Enhancing the role of natural regeneration in large-scale forest and landscape restoration

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- What is natural regeneration?
- What are the environmental and social benefits?
- Under what conditions is natural regeneration feasible?
- How to leverage natural regeneration to achieve goals of large-scale restoration?

- Re-establishment of forest ecosystem following disturbance
- Long-term process of self-organization involving stages with different dynamics and composition
- Outcomes have high degree of unpredictability
- Can be spontaneous or assisted
- Can be managed for different objectives

Assisted natural regeneration: Humbo Community-Based Natural Regeneration Project

Photo credit: Chris Reij

Following ANR practices to regenerate trees from stumps, within 7 years a new dense forest emerged on 2,700 ha

Assisted natural regeneration in the Philippines

Photo credit: Patrick Dugan

Assisted natural regeneration in Atlantic Forest, Brazil

Farmer-managed natural regeneration created 5 million ha of new agroforestry parklands

A dense and diverse new agroforestry parkland in Niger's Zinder Region

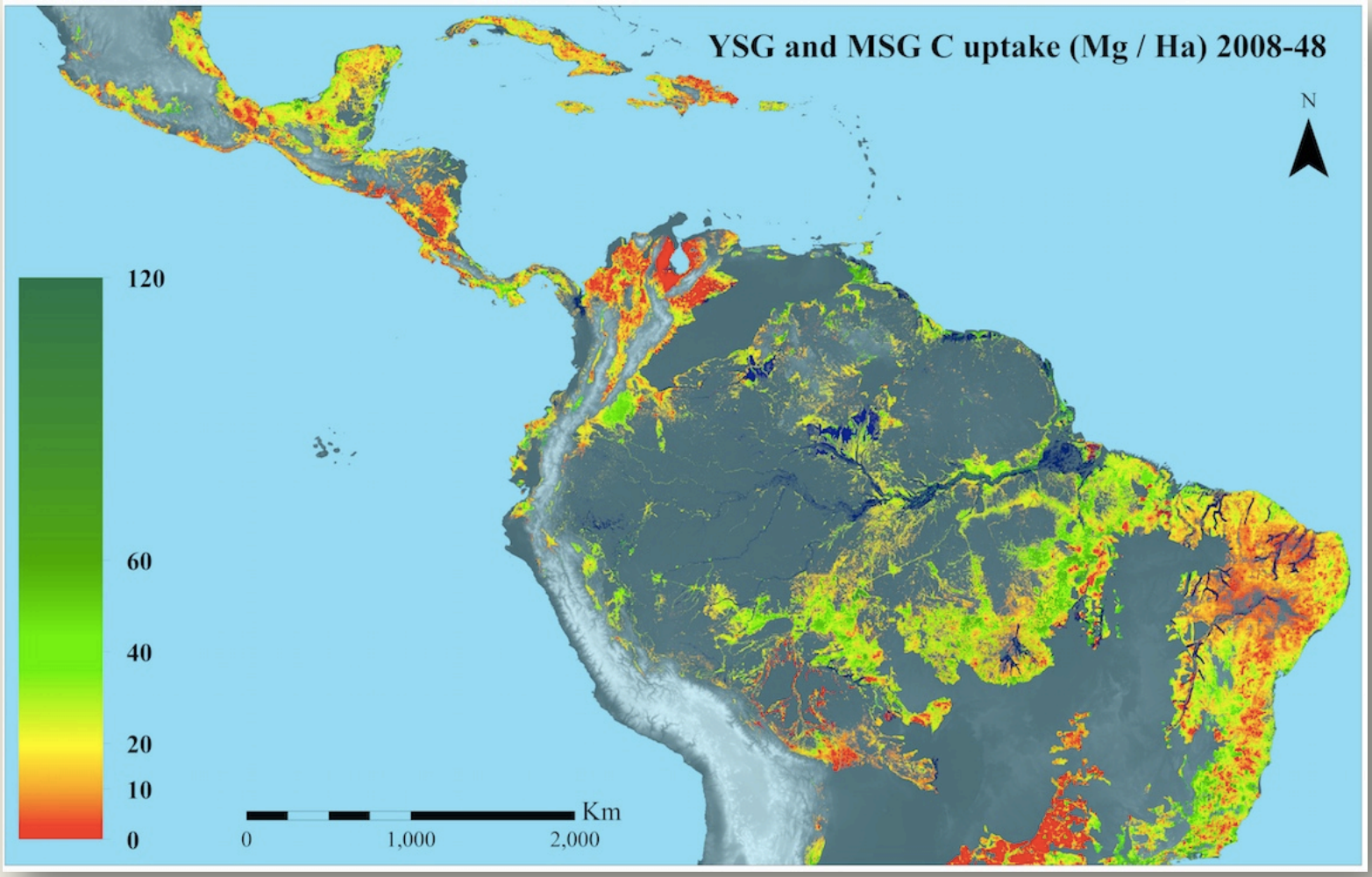
Photo credit: Chris Reij

New agroforestry parkland on Mali's Seno Plains

Ecological benefits of natural regeneration

- Colonization by diverse genotypes of native species that are adapted to local conditions and that bring their associated species.
- Recovery of multiple ecosystem functions
- Provides opportunities for movement of fauna through the landscape

Potential carbon storage after 40 years of natural regeneration in second-growth forests < 60 yr old in 2008



Chazdon et al. 2016. Carbon sequestration potential of second-growth forest regeneration in the Latin American tropics. Science Advances 2:e1501639.

