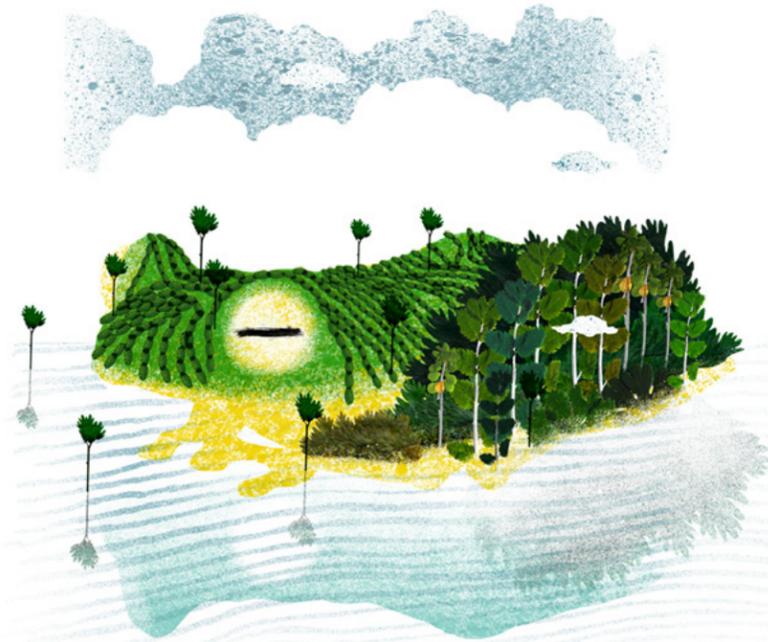


2018
VOL 12 ISSUE 1

current conservation

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storage. The number of rainforest species and the similarity of plant species mix are gradually increasing in comparison with relatively undisturbed rainforests. Soil microbes appear to be doing better in some restored sites, as shown by increases in soil nutrients and fertility. Once the growing saplings form a low canopy with other naturally-established native plants, weedy species thin out and decline in the shade.

Yet, restored sites lack key characteristics of undisturbed, mature rainforests. In the restored sites, natural plant colonisation and regeneration of typical rainforest plants, including shrubs and herbs, appears low. On the ground, leaf and other organic debris remains sparse, while up on the trees, epiphytes are still scarce.

While restored sites in isolated fragments are generally an improvement over adjoining naturally-regenerating sites that remain degraded, this is not always the case. At the edge of the surrounding extensive forest reserves, degraded sites appear to recover well through passive natural regeneration even when left alone. As some larger fragments and remnants were in reasonably good shape already, these edges need only protection from disturbance rather than any active restoration.

Landscape futures

Quantitative measures of recovery

may not capture other tangible and intangible benefits and spin-offs of restoration efforts. On private lands, the recognition and protection of rainforest fragments that were previously ignored by landowners help expand conservation and restoration into wider landscapes beyond protected reserves, and involve new constituencies and stakeholders. Remnants have other values, too, as watersheds and refugia for pollinators and natural predators of crop pests. While a start has been made, there is a long way to go before plantation businesses, landowners, and managers integrate ecological understanding and approaches into routine production practices.

Restoration—as a hands-on practice—also forces renewed appreciation of ecological history and the peculiarities of each restoration site. Nurturing the skills needed to work with each parcel of land and learning by doing become at least as important as grasping theoretical foundations and concepts in restoration ecology such as secondary succession or the roles of keystone or framework species. Ecological restoration melds science and praxis in relation to land.

As oases of diversity, beauty, and wonder, rainforest remnants add to the fullness of life in heavily used and transformed landscapes. For biologists like us, they carry the additional joys

of discovery and observing recovery of remarkable rainforests. Over a century since the rainforests were fragmented, we envision a more connected future where farms and forests, wildlife and people, science and wonder, all coexist.

