HOW TO DELIVER FOREST RESTORATION AT SCALE:

Recommendations for unlocking the potential of the most cost-effective way to restore forests in the fight against climate change and biodiversity loss

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KEY MESSAGES

1 Natural climate solutions, including forest restoration, are a vital part of the fight against climate change.

2 Assisted natural regeneration, the most cost-effective restoration strategy, should be the default approach for restoring forests at scale.

3 It is now possible to predict and identify, with high certainty, suitable areas for assisted natural regeneration.

4 Government action, through implementing smart policies and financial incentives such as the ones in this brief, is critical to unlocking the full benefits of assisted natural regeneration.

1. Natural climate solutions, including forest restoration, are a vital part of the fight against climate change

Harnessing the power of nature is essential to achieving the Paris Agreement goal of limiting global warming to well below 2°C beyond pre-industrial levels.[1] This means swiftly reducing carbon emissions from land use by maximizing tree cover in forests and enhancing carbon storage in other ecosystems, including agricultural systems.

> **Natural climate solutions can provide 30% or more of the climate change mitigation needed by 2030, yet they receive only 2% of global climate funding. Current nationally determined contributions to the Paris Agreement do not reflect the full potential of nature.[2]**

The current shortfall of US$250 billion–350 billion per year in financing for conservation and restoration,[3] as well as the urgency of the climate and biodiversity crises, demands the efficient use of currently available funds for forest restoration while also growing the available amount of capital.

New research has found that the most cost-effective solution for removing carbon from the atmosphere is restoring forests,[2] and the most cost-effective way of restoring forests is by removing barriers to the natural regeneration process and—where required—accelerating it, a strategy known as assisted natural regeneration.

2. Assisted natural regeneration, the most cost-effective restoration strategy, should be the default approach for restoring forests at scale.

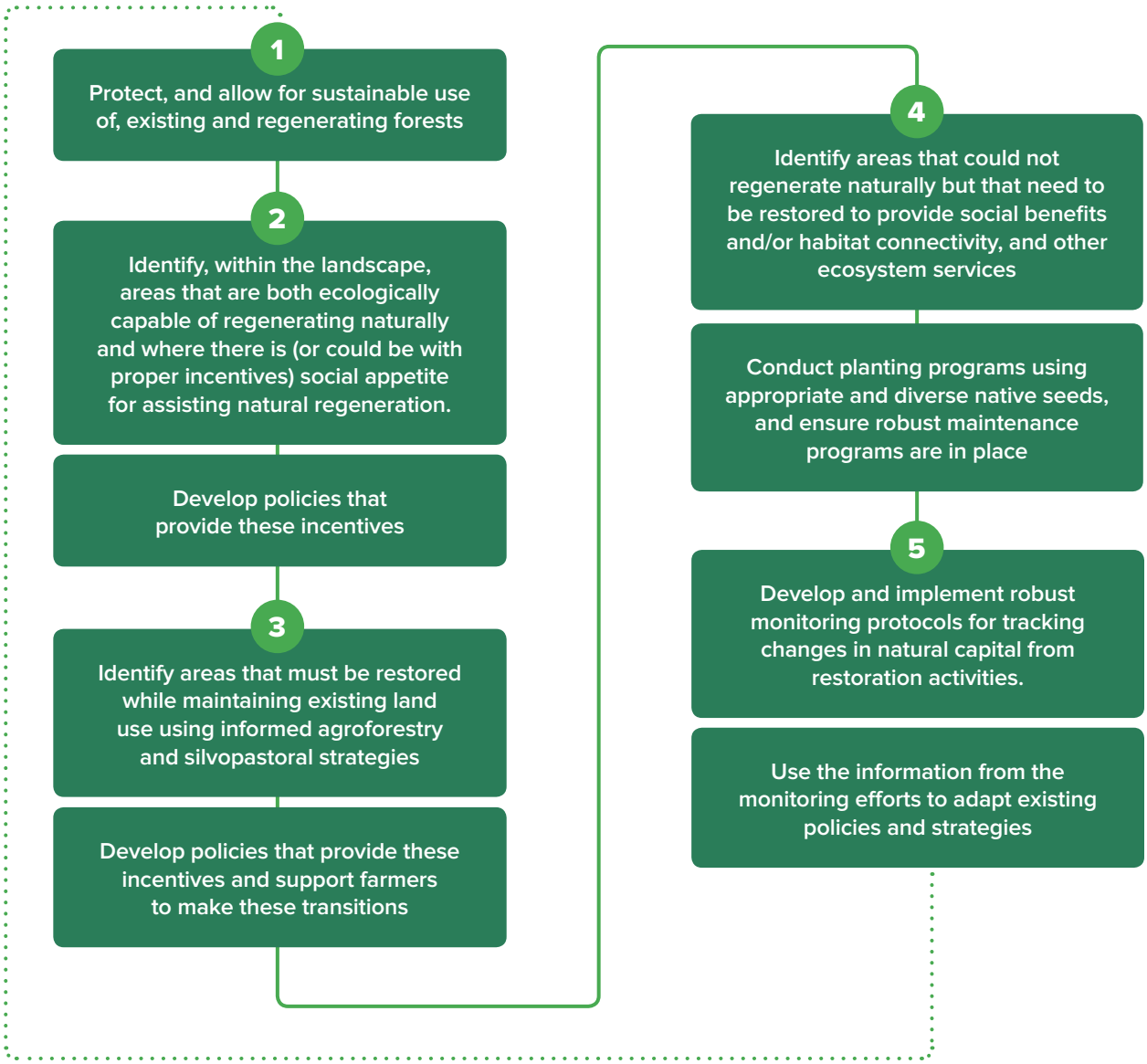
Natural regeneration of forests can occur on their own following the removal of agricultural or other pressures on the land. In many circumstances, assisted natural regeneration—consisting of interventions such as preventing fire and grazing, suppressing weeds, enhancing seed dispersal and enriching species composition—can help initiate, speed up and improve this forest recovery process. Assisted natural regeneration is a low-cost, low-tech and high-impact strategy for restoring forests, sequestering carbon, and conserving biodiversity. In fact, under suitable conditions, it can reduce the costs of implementing restoration by more than 70% compared to active restoration that uses full tree planting,[4] and it requires little or no specialist training.