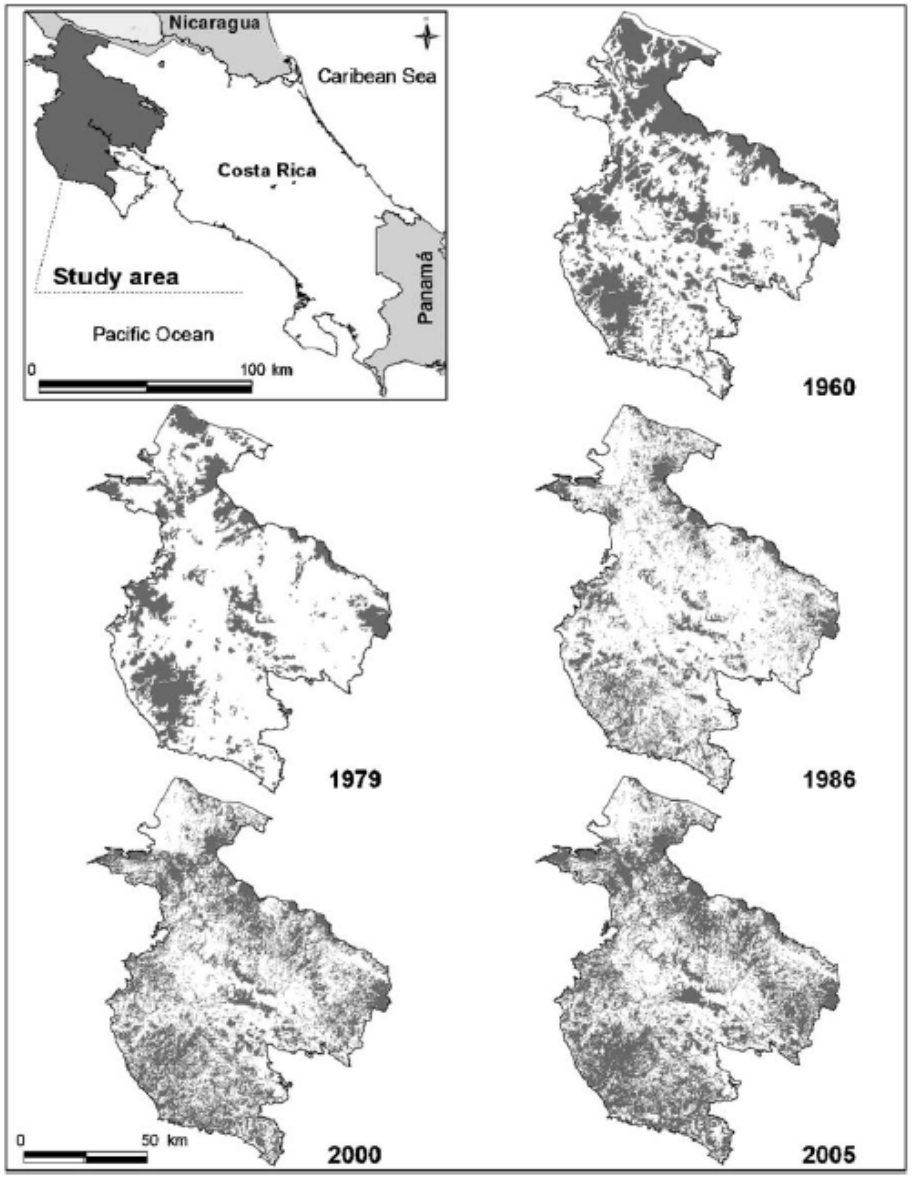
Social, economic, and cultural benefits of natural regeneration

- Restoration of species familiar to local people with known uses
- Supports local knowledge and cultural practices based on diverse uses of native flora and fauna
- Leaves open future use options for forest and land
- **Low implementation costs**

Under what conditions is natural regeneration feasible within landscapes?

- Steep slopes, high elevation, hilly terrain
- Proximity to forest fragments and water sources
- Poor access, distance to roads
- Little soil disturbance
- Remnant vegetation or root stocks

Spontaneous natural regeneration at large spatial scales



Forest cover doubled from 23% in 1966 to 47% in 2005 entirely through natural regeneration

Calvo-Alvarado et al. 2009. Forest Ecology and Management. 258:931-940.