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IMPLEMENTING the NATIONAL GREENING PROGRAMME IN THE Philippines LESSONS LEARNED

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The community-based approach to forest restoration has been adopted in the Philippines for more than two decades. In context, this approach involves community members working as a group to access government lands, restore degraded forests, and utilise and manage resources in a sustainable manner. The recent National Greening Programme (NGP) aims to rehabilitate 8.6 million hectares from 2011 to 2028 mainly following a community-based approach. However, devolving the responsibilities of rehabilitating denuded uplands and managing forest resources to communities has not been straightforward. In many cases, the primary objectives of poverty alleviation and sustainable management of forest resources are far from being realised. Community organisations disband when project funds are exhausted, livelihood projects fail, and tree plantations are abandoned.

As part of the research project funded by the Australian Centre for International Agricultural Research (ACIAR) in the Philippines, an evidence-based community forest landscape restoration project was

implemented in Biliran Province in 2014. The project aimed to identify and address key deficiencies of community-based forest restoration programmes. Evidence for the effectiveness of these programmes is drawn from a series of ACIAR-funded forestry research projects in the Philippines over 15 years, and lessons learned from past people-based reforestation programmes in the country.

The project site has adverse biophysical conditions but represents sites subjected to reforestation in the Philippines. The twenty-six hectare area was used for grazing with deliberate burning to produce palatable shoots for goat, cattle and water buffalo. Also common were uncontrolled fires from slash-and-burn farms and intentional burning by land claimants due to disputes over land. The site was planted with trees under four government reforestation projects since the early 1990s, but regular fire occurrence decimated most of the trees. The community is poor, with substantial food security issues and virtually no cash earning opportunities. An existing community organisation was involved

in implementing previous government forest restoration programmes, but with minimal participation of members. The land belongs to the government, which is usual in the case of government-funded forest restoration projects in the Philippines. The community holds a Community-based Forest Management Agreement, a tenurial instrument allowing the community to utilise the land for 25 years with a possible extension for another 25 years.

The project was designed following the systems approach, based on holistic thinking that integrates all elements in a system and recognises their dynamic and complex interactions. The project was designed to consider the multiple elements of a community-based forest restoration system and their intricate relationships. Project implementation followed a participatory approach, involving stakeholder groups in all stages including identification of issues and potential interventions, implementation of interventions, and monitoring of impacts. It also employed smallholder-based best practices developed from scientific investigations and lessons learned from previous

'In this project, we know what a quality seedling is and why it is important in reforestation. The technology is simple and not expensive. We could see our trees survived even in drought and they are growing fast!' - Anabelle Talon - PO member

community restoration programmes. The major factors hampering the success of community-based forest restoration programmes in the country were the absence of livelihoods that provide food and income to communities, lack of social preparation, poor seedling quality, uncertainty of land and tree tenure, and corruption.

The project implemented a package of interventions to improve the success of community-based forest restoration focused on integrating timber production and ecological restoration objectives with crops to provide food and income to the community. To address inadequate social preparation, capacity building activities engaged smallholders in best practice technologies in community forest restoration. Community organising rejuvenated the group. Gender equality was promoted by engaging men and women in various aspects of the project including making decisions on tree and crop species selection, plantation establishment, livelihood identification, and development of local policies. Identifying mother trees from the natural forest helped to improve the supply of high quality germplasm. The community produced high quality seedlings using smallholder-based best practice demonstrated in training activities. Each member of the community organisation received copies of the tenurial instrument. Local policies including sharing agreements of responsibilities and benefits among community members were developed.

'In this project, we see sustainability. We have food from crops, income from seedling sales, and trees to harvest in the future.' - **Romeo Dabalos, Peoples Organisation President**

The project initiated farmer-preferred and market-driven livelihood projects to provide short, medium and long-term benefits.

