



## 4.1 Analog forestry: creating productive landscapes

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### Introduction

One of the key challenges in the wake of the Green Revolution<sup>1</sup> is finding a way for agricultural landscapes to contribute to ecosystem integrity and safeguard biodiversity (Scherr and McNeely 2008). In order for restoration and sustainable land management to take hold in forested areas around the world, landscapes must be restored and managed in a way that provides connectivity and environmental services while also maintaining or improving the livelihoods of the people who inhabit those landscapes.

This article presents two experiences that provide specific steps to address these challenges. Productive landscapes can be created through inclusive, participatory networks, recognition of the diverse land uses that make up mosaic landscapes, and grassroots initiatives combined with regional coordination. These three aspects have distinguished the biological corridors in the Colinas Bajas Model Forest, Dominican Republic and in Nuevo Mundo, Ecuador. Initiatives there are further united by their focus on analog forestry as a method for achieving productive landscapes.

### Analog forestry: a restoration tool for productive landscapes

Analog forestry (AF) is a landscape-level approach geared to productive landscapes (Box 1). It is applied at the local level with individual practitioners and community groups. AF's key goal is to establish a tree-dominated ecosystem that is analogous in structure and function to the native forests of the region (Senanayake and Jack 1998). When applied to agroforestry systems, AF places an emphasis on selecting species that are analogous in structure to species in a natural forest, but that also provide an economic benefit. For example, understorey trees may be replaced by crops such as coffee or cacao, while taller canopies might be "recreated" with trees that are valued for their timber or other products. A further focus of AF is following natural succession, combining crops with varying production schedules.



ANALOG FORESTRY SYSTEMS ARE IDEAL FOR SMALL-SCALE AGRICULTURE OR FOR SINGLE COMPONENTS IN A DIVERSE, LARGER-SCALE LANDSCAPE.

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Annual crops may predominate at first, but they will gradually be replaced by longer-lived tree crops, so that the system develops into a mature, productive landscape that provides a diversity of products.

### **Box 1. Analog forestry and agroforestry**

A common source of confusion when talking about AF is the difference between analog forestry and agroforestry. AF is an agroforestry technique that emphasizes maturity and biodiversity. In practice, AF systems often use ecological succession to establish, in stages, a mature and productive forest system. In the first stage, annual crops are grown alongside fast-growing shrubs and trees that yield crops, NTFPs and/or timber within a relatively short time frame. Longer-lived canopy trees and late successional species are gradually introduced as the system matures.

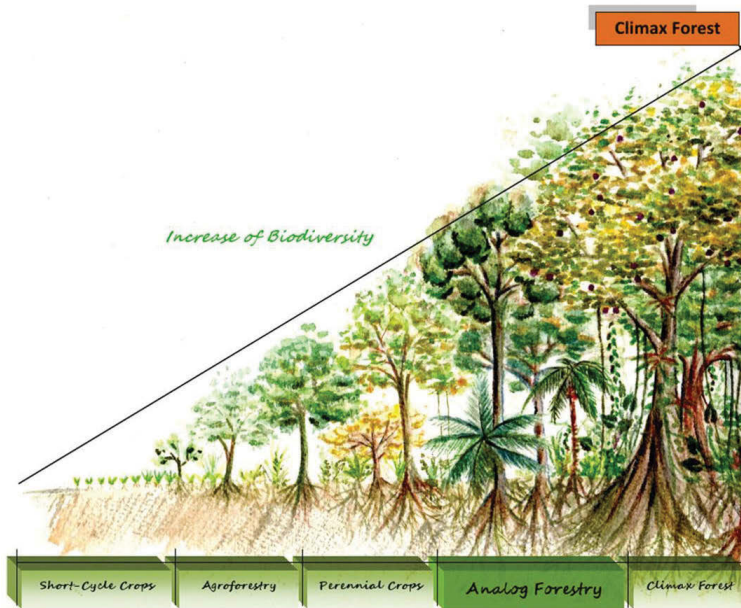
Analog forests differ from traditional agroforestry in their emphasis on mimicking native forest structure and their biodiversity. This increases their utility, both in diversity of production and in the ecosystem services they provide. They are also more useful in biological corridors, since their structure more closely approximates that of a natural forest and of the remnant forest patches that they seek to connect.

By creating an agroforestry system that mimics mature forest structure and function, analog forestry (Figure 1) provides three benefits:

- increased ecosystem services from a mature forest system;
- economic opportunities from the production of both timber and non-timber forest products (NTFPs); and
- social benefits stemming from community organization and the exchange of information, best practices and strategies among practitioners (woodlot managers, farmers and ranchers).