Large-scale natural regeneration in the Paraiba do Sul river watershed

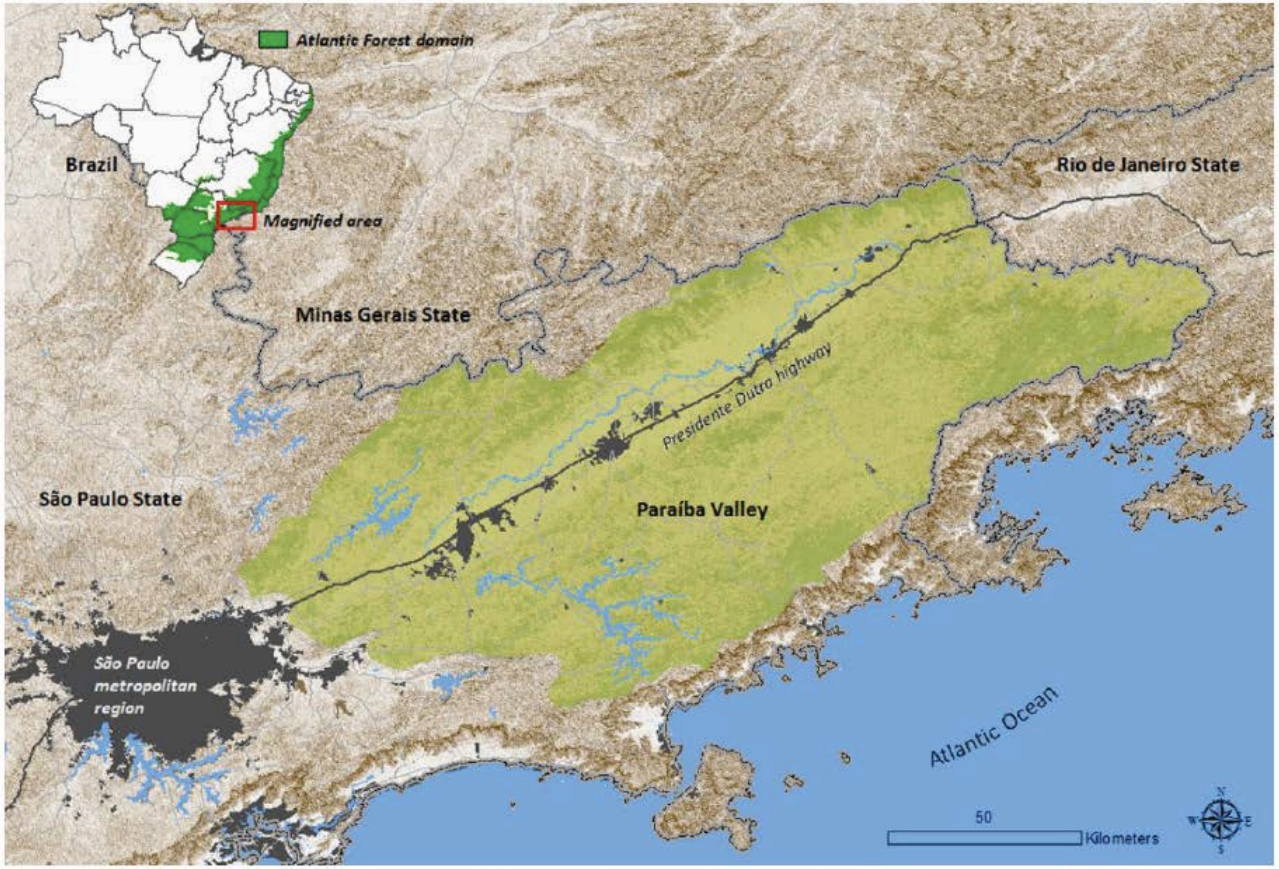
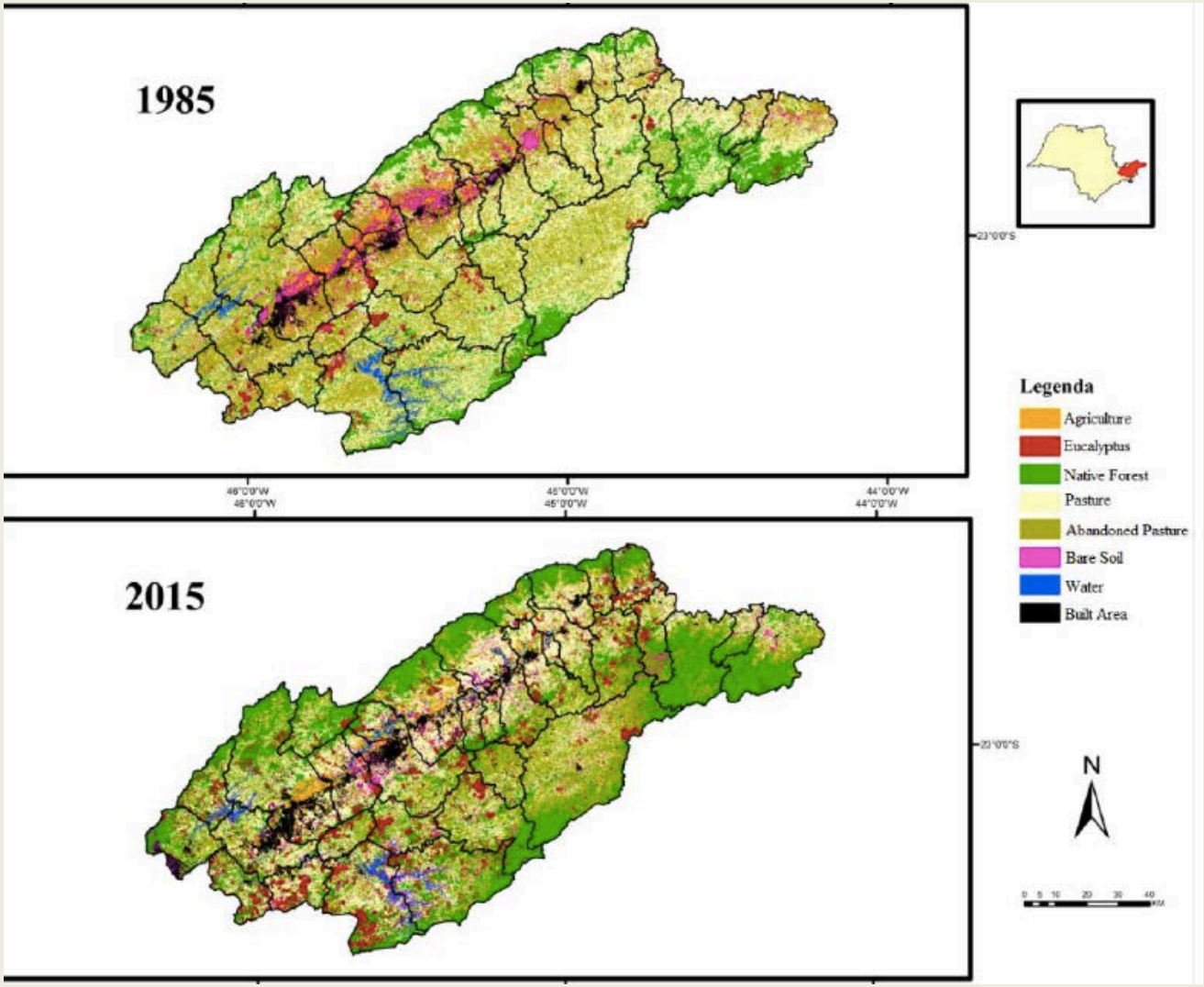


