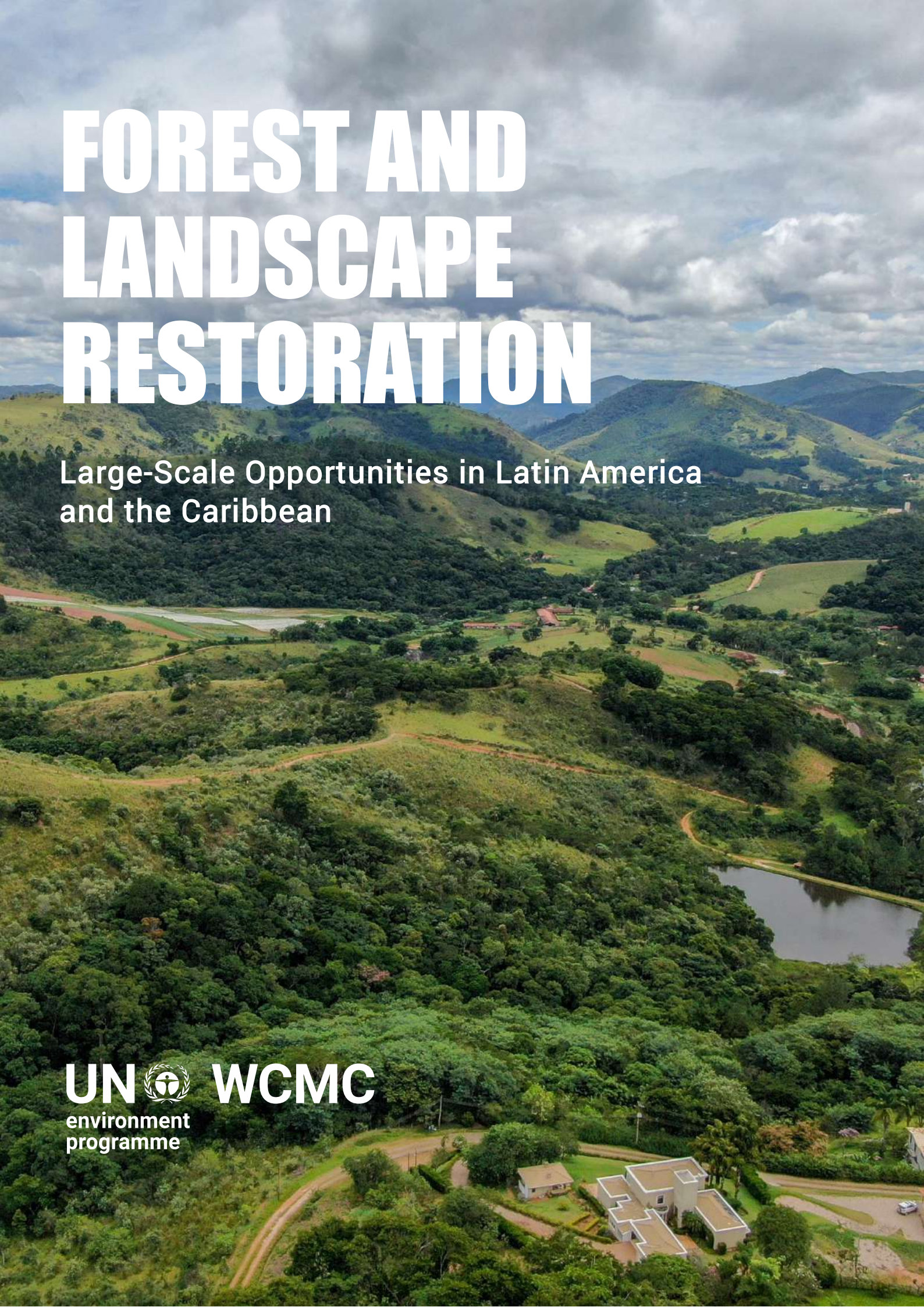
FOREST AND LANDSCAPE RESTORATION

Large-Scale Opportunities in Latin America and the Caribbean



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Forest and Landscape Restoration: Large-Scale Opportunities in Latin America and the Caribbean

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Opportunities for forest restoration in Latin America and the Caribbean

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Executive Summary

Land degradation and specifically deforestation and forest degradation are fundamental environmental challenges of our time. The Latin America and Caribbean region is and will continue to be one of the most affected ones, with agricultural practices, cattle grazing, and infrastructure being the most important drivers for deforestation. Avoiding, reducing and reversing forest degradation and deforestation is an urgent priority to protect not only biodiversity but also ecosystem services that are vital to ensure productive activities and human well-being.

In order to achieve the Sustainable Development Goals (SDGs), concerted and effective actions are needed to avoid and reduce forest degradation and deforestation and promote restoration. The COVID-19 crisis has highlighted the key role of healthy ecosystems in the supply of food and water and as the source of employment for millions of people in the world. It has also called the attention to the fact that most new infectious diseases affecting humans are zoonotic and their emergence may be linked to habitat loss due to forest area change and the expansion of human populations into forest areas, which both increase human exposure to wildlife.

Restoration has emerged as an important tool to address ecosystem degradation, and last year the United Nations announced 2021–2030 as the "Decade on Ecosystem Restoration" with the goals of preventing, halting and reversing ecosystem degradation worldwide. Forest and Landscape Restoration, known as FLR, is the opportunity to plan and implement restoration at the landscape level, in a participative 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. Priority areas for FLR include degraded agricultural land, deforested areas and degraded forests. A recent study showed that restoring 20 million hectares of degraded ecosystems in LAC could yield benefits evaluated in $23 billion over a 50-year period. This reinforces the point that large-scale landscape restoration in LAC can be an economically attractive opportunity to slow agricultural expansion, counteract land degradation and deforestation, and maintain the provision of ecosystem services and biodiversity, all while generating income in rural landscapes and contributing to the efforts of reducing carbon emissions in the regional economy.

Several LAC countries have made restoration commitments to the Bonn Challenge of restoring 150 million hectares of degraded landscapes and forest lands by 2020 and significantly increase the rate of global restoration, thereafter, representing at least an additional 200 million hectares by 2030. According to recent research, USD 360 billion and USD 830 billion are needed to achieve global restoration commitments for 2020 and 2030, respectively. Although global pledges under the Bonn

Challenge totalling more than 170 million hectares indicate significant political will to restore landscapes, the implementation is limited with only 26.7 million hectares having undergone restoration since 2000. The funding gap to achieve the commitments is also relevant since only USD 22 billion in green finance for forests has been committed from public and private sector sources in the last ten years.

In reflection of this, this work focuses on six LAC countries – Argentina, Brazil, Chile, Colombia, Peru and Costa Rica – in order to identify how enabling conditions for large-scale restoration are put in place. Areas already identified and prioritized for scaling-up restoration efforts were also compiled. Restoration commitments, existing legal framework, technical capacity, funds available and private sector engagement were described to each country. This analysis concludes that all countries have conditions to scale-up restoration. The six focal countries have **strategies and plans** that support restoration activities, including their national REDD+ strategies. For example, Brazil has the highest restoration target (22 million hectares) to be achieved until 2030. In the case of Brazil, Colombia and Argentina there is a significant mobilization of the **civil society** for restoration activities. A strong partnership between both Ministries of Environment and Agriculture in forests and climate change was identified as a factor favouring restoration in Peru. Brazil, Colombia, Costa Rica and Peru have applied the Restoration Opportunities Assessment Methodology (ROAM) methodology to identify priority areas for restoration at either the national (Costa Rica) or subnational level (Brazil, Colombia and Peru). In addition to ROAM analyses, Brazil, Argentina and Colombia also have studies where opportunity areas for restoration were identified, including the potential for natural regeneration, illustrating that restoration is not always a matter of planting trees. In Brazil, opportunity areas with high and very high natural regeneration potential sum 41 Mha. A total of 4.8 Mha of opportunity areas to manage restoration was identified in Colombia. Argentina has prioritized six main areas for restoration, totalling 24 Mha. For Chile a prioritization of restoration areas was not found but in 2019 an agreement with the Forest Carbon Partnership Facility (FCPF) was signed that will cover more than 15 Mha.

Regarding **private sector engagement**, in Brazil, Colombia, Argentina and Peru it was possible to identify coalitions with the private sector for restoration activities and the existence of private sector commitments to sustainability and to help upscaling investments in restoration. As an example, both Althelia Climate Fund and Root Capital have invested in several restoration projects in Peru, including shade coffee restoration. In Brazil, several coalitions with private sector are established (including Pact for Forest Restoration of Atlantic Forest, Alliance for Restoration of Amazon, Brazilian Coalition on Climate, Forests and Agriculture) as well as several multistakeholder commitments for restoration.

In terms of **large restoration projects** being implemented in the field, in Brazil those projects sum restoration targets of more than 150,000 ha. In Colombia, although 80% of the identified restoration projects are being implemented in areas less than 5000 ha, large project restoration targets sum more than 66,000 ha. More than 30 restoration projects were mapped in Peru, half of them being applied in areas less than 1,000 ha but the large projects identified involve restoration targets of more than 6.7 Mha.

Prioritizing areas that combine high potential for social and environmental benefits with high feasibility for large-scale restoration is an essential tool for helping countries achieve their commitments and for defining priorities for financing the restoration agenda. Efforts to combat climate change, conserve biodiversity and improve livelihoods through forest and landscape restoration can align with benefits from other REDD+ actions and should be part of the recovery

strategies to cope with the pandemic. With policy support from governments, the advocacy and technical expertise from the international cooperation (such as the UNREDD Programme) and the strategic engagement of the private sector, forest landscape restoration can effectively contribute to a post-COVID recovery and to improving the lives of millions of people in the LAC region who depend on healthy forests for food, water and employment.

Contents

1 Introduction and Objective

1.1. Land Degradation

Key messages

- **Land has been increasingly degraded worldwide and forests, rangelands and wetlands are the ecosystems mostly affected.**
- **Land degradation is causing impacts in:**
  - **biodiversity – driving the planet into the sixth massive extinction of species**
  - **climate change – with the Agriculture, Forestry and Other Land Use (AFOLU) activities being responsible for 23% of total net anthropogenic emissions of greenhouse gas emissions during 2007-2016**
  - **human well-being – with 3.2 billion people being affected worldwide, losses of biodiversity and ecosystem services estimated in more than 10% of world gross domestic product (GDP) and a higher exposure to zoonotic diseases such COVID-19.**
- **South America is a hotspot of degradation and desertification and deforestation, unsustainable management of grassland ecosystems, climate change and natural phenomena exacerbated or not by human action are the main direct causes of land degradation in the region.**

Land is the basis for human survival and development providing food, fibre, timber, energy, freshwater and multiple other ecosystem services, as well as plays an important role in the climate system (IPCC, 2019)[1]. Although being one of the most important and non-renewable resources in the planet, **land** has been increasingly **degraded** worldwide (Xie et al., 2020)[2]. Ecosystems affected by land degradation include mainly forests, rangelands and wetlands, with 87% of the wetlands lost globally in the last 300 years (IPBES, 2018)[3]. According to the latest report of the Intergovernmental Science-Policy Platform on Biological Diversity and Ecosystem Services (IPBES) the United Nations Convention to Combat Desertification (UNCCD) (United Nations Convention to Combat Desertification, 2019)[4] and the Intergovernmental Group of Experts on Climate Change (IPCC) (IPCC, 2019), **land degradation** is defined as all those human-induced processes that result in a long-term loss of biodiversity, ecosystem functions and ecosystem services. This definition shows variations in the scientific literature and conventions according to the emphasis placed on each of the different

[1] IPCC. 2019: Summary for Policymakers. In: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.- O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. In press. Retrieved from: https://www.ipcc.ch/site/assets/uploads/sites/4/2020/02/SPM_Updated-Jan20.pdf

[2] Xie, Hualin, Yanwei Zhang, Zhilong Wu and Tiangui Lv. 2020. A Bibliometric Analysis on Land Degradation: Current Status, Development, and Future Directions. Land 2020, 9, 28. Retrieved from: https://www.mdpi.com/2073-445X/9/1/28

[3] IPBES. 2018. *The IPBES assessment report on land degradation and restoration*. Montanarella, L., Scholes, R., and Brainich, A. (eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany. 744 pages. Retrieved from: https://www.ipbes.net/assessment-reports/ldr

[4] United Nations Convention to Combat Desertification. 2019. The Global Land Outlook, Latin America and the Caribbean Thematic Report, Bonn, Germany. Retrieved from: https://catalogue.unccd.int/1221_GLO_LAC_E.pdf

components of the land that are affected by degradation (biodiversity, ecosystem functions and ecosystem services). These differences make it difficult to develop a consistent method for measurement of land degradation on a large scale. Specifically, for the arid, semi-arid and dry sub-humid areas (collectively called drylands), land degradation is also known as "**desertification**" (IPBES, 2018). Despite the differences all definitions recognize the existence of **trade-offs** among the benefits delivered by land with land use intensification as well as the need to take urgent action to tackle the **impacts** land degradation is causing in biodiversity, climate change, food and energy security, and human well-being (IPBES, 2018). At least **3.2 billion people** are being **affected** worldwide with land degradation intensification, that is also driving the planet into the **sixth massive extinction of species** and leading to estimated **losses of more than 10% of world GDP** (IPBES, 2018). Other impacts are **income inequality** exacerbation, erosion of traditional knowledge, and changes in climate. Since the pre-industrial period, changes in land cover due to human activities have led to a net release of CO_2 contributing to global warming. Agriculture, Forestry and Other Land Use (AFOLU) activities accounted for around 13% of CO_2 , 44% of methane (CH_4), and 81% of nitrous oxide (N_2O) emissions from human activities globally during 2007-2016, representing **23%** (12.0 ± 2.9 $GtCO_2$ eq yr-1) of total net anthropogenic emissions of greenhouse gas emissions (GHGs). Climate change, in turn, can exacerbate the impacts of land degradation, worsening not only the risks to livelihoods, biodiversity, human and ecosystem health, infrastructure, and food systems but also reducing the viability of some options for avoiding, reducing and reversing land degradation (IPBES, 2018; IPCC, 2019).

Moreover, UNCCD secretariat and the Global Mechanism have recently highlighted that desertification, land degradation and drought (DLDD) are linked to the **spread of zoonotic diseases (including COVID-19)** from animals to humans (United Nations Convention to Combat Desertification, 2020)[(5)]. An estimate of 1.7 million unidentified viruses of the type known to infect people exist in mammals and water birds, and pandemics like COVID-19 could occur more frequently unless we scale up efforts to stop the destruction of nature (Settele et al., 2020)[(6)]. The existing data focusing in the LAC region suggest that **South America** is a **hotspot of degradation and desertification**, which would be causing a loss of 1% to 15% of agricultural GDP depending on the country (United Nations Convention to Combat Desertification, 2019). In the future, most degradation is forecasted to occur in Central and South America, one of the regions with the largest remaining amount of land suitable for agriculture. It is estimated that 50% of agricultural land in Latin America will be affected by desertification in the 2050s (IFAD, 2010; IPBES, 2018)[(7)].

Deforestation, unsustainable management of grassland ecosystems, climate change and natural phenomena exacerbated or not by human action are the main direct causes of land degradation in the LAC region. The indirect causes behind these phenomena are mainly population growth and regional and international demand for agricultural products, livestock, wood, fossil fuels or mining (United Nations Convention to Combat Desertification, 2019).

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[5] United Nations Convention to Combat Desertification. 2020. UNCCD and the COVID-19 crisis: landbased solutions for healthy people and a sustainable planet. Retrieved from: https://www.unccd.int/sites/default/files/inline-files/UNCCD%20and%20the%20COVID-rev%20FINAL_0.pdf

[6] Settele, J., Diaz, S., and Brondizio, E. 2020. IPBES Expert Guest Article – COVID-19 Stimulus Measures Must Save Lives, Protect Livelihoods, and Safeguard Nature to Reduce the Risk of Future Pandemics - https://ipbes.net/covid19stimulus

[7] IFAD. 2010. *Desertification.* Retrieved from: https://www.ifad.org/documents/38714170/39150184/Desertification+factsheet_e.pdf/40c0689e-a726-42ed-91c4-a5f79273ccd8

1.2. Forest Degradation, Deforestation and the Opportunity for Restoration

Key messages

- **Deforestation and forest degradation continue to take place at alarming rates and are the main processes contributing to land degradation.**
- **The global forest area decreased by 420 million hectares in the last three decades and in South America deforestation rate was estimated at 2.60 million hectares per year between 2010 and 2020.**
- **The main direct driver of deforestation is agricultural expansion.**
- **Avoiding, reducing and reversing forest degradation and deforestation is vital for biodiversity conservation, greenhouse gas emissions' reduction, poverty alleviation, food and water security, risk mitigation of natural disasters, avoidance of conflicts and migrations, among others.**

Forests cover **31 percent of the global land area** and more than half of those forests are in only five countries (Brazil, Canada, China, Russian Federation and United States of America) (FAO and UNEP, 2020)[8]. The **LAC region** has the **largest area of tropical forests** (Aide et al., 2013)[9], a type of forests that alone is responsible for 60 percent of the world's vascular plants and that plays a unique role in ecological terms (FAO and UNEP, 2020). Although more than one-third of the world's forests are primary forests, deforestation and forest degradation continue to take place at alarming rates and are the main processes contributing to land degradation (FAO and UNEP, 2020; IPBES, 2018). The accelerated loss of primary forests is associated with **climate change**. Annual tropical tree cover loss between 2014 and 2018 has emitted an average value of 4.7 gigatons of carbon dioxide per year and nearly half of these emissions occurred within humid tropical primary forests (NYDF Assessment Partners, 2019)[10].

