Re-establishing tropical natural forest vegetation

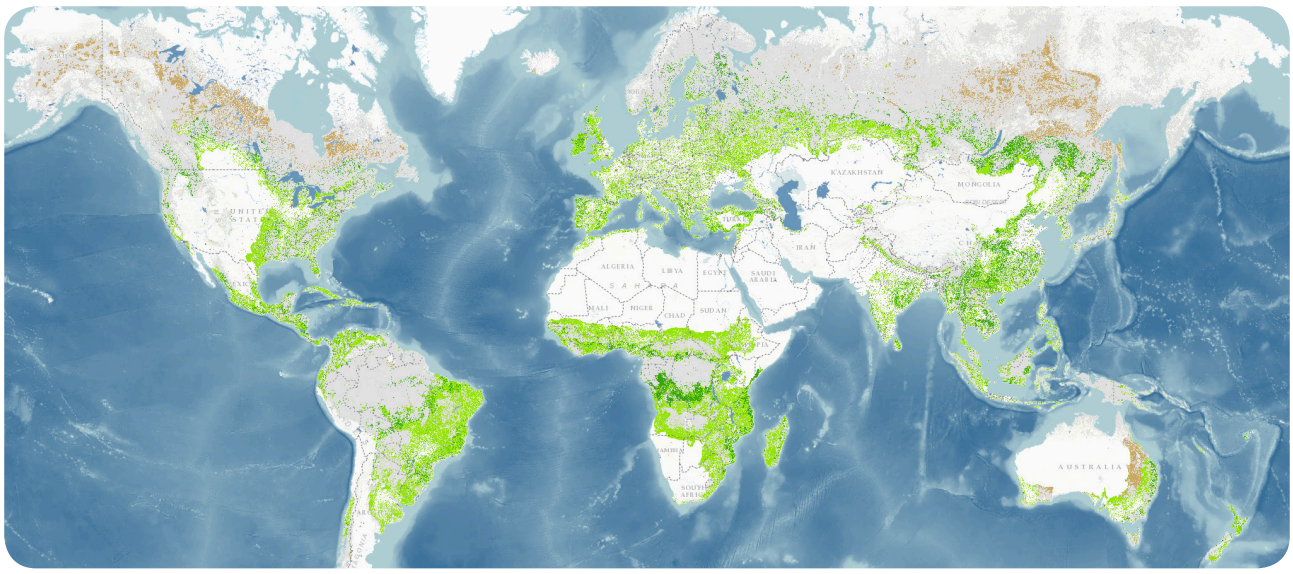
Successful experiences from Upper Xingu in Brazil to supply native seed for re-establishing tropical natural forest vegetation can be scaled up across the world, benefit local livelihoods, conserve biodiversity and store billions of tons of carbon.

There is broad agreement that improved land-use management is a key and cost-effective climate solution. The report "Missing Pathways to 1.5°C"[1] by the CLARA network assess the mitigation potential through improved land use to 15 Gt of CO2 per year, where restoring natural forests can contribute to almost half of this. Natural forest restoration also has significant ecological and biodiversity benefits, but this part of the solution has still been largely overlooked.

Experiences from seed network cooperation in Brazil for re-establishment of natural forest on degraded lands, using native seeds, local knowledge and modern technology can set a new global standard for climate and biodiversity friendly forest restoration. Scaled-up effort is needed to spread the knowledge and establish local seed collection and disbursement systems.

Who are involved?

The Xingu Seed Network[2] is a community-based network in the Brazilian Amazon that has developed a business model for native seed supply. The initiative involves indigenous communities, farmers, landowners, local governments and non-governmental organizations including Brazilian Instituto Socioambiental[3] and Norway-based Rainforest Foundation Norway[4], and has successfully restored 6000 hectares of degraded land over the last decade through direct seeding of natural forest.



Source: bonnchallenge.org

Restoration oppurtunity areas

- Wide-scale restoration
- Mosaic restoration
- Remote restoration

Other areas

- Forest without restoration needs

Where?

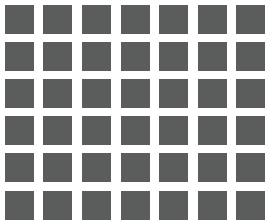
So far, this activity has taken place in the Upper Xingu region in Brazil. Under the Bonn Challenge[5] and Brazil's own NDC, Brazil has a restoration target of 12 million hectares. Globally, the corresponding Bonn commitment is restoration of 350 million hectares of degraded land by 2030. IUCN[6] and other scientists[7] have shown that even larger areas can be available for restoration.