Figure 1. Study region, the Paraíba do Sul river watershed at the state of São Paulo (PSWSP), and the regional context.

Ronquim, C.C. et al. 2016. Carbon sequestration associated to the land-use and land-cover changes in the forestry sector in Southern Brazil. Proceedings of SPIE 2016 Remote Sensing and Security + Defense International Symposia. Edinburgh, UK.

205,690 ha of a secondary native forest spontaneously appeared during past 30 years



About 30% (8 Mha) of the total pasturelands in Minas Gerais holds medium to high natural regeneration potential

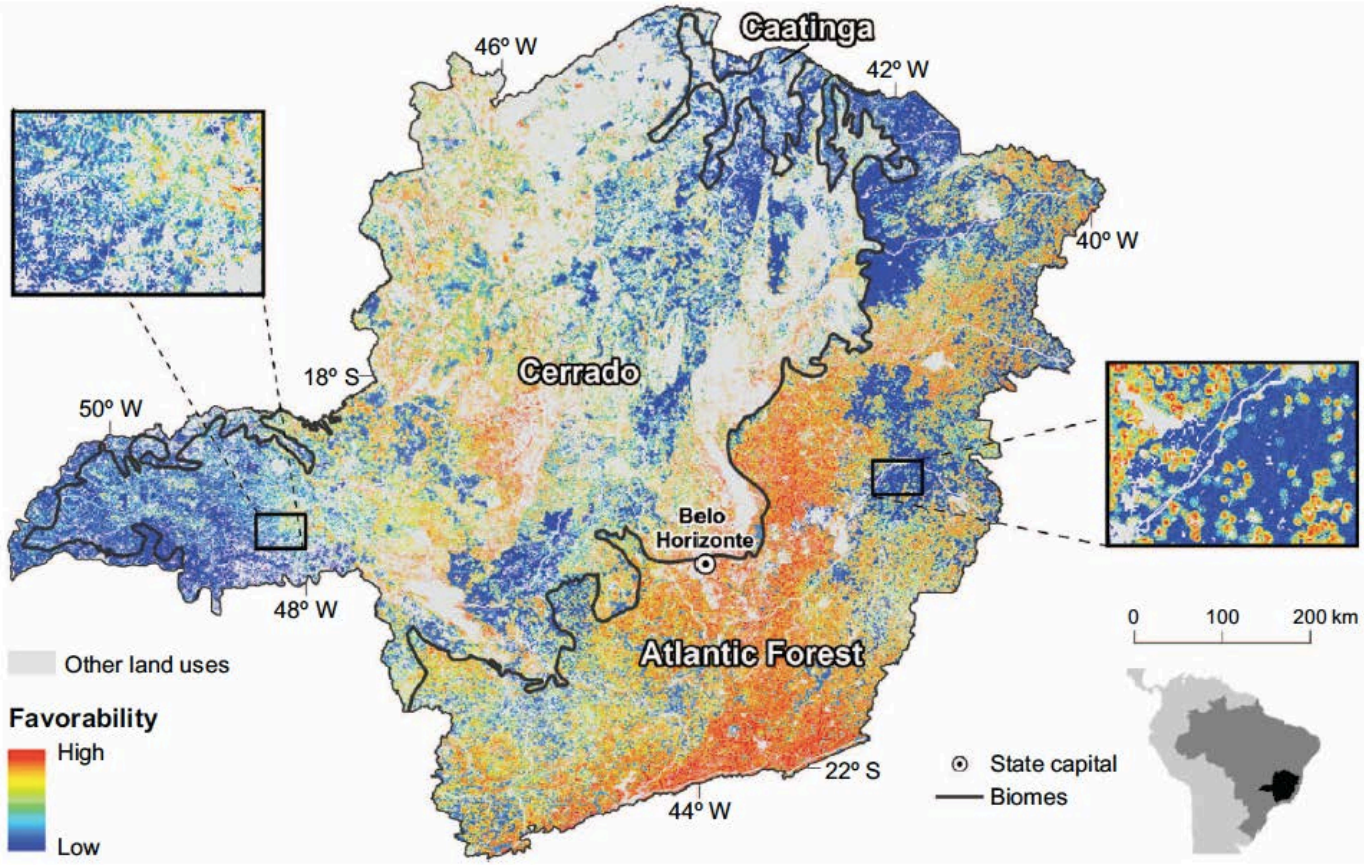


Figure 2. Favorability for natural regeneration on pasturelands of Minas Gerais.

Nunes, F. S., B. S. Soares-Filho, R. Rajão, and F. Merry. 2017. Enabling large-scale forest restoration in Minas Gerais state, Brazil. Environmental Research Letters 12:044022.

About 36% (0.7 Mha) of the Forest Code restoration obligation could be met using spontaneous NR only and 75% (1.5 Mha) by adding assisted NR.