Forest degradation is defined as a reduction in the biomass, productivity or benefits from the forest as a result of both anthropogenic and environmental changes (IPBES, n.d.)[11]. **Deforestation** is a human-induced conversion of forested land to non-forested land according to the IPBES. In terms of forest **degradation**, from 2000 to 2012 the **extent of undisturbed forest fell by 7.2%** (Potapov et al., 2017)[12]. More than 100 million hectares of forests are adversely affected by forest fires, pests,

[8] FAO and UNEP. 2020. The State of the World's Forests 2020. Forests, biodiversity and people. Rome. https://doi.org/10.4060/ca8642en. Retrieved from: http://www.fao.org/3/ca8642en/CA8642EN.pdf

[9] Aide, T. Mitchel, Matthew L., Clark H, Ricardo Grau, David López-Carr, Marc A. Levy, Daniel Redo, Martha Bonilla-Moheno, George Riner, María J. Andrade-Núñez, María Muñiz. 2013. Deforestation and Reforestation of Latin America and the Caribbean (2001–2010). Biotropica Volume 45, Issue 2. Pages 262-271. Retrieved from: https://onlinelibrary.wiley.com/doi/full/10.1111/j.1744-7429.2012.00908.x

[10] NYDF Assessment Partners. 2019. Protecting and Restoring Forests: A Story of Large Commitments yet Limited Progress. New York Declaration on Forests Five-Year Assessment Report. Climate Focus (coordinator and editor). Accessible at forestdeclaration.org.

[11] IPBES. n.d. Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Retrieved from: https://www.ipbes.net/

[12] Potapov, P ., Hansen, M . C ., Laestadius, L ., Turubanova, S ., Yaroshenko, A ., Thies, C ., Smith, W ., Zhuravleva, I ., Komarova, A ., Minnemeyer, S ., & Esipova, E . (2017) . The last frontiers of wilderness: Tracking loss of intact forest landscapes from 2000 to 2013 . Science Advances, 3(1) . Retrieved from http:// advances .sciencemag .org/content/3/1/ e1600821 .abstract

diseases, invasive species, drought and adverse weather events (FAO and UNEP, 2020). Regarding **deforestation**, the **global forest area decreased by 420 million hectares** between **1990 and 2020** and the area of primary forest worldwide decreased by 81 million hectares. The rate of deforestation was estimated at 10 million hectares per year between 2015 and 2020, down from 16 million hectares per year in the 1990s. In **South America,** deforestation rate was estimated at **2.60 Mha per year** (between 2010-2020) (FAO and UNEP, 2020). For the **LAC region** it was estimated an **overall net loss of tropical forests of 56.9 million ha between 1990 and 2010** with net deforestation rates between 2000 and 2010 for humid and dry forests in Central and South America of 1.92 and 0.92 million ha per year, respectively (Achard et al., 2014)[13]. Other study estimated a net loss of 17.9 million ha between 2001 and 2010 with Argentina, Brazil, Paraguay, and Bolivia accounting for 80 % of the deforestation in the region (Aide et al., 2013). A recent analysis focusing in 17 LAC countries showed a high variability of forest loss rates among countries between 1990 and 2014 with Chile and Argentina showing the highest deforestation rates (−3.28 and−2.31 yearly average, respectively), followed by Ecuador and Paraguay (−2.19 and−1.89 yearly average, respectively) (Armenteras et al., 2017)[14].

The **main direct driver** of deforestation and forest degradation is **agricultural expansion** with large-scale commercial cattle ranching and cultivation of soya bean and oil palm accounting for 40 percent of tropical deforestation between 2000 and 2010 and local subsistence agriculture for 33 percent between the same period (FAO and UNEP, 2020). In the specific context of the LAC region agricultural practices, cattle grazing, and infrastructure are the most important direct drivers for deforestation (Armenteras et al., 2017). Indirect drives are quoted as: weak environmental and institutional governance in forestry management along with uncertain land title and property rights; the existence of perverse incentives towards changes in land use for agricultural uses; and the lack of integration of the value of forest ecosystem services into the decision-making of both public and private sectors (Quiroga et al., 2016)[15].

Avoiding, reducing and reversing land degradation, particularly **forest degradation and deforestation,** is vital for biodiversity conservation, greenhouse gas emissions' reduction, poverty alleviation, food and water security, risk mitigation of natural disasters, avoidance of conflicts and migrations, among others. In turn, it will contribute for the **achievement of multiple international commitments** such as the Post-2020 Biodiversity Plan under the Convention on Biological Diversity (CBD), the Paris Agreement under the United Nations Framework Convention on Climate Change, and the 2030 Agenda for Development Sustainable. This is mostly relevant in the context of LAC region, given the important role that natural capital plays in both the region's economy and the population well-being (IPBES, 2018). The recent **COVID-19 crisis** has highlighted the key role of healthy land and particularly healthy forests not only in the supply of food and water but also as the source of employment for millions of people in the world. It has called the attention to the fact that most new infectious diseases affecting

[13] Achard, Frédéric, René Beuchle, Philippe Mayaux, Hans-Jürgen Stibig, Catherine Bodart, Andreas Brink, Silvia Carboni, Baudouin Desclée, François Donnay, Hugh D. Eva, Andrea Lupi, Rastislav Raši, Roman Seliger, Dario Simonetti. 2014. Determination of tropical deforestation rates and related carbon losses from 1990 to 2010. Global Change Biology, Volume 20, Issue 8, Pages 2540-2554. Retrieved from: https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.12605

[14] Armenteras, Dolors, Josep María Espelta, Nelly Rodríguez, Javier Retana. 2017. Deforestation dynamics and drivers in different forest types in Latin America: Three decades of studies (1980–2010). Global Environmental Change Volume 46, Pages 139-147. Retrieved from: https://www.sciencedirect.com/science/article/pii/S0959378016304745?via%3Dihub

[15] Quiroga, R., M. C. Perazza, D. Corderi, O. Banerjee, J. Cotta, G. Watkins, & J. L. López Sancho. 2016. Environment and biodiversity: priorities for protecting natural capital and competitiveness in Latin America and the Caribbean. Inter-American Development Bank. Environment, Rural Development and Risk Management Division., Washington, D.C., USA. Retrieved from: https://publications.iadb.org/publications/english/document/Environment-and-Biodiversity-Priorities-for-Protecting-Natural-Capital-and-Competitiviness-in-Latin-America-and-the-Caribbean.pdf

humans are zoonotic and their emergence may be linked to habitat loss due to forest area change and the expansion of human populations into forest areas, which both increase human exposure to wildlife. By harnessing the potential of avoided degradation, sustainable management and restoration of land and forests, the future zoonotic disease burden can be limited (FAO and UNEP, 2020; United Nations Convention to Combat Desertification, 2019).

Degradation avoidance, sustainable land management practices and restoration, supported by coordinated policies, institutions, governance arrangements, better informed consumer demand and corporate social responsibility, can lead to significant improvements in land condition along with the provision of ecosystem services essential for the future survival and well-being of the growing numbers of people adversely affected by land degradation (IPBES, 2018).

1.3. Forest and Landscape Restoration – the Concepts Involved

Key messages

- **Restoration has emerged recently as a tool to address land degradation.**
- **Restoring damaged ecosystems can be an efficient and cost-effective way to address the most pressing challenges humanity is facing today, such as the COVID-19 pandemic, especially in the context of the Build Back Better approach.**
- **The UN Decade on Ecosystem Restoration 2021-2030 was recently launched by UNEP and FAO and is a global effort aiming at restoring the planet and ensuring One Health for people and nature.**
- **Forest and Landscape Restoration (FLR) is the ongoing process of regaining ecological functionality and enhancing human well-being across deforested or degraded forest landscapes and highlights that restoration is not always a matter of planting trees. Being planned at the landscape level, FLR** can integrate other approaches such as climate-smart agriculture and REDD+ (Reducing Emissions from Deforestation and Forest Degradation).

Restoration has emerged recently as a **tool to address land degradation**. **According to the IPBES**, **restoration** is defined as any intentional activity that initiates or accelerates the recovery of an ecosystem from a degraded state (IPBES, n.d.)[16]. The concept of ecosystem restoration encompasses all those activities whose objective is the recovery of ecosystem's structure, functionality, and capacity to provide benefits to people. **IPBES** defines **rehabilitation** as a specific set of restoration activities that move a site towards a natural state baseline in a limited number of components (i.e. soil, water, and/or biodiversity), including natural regeneration, conservation agriculture, and emergent ecosystems.

Restoration has several **benefits**: it contributes to climate change mitigation by increasing carbon stocks; it promotes adaptive capacity to climate change ensuring both food and water security along with more secure livelihoods to forest and rural communities; it addresses the decline in biodiversity by increasing both quality and extent of habitats and by decreasing fragmentation (Blignaut et al., 2014)[17]. Restoring ecosystems has also a positive impact in human health.

On 1 March 2019, the United Nations announced 2021–2030 as the "**UN Decade on Ecosystem Restoration**" to fast-track the restoration of severely degraded landscapes and seascapes worldwide. The Decade, which runs from 2021 through 2030, represents a global effort aimed at preventing, halting and reversing ecosystem degradation and ensuring One Health for people and nature (UNEP and FAO, n.d.)[18]. Restoring damaged ecosystems can be an efficient and cost-effective way to

[16] IPBES. n.d. Intergovernmental Science–Policy Platform on Biodiversity & Ecosystem Services website (assessed 1st September 2020). Retrieved from http://www.ipbes.net/

[17] Blignaut, J., J. Aronson, & R. de Groot. 2014. Restoration of natural capital: A key strategy on the path to sustainability. Ecological Engineering 65:54-61.

[18] UNEP and FAO. n.d. United Nations Decade on Ecosystem Restoration 2021-2030 website (assessed 1st September 2020). Retrieved from https://www.decadeonrestoration.org/

address the most pressing challenges humanity is facing today, such as the COVID-19 pandemic, especially in the context of the Build Back Better approach (UNEP/FAO, 2020)[19].

Restoration efforts should be **planned at the landscape level** with the aim of re-establishing ecological integrity and supporting human wellbeing (Maginnis & Jackson, 2003; Sabogal et al., 2015)[20][21]. The concept of **Forest and Landscape Restoration (FLR)** is the ongoing process of regaining ecological functionality and enhancing human well-being across deforested or degraded forest landscapes and has the potential to counteract some of the deep negative global impacts of human development on environmental systems, bringing multiple benefits to nature, climate and people (Crouzeilles et al., 2020; GPFLR, n.d.; Holl, 2017)[22][23][24] (see BOX 1).

FLR highlights that **restoration is not always a matter of planting trees**. Besides tree planting, FLR comprises other processes, such as managed natural regeneration, agroforestry, and improved land management to accommodate a mosaic of land uses such as agriculture, protected wildlife reserves, managed plantations and riverside plantings (IUCN, n.d.)[25]. In fact, in most places where reforestation is desirable, forests can regenerate naturally from seeds or sprouts, even in landscapes that appear to be highly degraded. Moreover grasslands, shrublands, and peatlands are ecosystems that do not naturally support dense tree cover and so, in this case, tree planting causes harm to biodiversity (Fleischman et al., 2020)[26]. Other examples where tree planting can cause negative impacts are in places where trees can reduce water availability or if tree planting is made with exotic species (Holl & Brancalion, 2020)[27].

Therefore, **to design successful restoration programs**, it is important to know what type and combination of responses can most effectively address drivers, processes and/or forms of land degradation, especially allowing for contextual variations in environmental, economic, social, technical, cultural and political conditions. Most effective land restoration responses will be those that: (1) are adaptive and have a wide domain of application; (2) are cost-effective, feasible and practical for a specific degradation or restoration context; and (3) provide multiple biodiversity and

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[19] UNEP/FAO. 2020. UNEP/FAO Factsheet. The UN Decade on Ecosystem Restoration 2021-2030. Retrieved from: https://wedocs.unep.org/bitstream/handle/20.500.11822/30919/UNDecade.pdf

[20] Maginnis, S. and Jackson, W. 2003. The role of planted forests in forest landscape restoration. UNFF Intersessional Experts Meeting on the Role of Planted Forests in Sustainable Forest Management, 25–27 March 2003. New Zealand.

[21] Sabogal, C., Besacier C. and McGuire D. 2015. Forest and landscape restoration: concepts, approaches and challenges for implementation. Unasylva. Vol. 66 2015/3. Retrieved from: http://www.fao.org/3/a-i5212e.pdf

[22] Crouzeilles R, Beyer HL, Monteiro LM, et al. 2020. Achieving cost-effective landscape-scale forest restoration through targeted natural regeneration. Conservation Letters. e12709. Retrieved from: https://conbio.onlinelibrary.wiley.com/doi/epdf/10.1111/conl.12709

[23] Holl, K. D. 2017. Restoring tropical forests from the bottom up. Science, 355, 455–456. Retrieved from: https://science.sciencemag.org/content/sci/355/6324/455.full.pdf

[24] GPFLR. n.d. Global Partnership on Forest Landscape Restoration website (assessed in 1st September 2020). Retrieved from: http://www.forestlandscaperestoration.org/

[25] IUCN. n.d. International Union for the Conservation of Nature (IUCN) website on Forest Landscape Restoration (Info-FLR) (assessed in 1st September 2020). Retrieved from https://infoflr.org/

[26] Fleischman, Forrest, Shishir Basant, Ashwini Chhatre, Eric A. Coleman, Harry W. Fischer, Divya Gupta, Burak Güneralp, Prakash Kashwan, Dil Khatri, Robert Muscarella, Jennifer S. Powers, Vijay Ramprasad, Pushpendra Rana, Claudia Rodriguez Solorzano, And Joseph W. Veldman. 2020. Pitfalls of Tree Planting Show Why We Need People-Centered Natural Climate Solutions. BioScience XX: 1–4. Retrieved from: https://academic.oup.com/bioscience/article/70/11/947/5903754

[27] Holl, K. and Brancalion, P.H.S. 2020. Tree planting is not a simple solution. *Science* 368, 6941: 580-581. Retrieved from: https://science.sciencemag.org/content/368/6491/580/tab-pdf

ecosystem service benefits (Pandit et al., 2020)[28]. FLR therefore can integrate other approaches such as **climate-smart agriculture** and **REDD+** (Reducing Emissions from Deforestation and Forest Degradation). The implementation of FLR initiatives can vary considerably in temporal scale, size and purpose. They can serve either one single objective (e.g. adapting/ mitigating climate change or biodiversity conservation) or be carried out for multiple combined objectives (Sabogal et al., 2015).

BOX 1. Framework of Forest and Landscape Restoration

(GPFLR, n.d.; Sabogal et al., 2015)

A framework for FLR was developed by the Global Partnership on Forest and Landscape Restoration (GPFLR), a global network that aims to catalyse dynamic, voluntary action through sharing diverse experiences on restoration efforts which deliver tangible benefits to both local communities and nature through a landscape approach, while also fulfilling international commitments on forests. GPFLR has defined FLR 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*. Priority areas for FLR include degraded agricultural land, deforested areas and degraded forests. The Table illustrates relevant option categories for FLR work.

