

Restoring forest landscapes

Forest landscape restoration aims to re-establish ecological integrity and enhance human well-being in degraded forest landscapes

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THINK of a tropical forest landscape and the image that probably springs to mind is of a billowing, continuous canopy with scattered solitary emergents, a sea with many shades of green and the occasional dramatic splash of colour stretching uninterrupted towards the horizon.

Reality is often quite different. Deforestation and forest degradation have altered many of the world's tropical forest landscapes to such a degree that—according to a report by Bryant et al. (1997)—only 42% of remaining forest cover, or 18% of original forest cover, in the tropics is still found in large, contiguous tracts. The same report lists eight ITTO producer countries (and most ITTO consumer countries) in which virtually all the forest estate is in fragmented, modified blocks.

The figures behind this shift in the configuration of tropical lands are dramatic. About 830 million hectares of tropical forest can be classified as fragmented (Bryant et al. 1997), although admittedly some of these forest fragments might be hundreds of square kilometres in size. Care should be taken when combining figures from different sources, but it is reasonable to suppose that the vast majority of the estimated 500 million hectares of degraded primary and secondary tropical forest (ITTO 2002) is part of those same fragmented forest blocks. Another 350 million hectares of former forest land within the tropical forest biome has been severely degraded through fire, land clearance and destructive harvesting practices, while an additional 400 million hectares of productive agricultural land still retain a significant tree component.

Therefore, today's 'typical' tropical forest landscape is more likely to be a mix of primary forest, managed forest, secondary forest and degraded forest lands interspersed with extensive areas of other, non-forest land-uses. It is also likely that there are many more people living in these landscapes than was previously the case; reliable estimates indicate there might be 500 million people in rural areas of the humid tropics and that they depend on a mixture of agricultural and forest resources to maintain their livelihoods.

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To reflect this shift, we propose broadening the definition of a forest landscape to:

a landscape that is, or once was, dominated by forests and woodlands and which continues to yield forest-related goods and services.

Why restoration?

The world's decision-makers and advocates have tended to focus on the fate of the remaining primary forests, largely because of their value as some of the richest repositories of biological diversity and as critical biotic storehouses of carbon. While ensuring an adequate network of protected forest areas and a viable, sustainably managed productive forest estate is certainly of the utmost priority, recent analysis by Howard and Stead (2001) indicates that this focus probably only accounts for 30-35% of the world's forest estate; 10% of forests are now legally protected while the 1.6 billion m³ of timber harvested each year is sourced from 600-800 million hectares of forest.

To many in government, the private sector and the NGO community, the remaining area of forest land is seen as a reserve that will in time be protected, exploited or converted—depending on which interest group stakes its claim first. However, regarding forests purely in terms of conservation or production omits the vital role they play in securing and maintaining the livelihoods of many rural and urban people. It also raises serious questions: can the conservation of biological diversity really be limited to 10% of the world's forests? Are the only goods that merit attention from unprotected forest formally traded commodities such as industrial roundwood?

In Kenya and Tanzania, for example, formal health care is so expensive that up to 70% of the rural poor rely solely on herbal medicines collected from forests and woodlands to remedy all but the most serious ailments. In India, Kerr (2002) documents the Sukhomajri watershed development program, under which tree density on denuded slopes increased a hundredfold, from 13 to 1292 per hectare, over a period of 16 years. Subsequent increases in the production of forest grasses resulted in a sixfold increase in milk production, while better-regulated water flow permitted more diverse and higher yielding cropping systems. As a direct result of this increased economic activity, household incomes across all social classes increased by 50%. Further downstream, the siltation rate of an important lake near the major city of Chandigarh was reduced by 95%, saving the city US\$200 000 annually in dredging costs.

The fact is that tree cover no longer dominates many tropical forest landscapes. In some areas, the current land-use configuration has led to a dramatic and detrimental decline in the availability of forest goods and services. In such degraded landscapes, agricultural production tends to suffer, local shortages of timber and fuelwood prevail, household income falls, and biological diversity declines. Often, the effects of landscape degradation are felt further downstream—siltation loads increase and water quality declines. Restoration can therefore help reverse some of the more severe impacts of forest loss and degradation by providing: more secure access for local people to a range of forest products, including fuelwood and non-timber forest products; improved hydrological regulation and nutrient cycling; more diverse and better connected habitats, thus supporting more biological diversity; and options to increase the resilience and adaptability of existing agricultural systems.

Although it is clear that restoration should be a key element in any national forest strategy, this does not mean simply getting as much forest cover back as possible. A more

comprehensive approach to restoration should emphasise the importance of both the quality and quantity of tree cover and should require that ecological integrity is enhanced at the same time as tangible benefits accrue to local people. This means that reforestation with the main plantation species can only ever be part of the solution.

Forest landscape restoration

Forest landscape restoration can be defined as 'a process that aims to regain ecological integrity and enhance human well-being in deforested or degraded forest landscapes'. It is being promoted by IUCN - The World Conservation Union, the World Wide Fund for Nature (WWF) International and various governments and other partners to meet the challenge of restoring goods and services in modified and degraded forest landscapes. It focuses on restoring forest functionality: that is, the goods, services and ecological processes that forests can provide at the broader landscape level as opposed to solely promoting increased tree cover at a particular location.

Forest landscape restoration is not a new idea. It builds on a number of existing rural development, conservation and natural resource management principles and approaches, bringing them together to restore multiple forest functions to degraded landscapes. It doesn't aim to return forest landscapes to their original, 'pristine' state. Rather, it is a forward-looking approach that seeks to put in place forest-based assets that are good for both people and nature. Since forest landscape restoration addresses the supply of forest goods and services at a landscape level, it is not limited to—nor does it exclude—particular site-based technical interventions. Any individual application of the forest landscape restoration approach will be a flexible package of site-based techniques, from pure ecological restoration through blocks of plantations to planted, on-farm trees, whose combined contribution will deliver significant landscape-level impacts.