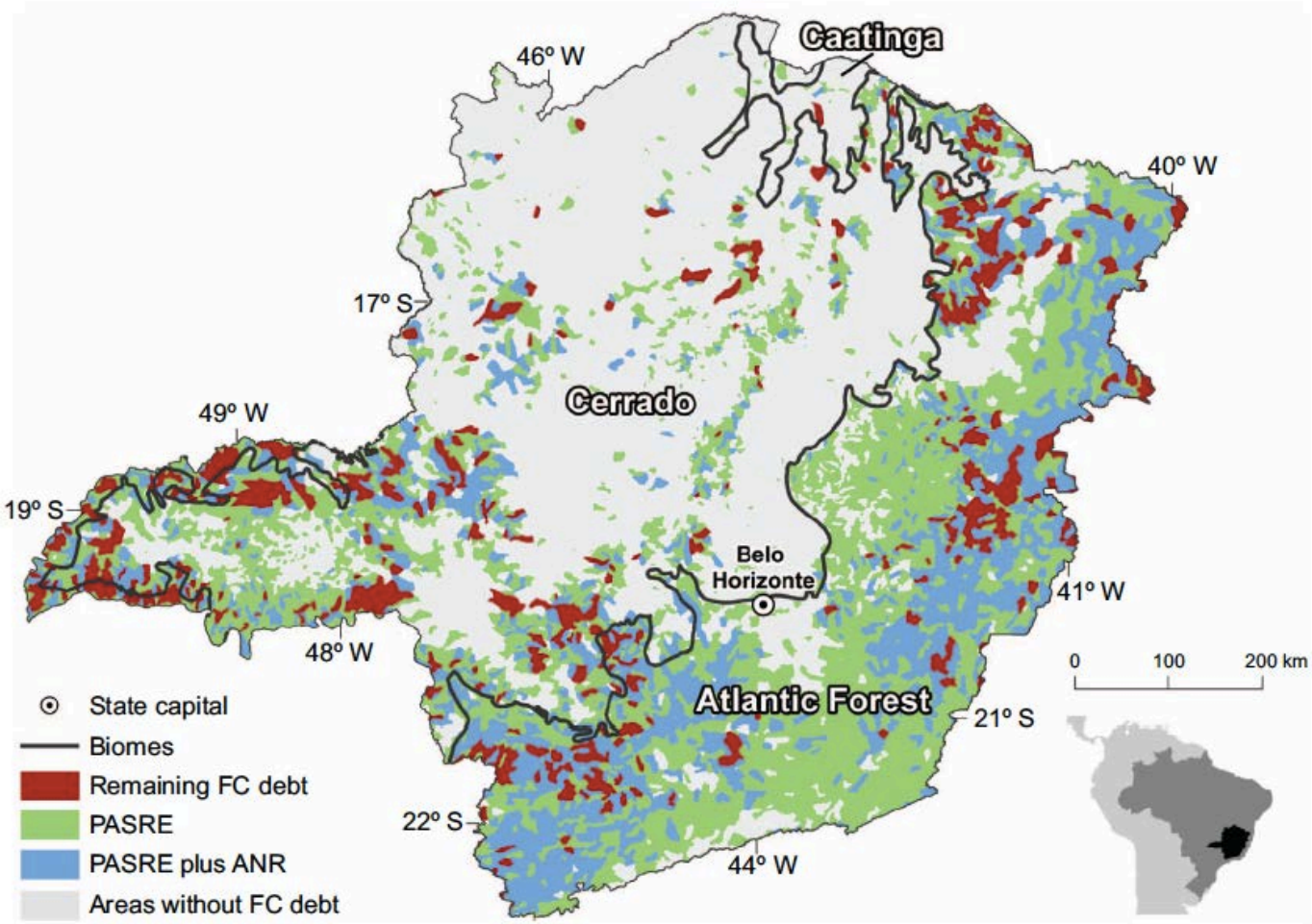
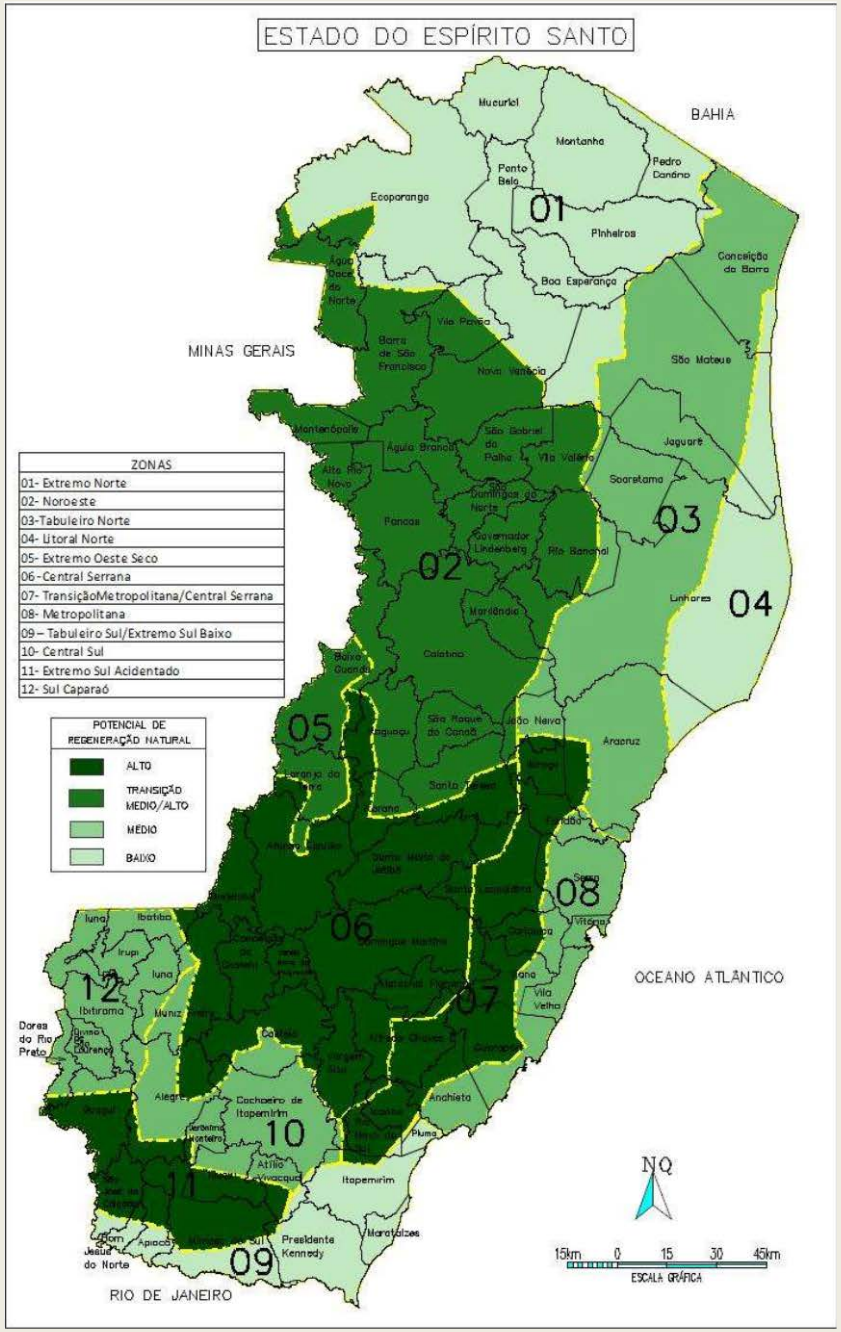


Figure 3. Solving the FC debt by employing PASRE and ANR. The remaining FC debt would require PARPLAN and TOTPLAN methods.

