



Routes to roots: A series on forest restoration

A critical exploration of the different ways to reforest the Earth

Blake Weyland, Unsplash



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Augusta Dwyer

With some 10 million hectares of forest cut down every year and about a third of the world's forested spaces already devastated, deforestation is a vice humanity just can't seem to quit.

The vast majority of it is for agriculture, far too much of it is unsustainable, and it is collectively costing us trillions of dollars in impaired ecosystem services.

Fortunately, the significance of all that loss is being increasingly recognized, and forest restoration is having a renaissance.

Forest restoration can encompass a number of different activities. At its simplest, it's planting trees on degraded land. Protecting or enhancing naturally regenerating forests – secondary forests – is even more ideal, as degraded forests are able to do a pretty good job of recovering much of their original biomass and biodiversity if they're left alone (or properly helped). Growing tree plantations and mixing forests and trees with agriculture are also gaining favor, as they have a solid economic component to their benefits.

The concrete facts about forest restoration's potential are still a bit murky. (Exactly how much of the global land mass can be reforested – is it 1 billion hectares or 2? And how much climate-harming carbon dioxide can be drawn out of the atmosphere as a result – 30 percent or more?) But what is clear is that there are more opportunities and techniques than ever before to effectively restore forests, and the body of research around this topic is growing. As Kate Hardwick, a conservation scientist at the Royal Botanical Gardens, Kew, points out, re-establishing forests that will be similar to their previous ecological state is a relatively recent ambition for Western society, and science plays a critical role in doing it well.

"By showing the area of opportunity, science has revealed how valuable nature is for the global community, and it has sparked huge interest in nature," says ecologist Thomas Crowther, founder of RESTOR, a restoration mapping platform co-created with Google, and co-chair of the UN Decade on Ecosystem Restoration. "Every region of our planet is totally different, so the ecology and the social challenge is different in every location. But with systematic scientific process, you can help to find those solutions in every region."

Is there a blanket definition of what success looks like for forest restoration?



An agroforested coffee landscape in São Paulo, Brazil. Projeto Café Gato-Mourisco

Given the many ways to regrow trees and forests, the answer to this question is yes and no. For Terry Sunderland, director of International Cooperation and Engagement at the University of British Columbia's Faculty of Forestry, what successful forest restoration looks like is highly dependent on the environment. "In context," he says, "it would be a process of restoration or encouraging natural regeneration that is socially, economically and environmentally sustainable."

"When we talk about restoration," echoes Crowther, "we're talking about all activities that empower local people by promoting the biodiversity they depend on. So it's many approaches, including conservation, sustainable agroforestry, sustainable timber production,

natural regeneration, rewilding. Whenever restoration promotes the wellbeing of people and biodiversity, that's when you know it's working."

So, at the macro level, experts seem to agree that successful forest restoration means facilitating the growth of new trees and forests that bring both environmental and social benefits.

But, again, it's when the lens zooms in that the benefits of different methods get tricky to balance. New research continues to be published on the massive role that secondary forests play in carbon sequestration. Tree-planting, meanwhile, is probably the most popular way of restoring forested landscapes, but the outputs of this can range from monoculture plantations that can boost the economies of developing countries but have little environmental benefits, to Assisted Natural Regeneration (ANR) where trees are planted in small patches within secondary forests, and the scales are tipped in the opposite direction.

Agroforestry, meanwhile, is increasingly being viewed as an effective method that sits somewhere in the middle, both promoting biodiversity and ensuring local livelihoods by transforming agriculture through the power of trees and forests. Since it was founded in 1978, World Agroforestry (ICRAF), whose work will be featured in this series, is one organization that has been working to facilitate a paradigm shift for agriculture and forestry, drawing on a vast body of local traditions and knowledge from all over the world.

Mosaic landscapes are yet another way to bring together environmental goals and the production of food and commodities, especially in densely populated areas. By looking at multi-purpose landscapes containing a mix of agriculture, forestry and other ecosystems, such as wetlands, the mosaic approach seeks to optimize what is already there as well as address local needs.

"There are fifty shades of green in terms of what you can do with replanting, agroforestry or letting the forest grow," sums up Lourens Poorter, professor in functional ecology at Wageningen University and lead author of a recent paper on tropical forest recovery.

How do we ensure that restored forests and newly planted trees stay standing?

A farmer plants saplings in an indigenous tree plantation in the Democratic Republic of Congo. Axel Fassio, CIFOR-ICRAF

This ever-plaguing question comes back to the crucial link that must be made between forest restoration and economies. Restoration that provides alternative forest-based livelihoods inherently removes people's incentive to cut forests down.

"The starting point is not to offset emissions," emphasizes Robert Nasi, director general of the Center for Forestry Research (CIFOR) and managing director of the center's partnership with World Agroforestry (CIFOR-ICRAF). "The starting point is to improve the livelihoods of local people and to reduce the pressure on the natural vegetation – and on top of that you get the carbon storage."

This concept seems to be catching on. In the last two years alone, says Crowther, “we’ve seen the building of a massive network of projects around the world that are ultimately nature-based businesses. Every single one of them is either conserving, protecting, or restoring land for the economic sustainability of the local people that depend on it.”

As this series will show, we have a tremendous opportunity to revive degraded landscapes through forest restoration. That opportunity is increasingly enabled by all kinds of funding mechanisms, with investments from governments, donors and private companies.

We will see how, when done right, there are many ways to restore and strengthen forest ecosystems, giving the world the chance to both fight climate change and counteract the failings of the past.

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