

Role of Planted Forests for Biodiversity Conservation & Restoration: *Build it and they will come?*



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Likely impacts of planted forests on biodiversity depend on what they are replacing



strongly negative

?

strongly positive

Biodiversity impacts of planted forests are mediated by several biophysical and socioeconomic factors operating at the landscape level: *context matters*



Degradation drivers: climate/weather, fire, agricultural conversion, unsustainable management of forests, grazing lands, croplands, mining & infrastructure....

Land use history and degree of degradation of soils, vegetation & wildlife communities.

Current and future land use/land cover, and location and condition of forests on the landscape.

Planted forest options differ in their potential to deliver benefits to people as well as their potential biodiversity impacts

Depending on landscape restoration goals and priorities of land managers/owners, these may include:

- Agroforestry systems (*food and nutritional security*).
- Short- and long-rotation fiber/timber plantations (*livelihoods, income, industrial fiber production, timber*).
- Mixed-species silviculture for timber and non-timber forest products (*forest-based livelihood diversification*).
- “Restoration forestry”, combining production with ecosystem restoration (*biodiversity and multiple ecosystem services*).

“Restoration Forestry”: lessons from early research in PR

Establishment of planted forests on degraded sites that are unlikely to recover through natural regeneration along in the near term, accelerates restoration via:

- Moderation of understory temperature, humidity and light regimes, resulting in improved conditions for natural regeneration and suppression of dominant grasses or ferns





- Creation of suitable habitat for native flora and fauna at the local (site or stand) and/or broader landscape level, in particular for seed-dispersing wildlife (birds, bats, other mammals).
- Increase in soil organic matter & improved nutrient status
- Enhancement of nutrient cycling and soil biological processes

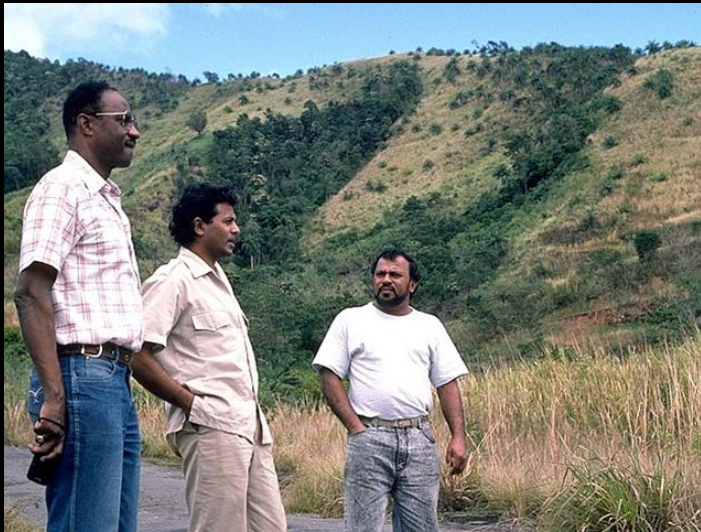
Main factors affecting the rate and extent of biodiversity recovery in planted forests

- Extent of soil and vegetation degradation;
- Landscape biological diversity: proximity of planted forests to natural forests (seed sources and dispersal agents);



Main factors affecting the rate and extent of biodiversity recovery in planted forests (2)

- Plantation species selection (growth rates, tree form, utility for wildlife, soil improvement potential);
- Silvicultural management practices, including protection from fire and other disturbances, and management intensity.



Planning and management decisions for planted forests can yield “win-win” outcomes: *short-rotation fiber plantations*



Hybrid eucalypt plantation in Bahia State, Brazil, with protected remnants of natural and restored semi-natural forest. In the Atlantic forest region of Brazil, the Government has stringent demands for forest conservation and restoration. (photo by Clio Luconi, Veracel, in Bockerhoff et al., 2013)

Planning and management decisions for planted forests can yield “win-win” outcomes: *long-rotation hardwood plantations*



100-year old *Eucalyptus grandis* plantations in Limpopo province, South Africa. The 30+ m tall “understory” within these long-rotation commercial stands harbors the full complement of native Afromontane forest flora and fauna, which has largely disappeared from the surrounding landscape (photo by J. Parrotta)

Planning and management decisions for planted forests can yield “win-win” outcomes: *restoration forestry on mined lands*



Oliver Henry Knowles was awarded the 2003 SER Theodore M. Sperry Award in recognition of his contributions to the science and art of tropical forest ecosystem restoration.



A unique program to restore forests on bauxite mined land at Trombetas in Pará State, Brazil (central Amazonia) was developed to treat ca. 100 ha of mined land per year by using stockpiled topsoil and by planting a mixture of up to 60 native tree species. Within 10 years of establishment, most sites have many more tree and shrub species than the number initially planted because of seed stored in the topsoil or colonization from the surrounding forest.

Conclusions

- Likely impacts of planted forests on biodiversity depend on what they are replacing – *context is critical*.



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- Several factors operating at the landscape level determine the effectiveness of planted forest options to yield positive biodiversity outcomes, i.e. degradation drivers (biophysical and socioeconomic); land use history, and its impact on soils, vegetation & wildlife; current and future land use/land cover, and location and condition of forests on the landscape.

Conclusions

- Likely impacts of planted forests on biodiversity depend on what they are replacing – context is critical.
- Biodiversity impacts of planted forests are mediated by several factors operating at the landscape level, i.e. degradation drivers (biophysical and socioeconomic); land use history, and its impact on soils, vegetation & wildlife; current and future land use/land cover, and location and condition of forests on the landscape.
- Planted forest options differ in their potential to deliver benefits to people as well as their potential biodiversity impacts – trade-offs.

Conclusions

- Likely impacts of planted forests on biodiversity depend on what they are replacing – context is critical.
- Biodiversity impacts of planted forests are mediated by several factors operating at the landscape level, i.e. degradation drivers (biophysical and socioeconomic); land use history, and its impact on soils, vegetation & wildlife; current and future land use/land cover, and location and condition of forests on the landscape.
- Planted forest options differ in their potential to deliver benefits to people as well as their potential biodiversity impacts
- Planning and silvicultural management decisions for all types of planted forests can yield “win-win” outcomes for biodiversity conservation and restoration, provision of ecosystem services and direct livelihood benefits to people

Thank You !