The detailed planning, design and implementation that go into analog forestry systems make it ideal for small-scale agriculture or as a single component of a diverse, larger-scale landscape. A diversified approach is often required, especially when AF involves a direct trade-off between income-generating activities, such as annual crops or livestock rearing, and a longer-term investment in biodiversity restoration and forest production. Analog forestry often forms a part of a larger landscape, alongside annual cultivation as well as perennial systems such as agroforestry and forest pastures.

In addition, the diversity of species and a dynamic information exchange system among practitioners distinguishes AF as a climate-smart solution for farmers and communities. AF systems are generally built around a long-term design, where species are chosen for short-, medium-, and long-term production time frames. The process of selecting which species will be used, when combined with local experience and projections of climate change impacts, allows farmers and communities to plan diverse agroforestry systems that address climate impacts.

**Figure 1. Analog forestry**

### Colinas Bajas Model Forest

#### *Towards a regional biological corridor*

The Colinas Bajas Model Forest is located in the heart of the Dominican Republic's western Cibao Region. It is part of the Iberoamerican Model Forest Network, a regional group of local networks of Model Forests. The Model Forest platform consists of a network of stakeholders with interests pertaining to large-scale, forest-based landscapes. The platform allows these actors to engage in dialogue on issues of common concern and plan joint projects. The model platform governance network includes local communities, indigenous groups, forest-based companies and local and regional governments. The Model Forest concept has been applied in forested landscapes in Canada, Europe and Asia as well as Latin America (see article 2.2).

The Colinas Bajas Model Forest was formed in 2011, making it the newest of the country's three Model Forests. It brings together diverse actors from western Cibao, including government, academic institutions, farmers' and ranchers' groups, and small, medium and large forest enterprises. These groups interact with one another and make joint decisions on issues that affect the forest landscape. The governance body is coordinated by the NGO Enda-Dominicana (Enda-dom) and the *Universidad Católica Nordestana*.

Since 2012, Enda-dom, in collaboration with other Model Forest actors, has executed an ambitious project to create a biological corridor that increases continuous forest cover between the Pueblo Viejo gold mine near Cotuí, Sánchez Ramírez Province, and Los Haitises National Park on the country's eastern coast (Checo 2010). This initiative is funded by Barrick Gold, which operates the Pueblo Viejo mine, as part of its restoration

strategy for the region surrounding the mine. It is also part of the company's community relations initiatives, which aim to create sustainable income-generating activities in the region.

The project's goal of expanding forest cover through the agricultural lands of the western Cibao Region has mostly taken the form of supporting the development of AF systems. These efforts build on Enda-dom's long history of involvement in this area; the NGO has worked on analog forestry systems with farmers' groups in the area for 30 years. This has made the prospect of changing production systems less daunting to the region's farmers, since there are several well-established analog forestry systems in the area. They are frequently visited by communities that are establishing their own AF projects.

In addition to privately held smallholder agriculture, forestry plantations belonging to medium- and large-scale landowners and pasture are important land-use activities in the Cibao Region. Indeed, a landscape-level approach that did not take all of these land uses into account would be extremely limited in its potential. There are fewer woodlots and pastures than smallholdings, although their average area is far greater, and they represent an important portion of the landscape. The issue of land tenure is sometimes a thorny one when working with smallholder agricultural lands and community-managed hinterland and the land's owner is not always known. The project has been assisted in this regard by the Dominican Agricultural Institute, a government body charged with resolving land tenure disputes.

Enda-dom has had success working with forest enterprises in the management of their woodlots, specifically in helping to formulate management plans. In the Dominican Republic this can be an onerous task that is often weighed down by bureaucracy. Programmes are underway to work with ranchers' groups to develop forest pasture systems. Although it is unlikely that the managed woodlots or forest pasture systems will reach similar levels of productivity or biodiversity to the analog forestry parcels, their function of increasing forest cover and maintaining connectivity within the biological corridor makes them indispensable landscape elements (Laurance 2004).

Coordination with woodlot owners and ranchers has been difficult at times. These groups sometimes mistrust environmental initiatives, especially in the context of the Dominican Republic, where forest protection laws have been strict, even punitive, towards forest businesses. The Model Forest platform has been invaluable in these efforts in terms of calling these groups together. Enda-dom's task has often been to facilitate communication between private-sector interests and the government bureaucracy, as it did in aiding in the development of management plans for forest enterprises. Agroforestry, forest pastures and analog forestry provide technical toolkits that help to facilitate the adoption of sustainable practices by these groups by providing operational guidelines.

## Nuevo Mundo

### *A new world is possible*

The settlement of Nuevo Mundo, in the northwest of Ecuador’s Pinchincha Province, is a relatively new settlement, populated most recently by migrants from Loja Province in southern Ecuador in the 1960s and ’70s. The first settlers produced primarily coffee, but by the 1990s the dominant economic activity in the area was cattle herding and milk production. This came about as a result of the widespread clearance of the land in the wake of government incentives that assigned land tenure to those who had “worked” (i.e., in many cases, cleared) the land.

