forests too: Forests and trees contribute to nutrition for poor people; forests provide large amounts of protein and other nutrient-rich food sources as well as cash income to buy food. Forest-based ecosystem services support sustainable agriculture by regulating the flows of water, and forests help mitigate the impacts of climate change. Approximately 25% to 30% of rural household income and food comes from off-farm resources, with forests providing a major share.

Landscape restoration is an untapped opportunity to address global challenges: Globally, more than 2 billion hectares offer opportunities for restoration, mostly in tropical and temperate countries¹. Three quarters of this area is suitable for mosaic restoration, where small areas of woodlands and individual trees can productively interface with agricultural land, while the remaining one quarter, where larger, more extensive areas of forest can be established and managed, is better suited to wide-scale restoration. The goods and services provided by restoration can support livelihoods, contribute to poverty eradication, and increase food security, benefitting the poorest and most vulnerable groups. Restoration also delivers significant benefits in the form of biodiversity conservation, climate change mitigation and adaptation, and combats desertification.

Landscape restoration enables more than trees to grow; it regenerates livelihoods and economies: IUCN estimates that the restoration of 150 million hectares of degraded and deforested lands in biomes around the world—in line with the Bonn Challenge²—would create approximately **\$84 billion per year in net benefits** that could bring direct additional income opportunities for rural communities.

Landscape restoration and Rio+20

The Report of the Secretary-General (SG) on *Objective and themes of the United Nations*

¹ A World of Opportunities, Global Partnership on Forest Landscape Restoration, September 2011.

² The Bonn Challenge is an effort to restore 150 million hectares of degraded and deforested lands by 2020.

Conference on Sustainable Development concluded that “*specific green economy policies affect livelihoods, income distribution and other social outcomes through different channels and in different ways*” and identified **restoration and enhancement of natural capital** as one of seven groups of necessary policies or ‘tracks’. As stated in the SG’s report, the “*importance of natural assets and the services they provide to poor communities has long been recognized*” and “*ecosystem services are critically important not only to resident communities but to broader national economies.*” Programmes and projects that aim to restore and enhance natural capital have real potential to directly impact livelihoods and poverty.

Landscape restoration already has a clear policy endorsement

Several significant international decisions have already been adopted that directly establish a policy imperative for restoration. The **Convention on Biological Diversity** has agreed on Aichi target 15 to restore 15% of degraded ecosystems by 2020. The **UN Framework Convention on Climate Change** has adopted a global goal to slow, halt, and reverse forest cover and carbon loss. Restoration of unproductive lands is also a focus of the **UN Convention to Combat Desertification**. Furthermore, the **UN Forum on Forests** has called on Member States and others to build on the work of the Global Partnership on Forest/Landscape Restoration (GPFLR) to further develop and implement landscape restoration, which contributes to the four Global Objectives on forests, adopted by the UN General Assembly. A global effort to restore 150 million hectares of degraded and deforested lands by 2020 was launched as the “**Bonn Challenge**” at an event in 2011 hosted by Germany and IUCN in collaboration with the GPFLR. This target supports delivery of progress on the Rio Conventions and other outcomes of the 1992 Earth Summit.

The economic case for landscape restoration is clear

In order to make a preliminary analysis of the direct economic benefit of achieving the Bonn Challenge, IUCN used the most recent forest benefit estimates from the peer-reviewed literature. The restoration of degraded and deforested lands produces a variety of ecosystem goods and services at the local, regional, and global levels, making it difficult for farmers, communities and other land stewards to capture benefits. A number of the broader societal benefits—such as watershed protection—are in effect provided free of charge without any compensation for good land stewardship accruing to the individual or community land managers. We have therefore limited our analysis to those goods and services which have potential to provide direct material benefit to the farmer or community. This is one of the points of divergence between total economic value and local economic development potential. Our approach to estimating the global benefit of restoring 150 million hectares has been to assume that restoration is delivered through three distinct approaches and quantifying the impact of each one:

- **Planted forests:** uses the planting of trees on degraded or deforested land to produce timber and timber-derived products, such as fuelwood.
- **Secondary and natural forest regeneration:** protects deforested and degraded landscapes from further disturbances, allowing forest species to naturally re-colonize the landscape, often with the active intervention of farmers, communities and other land managers.
- **Agroforestry:** integrates trees into agricultural landscapes in order to increase the availability of soil nutrients, prevent soil erosion, and decrease the use of inorganic fertilizers, leading to increased crop yields and/or reduce costs.

We have estimated the overall incremental contribution that each restoration method would make to the delivery of four important forest benefits for which global data are available. The global *climate* benefit has been estimated by calculating the quantity and value of carbon that would be stored through restoration³. We have estimated the local and regional livelihood benefit that FLR would create through the production, sale, and consumption of wood and non-wood forest products, and we have also quantified the local benefits people receive from FLR through cultural and other ancillary values, such as opportunities from increased tourism, recreation or hunting for which others might provide remuneration⁴. The *yield* benefits of agroforestry have been calculated using yield data from the FAO⁵. Our study does not attempt to quantify the benefits derived from other important ecosystem goods and services that provide broader societal benefits, for which no market or potential market currently exists, such as disaster risk reduction and biodiversity conservation. In addition, landscape restoration is an investment whose ecosystem goods and service benefits are realized over a period of time. As a result, we discount the benefits of FLR to reflect the opportunity costs of the investment in restoring trees and forests rather than continuing with business as usual.