Land use	Land subtype	General category of FLR option	Description
Forest land Land where forest is, or is planned to become, the dominant land use ➡ **Suitable for wide-scale restoration**	If the land is without trees, there are two options:	1. Planted forests and woodlots	Planting of trees on formerly forested land. Native or introduced species planted for various purposes, fuelwood, timber, building, poles, fruit production, etc.
		2. Natural regeneration	Natural regeneration of formerly forested land. The site may be highly degraded and no longer able to fulfil its past function, e.g. agriculture. If the site is heavily degraded and no longer has native seeds, some planting will probably be required.
	If the land consists of degraded forests:	3. Silviculture	Enhancement of existing forests and woodlands and stocking, e.g. by reducing fire and grazing and by liberation thinning, enrichment planting, etc.
Agricultural land Land that is managed to produce food	If the land is under permanent management:	4. Agroforestry	Establishment and management of trees on active agricultural land, either through planting or favouring natural regeneration, to improve crop productivity, provide dry season fodder, increase soil fertility, enhance water retention, etc.
➡ **Suitable for mosaic restoration**	If the land is under intermittent management:	5. Improved fallow	Establishment and management of trees on fallow agricultural lands to improve productivity, e.g. through fire control, extending the fallow period, etc., with the intention that eventually this land will revert back to active agriculture.
Protective land and buffers Land that is vulnerable to, or critical in safeguarding against, catastrophic events ➡ **Suitable for mangrove restoration, watershed protection and erosion control**	If the land is degraded mangrove:	6. Mangrove restoration	Establishment or restoration of mangroves along coastal areas in estuaries.
	If it is other protective land and buffer:	7. Watershed protection and erosion control	Establishment and restoration of forests on very steep sloping land, along water courses, in areas that naturally flood and around critical water bodies.

Source: GPFLR (n.d.), adapted from IUCN (2014).

The FLR concept is based on intersectoral approaches that include multiple action areas such as: assessment of landscape degradation (including identification of main agents and drivers of degradation) and restoration opportunities; enabling environment (policies, regulations and laws); institutional setting; governance issues (e.g. tenure, right to use of natural resources, local community and its involvement, etc.); technologies and approaches; private-sector investment; resource mobilization; capacity development, extension and dissemination; and research needs.

[28] Pandit, Ram, John A. Parrotta, Ashok Kumar Chaudhary, Douglas L. Karlen, Daniel Luis Mascia Vieira, Yaakov Anker, Ruishan Chen, Joe Morris, Jim Harris & Phumza Ntshotsho. 2020. A framework to evaluate land degradation and restoration responses for improved planning and decision-making, Ecosystems and People, 16:1, 1-18. Retrieved from: https://www.tandfonline.com/doi/pdf/10.1080/26395916.2019.1697756?needAccess=true

In recent years **restoring the world's degraded forests and landscapes** has become a **common goal** for governments, non-government organizations, universities and rural communities. These efforts are recognized by the UN Decade on Ecosystem Restoration. and the UN recognizes the critical role of the many initiatives already underway which want to rebuild the land and water ecosystems all people depend on.

To promote synergies between the actors involved in the restoration activities around the world several partnerships were created worldwide. Besides the already mentioned GPFLR, a voluntary interagency partnership on forests called **Collaborative Partnership on Forests (CPF)** (CPF, n.d.)[29] was established among 15 international organizations and secretariats to promote the sustainable management of forests and to strengthen long-term political commitment to that end.

Another initiative is the **Global Landscape Forum** (GLF)(GLF, n.d.)[30], a scientifically led, cross-sectoral platform that provides global support for the sustainable land use approach. This initiative, which is being supported by an IKI Funded Project running until 2021, recognizes that all have a role to play in restoration efforts. Farmers, indigenous communities and activists can directly help protect and bring back nature whereas consumers will have an impact through their choices as consumers. Recent discussions at the GLF stressed the importance of combining indigenous knowledge with modern technology and the latest of scientific research.

Additionally, the **Forest Carbon Partnership Facility (FCPF)** (FCPF, n.d.)[31] is a global partnership of governments, businesses and civil society focused on reducing emissions from deforestation and forest degradation, forest carbon stock conservation, the sustainable management of forests, and the enhancement of forest carbon stocks in developing countries, activities commonly referred to as REDD+. Launched in 2008, the FCPF now works with 47 developing countries including some of the LAC region.

[29] CPF. n.d. Collaborative Partnership on Forests website. Assessed in 1st September 2020. Retrieved from http://www.cpfweb.org/73947/en/

[30] GLF. n.d. Global Landscapes Forum website. Assessed in 1st September 2020. Retrieved from: https://www.globallandscapesforum.org/

[31] Forest Carbon Partnership Facility (FCPF) website. Assessed in 1st September 2020. Retrieved from: https://www.forestcarbonpartnership.org/

1.4. Benefits of the Restoration for the Latin America and Caribbean Region and the Importance of Scaling-Up Restoration

Key messages

- **Restoration in the LAC countries can yield about $23 billion over a 50-year period in benefits such as provision of both wood and non-wood forest products, agricultural outputs, ecotourism, carbon sequestration, and avoided costs of food security.**
- **A strategy of large-scale landscape restoration in the LAC region can be an economically attractive opportunity to both generate income in rural landscapes and decrease carbon emissions in the regional economy, all while conserving biodiversity and ES.**
- **Restoration cost-effectiveness can increase up to 13-fold when spatial allocation is optimized using multicriteria approaches, highlighting the importance of spatial prioritization and planning.**

A recent World Economic Forum report estimates that more than half of the world's GDP is moderately or highly dependent on ecosystems and its services (WEF, 2020)[32]. So, healthy ecosystems are essential for sustaining the economy and ensuring the well-being of societies. In its strategy, tThe UN Decade on Ecosystem Restoration reports an expected gain between three and seventy-five US dollars of **economic benefits** from ecosystem goods and services with each dollar spent on **restoration**, based on data from a wide range of ecosystems (UNEP and FAO, 2020)[33].

In fact, several goods and services are associated with healthy lands and, particularly, with healthy forests including provision of wood and non-wood forest products (NWFPs), water supply, climate change regulation or pollination. Restoring forests and avoiding deforestation can provide **one-third of the climate mitigation needed** between now and 2030 to keep warming below 2°C (Griscom et al., 2017)[34]. It is estimated that 75 percent of the world's leading food crops, representing 35 percent of global food production, benefit from animal pollinators that live in forests and in other ecosystems of native vegetation. Around **1 billion people in the world** depend to some extent on wild foods that are extracted from forests and NWFPs provide around 20 percent of income for rural households in developing countries. The formal forest sector provides **45 million jobs globally** and labour income in excess of USD 580 billion per year considering the estimates of both direct, indirect and induced employment. Other benefits are associated to tourism, recreation, medicinal plants and provision of fuelwood and charcoal (FAO. & UNEP, 2020). Additionally, the GEO-6 overarching theme "Healthy

[32] WEF. 2020. Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy. Retrieved from: http://www3.weforum.org/docs/WEF_New_Nature_Economy_Report_2020.pdf

[33] UNEP and FAO. 2020. The United Nations Decade on Ecosystem Restoration Strategy. Retrieved from: https://wedocs.unep.org/bitstream/handle/20.500.11822/31813/ERDStrat.pdf?sequence=1&isAllowed=y

[34] Griscom, Bronson W., Justin Adams, Peter W. Ellis, Richard A. Houghton, Guy Lomax, Daniela A. Miteva, William H. Schlesinger, David Shoch, Juha V. Siikamäki, Pete Smith, Peter Woodbury, Chris Zganjar, Allen Blackman, João Campari, Richard T. Conant, Christopher Delgado, Patricia Elias, Trisha Gopalakrishna, Marisa R. Hamsik, Mario Herrero, Joseph Kiesecker, Emily Landis, Lars Laestadius, Sara M. Leavitt, Susan Minnemeyer, Stephen Polasky, Peter Potapov, Francis E. Putz, Jonathan Sanderman, Marcel Silvius, Eva Wollenberg, and Joseph Fargione. 2017. Natural climate solutions. PNAS October 31, 2017 114 (44) 11645-11650. Retrieved from: https://www.pnas.org/content/114/44/11645

Planet-Healthy People" documented the existing links between healthy ecosystems and human health conditions, highlighting the importance of ecosystems and the services they provide to the human health (UNEP, 2016)[35].

A recent study (Vergara et al., 2016)[36] has monetized some of the benefits that would flow from restoring **20 million hectares** of the region's degraded lands, namely wood forest products, NWFPs , agricultural outputs, ecotourism, carbon sequestration, and avoided costs of food security in the **LAC region**. According to the results, restoration in the LAC countries would yield a net present value (NPV) of about **$23 billion over a 50-year period** considering the benefits referred above. This is an underestimated value as other societal and ecosystem benefits from landscape restoration, such as improvements in biodiversity, soil conservation, and surface hydrology were not computed. The study provides strong evidence to support the adoption of policy measures and the removal of barriers for forest and landscape restoration efforts by governments in the LAC region, at both national and subnational levels. The positive results are expected from most restoration actions in most biomes (wet, dry, temperate) and for a wide range of land degradation.

One of the challenges for the region is to **scale-up restoration initiatives** in a way that they can be cost-effective and generate significative results for the LAC countries' economic, environmental and social objectives. Guidance is needed to direct efforts toward the most cost-efficient restoration outcomes and to identify landscapes where multiple restoration benefits can be maximized (Brancalion, Niamir, et al., 2019)[37]. **Identifying restoration opportunities** —areas that combine high potential for socioenvironmental benefits with high restoration feasibility—is an essential tool for achieving the ambitious restoration commitments established for the LAC region and can help defining priorities for implementation and financing of the global restoration agenda. A recent study from Strassburg and colleagues indicates that restoring 15% of priority areas across the globe may prevent 60% of expected extinctions and sequester one third of the total CO_2 increase of the past 1.2 centuries (Strassburg et al., 2020)[38].

There's an urge for **multi-criteria and spatial analyses** to help maximizing environmental and economic benefits while minimizing conflicts with productive activities (such as agriculture). Prioritization of areas will also help to scale up the opportunities for restoration, reducing the costs and increasing ecological benefits. Cost effectiveness can increase up to 13-fold when spatial allocation is optimized using multicriteria approaches, according to a recent study, which highlights the importance of spatial prioritization and planning (Strassburg et al., 2020).

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[35] UNEP. 2016. GEO-6 Regional Assessment for Latin America and the Caribbean. United Nations Environment Programme, Nairobi, Kenya. Retrieved from: https://www.unenvironment.org/resources/assessment/geo-6-regional-assessment-latin-america-and-caribbean

[36] Vergara, Walter, Luciana Gallardo Lomeli, Ana R. Rios, Paul Isbell, Steven Prager and Ronnie De Camino. 2016. The Economic Case for Landscape Restoration in Latin America. World Resources Institute. Retrieved from: https://initiative20x20.org/publications/economic-case-landscape-restoration-latin-america

[37] Brancalion, Pedro H. S., Aidin Niamir, Eben Broadbent, Renato Crouzeilles, Felipe S. M. Barros, Angelica M. Almeyda Zambrano, Alessandro Baccini, James Aronson, Scott Goetz, J. Leighton Reid, Bernardo B. N. Strassburg, Sarah Wilson, Robin L. Chazdon. 2019. Global restoration opportunities in tropical rainforest landscapes. Sci. Adv. 2019; 5: eaav3223. Retrieved from: https://advances.sciencemag.org/content/advances/5/7/eaav3223.full.pdf

[38] Strassburg, Bernardo B. N., A. Iribarrem, H. L. Beyer, C. L. Cordeiro, R. Crouzeilles, C. C. Jakovac, A. B. Junqueira, E. Lacerda, A. E. Latawiec, & A. Balmford. 2020. Global priority areas for ecosystem restoration. Nature:1-6. DOI:10.1038/s41586-020-2784-9, Retrieved from: https://www.nature.com/articles/s41586-020-2784-9

Some of these tools have been applied in the LAC region. An example is the **Restoration Opportunities Assessment Methodology (ROAM)** developed by the IUCN and WRI (IUCN & WRI, 2014)[39]. ROAM provides a flexible and affordable framework for countries to rapidly identify and analyse areas that are primed for FLR and to identify specific priority areas at a national or sub-national level. Applying ROAM helps to (1) identify different restoration actions; (2) quantify costs and benefits related to restoration; (3) estimate environmental and social impacts of the different actions; (4) analyse financial and investment options; and (5) prioritize areas and types of interventions for restoration.

Another example is the work of Brancalion and colleagues where restoration opportunities were identified in lowland tropical rainforest landscapes by overlaying seven recent, peer-reviewed spatial datasets as proxies for socioenvironmental benefits and feasibility of restoration (Brancalion, Niamir, et al., 2019). Several mechanisms have been proposed in the last years that incorporate novel approaches and that weight the cost of restoring against the cost of no action, allowing more refined cost-benefit estimations (Holl & Howarth, 2000)[40].

Also, more focused coordinated action at international level is needed in order to increase the funding sources for FLR and to achieve the goals of the New York Declaration on Forests (NYDF) and other agreements. In 2015 Germany, Norway and the United Kingdom (the Germany-Norway-United Kingdom Initiative) agreed to expand their cooperation efforts with other governments and the private sector to increase the funding for forests until 2020 and beyond including the LAC region (IKI, n.d.)[41]. Other important factor is the collaborative work. As an example, the initiative **Acción Andina** (GFG, n.d.)[42] is scaling up a community reforestation model and aims at protecting the remaining 500,000 hectares of critically important native *Polylepis* forests in six South American countries while reforesting an additional of 500,000 hectares. Regeneration of these forest ecosystems - in Colombia, Ecuador, Peru, Bolivia, Chile and Argentina - is essential for addressing the challenges of climate change.

A **strategy of large-scale landscape restoration (or rehabilitation) in the LAC region** is an opportunity to:

- Generate income in rural landscapes and increase the human well-being of rural communities and ethnic groups
- Ensure the functionality of the landscapes by slowing down the agricultural expansion, counteracting land degradation and maintaining the provision of Biodiversity & ES
- Contribute to the efforts of reducing carbon emissions in the regional economy
- Help countries to achieve both national and international commitments of sustainability such as the 2030 Agenda (SDGs).

[39] IUCN and WRI. 2014. A guide to the Restoration Opportunities Assessment Methodology: Assessing forest landscape restoration opportunities at the national or sub-national level. Working Paper (Road-test edition). Gland, Switzerland: IUCN. 125pp. Retrieved from: https://portals.iucn.org/library/sites/library/files/documents/2014-030.pdf

[40] Holl, K. D. & R. B. Howarth. 2000. Paying for Restoration. Restoration Ecology 8:260-267. DOI:10.1046/j.1526-100x.2000.80037.x. Retrieved from: https://www.researchgate.net/publication/229966606_Paying_for_Restoration

[41] IKI. n.d. International forest-related climate finance IKI Project. Assessed in 1st September 2020. Retrieved from: https://www.international-climate-initiative.com/en/details/project/international-forestrelated-climate-finance-18_III_103-3080

[42] GFG. n.d. Global Forest Generation. Retrieved from: https://www.globalforestgeneration.org/Accin-Andina

The relation between a strategy for land restoration or rehabilitation and the achievement of multiple SDGs is pointed out by the International Resource Panel (IRP, 2019)[43] . This report illustrates that restoration activities can contribute to all the 17 sustainable development goals of the 2030 Agenda, depending on how policymakers mitigate trade-offs and maximize synergies at the landscape-level when addressing the complex realities of landscape development.

[43] IRP (2019). Land Restoration for Achieving the Sustainable Development Goals: An International Resource Panel Think Piece. Herrick, J.E., Abrahamse, T., Abhilash, P.C., Ali, S.H., Alvarez-Torres, P., Barau, A.S., Branquinho, C., Chhatre, A., Chotte, J.L., Cowie, A.L., Davis, K.F., Edrisi, S.A., Fennessy, M.S., Fletcher, S., Flores-Díaz, A.C., Franco, I.B., Ganguli, A.C., Speranza, C.I, Kamar, M.J., Kaudia, A.A., Kimiti, D.W., Luz, A.C., Matos, P., Metternicht, G., Neff, J., Nunes, A., Olaniyi, A.O., Pinho, P., Primmer, E., Quandt, A., Sarkar, P., Scherr, S.J., Singh, A., Sudoi, V., von Maltitz, G.P., Wertz, L., Zeleke, G. A think piece of the International Resource Panel. United Nations Environment Programme, Nairobi, Kenya. Retrieved from: https://wedocs.unep.org/bitstream/handle/20.500.11822/29749/LandSDG.pdf?sequence=1&isAllowed=y

1.5. International and Regional Commitments on Restoration of Forest Landscapes

Key messages

- **There are several restoration efforts at global scale, such as the Bonn Challenge, which aims to restore 350 million hectares of degraded landscapes by 2030 or the New York Declaration on Forests, which supports the Bonn Challenge in its goal 5.**
- **At the regional scale, Initiative 20x20 is a country-led effort seeking to change the dynamics of land degradation in Latin America and the Caribbean by beginning to protect and restore 20 million hectares of forests, farms, pasture, and other landscapes by 2020.**

Given the strategic importance of restoration for climate, people and nature, the Government of Germany together with the IUCN launched in 2011 the Bonn Challenge. The **Bonn Challenge** is a **global goal** to bring 150 million hectares of degraded and deforested landscapes into restoration by 2020 and **350 million hectares** by **2030** and has surpassed the 150-million-hectare milestone in 2017 (IUCN and BMUB, n.d.)[44]. The Bonn Challenge is aligned with other goals established by **multilateral agreements** such as: the Sustainable Development Goals (SDGs) established by the 2030 Agenda (particularly Goals 14.2, 15.1, and 15.3), the Aichi Biodiversity Targets (mainly the Target 15) established by the Convention on Biological Diversity (CBD), the Land Degradation Neutrality (LDN) goal promoted by the United Nations Convention to Combat Desertification (UNCCD) and the intended Nationally Determined Contributions to the Paris Climate Agreement in the context of the United Nations Framework Convention on Climate Change (UNFCCC). The Bonn Challenge brings together countries in **regional platforms** to help catalyse political will and restoration ambition.