Active restoration strategies based on full tree planting are more expensive, costing from US $1,400–$34,000 per hectare (ha),[5] and should therefore only be applied as a complement to (assisted) natural regeneration (see Figure 1). Active restoration strategies can be used in areas where: (1) economic development using timber species and agroforestry strategies are required by local communities, or (2) (assisted) natural regeneration is not ecologically or economically feasible – that is, areas where land degradation or the opportunity cost of land is high, and the land is far from forest remnants from which seeds would naturally disperse.

In tropical regions and under suitable conditions, (assisted) natural regeneration of forests can yield higher benefits than active restoration for native biodiversity recovery and carbon sequestration.[5] Active restoration, on the other hand, can support higher direct economic returns, often in the form of wood products. (see restoration strategy definitions in Appendix I.)

Restoration planning must be an iterative process that brings together and balances the needs of local communities and national priorities. Although it is essential to use the best science to map where restoration can occur, and what kinds of restoration methods are most socially and ecologically appropriate, all such mapping must be co-created and validated by local stakeholders. Community ownership of restoration plans is essential to their success, and every effort must be taken to ensure such plans are not the product of top down decision making.

Figure 1. Flow chart of the sequence of activities restoration strategies should follow, with local community leadership and engagement at each step



3. It is now possible to predict and identify, with high certainty, suitable areas for assisted natural regeneration.

A major barrier to the use of natural regeneration in forest restoration has been the ability to identify where this strategy can be successful and where more active restoration strategies might be needed. Thanks to cutting-edge technologies, a spatial predictive model has been created to analyze the conditions favoring successful natural regeneration. It is now possible to predict and identify suitable areas for both spontaneous and assisted natural regeneration with high certainty.

Using these methods, an analysis of the Brazilian Atlantic forest found that areas suitable for assisted natural regeneration (21.8 million hectares — 30% of the entire restorable area) could be predicted and identified with approximately 80% accuracy (Figure 2).[4] A recent analysis using the same technique estimates that 238 million hectares (38%) of restorable lands within tropical and temperate forest countries are promising candidates for assisted natural regeneration.[6]

High predictive power permits better planning, increases certainty in restoration outcomes, reduces need for risk management, and reduces investment risk from the public and private sectors. Such planning also helps to ensure that decision makers don't target costly and laborious planting efforts in areas with a high suitability to regrow on their own or with low-cost assistance. A global spatial predictive model and map of the suitability for assisted natural regeneration within forest tropical regions is currently under development by the International Institute of Sustainability (IIS) and the Center for International Forestry Research (CIFOR), which will soon enable decision-makers and land-use planners to develop cost-effective restoration plans and incorporate high priority natural regeneration areas into existing policies.