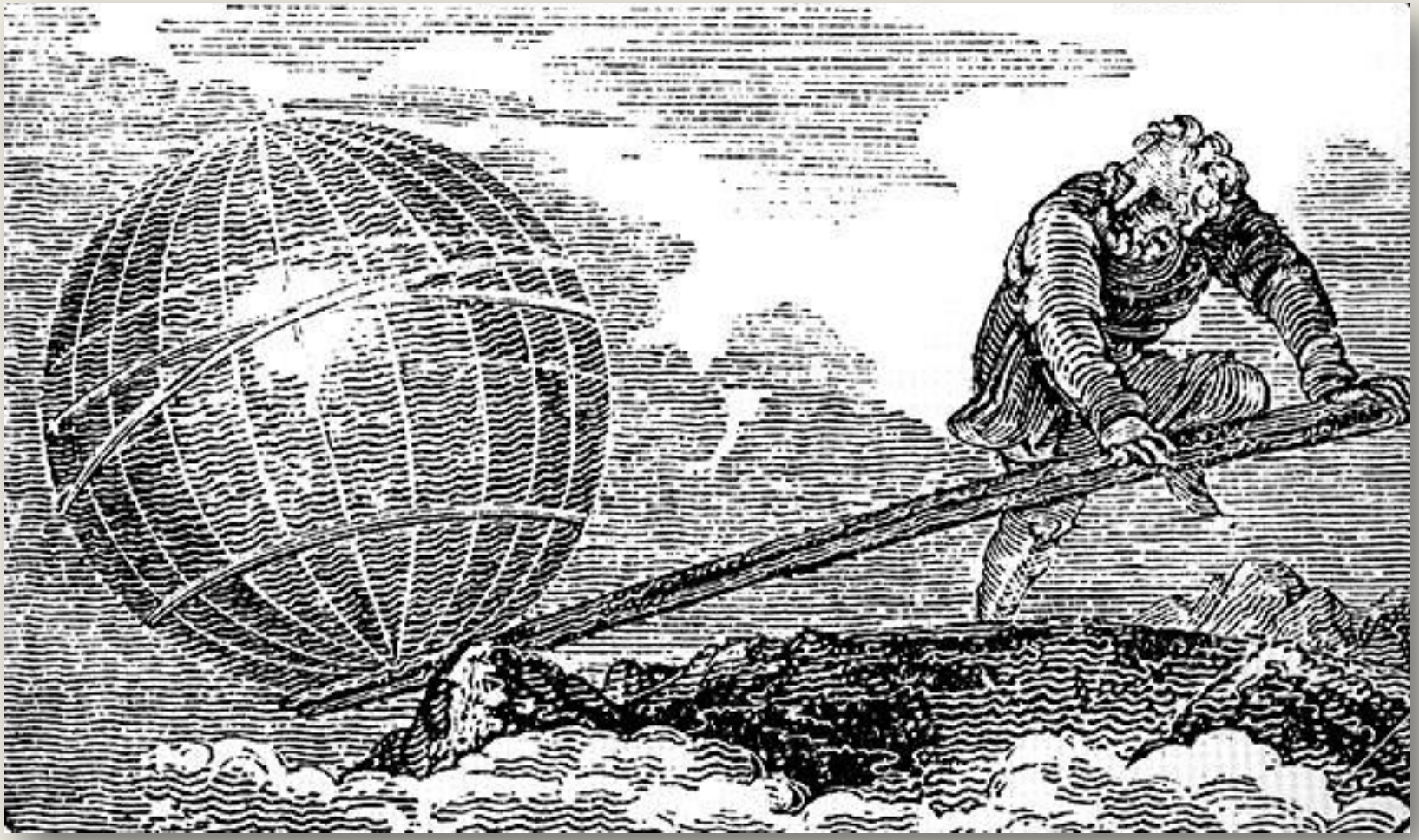


From 1975-2008, 18,979 forest fragments of Atlantic Forest regenerated naturally in Espirito Santo,occupying an area of 106,555 ha, equivalent to 2.3% of state area.

Areas with high potential for natural regeneration extend to 628,083 ha, corresponding to 13.6% of the area of Espirito Santo