The first region to sum up efforts to support the Bonn Challenge was Latin America and the Caribbean (LAC) in **2014**. The **20x20 Initiative** (Initiative 20x20, n.d.)[45] was formally launched at COP20 in Lima, Peru and the established goal of restoring 20 million hectares until 2020 was already reached. So far, 17 Latin American countries and three regional programs have committed to begin restoring more than 50 million hectares of degraded land by 2020 (Figure 1).

The initiative is supported by more than 70 technical organizations and institutions and a coalition of impact investors and private funds deploying US$2.5 billion in private investment. Main activities of the Initiative include the assessment of the societal benefits from restoration and avoided deforestation, the establishment of a financial mechanism for the private sector to fund restoration projects and the promotion of dialogues with Ministers of Agriculture and Environment in the region.

In 2014 the **New York Declaration on Forests** (NYDF) (NYDF, n.d.)[46] was endorsed at the United Nations Climate Summit as a voluntary and non-binding international declaration to take action to

[44] IUCN and BMUB. n.d. International Union for the Conservation of Nature (IUCN) and German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMUB) website on the Bonn Challenge. Assessed in 1st September 2020. Retrieved from https://www.bonnchallenge.org/

[45] Initiative 20x20. n.d. The Initiative 20x20 website. Assessed 1st September 2020. Retrieved from: https://initiative20x20.org/

[46] NYDF. n.d. The New York Declaration of Forests website. Assessed 1st September 2020. Retrieved from: https://forestdeclaration.org/

halt global deforestation. The New York Declaration on Forests supports the Bonn Challenge in its Goal 5. Until now the Declaration has reunited 200 endorsers, including national governments, sub-national governments, multi-national companies, groups representing indigenous communities, and non-government organizations. The declaration includes ambitious targets to end natural forest loss by 2030 along with **restoring 150 million hectares of degraded landscapes and forestlands by 2020 and 350 million hectares by 2030**, supporting the private sector in eliminating deforestation from the supply chains of major agricultural commodities by 2020, and providing financial support to reduce emissions related to deforestation and forest degradation. UNDP along with the Meridian Institute is responsible for the **Global Platform on the New York Declaration on Forests**, receiving funds from the German Government (through IKI) to help convening the Platform and serving as its secretariat.

The **Tropical Forest Alliance** (TFA) (TFA, n.d.)[47] was founded in 2012 and has committed to zero net deforestation by 2020 for palm oil, soy, beef, and paper and pulp supply chains. Being a global umbrella partnership hosted by the World Economic Forum that brings together governments, the private sector, and civil society organizations, the TFA aims to eliminate deforestation from commodity production.

Figure 1. Commitments of restoration by the LAC countries in the context of the 20x20 Initiative (WRI, n.d.)[48]

[47] TFA. n.d. Tropical Forest Alliance (TFA) website. Assessed 1st September 2020. Retrieved from: https://www.tropicalforestalliance.org/en/about-tfa/about/

[48] WRI. n.d. The Initiative 20x20 Infographic. Retrieved from: https://initiative20x20.org/sites/default/files/inline-files/20_Info_20x20-03.pdf

Pledges under the Bonn Challenge totalling 170.6 million hectares indicate **significant political will** to restore landscapes. Despite high ambition, the **implementation is limited,** as proved by the latest report of the New York Declaration of Forests which shows that only 26.7 million hectares of forest landscapes have undergone restoration since 2000 (20.5 Mha reforestation, 6.2 Mha afforestation). Part of those areas that have undergone FLR are in Latin America (9.7 million hectares between 2000 and 2010), primarily as regeneration in Brazil (97 %) (NYDF Assessment Partners, 2019).

Led by El Salvador and together with over 70 countries, the United Nations General Assembly (UNGA) declared 2021–2030 as the **UN Decade on Ecosystem Restoration** (UNGA, 2019)[49] which aims to prevent, halt and reverse the degradation of ecosystems worldwide. The declaration recognizes the role of ecosystem restoration to the achievement of all the 17 Sustainable Development Goals, meaning that restoration will "*support Life Below Water (SDG 14) and Life on Land (SDG 15) by enhancing the quality and area of habitats for wildlife" which "… will in turn help societies mitigate and adapt to climate change (SDG 13), improve the health of societies in rural and urban environments (SDGs 3, 11), and increase the supplies of clean water (SDG 6) and sustainable food (SDG 2, 12). Investments in restoration that adhere to principles of gender equality and restorative justice will also provide and improve: work opportunities and income streams (SDGs 1, 5, 8, 10, 16); and cross-sectoral collaboration, learning and innovation on the use of ecosystem goods and services (SDGs 4, 7, 9, 17)*" (UNEP and FAO, 2020). Besides the 2030 Agenda, the UN Decade will contribute to achieve other multilateral environment agreement targets such as the ones defined by the CBD, the UNCCD, the UNFCCC Paris Agreement and other global frameworks.

In order to achieve its goal, the UN Decade needs support from all segments of society and it asks that Member States to "*foster political will, mobilize resources, build capacities, mainstream ecosystem restoration into national policies and plans, implement plans to protect and restore ecosystems and undertake collaborative scientific research*"(UNEP and FAO, 2020).

[49] UNGA. 2019. United Nations General Assembly (UNGA) Resolution on the United Nations Decade on Ecosystem Restoration (2021–2030). Resolution A/RES/73/284, 1 March 2019. Retrieved from: https://undocs.org/pdf?symbol=en/A/RES/73/284

1.6. Finance for Restoration

Key messages

- **Between USD 830 and USD 1,208 billion are needed to achieve the global commitment of 350 million hectares restored until 2030.**
- **The use of generic restoration cost estimates as well as the lack of detailed analyses of the components and drivers of restoration costs makes landscape restoration planning as well as management of restoration commitments harder.**
- **In total, just under USD 22 billion in green finance for forests has been committed since 2010 from public and private sector sources.**
- **Long-term financing solutions rely on the private sector and on instruments that enable self-sustained financing such as the environmental funds**

Restoration is generally a costly undertaking, partly because it often begins after the environmental degradation is well-advanced and expensive to reverse meaning it is often labour and resource intensive (Wainaina et al., 2020)[50]. The **costs can vary greatly**, depending on the type of restoration (natural regeneration to tree planting), operational procedures (mechanized or manual site preparation), species used (pioneer species or high conservation value species with expensive seeds), extent of site preparation needed to improve degraded biophysical conditions and duration of project (Brancalion, Meli, et al., 2019)[51].

So, limited funding is an important barrier for achieving the ambitious international commitments on forest and landscape restoration. In one hand it's essential to reduce restoration costs to upscale restoration. In the other hand it's crucial to understand how much **funding** is required to effectively achieve those targets. **Costs for FLR activities** are dependent on a series of factors including the degree of forest degradation and deforestation, specific social, political, and biophysical characteristics and circumstances and the measures that will be taken (NYDF Assessment Partners, 2019).

A joint investigation carried out by the Global Mechanism of the UNCCD and FAO (FAO & Global Mechanism of the UNCCD, 2015)[52] reported that **USD 360 billion** is required to meet the Bonn Challenge (until 2020) and **USD 830 billion** is needed to meet the target of the New York Declaration on Forests (until 2030), corresponding to a budget between USD 36 billion and USD 49 billion per year. In the recent report of the NYDF an estimated **USD 359–518 billion** is needed to meet the 2020 target of the Bonn Challenge (150 million hectares) and **USD 837–1,208 billion** to achieve the NYDF (350

[50] Wainaina, Priscilla, Peter A. Minang, Eunice Gituku and Lalisa Duguma. 2020. Cost-Benefit Analysis of Landscape Restoration: A Stocktake. Land 2020, 9, 465. Retrieved from: https://www.mdpi.com/2073-445X/9/11/465

[51] Brancalion, Pedro H.S., Paula Meli, Julio R.C. Tymus , Felipe E.B. Lentic , Rubens M. Benini , Ana Paula M. Silva , Ingo Isernhagen , Karen D. Holl. 2019. What makes ecosystem restoration expensive? A systematic cost assessment of projects in Brazil. Biological Conservation 240.

[52] FAO & Global Mechanism of the UNCCD. 2015. Sustainable financing for forest and landscape restoration: Opportunities, challenges and the way forward. Discussion paper. Rome. Retrieved from: http://www.fao.org/publications/card/en/c/274a1d5d-868a-4c70-9700-590615875184/

million hectares) (NYDF Assessment Partners, 2019). According to different studies the benefits of restoration superpose the costs including environmental, economic and social gains. As an example of the contribution of FLR for job creation it is estimated that up to 191,000 direct jobs will be created per year in human-supported restoration activities for Brazil alone (Brasil. Ministério do Meio Ambiente, 2017a)[53].

Given all the benefits associated with the FLR (some of them described in the section 1.4.), it's important to evaluate if the current funding available specifically for FLR is enough to achieve the commitments done, what's the existing **funding gap** for FLR activities, how much financial resources need to be mobilized and what are the best ways to design mechanisms and to channel funds in order to maximize the results for both nature, people and climate.

According to a recent review, there are gaps in the economic analysis of landscape restoration that difficult the **prioritization of investment of the resources**. Most of the reviewed **cost-benefit analysis** studies don not capture all cost categories, such as opportunity costs and maintenance and monitoring costs; do not go beyond direct use values; and do not capture public benefits making harder to create evidence for the need of public investments (Wainaina et al., 2020). The use of generic restoration cost estimates as well as the lack of detailed analyses of the components and drivers of restoration costs makes landscape restoration planning, as well as management of restoration commitments, harder (Brancalion, Meli, et al., 2019).

A study of Brancalion and colleagues in Brazil has recently assessed terrestrial restoration costs across diverse ecosystems and degradation conditions in Brazil and calculated investment needed to achieve the 12 million ha target of Brazil's restoration plan. A total of US$8.9–15.6 billion between 2017 and 2030 will be needed, which represents an annual value of US$0.7-1.2 billion. This value does not consider the potential cost increases over time nor the land opportunity costs (Brancalion, Meli, et al., 2019).

So, to create an enabling environment for FLR investments it's essential to **raise awareness of investors and project promoters and implementers on costs and benefits of restoration** (FAO & Global Mechanism of the UNCCD, 2015). Assessing information on costs and benefits would support the design of strategic financing option that consider which investors would be ready to finance specific costs and to purchase specific benefits (FAO & Global Mechanism of the UNCCD, 2015).

Several initiatives, such as the Economics of Ecosystems and Biodiversity (TEEB), the National Ecosystem Assessments (IPBES), the Wealth Accounting and the Valuation of Ecosystem Services (WAVES), the UNSD's framework on both Environmental Economic Accounts and Natural Capital Experimental Accounting Systems and the UNDP's Biodiversity Finance Initiative (BIOFIN) can contribute to the development of national databases on the costs and benefits of restoration strategies (FAO & Global Mechanism of the UNCCD, 2015).

Identifying synergies with other related agendas such as forestry, sustainable land management (SLM), biodiversity, agriculture and climate and respective funds available can be an approach to maximize results and to optimize the financial investments. The variety of possible sources of finance is illustrated in Figure 2.

[53] Brasil. Ministerio do Meio Ambiente. 2017. Planaveg: Plano Nacional de Recuperação da Vegetação Nativa / Ministério do Meio Ambiente, Ministério da Agricultura, Pecuária e Abastecimento, Ministério da Educação. – Brasília, DF: MMA, 2017.

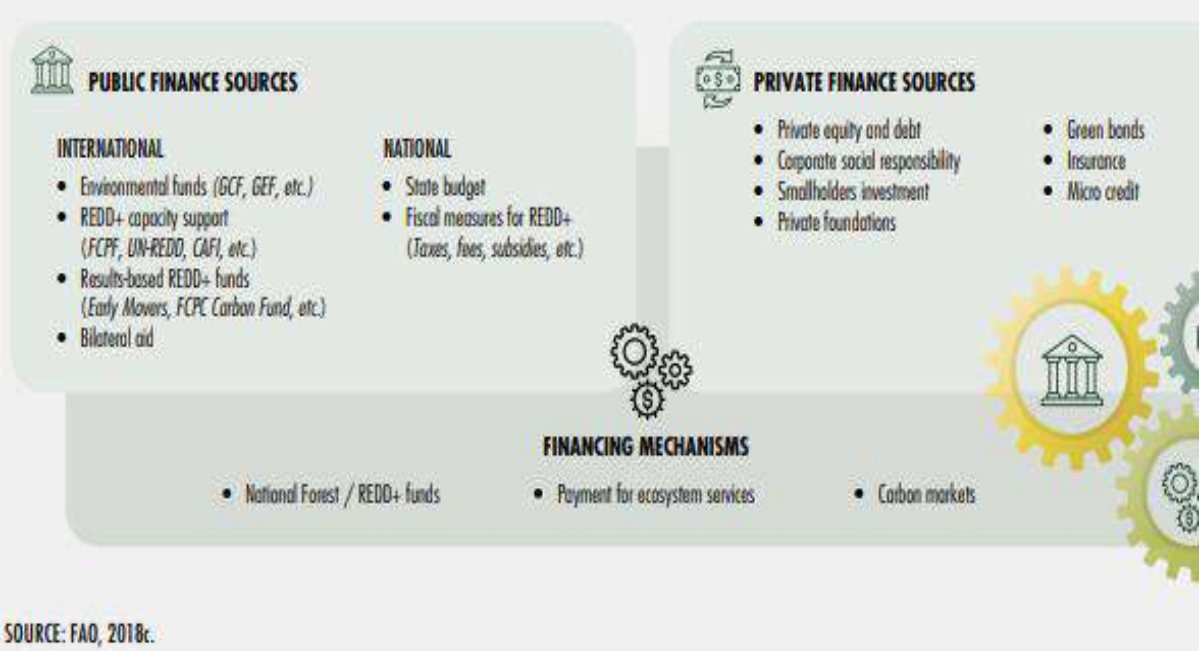

Figure 2. possible sources of finance for FLR (FAO and UNEP, 2020)

There is a need not only for new finance but also by shifting the existing funds from traditional (grey financing) to sustainable investments (green financing). As an example, over 15 times more public finance from international donors is allocated to the agriculture sector in tropical countries than climate mitigation finance with a forest objective (NYDF Assessment Partners, 2019), In total, just under **USD 22 billion** in green finance for forests has been committed since 2010 from public and private sector sources. In the period between 2010–2017, developed countries and multilateral institutions committed **USD 5.1 billion** in forest sector finance for climate mitigation-related development whereas another **USD 1.3 billion** has been pledged for regional or unspecified support to the forestry sector. Nearly **USD 4.7 billion of results-based finance for verified carbon emissions reductions** has been committed by bilateral or multilateral sources since 2010 (Table 1).

Table 1. Agreements for multilateral and bilateral initiatives in the LAC region (NYDF Assessment Partners, 2019)

Initiatives	Countries
Multilateral – Programs provisionally selected into the FCPF Carbon Fund Portfolio	Mexico, Guatemala, Republica Dominicana, Costa Rica, Colombia, Peru, Chile
Multilateral – Programs selected into the BioCarbon Fund Initiative for Sustainable Forest Landscapes	Colombia
Bilateral - German, Norwegian and/or UK agreements in the REDD Early Mover Program	Mato Grosso, Acre (Brazil) Mexico
Amazon Fund agreement with Norway/Germany	Brazil
Other Norwegian bilateral agreements	Peru, Guyana

Long-term financing solutions rely on the private sector and on instruments that enable self-sustained financing such as the environmental funds. Examples are the **Landscape Fund** proposed by CIFOR that plans to issue restoration bonds following the model of green bonds and the **public–private partnership model of the Land Degradation Neutrality Fund**. The later, developed by the Global Mechanism of UNCCD, supports the transition to land degradation neutrality through land rehabilitation while generating revenues for investors from sustainable production on rehabilitated land (FAO and UNEP, 2020).