4. Government action, through smart policies and financial incentives such as the ones below, is critical to unlocking the full benefits of assisted natural regeneration.

The first step in developing assisted natural regeneration policies is to identify where the process could take place successfully, using maps such as the one in Figure 2, based on spatial predictive models. These models must then be verified through local community and stakeholder engagements.

Then, policy levers can be applied to widely promote and incentivize the use of assisted natural regeneration where the likelihood of success is high, as part of restoration strategies at any scale. Such a process can also be used to support the development and implementation of national contributions to international agreements such as the Paris Agreement, UN Convention on Biological Diversity or UN Convention on Combating Desertification. Conservation International is working to develop decision maker support tools to help integrate and/or strengthen the role of assisted natural regeneration in existing and new legislation.

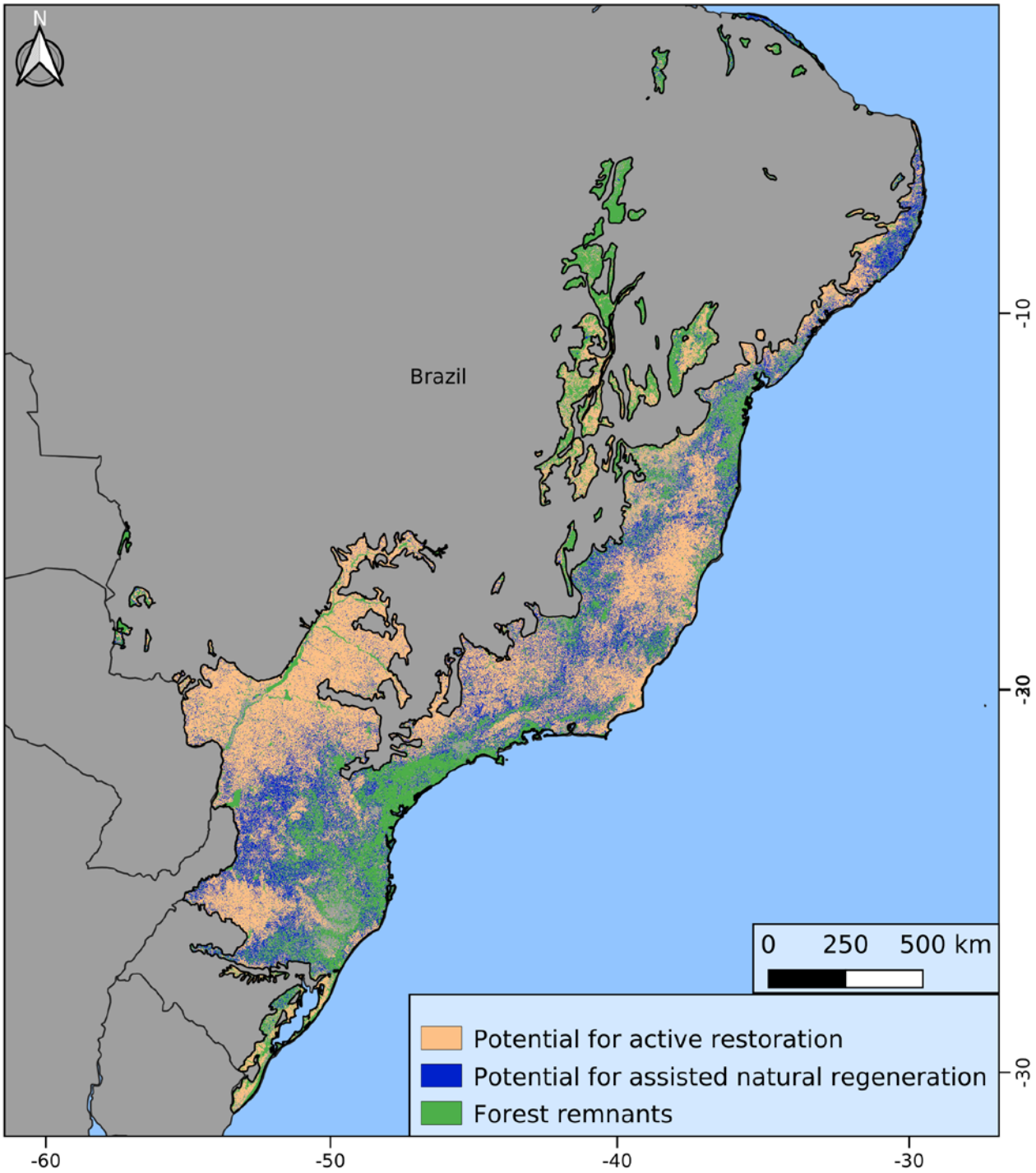


Figure 2: Map of areas that have potential for unassisted and assisted natural regeneration in the Brazilian Atlantic Forest (results of a spatially predictive model mentioned above).

Ten examples of policy levers that could maximize natural regeneration:

1. Legislation that requires landowners to maintain specified levels of native forests on their land (e.g., Brazil's Native Vegetation Protection Law)

2. Legislation governing land clearing and penalties for illegal land clearing (e.g., Australia's Environmental Protection and Biodiversity Conservation (EPBC) Act)

3. Science-driven legislation governing offsetting (replacing lost forest) when land is legally cleared for development, including minimum offset ratios—for example, five hectares restored for every one hectare cleared, and adapted to specific ecosystem types (e.g., US wetland mitigation banking under the Clean Water Act)

4. Legislation requiring ranchers to provide shade trees for animal welfare and production purposes, which could be supported by regulated labeling of ethically produced food products (e.g., Argentina's cost-sharing program for improved forest cultivation ; case study)

5. Policy that encourages integrated landscape management to ensure that forest restoration achieves many benefits including carbon sequestration, biodiversity conservation, erosion and runoff reduction (watershed management), freshwater supply management, and economic value (e.g., Rwanda's ongoing environmental policy integration work)