The successful experience from the Xingu Seed Network is a scalable natural solution for real forest restoration that can save billions of tons of carbon

As shown by the recent study by Lewis et al in Nature[8], the amount of carbon stored per hectare of re-established natural forest is in the magnitude of 40 times higher than in a plantation. This suggests an increased emphasis on re-establishing natural forests as climate mitigation measure on degraded land, not only in Xingu, but world-wide.

However, only limited experience exists from such forest restoration in practice. Recent studies suggests that seed availability for forest restoration is insufficient[9] globally, and Brazilian studies have concluded in the same direction[10].

ALL LAND BECOMES FOREST NATURALLY



42 petagrams of carbon stored in 350 Mha

This is the most effective way to retain carbon.

ALL LAND BECOMES PLANTATIONS

1

= 1 petagram of carbon

Source: nature.com

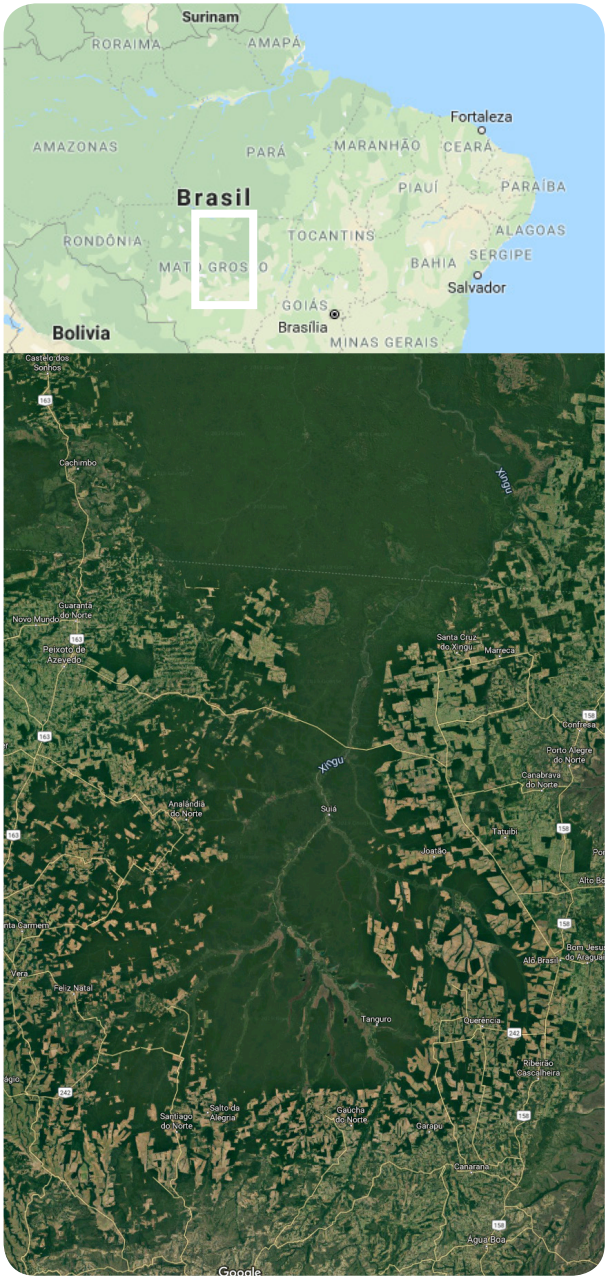
A success story that can and should be replicated

The Xingu Seed Network has the needed experience and knowledge, and can set a new standard for climate, biodiversity and community friendly forest restoration world-wide. Key learnings include:

- Using local knowledge to select and harvest native seeds combines social benefits with a successful forest restoration. The muvuca seed mix contains more than 200 unique species that are specially selected for sequential growth and local conditions after years of testing.

- Direct seeding using the *muvuca* technique is less costly, provides more biodiversity, higher density and resilience, and more local income opportunities, compared to planting of tree seedlings. Direct seeding restoration costs is up to two-thirds cheaper than planting of seedlings (USD 1.77 thousand/ha against USD 3 to 5 thousand/ha).

- The mix of native seeds can be sown using large farmer machinery such as spreaders, which enables low cost and high scalability.