1.7. Objective

This work aims to assess the enabling conditions for large-scale restoration action in all LAC countries (Anguilla, Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Cayman Islands, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, French Guiana, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos Islands, Uruguay, Venezuela (Bolivarian Republic of), Virgin Islands (British) and Virgin Islands (US)) and identify restoration opportunities at national and the subnational level in a subset of those countries.

2. Methodology

To evaluate the enabling conditions in all LAC countries to implement large scale restoration, a **restoration readiness score** (varying between 0 and 5) was computed based on:

- Existence of Bonn Challenge commitments (taken from the Bonn Challenge website) (IUCN and BMUB, n.d.); forest reference emission level that includes restoration/enhancement of carbon stock (taken from UNFCCC submissions website) (UNFCCC, n.d.);
- Restoration Opportunities Assessment Methodology (ROAM) analysis or equivalent (taken from IUCN / WRI via infoFLR (IUCN, n.d.);
- Other published ROAM analysis;
- Restoration/enhancement included in the Nationally Determined Contribution (NDC) (taken from the UNDP NDC Spreadsheet) and national restoration policies in place (taken from IUCN / WRI via infoFLR) (IUCN, n.d.).

Other types of information were used such as:

- the number of restoration projects currently being implemented according to LUCID Database (Romijn & Coppus, 2018)[54]; and
- the aggregate governance indicator from the World Bank Project, which varies between -2.5 and + 2.5 (World Bank, n.d.-b)[55].

After the collation of this information a pool of countries was selected for further analysis on potential restoration priorities, as well as to characterize technical and financing gaps for this work. The selection was based on readiness restoration scores equal or higher than 2.5 (in a scale of zero to five); and on at least one of the following criteria:

- more than 10 restoration projects already being implemented;
- countries with restoration commitments equal or higher than 1 Mha; and/or
- positive governance indicator positive.

This short-list of the countries was then evaluated by LAC UN-REDD experts.

For the short-list of selected countries **areas already identified and prioritized for scaling-up restoration efforts** were compiled from several sources:

- (i) ROAM analyses;
- (ii) restoration national strategies;
- (iii) large restoration projects (collated from GEF website, World Bank website, LUCID database; and
- (iv) studies at the country and/or global scale on restoration spatial prioritisation.

[54] Romijn, J.E. & Coppus, R., 2018. Restoration Database for Latin America and the Caribbean. Comparative Research Project on Landscape Restoration for Emissions Reductions. CIAT/WUR project for USAID [database]. Assessed 1st September 2020. Retrieved from http://lucid.wur.nl/

[55] World Bank. n.d. Worldwide Governance Indicators (WGI) project. Assessed 1st September 2020. Retrieved from https://info.worldbank.org/governance/wgi/

Finally, for each of the short-listed countries an identification of the **opportunities to scaling-up restoration efforts were identified** based on several criteria:

- enabling environment (policies, regulations and laws);
- governance issues;
- private-sector engagement;
- funds available;
- coalitions and partnerships and/or;
- technical capacity.

This methodology was undertaken during the months of July till September as part of a desk-based study in consultation with experts.

3. Results

3.1. Selection of the Short-List of Countries

Table 2 shows the **information collated for 33 LAC countries** regarding their suitability for further identification of subnational opportunities for restoration.

The **short-list of countries to be further evaluated by the LAC UN-REDD experts** is shown in the Table 3. Criteria for selection are detailed in Section 2 'Methodology'.

The LAC UN-REDD experts' identified the following list of countries to further evaluate in terms of potential for large-scale restoration based on their knowledge and experience about the governance issues and other major bottlenecks for the restoration: **Brazil, Colombia, Costa Rica, Chile**, **Argentina** and **Peru**.

Table 2. Collation of information for LAC countries regarding their suitability for further identification of subnational opportunities for restoration.

Country	Restoration Readiness Score (*)	Description of Restoration Readiness Score (*)	Number of Projects from LUCID Database (**)	Predominant source of investment for the Projects in LUCID database (**)	ROAM Assessments (Yes/No; National/Sub-national)	Restoration Commitments (Mha) (***)	Governance
Honduras	5	Bonn Challenge FREL incl. removals ROAM Restoration in NDC National policies	-	-	Yes (National)	1 (Bonn Commitment)	-0.63
Costa Rica	5	Bonn Challenge FREL incl. removals ROAM Restoration in NDC National policies	2	Public Investor Int. Donor	Yes (National)	1 (Bonn Commitment) 0.2 (National restoration target)	0.59
Chile	4	Bonn Challenge FREL incl. removals Restoration in NDC National policies	24	Company Public	No	0.5 (Bonn Commitment)	1.01
El Salvador	4	Bonn Challenge ROAM Restoration in NDC National policies	-	-	Yes (National)	1 (Bonn Commitment) 1 (National restoration target)	-0.37
Guatemala	4	Bonn Challenge ROAM Restoration in NDC National policies	8	Company Int. Donor	Yes (National)	1.2 (Bonn Commitment) 0.83 (National restoration target)	-0.61

Country	Restoration Readiness Score (*)	Description of Restoration Readiness Score (*)	Number of Projects from LUCID Database (**)	Predominant source of investment for the Projects in LUCID database (**)	ROAM Assessments (Yes/No; National/Sub-national)	Restoration Commitments (Mha) (***)	Governance
Brazil	3.5	Bonn Challenge ROAM (subnational) Restoration in NDC National policies	12	Int. Donor Investor Public	Yes (Subnational – 5 states + Federal District)	22 (Bonn Commitment) 3.2 (National restoration target)	-0.24
Mexico	3.5	Bonn Challenge ROAM (subnational) Restoration in NDC National policies	24	Public Int. Donor	No	8.47 (Bonn Commitment)	-0.35
Argentina	3	Bonn Challenge ROAM Restoration in NDC	3	Public Int. Donor	-	1 (Bonn Commitment)	0.01
Panama	3	Bonn Challenge FREL incl. removals Restoration in NDC	-	-	No	1 (Bonn Commitment)	0.1
Colombia	2.5	Bonn Challenge ROAM National policies	36	Public Investor	Yes (subnational – 1 region)	1 (Bonn Commitment) 2.02 (National restoration target)	-0.18
Peru	2.5	Bonn Challenge ROAM National policies	33	Public Int. Donors	Yes (Subnational – 5 states)	3.2 (Bonn Commitment) 2.2 (National restoration target)	-0.13

Country	Restoration Readiness Score (*)	Description of Restoration Readiness Score (*)	Number of Projects from LUCID Database (**)	Predominant source of investment for the Projects in LUCID database (**)	ROAM Assessments (Yes/No; National/Sub-national)	Restoration Commitments (Mha) (***)	Governance
Cuba	2	Bonn Challenge Restoration in NDC	-	-	No	0.47 (Bonn Commitment)	-0.46
Dominican Republic	2	Bonn Challenge FREL incl. removals	-	-	No	0.187 (Bonn Commitment)	-0.24
Nicaragua	2	Bonn Challenge FREL incl. removals	1	Int. Donor	Manual for FLR activities, formal assessment not made	2.7 (Bonn Commitment)	-0.91
Uruguay	2	Bonn Challenge Restoration in NDC	2	Public Int. Donor	No	0.2 (Bonn Commitment)	0.86
Ecuador	2	Bonn Challenge National policies	3	Int. Donor	No	0.5 (Bonn Commitment)	-0.4
Bahamas	1	Restoration in NDC	-	-	No	-	0.6
Belize	1	Restoration in NDC	-	-	No	-	-0.29
Bolivia (Plurinational state of)	1	National policies	3	Int. Donor	No	-	-0.55
Haiti	1	Restoration in NDC	-	-	No	-	-1.13
Saint Vicent and the Grenadines	1	Restoration in NDC	-	-	No	-	0.56
Suriname	1	Restoration in NDC	-	-	No	-	-0.19

Country	Restoration Readiness Score (*)	Description of Restoration Readiness Score (*)	Number of Projects from LUCID Database (**)	Predominant source of investment for the Projects in LUCID database (**)	ROAM Assessments (Yes/No; National/Sub-national)	Restoration Commitments (Mha) (***)	Governance
Antigua and Barbuda	0	-	-	-	No	-	0.4
Barbados	0	-	-	-	No	-	0.8
Dominica	0	-	-	-	No	-	0.48
Grenada	0	-	-	-	No	-	0.28
Guyana	0	-	-	-	No	-	-0.21
Jamaica	0	-	-	-	No	-	0.25
Paraguay	0	-	-	-	No	-	-0.35
Saint Kitts and Nevis	0	-	-	-	No	-	0.61
Saint Lucia	0	-	-	-	No	-	0.57
Trinidad and Tobago	0	-	-	-	No	-	0.09
Venezuela (Bolivarian Republic of)	0	-	-		No	-	-1.75

(*) The restoration readiness score pulls information from several sources, such as Bonn Challenge commitments and national outputs including reference level submissions, NDCs and other national policies. Please note that the information used for NDCs and national policies may be incomplete or out of date.

(**) The LUCID Database is a compilation of projects planned/implemented/completed until 2018. For the countries that have no projects listed that doesn't mean there are not restoration projects put in place, just that they were not compiled by the database.

(***) Bonn Challenge commitments were taken from the Bonn website (16/09/2020); only country level commitments are shown here, but both Brazil and Mexico have state level commitments to Bonn. (Only countries with a Bonn challenge commitment have been included. National restoration targets are included, e.g. REDD+ commitments. Data from IUCN-INFOFLR country profiles may be incomplete.

Table 3. Short-list of countries that were submitted to the UNEP UN-REDD LAC team experts for evaluation [Conditions: (1) countries listed with readiness scores equal or higher than 2.5; (2) countries with ROAM assessments performed (national/sub-national); (3) countries with a significant number of restoration projects already being implemented according to LUCID Database (>10); and (4) the countries with restoration commitments equal or higher than 1 Mha]

Country	Conditions
Brazil	(1) (2) (3) (4)
Colombia	(1) (2) (3) (4)
Peru	(1) (2) (3) (4)
Costa Rica	(1) (2) (4)
Honduras	(1) (2) (4)
Guatemala	(1) (2) (4)
El Salvador	(1) (2) (4)
Chile	(1) (3)
Argentina	(1) (4)
Panama	(1) (4)
Nicaragua	(2) (4)
Mexico	(3) (4)

3.2. Description of the selected country Brazil

3.2.1. Country's Characterization

Commitments

The Brazilian government announced its contribution to the **Bonn Challenge and the 20x20 Initiative** in December **2016** during the 13th Conference of the Parties - COP of the Convention on Diversity Biological - CDB, held in Cancun - Mexico. Brazil's overall restoration commitment to Initiative 20x20, in support of the Bonn Challenge, was **22,000,000 ha** (between 2016 and 2030). From the total committed, 12,000,000 ha was with the objective of restore, reforest and induce the natural regeneration of forests (until 2030) for biodiversity and climate benefits, 5,000,000 ha to implement integrated agricultural systems combining farming, livestock and forests (until 2030) and 5,000,000 ha to recover degraded pastures (until 2020). In 2011 the Atlantic Forest Restoration Pact, a bottom-up, multi-stakeholder movement, pledged a target of one Mha of Atlantic Forest biome restoration to the 2020 Bonn Challenge (Crouzeilles et al., 2019)[56]. The targets established will allow Brazil to sequester 1140 million t CO_2e plus an additional of 90 million t CO_2e associated with PACTO's commitment for the Atlantic Forest biome.

Enabling Policies

The **Native Vegetation Protection Law** (12.651/2012) (DOU Brasil, 2012)[57] is the main national environmental law that protects and regulates the use of native vegetation in rural private lands. The law requires landowners to conserve a minimum proportion of native vegetation on their rural properties called Legal Reserve (RL, acronym in Portuguese). That minimum varies according to the biome in which rural properties are located: 50–80% if they are located in the Amazon biome (depending on the deforestation year and regional law), 35% in Cerrado lands in the Legal Amazon, and 20% in the Atlantic Forest, Cerrado, Pampa and Pantanal biomes. The law establishes also Areas of Permanent Protection (APP, acronym in both Portuguese and English) that include vegetation on hilltops, high elevations and on steep slopes, riparian vegetation adjacent to streams and rivers, around springs, coastal shrublands and mangroves. The law emphasizes that portions of the RLs can be used to generate economic benefits from sustainable forest management. Specific recommendations are that: i) up to half of the RLs may be used for economic benefits; ii) when using exotic species (up to 50%), these species need to be interspersed with native species; iii) when using exotic species, management should promote the regeneration of native species; iv) the holding must follow the principles of sustainable forest management; and v) the species diversity needs to be maintained. However, there is a lack of specification on some aspects, such as the required value to maintain species diversity. APPs may not be used to provide economic benefits, although small rural

[56] Crouzeilles, Renato et al. 2019. There is hope for achieving ambitious Atlantic Forest restoration commitments. Perspectives in Ecology and Conservation 17: 80-83.

[57] DOU Brasil. 2012. Lei nº 12.651, de 25 de maio de 2012. Dispõe sobre a proteção da vegetação nativa; altera as Leis nºs 6.938, de 31 de agosto de 1981, 9.393, de 19 de dezembro de 1996, e 11.428, de 22 de dezembro de 2006; revoga as Leis nºs 4.771, de 15 de setembro de 1965, e 7.754, de 14 de abril de 1989, e a Medida Provisória nº 2.166- 67, de 24 de agosto de 2001; e dá outras providências. Diário Oficial [da] República Federativa do Brasil, Brasília, DF, May 25th 2012.

properties (≤ 4 fiscal module units) can use them for sustainable agroforestry. Besides the Native Vegetation Protection Law, the **National Policy for the Recovery of Native Vegetation (PROVEG)** (DOU Brasil, 2017)[58] and the **National Plan for the Recovery of Native Vegetation (PLANAVEG)** (Brasil. Ministério do Meio Ambiente, 2017a)[59] are providing the enabling environment for restoration. In the context of the National Policy on Climate Change is important to highlight too the **Sectoral Plan of Agriculture and Livestock (ABC Plan)** (Brasil. Ministério da Agricultura, 2012)[60] with some of the goals include restoring 15 million hectares of degraded pasture; implementing 5 million hectares of integrated crops, livestock, and forest and agroforestry systems and adding 3 million hectares of planted forests.

The National REDD+ Strategy (ENREDD+) was established in 2016 and its goal is to contribute to mitigate climate change by eliminating illegal deforestation, conserving and **recovering forest ecosystems**, and developing a sustainable low-carbon forest economics, generating economic, social and environmental benefits (Brasil. Ministério do Meio Ambiente, 2016)[61]. In 2019 Brazil was the first country to receive results-based payments from the Green Climate Fund and the funding will be used by Brazil to pilot an environmental service incentive program for conservation and recovery of native vegetation (known as "Floresta+") and for strengthening the implementation of Brazil's REDD+ strategy, contributing to the achievement of Brazil's NDC (UNFCCC, 2019)[62].

Alliances and Coalitions

Also important in the context of Brazil is the existence of important alliances and coalitions to promote restoration activities. One example is the already mentioned **Pact for Forest Restoration of Atlantic Forest** (PACTO) (PACTO, n.d.)[63], a bottom-up, multi-stakeholder movement including more than 220 organizations, among civil society, international organizations, governmental agencies, research institutions, and the private sector. It is the main initiative to promote the ecological restoration of the Atlantic Forest, aiming to restore 15 million hectares of this biome by 2050. Another example is the **Alliance for Restoration in Amazon** (Aliança pela Restauração na Amazônia, n.d.)[64], a recent initiative focused on qualifying and expanding the scale of forest restoration in the Brazilian Amazon. The **Brazilian Coalition on Climate, Forests and Agriculture** (Coalizão Brasil Clima, n.d.)[65] is a multisectoral platform of more than 200 representatives from the agribusiness, financial sector, civil society and academia. Its main role is to articulate actions for the country to promote a new economic

[58] DOU Brasil. 2017. Decreto Nº 8.972, de 23 de Janeiro de 2017. Institui a Política Nacional de Recuperação da Vegetação Nativa -Proveg, dispõe sobre seus objetivos e diretrizes, estabelece seus instrumentos e define sua governança. Diário Oficial [da] República Federativa do Brasil. Brasília, DF, January 23th 2017.

[59] Brasil. Ministério do Meio Ambiente. Plano Nacional de Recuperação da Vegetação Nativa – PLANAVEG. Ministério do Meio Ambiente, Brasilia/DF, Brasil.