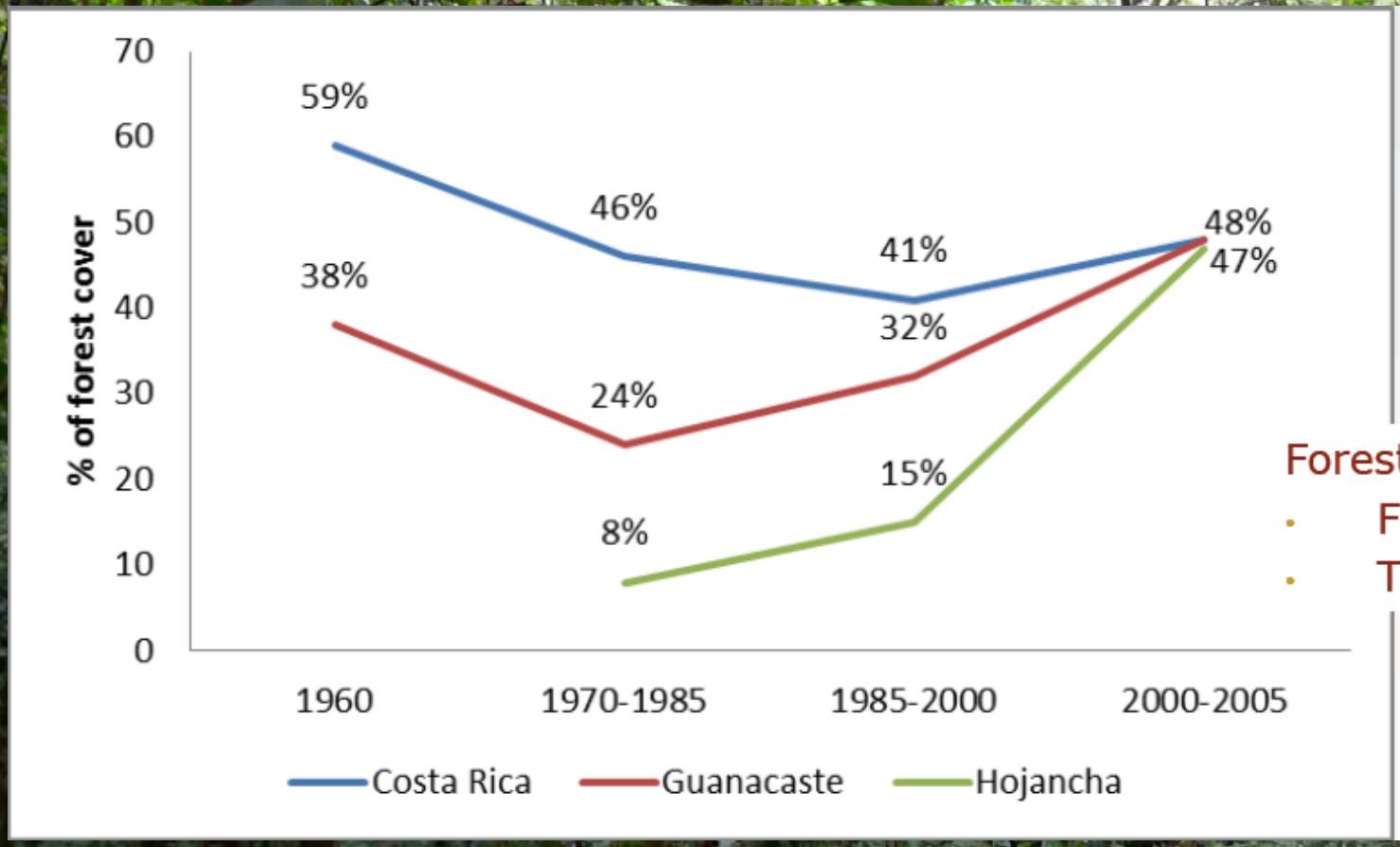
Martins, S. V. et al. 2014. Potencial de regeneração natural de florestas nativas nas diferentes regiões do estado do Espírito Santo. CEDAGRO, Vitória, ES, Brazil.

Archimedes said "Give me a place to stand and with a lever I will move the world.”




lapa verde
refugio
PROGRAMA DE PAGO
POR SERVICIOS AMBIENTALES
Regeneración Natural
ECOVIDA INMOBILIARIA S.A
PROHIBIDA LA CAZA, LA TALA Y LA EXTRACCION DE PLANTAS LEY FORESTAL 7575
SJ-01-281-0148-2011 FONAFIFO 90.4 Ha

Partnering with nature



Forest cover gains in:

- Forest regrowth
- Timber plantations

Conclusions

- Under suitable biophysical and social conditions, natural regeneration offers the most cost-effective opportunities for conservation of local native biodiversity, increased resilience to climate shocks, and production of diverse ecosystem services.
- It is unlikely that ambitious restoration goals and commitments, such as the Bonn Challenge and the New York Declaration on Forests, will be achieved without a major global effort to enable natural regeneration.
- Enabling and protecting naturally regenerating forests requires development and application of new policies, governance structures, and assessment methodologies. Tools to identify and map conditions suitable for natural regeneration are urgently needed.

Thank you!


Piensa
Globalmente
Think Global
Actúa
Localmente
Act Local
Conectate,
Colabora,
Crea
Connect
Collaborate
Create
7·2012

Coupling natural regeneration with reforestation plantations

Natural Regeneration Partnership

- Recognizing, valuing and protecting existing natural regeneration
- Provide basic information to policy makers and implementers
- Tools for prioritization and mapping natural regeneraiton
- Local and regional champions
- Alliances to improve governance and management