The project demonstrated early success. Community participation improved from five to thirty active members. Tree establishment and quality improved dramatically. After three years, seedling survival exceeded 80%, with *Acacia mangium* trees in the production zone reaching an average height of 11 metres. Fruit trees and cash crops were planted and the community started harvesting crops to supplement the food requirements of members and provide income to help meet their subsistence needs. The knowledge and skills of community members to produce high quality seedlings and apply smallholder-based best practice

silviculture has significantly improved. The community received direct financial benefits from the project for three years for implementing project activities including seedling production, and plantation establishment and maintenance. The community also shifted the communal nursery seedling production into a livelihood enterprise providing income to community members from seedling sales.

The collective action of community members to implement project activities was very high when direct financial benefit was provided. For example, activities such as seedling production, site preparation, and plantation establishment and maintenance encouraged high levels of participation when wages were provided immediately after the completion of tasks. Levels of participation were lower when voluntary labour was required, such as in the management of the communal farm. Monetary benefit appears to be the greatest factor that drove community members to



'We manage our trees voluntarily as a group because management is not intensive and we need to work together to protect them. But for the crops and fruit trees, it is better to manage them by family members because they need frequent labour. If voluntary labour is needed, some members are less active.' - **Elpidio Verba, PO member**

participate in community-based forest restoration. The lower performance of some members also led to waning interest of other members of the community to manage the communal farm.

Eventually, the community decided to divide the farm into plots for management by individual family members. This decision was supported with a community policy regarding sharing of returns between members and the community organisation, with penalties for members who would abandon their respective farms. The distribution of farm plots to individual family members was found to be effective in managing the communal farm. Apparently, community members preferred to provide voluntary labour to manage individual lots rather than work as one group in managing the communal farm. A similar scheme will be adopted in managing the established communal tree plantation.

The implementation of the pilot evidence-based community forest restoration project has provided some lessons that would help improve the success of the National Greening Programme in the Philippines and similar community-based restoration projects in other developing countries in the tropics. The project illustrated the importance of project design to match the needs, interests and circumstances of the communities, and the usefulness of the systems approach in designing the project to harmonise multiple uses



of the landscape. As most of those involved in community-based forest restoration in the Philippines are poor, financial incentives and food security become primary drivers of participation. The project has showcased the crucial role of sustainable livelihoods in community forest restoration. It has also demonstrated the importance of adequate social preparation, strong

leadership, security of land tenure, and supportive policy and good governance in promoting a successful community-based forest restoration project. Women play vital roles in undertaking various forest restoration activities. In the project, women members of the community were actively involved in germplasm collection, seedling production, and plantation

establishment. Women were also effective extension agents, and held key responsibilities for keeping community records and administering project funds.

The factors contributing to mixed results of community-based forest restoration are complicated, and designing and implementing interventions is equally challenging. Our research demonstrated the usefulness of the systems approach in understanding causalities and developing effective interventions. The application of genuine participatory processes at all stages of the community-based restoration project is imperative, and integration of lessons learned from past reforestation programmes in the project design and implementation plan guided implementation success.

The results of our project revealed that addressing socio-economic and food security issues of smallholders is key to the success of community-based forest restoration. Hence, livelihood projects that provide food and income to the community are an essential component of community-based forest restoration. Social mobilisation and community collective action is facilitated when immediate financial incentives are offered. In the absence of financial incentives, community members prefer to work on individually allocated farm plots and woodlots rather than on commonly owned tree plantations and agricultural farms. This finding suggests that the best way to implement a community-based restoration could be through individual family members managing restoration areas, particularly when project funds are exhausted. While individual families need to form a community organisation to access government lands, and receive financial and material support to develop restoration sites, the long-term management of established trees and crops could be family-based.

The size of the community organisation is important when collective action



is needed in forest restoration. Some community organisations in the Philippines manage hundreds of hectares of forest restoration projects, which is beyond the capability of community groups to manage effectively. The pilot community-based restoration in Biliran demonstrates the importance of matching the target area of restoration to the size of the community organisation.

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