[60] Brasil. Ministério da Agricultura, Pecuária e Abastecimento. Plano setorial de mitigação e de adaptação às mudanças climáticas para a consolidação de uma economia de baixa emissão de carbono na agricultura : plano ABC (Agricultura de Baixa Emissão de Carbono) / Ministério da Agricultura, Pecuária e Abastecimento, Ministério do Desenvolvimento Agrário, coordenação da Casa Civil da Presidência da República. – Brasília : MAPA/ACS, 2012. 173 p

[61] Brasil. Ministério do Meio Ambiente. 2016. ENREDD+: Rstratégia Nacional para Redução das Emissões Provenientes do Desmatamento e da Degradação Florestal, Conservação dos Estoques de Carbono Florestal, Manejo Sustentável de Florestas e Aumento de Estoques de Carbono Florestal / Brasil. Ministério do Meio Ambiente. Secretaria de Mudanças Climáticas e Qualidade Ambiental. Departamento de Políticas de Combate ao Desmatamento. Brasília: MMA, 2016. 48 p. Retrieved from: http://redd.mma.gov.br/images/publicacoes/enredd_documento_web.pdf

[62] UNFCCC. 2019. Article / 05 March 2019. Forest Protection in Brazil Boosted through REDD plus. Retrieved from: https://unfccc.int/news/forest-protection-in-brazil-boosted-through-redd-plus

[63] PACTO website. Retrieved from: http://www.pactomataatlantica.org.br/

[64] Alliance for Restoration in Amazon website. Retrieved from: https://aliancaamazonia.org.br/en/

[65] Brazilian Coalition on Climate, Forests and Agriculture website. Retrieved from: http://www.coalizaobr.com.br/home/

development model based on low-carbon economy and, consequently, respond to the challenges of climate change. The Coalition maintain Dialogue Forums in some subjects including Native Forests (where the restoration subject is discussed) and Agriculture and Forestry (where the subjects of agroforestry systems, planted forests, farming, livestock and forest integration and recovery of pastures are included).

In September 2017, over 60 Brazilian NGOs, including WWF-Brazil, TNC, CI-Brazil, Greenpeace Brazil, IPAM (Amazon Environmental Research Institute) and Imaflora (Institute of Agricultural and Forest Management and Certification) released the **Cerrado Manifest**, a call for immediate action in defence of the Cerrado biome by companies that purchase soy and meat from within the biome, as well as by investors active in these sectors (FAIRR, n.d.)[66].

Funds

The **National Fund for Forest Development** (*Fundo Nacional de Desenvolvimento Florestal*) was established as a key mechanism for implementing Brazil's Forest Code, being designed to promote forest development with a focus on forest-based enterprises. The **Amazon Fund** was established by the Brazilian Government in 2008 and is managed by the Brazilian Development Bank. Most of its funding comes from the governments of Norway and Germany, and from Petrobras (a Brazilian oil company), and the focus is on preventing deforestation (BNDES and MMA, n.d.)[67]. With the promulgation of Decree No. 9,759, on April 11, 2019 the two committees responsible for the governance of the Amazon Fund – the Amazon Fund Steering Committee (COFA) and the Amazon Fund Technical Committee (CTFA) – were extinguished as of June 28 (BNDES and MMA, 2020)[68]. These changes in the Fund governance along with a surge in the deforestation have resulted in a suspension in the donations by both donor countries. Negotiations have been opened between the Brazilian government and the governments of Germany and Norway to establish a common understanding of a new governance structure and the negotiations are still in course. The analysis and approvals of new projects have therefore been suspended as of December 2019 (BNDES and MMA, 2020).There are some credit lines for funding restoration from:

- **Climate Fund (Native Forests)** – Funds to promote forest management and forest planting with native species and are to be assessed by public bodies and companies
- **Brazilian Development Bank (BNDES) (BNDES Forest)** – Funds to promote environmental regulation, recovery of degraded areas, reforestation and forest management and are to be assessed by individual entrepreneurs, associations, and foundations
- **Low Carbon Agriculture Program (ABC)** – Funds to promote environmental regulation of farms, forest management and forest of palm oil and are to be assessed by producers and cooperatives

In the context of the Brazil's Funding Proposal to access resources of the Green Climate Fund (GCF), part of the results-based payment received by Brazil from the GCF will be used to implement a pilot of an Environmental Services Incentive Program for Conservation and Recovery of Native Vegetation

[66] FAIRR. n.d. Cerrado Manifest. Retrieved from: https://cerradostatement.fairr.org/

[67] Amazon Fund website. Retrieved from: http://www.amazonfund.gov.br/en/home/

[68] BNDES and MMA. 2020. Amazon Fund. Activity Report 2019. Retrieved from: http://www.amazonfund.gov.br/export/sites/default/en/.galleries/documentos/rafa/RAFA_2019_en.pdf

(Floresta+) (MMA, n.d.) [69] that includes providing direct payments for farmers (Forest+ Restoration sub-program) that promote native vegetation restoration and recovery.

In Brazil the achievement of 12 million hectares of forest restoration represents an investment between R $ 31 billion and R $ 52 billion, according to the chosen scenario. This means annual investments between R $ 2.2 billion and R $ 3.7 billion per year for 14 years, the creation of 138,000 to 215,000 jobs and the collection of R $ 3.9 to R $ 6.5 billion in taxes (Instituto Escolhas, 2016)[70].

Investors need reliable information on costs and benefits for investment proofing and decision-making on restoration. Brazil is involved in different initiatives that are helping the country to structure its database on the costs and benefits associated with natural capital conservation and restoration which will help the country to take strategic decisions related with investments. Examples are:

- The Biofin Initiative (UNDP, n.d.)[71]
- The Economics of Ecosystems and Biodiversity (TEEB) Initiative (UNEP, n.d.)[72]
- The Brazilian process of Environmental Economic Accounts and Natural Capital Accounts (IBGE, n.d.)[73]

Technical capacity

Brazil has a relevant capacity in terms of monitoring systems of land use and land cover, including the recently launched "Brazilian Annual Land Use and Land Cover Mapping Project – MapBiomas" (MapBiomas, n.d.)[74].

The country has done also some important studies at national scale, such as the study focused on the evaluation of the potential of natural regeneration for all Brazilian biomes (Brasil. Ministério do Meio Ambiente, 2017b)[75] and the one focused on the costs of recovering native vegetation for the different Brazilian biomes (TNC, 2018)[76], with the objective of capturing the variability of costs associated with differences in regional environmental characteristics.

According to the Bonn Challenge Barometer's evaluation (IUCN, n.d.) there's technical capacity to plan, implement and monitor FLR activities in the country but is not enough to be effective. The main gaps identified were the lack of appropriate coordination among institutions, initiatives and specialists to plan, implement, and monitor FLR activity, the need of a large network on rural extension and the lack of stable funding support for different components of FLR activity.

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[69] MMA n.d. Website do Ministério do Meio Ambiente. Retrieved from: http://www.mma.gov.br

[70] Instituto Escolhas. 2016. Quanto o brasil precisa investir para recuperar 12 milhões de hectares de floresta? Coordenação: Roberto Kishinami e Shigueo Watanabe Jr. do Instituto Escolhas

[71] UNDP. n.d. The Biofin Initiative website. Retrieved from: https://www.biodiversityfinance.net/

[72] UNEP. n.d. The Economics of Ecosystems and Biodiversity (TEEB) website. Retrieved from: http://www.teebweb.org/

[73] IBGE. n.d. Environmental Economic Accounts – Brazil. Retrieved from: https://www.ibge.gov.br/en/statistics/multi-domain/environment/20510-environmental-economic-accounting-for-water-brazil.html?=&t=o-que-e

[74] MapBiomas. n.d. Retrieved from: https://plataforma.mapbiomas.org

[75] Brasil. Ministério do Meio Ambiente. 2017. Potencial de Regeneração Natural da vegetação no Brasil. Ministério do Meio Ambiente – MMA, World Resources Institute – WRI Brasil. Brasília, DF: MMA. Retrieved from: https://www.mma.gov.br/images/arquivos/biomas/mata_atlantica/Potencial%20de%20regeneracao%20natural_brasil.pdf

[76] TNC. 2018. Caracterização de técnicas e estimativas de custo como subsídio a programas e políticas públicas e privadas de restauração em larga escala. Relatório de Pesquisa. Retrieved from: https://www.tnc.org.br/content/dam/tnc/nature/en/documents/brasil/restauracao-da-vegetacao-nativa-no-brasil.pdf

A report recently published about the Brazil's INDC Restoration and Reforestation Target (World Bank, 2017)[77] established some **recommendations for the government** to accomplish the restoration/reforestation targets:

- Create the proper environment for investment in the native vegetation restoration supply chain.
- Validate the Rural Environmental Cadastre (CAR) and monitor compliance with the Forest Code.
- Establish priority areas for restoration in the different states
- Integrate restoration programs with actions for the agricultural sector to increase productivity
- Expand incentive mechanisms for farmers to implement restoration
- Establish a strategy for forestry credit under the ABC Program and other financial mechanisms for restoration and Integrated Crop-Livestock-Forest Systems
- Expand incentive mechanisms for small- and medium-size enterprises in the forest sector and their role in restoring lands at scale
- Develop a mechanism of transparency and establish community-based forest monitoring and restoration programs
- Increase capacity building for silviculture of native Brazilian tree species and scale up research on these
- Clearly define the roles of different government agencies at the three levels of government (federal, state and municipal)

3.2.2. Opportunities to restoration from ROAM analyses

Five of the 26 states along with the Federal District (SEMA-DF, 2017)[78] undertook the ROAM process and have published the results from the assessments: Espirito Santo (Seama-ES, 2017)[79], Pará (Nunes et al., 2017)[80], Pernambuco (Cepan, 2018)[81] Santa Catarina and São Paulo (SMA-SP, 2018)[82]. In the following table there's a compilation of restoration targets and priority areas for restoration at the states where ROAM analysis was applied. The ROAM reports bring strategic information regarding the priority areas for restoration, the most feasible restoration intervention types, the costs and benefits involved in the restoration of priority areas and a diagnostic of criteria that should be met to ensure the success of the process as well as the strategies for addressing the challenges. Those recommendations are compiled in a ROAM Country Brief (IUCN, 2020b)[83] published in August 2020.

[77] World Bank. 2017. Brazil's INDC Restoration and Reforestation Target. Washington, DC, World Bank. Retrieved from: http://documents1.worldbank.org/curated/en/917511508233889310/pdf/AUS19554-WP-P159184-PUBLIC-Brazils-INDC-Restoration-and-Reforestation-Target.pdf

[78] SEMA-DF. 2017. Plano Recupera Cerrado – Uma avaliação das oportunidades de recomposição para o Distrito Federal. 99p.

[79] SEAMA-ES. 2017. Avaliação das oportunidades da restauração de paisagens e florestas para o Estado do Espírito Santo, Brasil: ROAM-ES. 88p

[80] Nunes, S. et al. 2017. Oportunidades para restauração florestal no Estado do Pará / Sâmia Nunes ... [et al]. – Belém, PA: Imazon; Curitiba: Conserve Brasil; Guaxupé: Terra Nativa Gestão & Negócios, 56 p.

[81] CEPAN. 2018. Avaliação das oportunidades de restauração de paisagens florestais para o Estado de Pernambuco, Brasil: (ROAM-PE) / Centro de Pesquisas Ambientais do Nordeste; União Internacional para a Conservação da Natureza – Brasil.112p.

[82] SMA. 2018. Oportunidades para restauração de paisagens e florestas na porção paulista do Vale do Paraíba: Plano de Desenvolvimento Florestal Territorial para a porção paulista do Vale do Paraíba. Secretaria de Meio Ambiente de Sao Paulo / coordenação geral Aurélio Padovezi. – 1. ed. – Porto Alegre: Ideograf.

[83] IUCN. 2020. Brazil ROAM Country Brief. Retrieved from: https://infoflr.org/sites/default/files/2020-08/roam_country_brief_brazil_post.pdf

Table 4. Compilation of restoration targets and priority areas for restoration

State	Mapping of Priorities (Yes/No)	Restoration targets (ha)	Area for FLR opportunity (ha)	Area identified as FLR priority (ha)	Benefits	Estimated cost per ha restored (BLR)
Espirito Santo	Yes	80,000	187,000	80,000 (20,000 plantations, 60,000 natural regeneration)	water supply	4,130-14,640
Pernambuco	Yes	-	3,452,722	569,814 agroforestry, 154,998 native forest	sediment retention	2,800-13,000
Sao Paulo (*)	Yes	300,000	271,000	-	biodiversity conservation	2,264-70,001
Santa Catarina	Yes	-	-	Central region of the state	C capture	-
Distrito Federal	Yes	27,000	27,000	27,000	income	28,214
Pará	Yes	-	Nearly 3,000,000	-		2,300-11,000

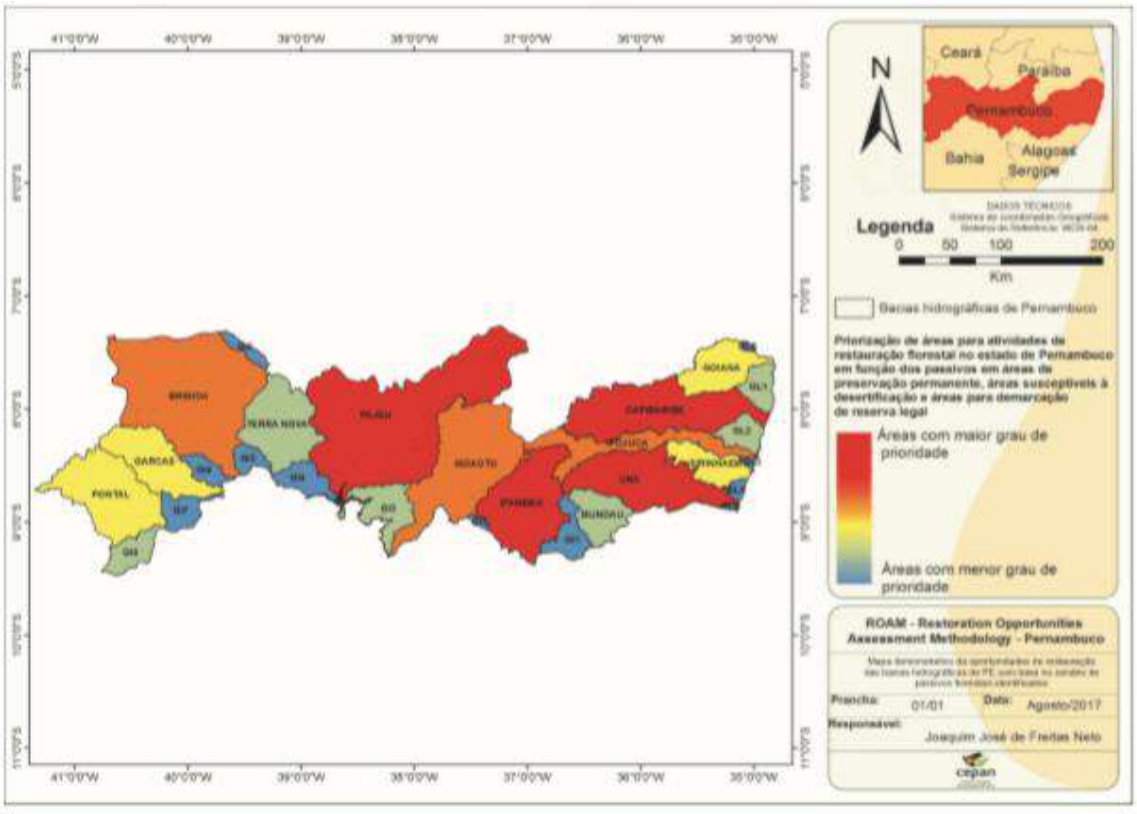
(*) Paraiba Valley

As an example, the evaluation of the criteria is shown for the state of Espirito Santo. This Brazilian state has a legal framework that favours restoration activities as there's a Strategic State Plan for Forest Restoration [*Plano Estratégico para Restauração Florestal no Espírito Santo – Perf*] (Sossai et al., 2018)[84] which establishes the coordination between the institutions, the initiatives and the stakeholders involved. There's also a state target for restoration corresponding to the expansion of the Atlantic Forest biome area by 80,000 hectares (in 2018), according to goals defined by the State Government in the Strategic Planning 2015/2018. At least two government institutions are involved in the implementation of the legal framework: State Secretariat for the Environment and Water Resources and Secretary of State for Agriculture, Supply, Aquaculture and Fisheries. Espirito Santo has a total capacity of producing 11.6 million of seedlings/year and according to the Strategic Plan's diagnostic data there are 45 nurseries that produce seedlings of native species of the Atlantic Forest. The ROAM analysis found a total of 6 institutions capable of ensuring training and technical assistance to restoration activities and a total of 68 institutions (seedling production companies, forest restoration enforcers, support organizations, government agencies and civil society organizations) are involved in the process. There are funds available to restoration activities (National

[84] Sossai, Marcos Franklin; Benini, Rubens; Girão, Vanessa Jó. 2018. Plano estratégico da cadeia da restauração florestal no Espírito Santo. Marcos Franklin Sossai; Rubens Benini; Vanessa Jó Girão; Espírito Santo, 29 p. Retrieved from: https://www.tnc.org.br/content/dam/tnc/nature/en/documents/brasil/perf-es.pdf

Fund of Forest Development / *Fundo Nacional de Desenvolvimento Florestal – FNDF*, BNDES funds, Rural Credit) and incentives from the government are put in place for the private sector through the State Programme of Payment for Ecosystem Services (PES) called Reflorestar. So, PES is available for rural producers who allocate or want to allocate part of their property for the purpose of preserving the environment or for sustainable rural practices. All the reports from ROAM assessments have mapped the priorities in terms of areas to restore. As an example, the Pernambuco mapping is shown in BOX 2.

