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TOWARDS MORE RESILIENT AND DIVERSE PLANTED FORESTS

Highlight

TreeDivNet,
a global research network
on mixed-species planted
forests

How can new models
of planted forests help
achieve Agenda 2030?

Exploring the contributions
of planted forests to Global
Forest Goal 1 through the
work of FAO and partners

Planted forests and
restoration: impacts on the
environment, production
and livelihoods

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Increasing the restoration role of planted forests in the United Nations Decade on Ecosystem Restoration

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Highlights

- The United Nations Decade on Ecosystem Restoration is a global restoration movement to catalyse restorative ground-level action.
- Planted forests can deliver on multiple objectives, including wood production and the UN Decade's mission of preventing, halting and reversing ecosystem degradation.
- The UN Decade provides a platform for sharing knowledge to enhance the contributions of planted forests to restoration worldwide.

The need and opportunity to combine restoration and sustainable wood production

Facing the urgency of reversing ecosystem degradation, countries worldwide have made ambitious pledges to restore an area amounting to more than 1 billion hectares (ha) (UNEP, 2021). This political momentum led

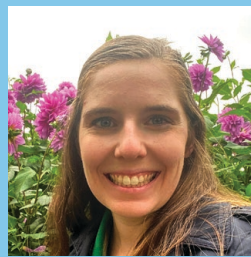
Youth in the UN Decade

to declaring 2021–2030 the United Nations Decade on Ecosystem Restoration (hereafter, the “UN Decade”), a global restoration movement catalysing action on the ground and from all society (see box on Youth in the UN Decade). Within the scope of the UN Decade, ecosystem restoration encompasses a wide range of restorative activities that contribute to different objectives, from reducing societal impacts, improving ecosystem management, rehabilitating ecosystem functions and services, to fully recovering native ecosystems (FAO, SER and IUCN CEM, 2023). In terrestrial ecosystems, forest and landscape restoration (FLR), defined by the Global Partnership on Forest and Landscape Restoration (GPFLR) as “an active process that brings people together to identify, negotiate and implement practices that restore an agreed optimal balance of the ecological, social and economic benefits of forests and trees within a broader pattern of land uses” (GPFLR, n.d.), is a widely adopted approach for ecosystem restoration in degraded forest and deforested landscapes.

Meeting FLR commitments is expected to lead to large-scale restoration of degraded forests through a combination of several types of restorative activities, including afforestation, reforestation and sustainable forest management throughout the world. With a global demand for primary processed wood products expected to increase by 37 percent by 2050 compared to 2020 (FAO, 2022), the major forest area expansion foreseen through FLR could be the springboard towards sustainably increasing wood production globally. Planted forests include a wide diversity of systems and management intensities – from monoculture plantations to multipurpose, diverse plantings – and can supply timber (including woodfuel), non-wood forest products and other environmental services for commercial and non-commercial use (FAO, 2016). This article explores how planted forests can successfully contribute to meeting the growing demand for wood and other products and services, as well as restoration commitments on a global scale.



Francis Asamoah, Wildlife Ecologist, Member of the Youth Taskforce of the UN Decade on Ecosystem Restoration



Sarah Voska, Co-chair of the Youth Taskforce of the UN Decade on Ecosystem Restoration; Sales Manager at Bluestem Ecological Services

Across cultures, people have said, “Plant a tree not for yourself, but for your children’s children to one day sit under its shade.” As the Youth Taskforce (YTF) for the United Nations Decade on Ecosystem Restoration, we speak for our generation and the following ones when we stress the intergenerational nature of reforestation and the importance of youth engagement in ecosystem restoration, forest management and policymaking. Youth involvement in forestry historically dates back to the early 1800s, but recognition for youth actions in the sector has only come in recent years.

The YTF is a youth-led movement demonstrating the power of an environmentally conscious generation taking concrete action towards #GenerationRestoration to protect a healthy planet. Young people are already taking steps towards restoring today’s environment, and we will continue, with or without recognition. It is often said that there is time, well, this is the time, we cannot fail, this is our planet!

Source: Kaiser, F. 2021. A new generation of young people is putting the planet first. Here’s everything you need to know. In: World Economic Forum. Cited 9 August 2023. <https://www.weforum.org/agenda/2021/04/generation-restoration-everything-you-need-to-know/>

The contributions of planted forests to the restoration of mosaic landscapes

Planted forests are primarily established for productive purposes (FAO, 2006). Seventy-six percent of planted forests globally are managed for the production of essential goods such as wood products, pulp and fibre, and fuel or bioenergy (Evans, 2009). Planted forests are also increasingly established to sequester carbon. Although they accounted for only 7 percent²⁰ of the global forest area in 2015, planted forests contributed around 46 percent of global industrial roundwood supply

(Nepal, 2019). Plantations,²¹ which are intensively managed planted forests, are especially successful in meeting the demand for wood production because they are designed to meet a single management objective (Bauhus *et al.*, 2010). Globally, the area of plantation forest composed of introduced species is 49.7 million ha, which represents 1.4 percent of the total forest area of the reporting countries. Introduced species account for 44 percent of the total area of plantation forest in these countries.