Source: Google Maps

The Xingu Seeds Network was first created to satisfy demands for native seed created by local restoration projects to protect springs and riparian areas. The Network is now the largest native seed supplier in Brazil, with more than 600 seed collectors from 14 settlements and 6 indigenous ethnicities, and has generated about 1.2 million US dollars in local income. Native seed collection has helped diversify household income sources and livelihoods[11], reconcile divergent interests of landowners and indigenous and rural communities, engage collective action and local agreements to protect springs and riparian areas, improve local biodiversity and food security, and store significant amounts of carbon. The practical success of the direct seeding method is well documented, see studies 2013[12] and 2019[13].

Scaling up the Xingu experience can give global forest restoration a new drive

While most actors agree restoration of degraded land is good, implementation is still slow. Currently, most of the effort is toward plantations, not restoration of natural forest. Even with support for large-scale restoration, very few would know how to do it in practice. This is why the Xingu experience has transformational capacity and global potential.

The Xingu model can be **scaled up** in two steps.

Step one is to spread the knowledge to other regions. Knowledge of social architecture, seed collection, field tests for the right seed mix and spreading methods are crucial elements.

Step two is to create conditions for securing land. In Xingu, the main incentive for land owners to participate in restoration of forests on their land is a combination of the forest code that commits farmers to maintain forest cover on a certain percentage of their land, and the need to protect water sources. In other areas there might be other incentives, such as agricultural or climate policies, international commitments, REDD+ or other systems, or a combination of these.

With the Bonn Challenge, a global commitment to forest restoration already exists, and it can be made even bigger. However, to maximize the mitigation benefit of this commitment, it is important that as much as possible is restoration to natural forests. The Xingu experience has shown how this can be done successfully and cost-effective, while achieving multiple benefits for both local communities, farmers and biodiversity, as well as for the global climate. We have a recipe that works, and are ready to share experiences and help. There is no time to waste. Native seed networks must be built everywhere.

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Notes

1 The full report by the Climate Land Ambition and Rights Alliance is available here https://www.climatelandambitionrightsalliance.org/report

2 Xingu seed network can be visited at https://sementesdoxingu.org.br/site/

3 Instituto Socioambiental is one of Brazil's leading environmental organizations https://www.socioambiental.org/pt-br

4 The Norwegian Rainforest Foundation has worked with rights based rainforest protection for 30 years https://www.regnskog.no/en/

5 The Bonn Challenge is a global effort to bring 350 million hectares of the world's deforested and degraded land into restoration by 2030 http://www.bonnchallenge.org/

6 A background study for IUCN by WRI and the University of Maryland estimates available areas up to 2 million hectares http://www.bonnchallenge.org/what-our-global-restoration-opportunity

7 Gibbs et al., 2015: Mapping the world's degraded lands. Applied Geography 2015, describes why estimates for degraded land varies considerably, from 1 to 6 billion hectares https://www.sciencedirect.com/science/article/pii/S0143622814002793?via%3Dihub

8 Lewis et al.,2019: Restoring natural forests is the best way to remove atmospheric carbon: Nature, 2019 outlines the carbon effect of reaching the Bonn Challenge via natural forests vs plantations https://www.nature.com/articles/d41586-019-01026-8?fbclid=IwAR16AnQ43CH8tXbRjJfOMFXd9QifQD8cc2ulca4I_XrGlrZsfnL4mbwh9fQ

9 Merritt et al., 2011: Restoration Seed Banks—A Matter of Scale, Science 2011 https://science.sciencemag.org/content/332/6028/424

10 How policies restrain native seed supply: Urzedo et al, Restoration Ecology 2019 https://onlinelibrary.wiley.com/doi/abs/10.1111/rec.12936

11 Urzedo et al., 2016: Tropical forest seeds in the household economy: effects of market participation among three sociocultural groups in the Upper Xingu region of the Brazilian Amazon: Environmental Conservation 2016 https://www.cambridge.org/core/journals/environmental-conservation/article/tropical-forest-seeds-in-the-household-economy-effects-of-market-participation-among-three-sociocultural-groups-in-the-upper-xingu-region-of-the-brazilian-amazon/D36534C402134A3BDACF30C37FC5B5FE

12 Filho et al., 2013: Mechanized Direct-Seeding of Native Forests in Xingu, Central Brazil: Journal of sustainable forestry 2013 https://www.tandfonline.com/doi/abs/10.1080/10549811.2013.817341

13 Freitas et al., 2019: Evaluating the success of direct seeding for tropical forest restoration over ten years, Forest Ecology and Management 2019 https://www.sciencedirect.com/science/article/pii/S0378112718321534