The results of our analysis show that achieving the Bonn Challenge by **restoring 150 million hectares of degraded and deforested lands will generate at least \$84 billion in material benefits, net of costs, annually**, providing direct, additional income opportunities to rural communities.

Achieving the Bonn Challenge would **sequester 47 GtCO₂e (at an approximate rate of 1 GtCO₂e per year), generating \$5 billion in annual net benefits⁶** and reducing the current “emissions reduction gap⁷” by between 11% to 17%⁸.

Restored landscapes would also provide **\$64 billion per year in net benefits from the sale of wood related products**, including the sustainable production of firewood and charcoal, and local communities would receive a combined **\$8 billion of benefits from non-wood forest products** that they either directly consume (wild meat) or process and market (cola nut, cardamom, etc.).

Agroforestry provides many environmental and livelihood benefits. Trees on cropland can fix nitrogen and increase soil nutrients, which ultimately increase crop yields and maintain the productivity of land for longer periods of time. Agroforestry can also reduce the amount of fertilizer required to maintain crop yields. Our agroforestry benefit estimate accounts for the revenue raised through increased crop yields. Unfortunately, adequate data were not available to account for the benefits resulting from reducing fertilizer use or extending the

³ Data from World Resources Institute & Nordhaus, W., (2011). Estimates of the Social Cost of Carbon: Background and Results from the RICE-2011 Model. Cowles Foundation Discussion Paper No. 1826.

⁴ Data from Chiabai A, Travisi, C.M, Markandya A, Ding, H, and Nunes P.A.L.D., (2010). “Economic Assessment of Forest Ecosystem Services Losses: Cost of Policy Inaction”, Environmental and Resource Economics.

⁵ Data from FAOSTAT Database on Agriculture; Accessed 2 May, 2012.

⁶ Based on the social cost of carbon as calculated in Nordhaus, W., (2011). Estimates of the Social Cost of Carbon: Background and Results from the RICE-2011 Model. Cowles Foundation Discussion Paper No. 1826.

⁷ UNEP. (2010). The Emissions Gap Report. Are the Copenhagen Accord Pledges Sufficient to Limit Global Warming to 2°C or 1.5°C? United Nations Environment Programme.

⁸ The emission reductions gap is the estimated shortfall in climate mitigation action, once all current greenhouse gas reduction efforts and commitments are taken into account, required to avoid global temperature increases exceeding 2°C.

period of time land remains productive, and these benefits can be significant. For example, shade-grown coffee has been shown to require less pesticide and fungicide, while some experimental data on evergreen agriculture indicates that inorganic fertilizer inputs can be reduced by as much as 50%. While these benefits have been documented in the literature, we were not able to find a representative global value. We therefore estimate that restoring 150 million hectares of degraded forest and agro-forest lands would generate, at a minimum, an additional annual net benefit of **US\$ 6 billion in terms of additional crop yields**. We anticipate that this figure may rise significantly when data become available to include other benefit sources in the estimate.

Finally, we also estimate that communities could receive **US\$ 467 million in net annual cultural and ancillary benefits**. The restoration of degraded and deforested lands also increases the supply and purity of freshwater, conserves biodiversity, and reduces the risk of catastrophic disasters. However, there are no global estimates of these benefits, and as a result they are not included in the analysis. When these missing benefits are taken into consideration—along with a more differentiated and accurate analysis of returns to on-farm productivity—evidentiary estimates of the beneficial economic impact of achieving the Bonn Challenge on affected communities and broader society would be much larger.

Going Forward

Landscape restoration is a proven way to restore the benefits of a healthy forest ecosystem. FLR can directly improve the lives of some of the 1.6 billion rural poor, who depend on forests, by increasing access to clean water, diversifying sources of household income, providing food security, and simultaneously conserving biodiversity. As deforestation, agricultural intensification, and reductions of fallow periods continue to degrade land, the imperative for restoration of degraded and deforested lands will continue to increase.

However, there are still challenges ahead. Landscape restoration produces a combined output of commodities and public goods, but private land-use decisions generally depend only on the commodity value of the land-use and this makes restoration less competitive. Adoption of Payment for Ecosystem Service (PES) schemes and the continued expansion of carbon markets will increase the competitiveness of FLR as a private land-use option. Without these changes, privately funded restoration will rely too much on commodity production at the expense of restoration's broader social benefits. Governments should promote economic instruments, such as PES, that value the services of nature and make restoring natural landscapes a competitive land use option. Additionally, policies that directly or indirectly create incentives that result in environmentally harmful land management practices should be removed, and livelihood and biodiversity enhancing policies incentivizing investment in landscape restoration should be encouraged. If the necessary changes are made, the world's degraded and deforested lands can be restored for the benefit of communities everywhere.