As of 1998, the community began a working relationship with a Quito-based NGO, Fundación Rainforest Rescue (FURARE), which coordinated the analog forestry projects within the area. Analog forestry began in the area as a way to reclaim some of the land that had been cleared for pasture — which was becoming less and less productive — with a focus on fruit production for community nutrition (Gamboa et al. 2010).

As time went on, producers along the town’s two rivers, the Río Macas and the Río Nuevo Mundo, decided to create a continuous biological corridor in order to safeguard the town’s water supply, which was increasingly prone to droughts and floods. A number of land uses prevailed, including more mature analog forestry parcels, incipient agroforestry zones, and forest pastures in grazing zones. Given the general decline observed in local pastures throughout the 1990s, one of the key practices adopted with AF was forest pastures, which allowed producers to maintain their cattle herds without clearing new land.

One of the important results of the Nuevo Mundo project was capacity building. By the time project activities ended, almost all community members had received some training in land management, the application of analog forestry, care of orchids, guiding and birding, and other skills. Since the activities related with the biological corridor ceased, neighbouring communities have learned from the experiences of the inhabitants of Nuevo Mundo and replicated their practices to a limited degree.



## Lessons learned: mosaic landscapes and grassroots approaches

### *Analog forests in mosaic landscapes*

Analog forests are a key component of mosaic landscapes. The goal is for forests to be valued by individual land-owners, communities and regional associations for a range of uses. Analog forestry forms part of a landscape that includes diverse land uses, including pasture, annual cultivation, agroforestry, forest pasture, plantations and natural forests. Analog forestry is a key part of the landscape due to the increased ecosystem services, forest products, and the linkages between natural forest areas that it provides. Analog forestry benefits from a landscape approach that emphasizes various methods to increase

forest cover, including forest pastures and agroforestry, since this helps to create a connected landscape with fewer ecologically vulnerable areas.

### *The importance of bottom-up participation*

Because of the high degree of planning and design required to establish large-scale analog forestry projects, it is necessary to ensure that there is broad participation from the community. This includes farmers' associations and any other groups that are involved in land tenure, such as ranchers, foresters and government agencies. A regional platform for inter-sectoral dialogue — such as the Model Forest — is highly useful, as it helps diverse groups come to a common understanding on land use and policy.

It is important for facilitating groups, such as Enda-dom in the Dominican Republic and FURARE in Ecuador, to demonstrate value to key stakeholders so that they have a clear incentive to participate. In the case of FURARE, this took the form of providing a community nursery and various capacity-building workshops. Enda-dom, operating on a wider scale, has facilitated relationships between private-sector groups, community associations, and local and regional governments.

Capacity building is an important component of analog forestry plans, which often involve significant changes in local livelihoods related to production, consumption and transport. The creation of local capacity is one of the most important factors for replicating the experience in neighbouring areas; it empowers practitioners to share their knowledge and experiences with others who are willing to learn.

A final requirement is the documentation and sharing of experiences. Both FURARE and Enda-dom, as organizations who practise and promote analog forestry, belong to the International Analog Forestry Network, which is dedicated to knowledge sharing and capacity building among practitioners of analog forestry. This allows the lessons learned in distinct locations to be applied, where possible, to new locations and initiatives.

### **For more information**

The International Analog Forestry Network's web site ([www.analogforestry.org](http://www.analogforestry.org)) has extensive documentation of analog forestry projects, including those mentioned here. Specific inquiries can be directed to Adam Kabir Dickinson. Enda-Dominicana can be found at <http://endadom.wordpress.com>, and is searching for individuals with relevant research interests to aid in their monitoring and evaluation efforts, with logistical support available for visiting researchers. Mamerto Valerio, Executive Director of Enda-dom, can be reached at [direccion@endadom.org.do](mailto:direccion@endadom.org.do). There is no link to the Nuevo Mundo project, but inquiries can be directed to project leads Lorena Gamboa ([lorenagamboa8@gmail.com](mailto:lorenagamboa8@gmail.com)) and David Torres ([jdtorresg@yahoo.com](mailto:jdtorresg@yahoo.com)). More information about Model Forests can be found at [www.bosquesmodelo.net](http://www.bosquesmodelo.net) and [www.imfn.net](http://www.imfn.net).

## Endnote

1. The Green Revolution refers to research, development and technology efforts that took place from the 1940s to the late 1960s to increase agricultural production, especially in the developing world ([www.wikipedia.com](http://www.wikipedia.com)).

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