6. Incentive programs that provide payments for ecosystem services and provide technical assistance to encourage landowners to restore forests on their land (e.g., Costa Rica's Forest Law 7575)

7. Incentive programs for sustainable production of timber and non-timber products from naturally regenerating forests (e.g., the US state of Vermont's Value Appraisal Forestland Tax Program)

8. Incentive programs for sustainable forestry based on native species and agroforestry, to be applied as a complement to assisted natural regeneration of forests and to provide alternatives that produce economic benefits for landowners (e.g., Panama's Law No. 69 of October 30th 2017)

9. Financing for monitoring and enforcement of environmental laws governing forest loss and regrowth (some examples can be found here)

10. Establishing market trading schemes for environmental offsets, thereby allowing some landowners to maintain high levels of agricultural production (e.g., Germany's production-integrated compensation (PIC) program

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Restoration Strategies

NATURAL REGENERATION

The spontaneous (meaning unassisted) natural recovery of forest cover from seeds or rootstocks already present in the soil or newly dispersing from neighboring forests. This type of restoration happens without human intervention, including site protection, and is often a by-product of unplanned land abandonment triggered by larger socioeconomic forces. Natural succession happens uninhibited and requires no support.

ASSISTED NATURAL REGENERATION

In areas that have the socioeconomic and ecological potential to regenerate from the seedbank or neighboring seed sources, but specific conditions impede success, human interventions are used to secure, catalyze, or enrich the process. Such interventions can include fencing, weed and/or fire control and enrichment planting. Farmer-managed natural regeneration, where farmers intentionally manage regrowing trees in their agricultural areas to secure a variety of benefits, is also included here. Assisted natural regeneration does not include intentional and systematic planting of seedlings grown offsite in order to create an agroforestry system.

RESTORATION PLANTING / ACTIVE RESTORATION

The active growth and maintenance of seedlings in nurseries and the planting of seedlings in a systematic way. This includes establishment of restoration plantations, woodlots, agroforestry plots, silvopastoral systems, or biodiversity habitat corridors. Initial plantings often serve to stimulate natural regeneration where it would not otherwise be possible.