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One of the key challenges for forest landscape restoration is to identify the type and level of restoration that will be compatible with social and physical realities. Thus, it is important to be clear on both the immediate and long-term objectives of restoration when identifying the potential suite of technical approaches and policy interventions. For example, Whisenant (1999) points out that while healthy ecosystems have built-in repair mechanisms, those that are badly degraded may have surpassed their capacity for self-repair. In such situations, restoration activities are better focused on the recovery and maintenance of primary processes (hydrology, nutrient cycling, energy flows) rather than on attempting to replace the original forest structure or 'near-natural' species mix immediately.

Restoration objectives must be based on the interests of key stakeholders, the nature of the physical landscape and the resources available. It will depend on factors like existing institutional and land tenure arrangements, the prevailing land-use policy framework, and biotic factors such as residual soil fertility and remnant species diversity, abundance and distribution. It is important to recognise that objectives may shift over time. While long-term aims may be to increase the resilience, diversity and productivity of land-use practices and

conserve biodiversity, realities on the ground may require short-term interventions that yield immediate benefits.

Community support is a key element in the success of any forest landscape restoration activity. Stakeholders need to feel empowered to act and to be sure the resources they put in place will not be taken away from them. This means that perennial land-use governance issues such as decentralised decision-making and the transfer of access and use rights must be addressed. Traditional practices and institutions also play a significant role, while the importance of long-term government commitment cannot be discounted.

Forest landscape restoration in practice

A recent workshop in Costa Rica supported by ITTO (among others) highlighted that forest landscape restoration is more than just an interesting idea (IUCN in prep.). The workshop heard about many programs and policies in both tropical and temperate countries that have brought about significant increases in forest goods and services at a landscape level. Two are briefly highlighted here.

The restoration of ngitili woodland enclosures in northern Tanzania

The Shinyanga region in Tanzania was originally covered in dry acacia woodland known locally as *ngitili*. The Sukuma people who live in that area had a strong pastoralist tradition and relied on *ngitili* woodland enclosures to provide dry season fodder and a range of other essential goods and services. However, tsetse fly eradication schemes, the conversion of land for cash crops, and state-sponsored collectivised farming meant that by 1985 only about a thousand hectares of *ngitili* remained in Shinyanga; land degradation had become a serious issue. A government-sponsored soil conservation project set out to work with traditional land-use systems and to build on institutional structures, coinciding with a relaxation in the rules governing collective farming. By 2000 the area of *ngitili* had increased to over 250 000 hectares. Although the restored patches of *ngitili* range between ten and 200 hectares in size, their cumulative effect has been to dramatically transform the Shinyanga landscape (Barrow et al. 2002).

Landscape-level restoration of riparian habitat in Sabah

The Kinabatangan River in Sabah, Malaysia stretches for 560 kilometres along its lower reaches. About thirty years ago its extensive floodplain was dominated by tropical high forest, but since then oil palm plantations have replaced at least 85% of forest cover. The remaining forest is now limited to a narrow, degraded and fragmented corridor along the banks of the river interspersed with the occasional larger forest reserve. Interestingly, this remnant forest is still a very important reserve for wildlife such as the forest elephant, orang utan and Sumatran rhino; it attracts large numbers of tourists who boost the local economy. The fact that the forest has been cleared right to the water's edge has also created its own set of problems; flooding regularly kills thousands of hectares of young oil palms, forest elephants have no option but to pass through plantations, destroying valuable crops as they do so, and fertiliser and pesticide run-off has significantly reduced water quality, diminishing the river's fish stocks on which local communities depend.

Over the past ten years WWF has been working with local communities, district authorities and plantation owners to identify and implement landscape-level restoration solutions that

benefit all. Some progressive plantation owners have agreed to allow those parts of their oil palm estate that flood regularly to revert back to secondary forest or to convert them to forest plantations, thus protecting the rest of their crop from seasonal flooding. These restoration activities have started to connect key forest fragments and will, in time, buffer the river from fertiliser and pesticide run-off. By creating a corridor at least 500 metres wide it also helps secure the habitat of some of Malaysia's most threatened species (WWF 2002).

Conclusion

The potential for a more systematic approach to forest restoration should not be underestimated. For example, in 1999 a meeting of senior forest department officials from the countries of the Lower Mekong concluded that up to 23 million hectares in that region alone could benefit from restoration. However, a range of technical approaches would have to be used to create a productive mosaic of agricultural and forest land, and existing institutional arrangements would have to be modified to help empower smallholders to become more involved in forest management (Gilmour et al. 2000).

New opportunities are emerging that will deliver further working examples of forest landscape restoration on the ground. For example, WWF aims to have 20 large-scale forest landscape restoration initiatives up and running by 2005. The *ITTO Guidelines for the restoration, management and rehabilitation of degraded and secondary tropical forests*, and the follow-up regional workshops in 2003, will make an important contribution to raising awareness and increasing capacity on this issue in ITTO producer countries. A United Kingdom-supported initiative should help to implement restoration-related elements of the work programs of the United Nations Forum on Forests and the Convention on Biological Diversity. Forest landscape restoration also offers a practical approach to implementing socially and environmentally responsible carbon sequestration projects under the terms of the Kyoto Protocol (Orlando et al. 2002); significant funding could soon be available that would make restoration a major driving force in helping to secure rural livelihoods and enhance ecological integrity in degraded tropical forest landscapes.

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