²⁰ Or 291 million ha according to the Global Forest Resources Assessment (FRA) 2015 (FAO, 2015). Note that according to FRA 2020 (FAO, 2020), the global planted forest area has increased to 294 million ha, which still amounts to 7 percent of the global forest area.

²¹ According to FAO (2020), plantations are intensively managed and include only one or two species, even-aged classes and regular spacing. This definition includes short-rotation plantations for wood, fibre and energy but excludes forest planted for protection or ecosystem restoration, and forest established through planting or seeding that at stand maturity resembles or will resemble naturally regenerating forest.

Planted forests can also directly provide a range of other ecosystem services that contribute to the UN Decade's mission of preventing, halting and reversing ecosystem degradation. About one-third of planted forests globally are established with the primary objective of protecting natural resources (Evans, 2009). When well designed and managed, planted forests contribute to regulating climate, recovering and maintaining soil structure and quality, and improving water quality. They can provide habitat for animal and plant species and corridors for wildlife. Tree planting is also a strategy to fight desertification, protect watersheds from erosion and for phytoremediation (Isebrands and Richardson, 2013).

Despite multiple trade-offs across production, profitability, social acceptability and environmental benefits such as carbon storage, water provisioning, soil erosion control and biodiversity (Hua *et al.*, 2022), planted forests have the potential to deliver on multiple objectives. They can play a role in enhancing productive capacity, ecological connectivity, livelihoods and food security. In some cases, planted forests provide the enabling environment for the establishment of native vegetation and can also help prevent further degradation of natural forests (Maginnis and Jackson, 2003). By reducing pressure on natural forests, they can contribute to strategies to combat forest degradation and deforestation (as an example, see the Makala Project box). Including planted forests as part of the mix of restoration options at the landscape level has the potential to provide balanced packages of ecosystem services and goods. Although intensively managed tree monocultures can hardly be considered as restored stands, they may be considered as a relevant FLR option in specific landscapes. Successful examples exist, where large-scale tree plantings with native species play a key role in the restoration of mosaic landscapes combined with a mix of other interventions, such as in The Atlantic Forest Restoration Pact "PACTO" (Rodrigues *et al.*, 2011). By optimizing spatial arrangements and balancing trade-offs between land uses and

The Makala Project: sustainably managing woodfuel resources

In the Congo and in the Democratic Republic of the Congo, a major part of domestic energy comes from wood. Urban sprawl takes a hard toll on natural peri-urban forests. The Makala ("charcoal" in lingala) Project implemented from 2009 to 2013 under the coordination of the French International Cooperation Centre of Agricultural Research for Development (CI-RAD), was designed to address the degradation of wood resources while meeting energy needs in the cities of Kinshasa and Kisangani, Democratic Republic of the Congo, and Brazzaville, Congo. Building on lessons learned from pre-existing high productivity plantations, the project contributed to increasing wood resources through planted forests. It adapted technical itineraries for planted forests, with the priority objective of sustainable production of wood for energy purposes; supported the establishment and management of woodfuel plantations by small private growers and communities; and integrated planted forests for energy purposes into an agroforestry dynamic.* In areas of second-growth forest where biodiversity was still high, the project favoured assisted natural regeneration to protect species useful to farmers.* In contrast, in the most degraded areas where only invasive grasses or shrubs remained, planting fast-growing leguminous trees was the most appropriate solution for restoring soil fertility, while producing woodfuel and non-timber forest products.**

Sources: * Peltier, R., Dubiez, E., Diowo, S., Gigaud, M., Marien, J.-N., Marquant, B., Peroches, A., Proces, P. & Vermeulen, C. 2014. Assisted Natural Regeneration in slash-and-burn agriculture: Results in the Democratic Republic of the Congo. *Bois et forêts des tropiques*, 321: 67–79.

** Bisiaux, F., Peltier, R. & Muliele, J.-C. 2009. Plantations industrielles et agroforesterie au service des populations des plateaux Batéké, Mampu, en République démocratique du Congo. *Bois et forêts des tropiques*, 301: 21–32. <https://doi.org/10.19182/bft2009.301.a20404>

between productive and protective functions of forests, expansion of the planted forests area can meaningfully contribute to achieving global restoration goals.