BOX 2. Priority areas for restoration mapped in the state of Pernambuco



HB	Priority areas for restoration (hectare)		
	APP	LR	ASD
Pajeú	37,643	42,650	205,366
Capibaribe	22.281	61,241	122,197
Ipanema	23,794	20,917	160,938
Una	21,697	118,928	16,898
Total	**110,421**	**238,729**	**505,399**

The ROAM assessment in the state of Pernambuco has produced a map of priority areas for forest restoration activities in the hydrographic basins of the state due to liabilities in areas of permanent preservation (APP), areas susceptible to desertification (ASD) and areas for demarcation of the legal reserve (LR). Four basins (red color in the figure, corresponding to Pajeu, Capibaribe, Ipanema and Una)) were identified with the highest priority for restoration, representing a total of **854,549 ha** (110,421 ha for APP, 238,729 ha for LR and 505,399

3.2.3. Opportunities to restoration from large Projects

The LUCID Database has identified a total of 12 restoration projects for Brazil. In the next Figure there's a distribution of the number of the projects per category of project area. Most of the projects (seven) are being implemented in areas higher than 100,000 ha. From these 12 projects, 4 are funded by GEF, 1 is funded by Althelia, 3 are UNFCCC CDM projects and 4 are funded by the Forest Investment Programme (FIP).

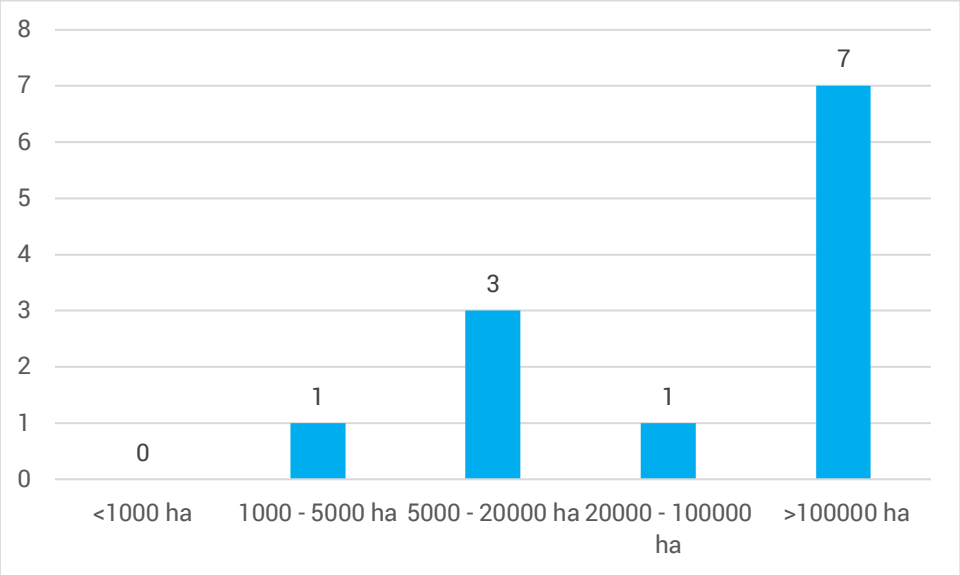


Figure 3. Number* of projects implemented in each category of area in Brazil according to the LUCID Database (*this doesn't correspond to the total number of restoration projects being implemented in Brazil)

Besides the LUCID database, the GEF website was also assessed. Table 5 shows a list of the selected projects (projects in implementation that show restoration targets higher than 10 000 ha)

Table 5. Selected projects with restoration activities

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	(a) Brazilian executing agencies (b) Implementing agencies
Protected and productive landscapes in the 9 Brazilian Amazon States	Amazon Sustainable Landscapes Program	GEF Trust Fund (ID 9664) | In implementation	- Promote sustainable practices in 10,814,139 ha of productive landscapes - Restore 28,000 hectares of degraded lands in Brazil (ASL, 2019)[85] Results so far:	(a) FUNBIO, CI, ICMBio and MMA (b) WB

85 ASL. 2019. Amazon Sustainable Landscape Program Report 2018-2019. Retrieved from: http://pubdocs.worldbank.org/en/407141582652061822/64857-ASL-Progress-Report-2018-19-FEB11.pdf

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	(a) Brazilian executing agencies (b) Implementing agencies
			Approximately 2,500 ha under natural regeneration in the State of Rondônia 171 properties (an estimated 17,100 hectares) enrolled in the Environmental Regularization Program (Programa de Regularização Ambiental, PRA) and developing sustainable land management practices.	
São João Basin APA (RJ), in the Atlantic Forest Global Hotspot, a 150,700 hectares Key Biodiversity Area (KBA) **Pouso Alto APA (GO), Cerrado Global Hotspot, a 850,000 hectares KBA**	Realizing the Biodiversity Conservation Potential of Private Lands	GEF Trust Fund (ID 9413) | In implementation	- In the pilot area of RJ restoration activities are planned. Note: A forestry agreement will be set up to improve the management of APP and LR in Brazilian Tree Industry areas (IBA).	(a) MMA, PUC-Rio (CSRio and CPI), FBDS (b) UNEP
Araripe, in southern Ceará Seridó, in southern Rio Grande do Norte and northern Paraíba **Uauá, in northeastern Bahia** **Xingó, in western Alagoas**	Reversing Desertification Process in Susceptible Areas of Brazil: Sustainable Agroforestry Practices and Biodiversity Conservation (REDESER)"	GEF Trust Fund (ID 5324) | In implementation	- 30,000 ha of restored forest - 15,000 ha [8 participatory projects for restoration of degraded lands and improvement of production landscapes and land use practices]	(a) MMA (b) FAO
North-East Brazil , Sergipe (Alto Sertao landscapes = test region)	"Sustainable Land Use Management in the Semi-arid Region of North-	GEF Trust Fund (ID 5276) | In	70,000 ha increase in vegetative cover in agro-ecosystems	(a) Secretary for Extraction and Sustainable Rural

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	(a) Brazilian executing agencies (b) Implementing agencies
	east Brazil (Sergipe)"	implementation		Development, MMA, SEMARH (b) UNDP
southeast corridor of the Brazilian Atlantic Forest / Paraiba do Sul river basin (Rio de Janeiro, Sao Paulo and Minas Gerais states)	"Recovery and Protection of Climate and Biodiversity Services in the Southeast Atlantic Forest Corridor of Brazil"	GEF Trust Fund (ID 4834) | In implementation	restoration of 15,500 hectares supporting the conversion of 1,300 hectares of degraded pasture	(a) MCTI, SMA-SP, Secretariat for Environment of the State of Rio de Janeiro, Secretariat for Science, Technology and Higher Education of the State of Minas Gerais (b) Inter-American Development Bank
Mato Grosso (Alta Floresta Municipality)	Novo Campo Programme for Sustainable Cattle Ranching in the Amazon Region	Private Investment (Althelia) | In implementation	10,000 ha of degraded pastureland in critical riparian areas will benefit from reforestation	(a) ICV
Southeastern Region of Brazil, States of São Paulo and Minas Gerais. Projects located along 10 resevoirs. Coordinates for approx. center of UUHE Agua Vermelha reservoir	AES Tietê Afforestation/Reforestation Project in the State of São Paulo, Brazil	UNFCCC CDM project	reforest up to 13,939 ha of riparian areas currently occupied by unmanaged grassland along the banks of ten hydropower reservoirs in the State of São Paulo with native forest species	(a) AES Tietê S.A. [a large Brazilian electrical energy generator]
Cerrado: Piaui, Maranhao, Minas Gerais, Estado de Mato Grosso do Sul, Mato Grosso, Goias, Federal District, Estado de Bahia, Tocantins	Sustainable Production in Areas Previously Converted to Agricultural Use Project	FIP (P143184)	- 378513.00 ha is the target land area where sustainable land mgt. practices will be adopted as a result of project	(b) SENAR

3.2.4. Opportunities to restoration from country and international studies

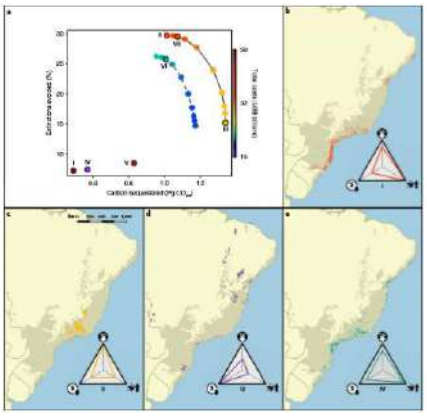
Prioritization of Areas to Restore in the Atlantic Forest Hotspot

A specific study was done to identify the **best restoration opportunities in the Atlantic Forest Hotspot** (Strassburg et al., 2019)[86]. A total of 5.17 million hectares corresponding to the enforcement of the Native Vegetation National Law were identified as deficits of native vegetation to be restored by farmers. A total of 382 restoration scenarios were evaluated combining different weights to the objectives of maximizing biodiversity conservation, maximizing C sequestration and minimizing total cost. The substantial reductions in total costs arise from the combination of efficiencies of scale and the ability to prioritize areas with lower opportunity costs and higher potential for natural regeneration. The scenario found as the most cost-effective was the one at which biodiversity benefits increased by 257% compared to the baseline (94% of Maximum Biodiversity scenario), climate change mitigation benefit increased by 105% (79% of Maximum Climate scenario) and costs with restoration decreased by 57% (83% of the reduction achieved by Minimum Costs scenario) (see BOX 3).

BOX 3. Systematic planning for restoration to obtain multiple environmental and economic benefits in the Brazilian Atlantic Forest Biome

In the study of Strassburg and colleagues a prioritization approach was used to show cost-effective solutions for restoration that consider multiple benefits, costs and policy scenarios. Using an actual large-scale restoration target of the Atlantic Forest hotspot, they showed that the approach of systematic restoration can deliver an eightfold increase in cost-effectiveness for biodiversity conservation compared with a baseline of non-systematic restoration. A compromise solution avoids 26% of the biome's current extinction debt of 2,864 plant and animal species, sequesters 1 billion tonnes of CO2-equivalent while reducing costs by US$28 billion.

[86] Strassburg, Bernardo B. N., Hawthorne Beyer, Renato Crouzeilles, Alvaro Iribarrem Felipe Barros, Marinez Ferreira de Siqueira, Andrea Sánchez-Tapiai, Andrew Balmford, Jerônimo Boelsums Barreto Sansevero, Pedro Henrique Santin Brancalion, Eben North Broadbent, Robin Chazdon, Ary Oliveira Filho, Toby Gardner, Ascelin Gordon, Agnieszka Latawiec, Rafael Loyola, Jean Paul Metzger, Morena Mills, Hugh P. Possingham, Ricardo Ribeiro Rodrigues, Carlos Alberto de Mattos Scaramuzza, Fabio Rubio Scarano, Leandro Tambosi, Maria Uriarte. 2019. Strategic approaches to restoring ecosystems can triple conservation gains and halve costs. Nature Ecology & Evolution. Vol 3, 62–70.



Spatial configurations and outcomes for climate change mitigation, avoided extinctions and total costs of selected scenarios. **a**, the following scenarios are considered: I, Baseline without offsets; II, Maximum Biodiversity; III, Maximum Climate; IV, Minimum Costs; V, Random; VI, Compromise; and VII, Environment Only. The unbroken (outer) line connects points in the efficiency frontier of environmental benefits when excluding costs from the prioritization algorithm. The broken (inner) line connects allocations for the cost-effective frontier. **b–e**, Spatial configurations and radar diagrams of outcomes for the Maximum Biodiversity

This study was developed in the context of an IKI Funded Project called "*Unlocking economic opportunities to scale Forest and Landscape Restoration in Brazil*" (BMUB, n.d.)[87], implemented by the WRI and the partners Brazilian Corporation of Agricultural Research, BNDES, MMA, International Institute for Sustainability (IIS) and PACTO.

Prioritization of Areas to Restore (using natural regeneration) in the Brazilian biomes

Another important study was the one developed by the Brazilian government in partnership with the WRI Brasil that aimed at **estimating the natural regeneration potential of native vegetation in Brazilian biogeographical regions** (Brasil. Ministério do Meio Ambiente, 2017b). Based in remote sensing data and spatial analyses about the structure and characteristics of the landscapes of each region interpreted by a group of different specialists in the different Brazilian biogeographical regions, this study was able to map the natural vegetation regeneration potential for the Amazon (BOX 4).

Prioritization of Areas to Restore (using natural regeneration) in the Atlantic Forest biome

Following this national study on the potential of natural regeneration a new research was developed in 2020 where the **natural regeneration potential** within 75.5 M ha of deforested lands in the **Brazilian Atlantic Forest biome was predicted, mapped, and quantified** (Crouzeilles et al., 2020). The study estimated that 2.8 M ha could naturally regenerate by 2035, and a further 18.8 M ha could be restored using assisted regeneration methods, thereby **reducing implementation costs by US$ 90.6 billion (77%) compared to tree planting**. These restored forests could sequester 2.3 Gt CO_2 of carbon, reduce the mean number of expected species at risk of extinction by 63.4%, and reduce fragmentation by 44% compared to current levels posing natural regeneration as a key process for achieving cost-effective large-scale restoration.

Prioritization of Areas to Restore in the Espirito Santo state after ROAM Application

[87] BMUB. n.d. International Climate Initiative (IKI) Webpage. Unlocking economic opportunities to scale Forest and Landscape Restoration in Brazil IKI Project. Retrieved from: https://www.international-climate-initiative.com/en/details/project/unlocking-economic-opportunities-to-scale-forest-and-landscape-restoration-in-brazil-17_III_069-2926

After the application of ROAM analysis in the Espirito Santo state another methodology developed by IUCN was applied between 2015 and 2017 (Beatty et al., 2018)[88]. The applied methodology was the Restoration Opportunities Optimization Tool (ROOT) that was developed to communicate more effectively the importance of ecosystem services (ES) to decision makers in the context of restoration activities. After the identification of the opportunity area for restoration in the state, the purpose was to demonstrate where restoration interventions could be made to decrease water yield and to increase sediment retention. Interventions in the identified areas have a high potential for generating the landscape-scale benefits desired by the state (BOX 5).

3.2.5. Restoration Initiatives involving multistakeholders

Restaura-Brasil

Restaura Brasil is a campaign launched in 2018 that mobilizes both civil society and companies in a collective pro-restoration movement to restore the country's native vegetation in deforested areas (TNC, n.d.-b) [89]. The goal is **to restore 1 billion trees on 400,000 hectares by 2030**. Donating trees makes it possible to increase the scale of forest restoration in Brazil and advance the work against climate change. Restaura Brasil is part of The Nature Conservancy's global campaign Plant a Billion Trees that has celebrated in 2018 its 10th year with a result of 35 million trees planted in 16,000 hectares in Brazil. TNC has created a methodology called the **Strategic Forest Restoration Plan (PERF)**, which proposes actions to strengthen the restoration chain in Brazil.