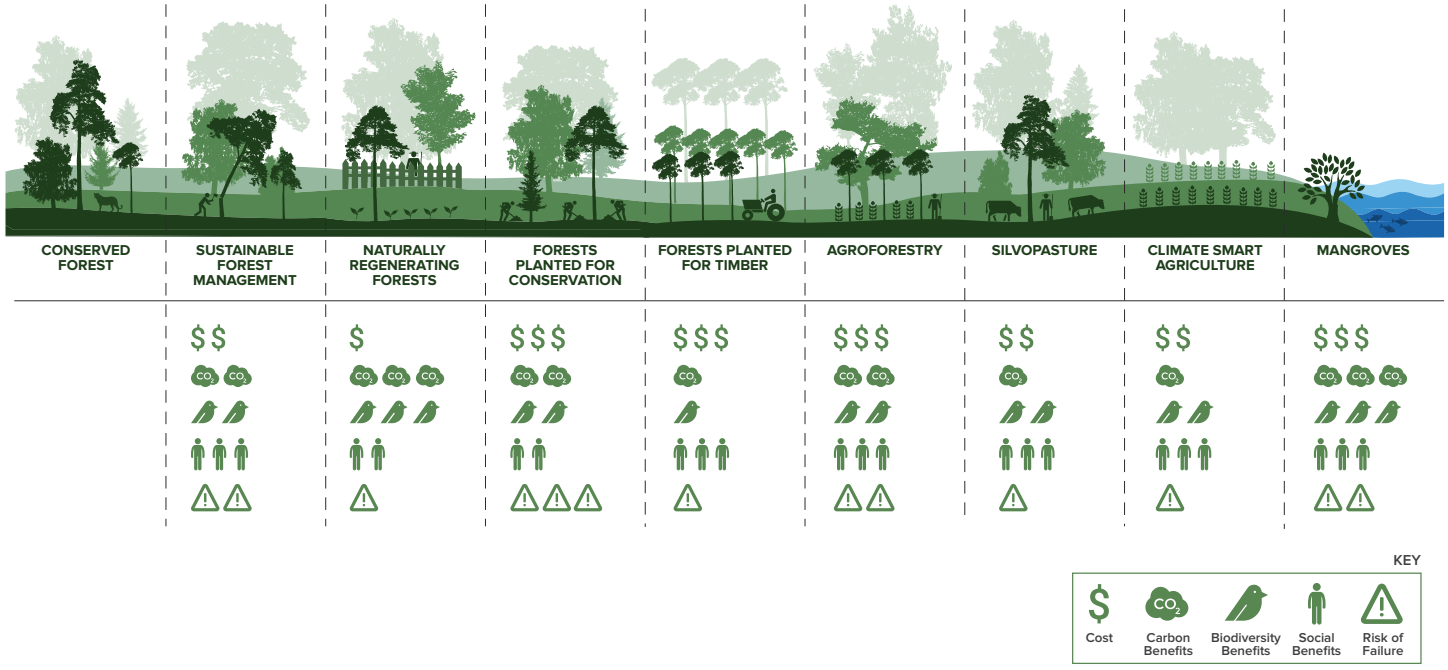

Figure 3. Different restoration strategies can be used for different purposes, and have different tradeoffs.

Conclusion

Nature is an essential part of the climate mitigation solution. Stopping emissions is critical, but will no longer be sufficient to avoid catastrophic climate change. Restoration is currently the only cost-effective way to remove CO2 from the atmosphere.

> **Assisted natural regeneration should be the default restoration strategy used, as it can provide locally optimized nature-based solutions that simultaneously tackle climate change and provide meaningful economic, social, and ecological benefits to people.**

Using the latest advances in scientific spatial assessments, restoration practitioners and decision makers can now identify where assisted natural regeneration could occur if proper policies are enacted. Policy makers must use this science, combined with robust stakeholder engagements, to develop scientifically robust and cost-effective policies for unlocking natural regeneration. By leveraging natural regeneration, policy makers can make rapid progress towards their Land Degradation Neutrality (LDN) commitments, strengthen their Nationally Determined Contributions (NDCs), support the Sustainable Development Goals (SDGs), prepare for Post-2020 Convention on Biological Diversity targets (CBD), and catalyze rural economic development.

Authors

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Further information: A summary of the scientific evidence base for the material presented in this policy brief can be found at **www.conservation.org/restoration.**

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