Implementing afforestation and reforestation as restoration interventions

The variety of tools and approaches already used in restoration initiatives worldwide can be mobilized towards effective restoration with planted forests. As for all restoration interventions, the ten principles for ecosystem restoration (FAO, IUCN CEM and SER, 2021) and standards of practice (FAO, SER and IUCN CEM, 2023) developed under the UN Decade provide a useful guiding framework and key recommendations, which can apply to afforestation and reforestation

initiatives, from assessment, planning and design, to implementation, ongoing management, and monitoring and evaluation. It is important to highlight that, to be considered restorative activities, afforestation and reforestation must result in improvements for biodiversity, ecosystem integrity and human well-being, and should enhance natural recovery processes and not generate additional degradation (FAO, IUCN CEM and SER, 2021). Aligned with the guiding framework, the ten golden rules for reforestation developed by Di Sacco *et al.* (2021) offer relevant recommendations for conducting reforestation within forest restoration initiatives in a way that maximizes benefits for nature and people.

From an assessment and planning standpoint, careful landscape- and stand-level assessment, planning and

mapping of restoration interventions, are needed. The widely used Restoration Opportunities Assessment Methodology (ROAM) (IUCN and WRI, 2014) offers a good starting point, but tools tailored to informing restoration planning while linking to forest value chains and especially wood production potential, and taking into account a variety of factors such as opportunity costs of land, infrastructure and wood prices, are much needed. Some organizations have started developing tools and approaches towards better consideration of these dimensions (Caradine *et al.*, 2023). The contribution of a wide range of planted forest management systems can be explored. On the one hand, establishing highly productive plantations to meet the industrial roundwood demand increase by 2050 would be needed over at least 33 million ha (FAO, 2022). On the other hand, models of multifunctional planted forests, including mixed-species planted forests, which produce diverse packages of ecosystem goods besides wood, such as non-timber forest products for food or medicinal use, fibre, biofuels or fuelwood, or closer-to-nature forest management – a new concept of nature-based forest management (NBFM) proposed in the EU Forest Strategy for 2030 – should be operationalized on a larger scale (Messier *et al.*, 2022).

In a restoration context, the quality of planting material is essential to ensuring successful outcomes. High-quality tree seed or other propagation material are needed in sufficient amounts. The lack of tree seed and forest reproductive material undermines the success of restoration. Guidelines, including FAO's recently launched publication on "Delivering tree genetic resources in forest landscape restoration: A guide for practitioners and stakeholders to ensure local and global restoration outcomes" (FAO, forthcoming), training materials (FAO e-learning) and tools are being developed to improve the use and benefits of genetic resources in restoration. To enhance the role of planted forests in restoration as well as the biodiversity benefits derived from their establishment, industrial roundwood production with commercial exotic

(not invasive) and indigenous species should be better explored.

Finally, lack of ownership from local populations is often quoted as a reason for failure of restoration efforts. To successfully integrate planted forests as a restoration option at the landscape level, buy-in of local communities is paramount. This entails engaging all stakeholders from the onset of the process to ensure that the proposed interventions are acceptable, the species selected are suitable and mechanisms are set up to grant their rights and benefits (Maginnis and Jackson, 2003). Some initiatives, such as New Generation Plantations, are working actively towards that end (refer to the article on the contribution of properly governed plantations on p. 91). As planted forests often involve economic interests, it is paramount to ensure responsible investments in restoration. Guidelines and principles developed in the context of forestry investments apply to reforestation programmes (FAO and Landesa, forthcoming). Other tools, such as certification, can be implemented to ensure the quality of restoration outcomes.

Moving forward

A vast body of knowledge focused on major challenges posed by the large-scale restoration movement, such as monitoring or finance, and on specific restoration approaches, such as assisted natural regeneration, has been consolidated. There is much evidence and experience from both science and practice about planted forests in FLR, but relatively limited capitalization and experience sharing on the topic. Knowledge on planted forests for restoration needs to be strengthened and widely disseminated. The UN Decade, through its Taskforce on Best Practices, provides a unique platform for sharing knowledge and good practices and engaging with a wide range of stakeholders, and to leverage science and practice, which could potentially enhance the role and contributions of planted forests to FLR and the global restoration movement.

Whereas national restoration assessments and strategies recognize

planted forests as one of the options for restoration, successful examples and best practices remain isolated. Partners have a role to play in encouraging the implementation of sound productive restoration interventions that deliver on multiple benefits across the landscape. Testing and promoting sound approaches in mosaic landscapes with planted forests, implemented through coalitions of partners, would help build the case required to meet the concomitant needs for restoration and production in the coming decades.

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