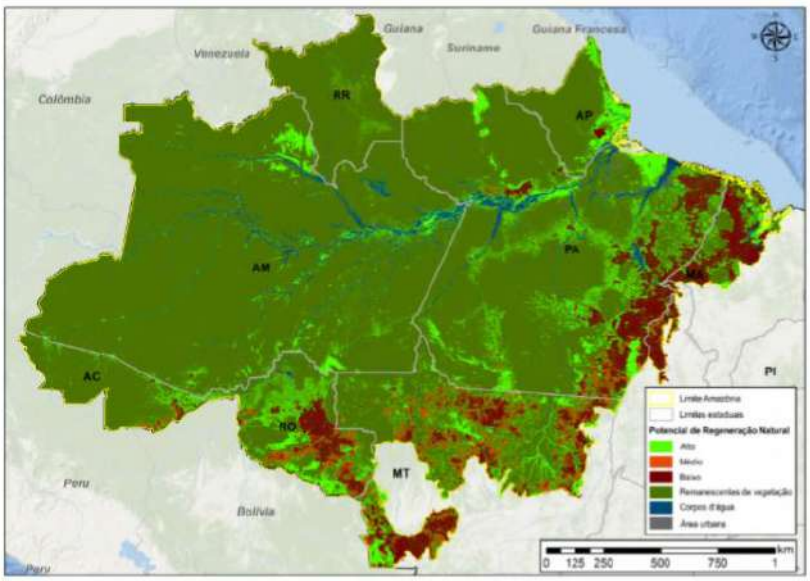
The Initiative works through tree donations. When the donation occurs, the planting site is defined, the specific areas are mapped, the areas that will undergo through restoration are registered in the SIR (Integrated Restoration System), the forest restoration occurs in the field and then the restored areas are maintained.

BOX 4 - Estimating the natural regeneration potential of native vegetation in Brazilian biomes

The natural regeneration potential of native vegetation was estimated for the six Brazilian biomes (Amazonia, Caatinga, Cerrado, Pampas, Pantanal e Mata Atlantica). The results indicate differences between biomes, with a higher percentage of areas with high potential for natural regeneration in the Pantanal and Amazonia and a higher percentage of areas with low natural regeneration potential in the Cerrado and Atlantic Forest. The Cerrado had low potential, because the intensive use of soils and exotic pastures eliminated the underground organs, especially the undergrowth, its main resilience factor. The Atlantic Forest had low potential as the presence of large areas of agriculture along with the low coverage of native vegetation in the landscape reduce resilience and result in a low natural regeneration capacity.

[88] Beatty, C.R., Raes, L., Vogl, A.L., Hawthorne, P.L., Moraes, M., Saborio, J.L. and Meza Prado, K. 2018. Landscapes, at your service: Applications of the Restoration Opportunities Optimization Tool (ROOT). Gland, Switzerland: IUCN, vi + 74pp. Retrieved from: https://portals.iucn.org/library/sites/library/files/documents/2018-031-En.pdf

[89] TNC. 2020. Restaura-Brasil Website. Retrieved from: https://www.restaurabrasil.org.br/

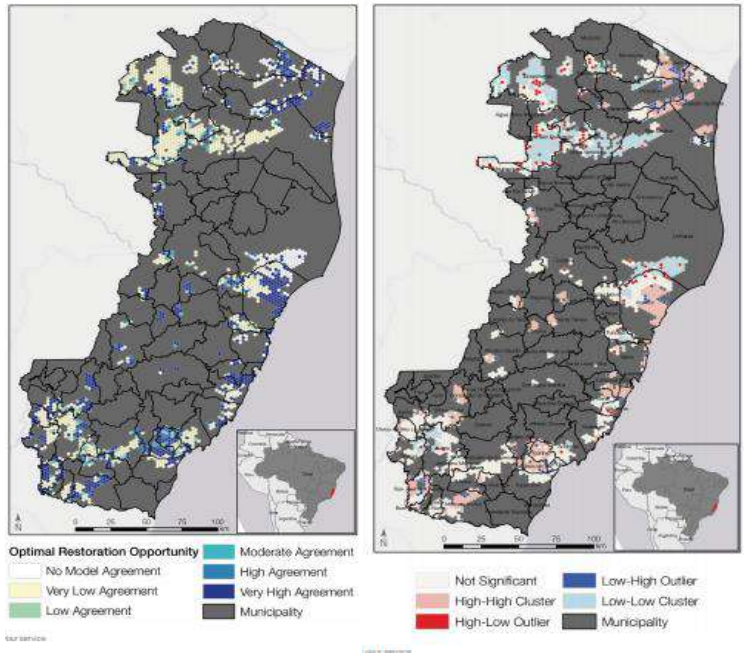


Example for Amazon with areas of potential for natural regeneration in the biome (green – high potential; red – medium potential; brown – low potential)

Total area of the different Brazilian biomes with high, medium and low natural regeneration potential (ha)			
Biome	**High**	**Medium**	**Low**
Amazonia	20,233,033	7,929,313	23,812,973
Cerrado	-	9,043,023	53,741,485 (pastures) 27,090,629 (agriculture)
Mata Atlantica	8,346,688	27,929,416	52,502,981
Pantanal	1,788,037	-	2,077,583
Caatinga	8.049.775	10.242.919	18.913.998
Pampas	2,584,952	4,532,461	3,188,796

BOX 5. Ecosystem services optimization in the opportunity area for restoration for Espirito Santo State, Brazil

The spatial agreement map (on the left) demonstrates the frequency with which a spatial decision unit (e.g. hexagon) is chosen among multiple simultaneous executions of the optimisation model. Generally, some units are chosen as optimal for ecosystem services and their benefits in nearly every model run (very high agreement) and some spatial decision units never contain optimal areas (no agreement). Areas that show higher agreement are indicative of areas where restorative actions would provide optimal benefits in ecosystem services. The map of optimal restoration clusters (on the right) demonstrates the confidence possible in whether adjacent areas to the optimal units are optimal as well and helps determining the extent to which restoration strategies should occur. The cluster analysis identifies **42,173 hectares of FLR opportunity** that occur in high-high cluster areas.



This indicates that at least half of Espirito Santo's Bonn Challenge commitment of 80,000 hectares can be implemented in areas that are highly optimal for ES provision and clustered with similar high priority areas. ROOT has identified **78,903 ha** of FLR opportunity area that is in high or very high agreement for ES optimisation, including the areas by municipality. If implemented, this would achieve Espirito Santo's commitment to the Bonn Challenge and do so in a manner that most optimally increased ES within the State, especially for low-income people in priority watersheds.

The Table shows the total number of hectares of FLR opportunity area identified for each municipality that were calculated as optimal by ROOT. These include areas of high and very high model agreement. This represents the FLR area in these municipalities that would contribute the most to ecosystem services provision

NAME	ha	NAME	ha	NAME	ha
Aracruz	5,465	João Neiva	1,320	Nova Venécia	521
São José do Calçado	5,011	Vila Velha	1,266	Itarana	500
Pedro Canário	4,988	Guarapari	1,251	Alto Rio Novo	499
Rio Novo do Sul	4,761	Ibitirama	1,151	Mantenópolis	454
Conceição da Barra	4,592	Guaçuí	1,135	Colatina	435
Muniz Freire	4,405	Apiacá	1,115	Serra	431
Ecoporanga	4,042	Fundão	1,058	Vila Pavão	409
Alegre	2,696	Montanha	1,037	Jerônimo Monteiro	158
Mimoso do Sul	2,680	Baixo Guandu	994	Santa Maria de Jetibá	153
Iconha	2,192	Pancas	944	Domingos Martins	90
Pinheiros	1,897	Divino de São Lourenço	925	Santa Leopoldina	70
Viana	1,800	Cachoeiro de Itapemirim	877	Iúna	39
Piúma	1,598	São Roque do Canaã	866	Alfredo Chaves	25
Boa Esperança	1,552	Muqui	862	Castelo	25
Afonso Cláudio	1,514	Bom Jesus do Norte	827	Vitória	13
Ponto Belo	1,492	Santa Teresa	761	Água Doce do Norte	11
Anchieta	1,479	Vargem Alta	726	Conceição do Castelo	6
Cariacica	1,372	Barra de São Francisco	580	Águia Branca	1
Itapemirim	1,345	Linhares	577	Total ha 'very high' and 'high' agreement: **78,903**	
São Mateus	1,327	Atilio Vivacqua	577		

The Green-Blue Water Coalition

The Green-Blue Water Coalition is an initiative of The Nature Conservancy (TNC) with support from the private sector and the collaboration of civil society for implementing nature-based solutions that promote water security in at-risk cities (TNC, n.d.-a)[90]. The initiative works to conserve and restore forests in 21 watersheds that supply almost 42 million people. In Brazil it is being implemented in **12 metropolitan areas (João Pessoa, Recife, Maceió, Belo Horizonte, Vitória, Goiânia, Santos, São Paulo/Campinas, Rio de Janeiro, Curitiba and Brasilia)**. The choice of cities served by the Coalition is based on the study "Green Infrastructure: an opportunity to guarantee water security in the main cities

[90] TNC. n.d. The Green-Blue Water Coalition Website. n.d. Retrieved from: http://cidadespelaagua.com.br/en/lp-en/

of “Latin America,” prepared by TNC and Science for Nature and People (SNAP). The donors are: Ambev, Fundação Femsa, Coca Cola Brasil, Klabin, Femsa Brasil, Faber Castell, Kimberly Clark, McDonald’s, Arcos Dourados, Unilver, Bank of America, Pepsico e P&G.

The Forest Cocoa Project

It’s an initiative of the TNC that has been working with smallholder farmers to promote restoration of degraded pastures with cacao-based agroforestry systems improving livelihoods and producing deforestation-free commodities in Brazil (IUCN Forests, 2017)[91]. The Forest Cocoa initiative started in 2012, in the municipality of São Félix do Xingú, in southeastern Pará, with the *Cacau Mais Sustentável* project, and aims to scale the agroforestry solution of landscape recovery to other municipalities in Pará and states in Brazil. Total area to be restored and suitable for cacao agroforestry systems in Pará State is 557,500 ha. **The project target is to restore 22,000 ha by 2022**. TNC has the support of the government through the Ministry of Agriculture´s Cacao Research and Technical Extension Agency (CEPLAC), of the World Agroforestry Centre (ICRAF) along with the **financial support** from **Cargill**, the **Norwegian Agency for Development Cooperation (NORAD)**, and **IUCN**, as part of the **KNOWFOR program** funded by UK aid from the UK government.

Mantiqueira Restoration Project

The Mantiqueira Restoration Project (Conservador da Mantiqueira, n.d.)[92] aims at creating and implementing a **plan for forest restoration** in the 100,000 km² (1.2% of Brazilian territory) corresponding to the area of influence of the **Serra da Mantiqueira** (280 cities in the States of Minas Gerais, São Paulo and Rio de Janeiro). This area shelters the springs of important rivers that feed the reservoirs of Furnas/MG where the electric energy that supplies the largest metropolitan areas of Brazil (São Paulo, Campinas and Rio de Janeiro) is produced. The **potential of restoration** in this area is **more than 1,200,000 hectares**. The Restoration Plan is based in the expertise of Extrema municipality in the implementation of the Water Conservation Project, the first Brazilian experience of forest restoration using the PSA mechanism, and the support for the implementation of the Atlantic Forest Municipal Plan (PMMA). The specific goals of this plan are: a) to create of an ecological corridor in the area of influence of the Serra da Mantiqueira; b) to improve the production capacity of ES, such as water, soil conservation, biodiversity, carbon sequestration, landscape maintenance; c) to promote a municipal and regional plan of the Atlantic forest with the participation of several actors and support from the SOS Mata Atlântica Foundation; d) to improve the resilience of cities to deal with the damage caused by climate change; and e) to strengthen environmental governance in the cities. The updated targets by 2022 are:

- 19,8Mton CO_2 sequestered
- 3,000 landowners engaged in restoration/conservation/best agriculture practices
- one capacity building (toolkit) for forest restoration is created
- $1 million USD invested in restoration projects, including PES
- 230,000 hectares are restored (include Agroforestry and Silvipastoral Systems)
- 500 landowners are receiving PES to restore their lands.

[91] IUCN Forests. 2017. Supporting cacao production and restoration in brazil. Retrieved from: https://www.infoflr.org/news-media/supporting-cacao-production-and-restoration-brazil

[92] Conservador da Mantiqueira website. Retrieved from: https://conservadordamantiqueira.org/en/

The founding institutions are: WRI Brasil. SOS Mata Atlantica, Conservador das Aguas – Extrema (MG), National Water Agency (ANA) and Fundag. The partner institutions are: IEF (MG), IFMG (Federal Institute of Minas Gerais), UKAid, Merck & Co. and WWF (BOX 6).

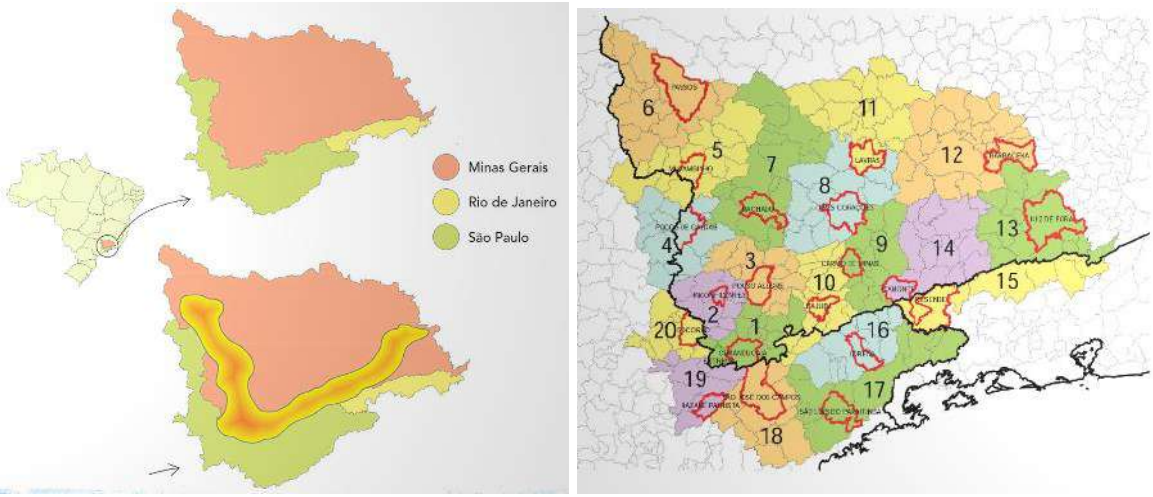
Rio Doce Basin Restoration Project

Renova Foundation (Fundação Renova, n.d.)[93] is responsible for the Integrated Environmental Recovery Plan (PRAI), initiated by Samarco Mineração, after the Fundão dam burst. In 2019, during the World Conference on Ecological Restoration that was held in South Africa, the Foundation has presented the PRAI, considered to be one of the largest forest recovery programs in the world. One of the Renova Foundation's objectives is to recover **40,000 hectares** of Permanent Preservation Areas (APPs) and Water Recharge Areas along the **Doce River Basin in ten years** (10,000 hectares through reforestation and 30,000 hectares through regeneration). To define the priority areas of the recovery process, the program partnered up with UFMG and UFV teachers, researchers, master's and PhD students. **TNC**[94] is also involved in actions covering an extensive area in the Central Corridor of the Atlantic Forest, the **Doce River Basin**, and regions of the Guandu River Basin in Rio de Janeiro state and the Paraíba Valley (TNC, n.d.-b).

[93] Fundação Renova. n.d. Fundação Renova website. Retrieved from: https://www.fundacaorenova.org/ [Renova Foundation management of the Rio Doce river basin's Integrated Environmental Recovery Plan (PRAI). Retrieved from: https://www.fundacaorenova.org/noticia/fundacao-renova-assume-plano-de-recuperacao-ambiental-integrado/ and https://www.fundacaorenova.org/programa/programa-de-recuperacao-de-areas-de-preservacao-permanente-apps/]

[94] TNC Project Reforestation and The Doce River. Retrieved from: https://www.restaurabrasil.org.br/en/our-projects/reforestation-and-the-doce-river/

BOX 6. The spatial area of the Mantiqueira Restoration Project



The restoration plan involves 205 municipalities in the Minas Gerais state (**71,059 Km^2**), 71 municipalities in the Sao Paulo state (**24,611 Km^2**) and 8 municipalities in the Rio de Janeiro state (**100,090 Km^2**). In the Plan the territories of the municipalities located in the river basins of the Grande, Paraiba do Sul, Tiete, Piracicaba and Mogi Pardo were included. The proposal was to carry out the actions in the period of 26 months, beginning in October 2016 with the planning for nuclei formations, to identify leaderships of state organs, river basin committees, teaching and research and NGOs. The territory of Mantiqueira was divided into nuclei using the most committed institutions as the training center. The training was planned to start until December 2018 to prepare professionals to be able to replicate forest restoration projects in the municipalities, using PES and establishing actions for the implementation of PMMA. A total of 20 cores was created.

Suzano S. A.'s Restoration Program

Suzano S. A., the world's largest short-fibre eucalyputs pulp producer (resulting from the merge between Suzano Papel e Celulose S.A. and Fibria Celulose in 2019), has an **innovative Restoration Program** (United Nations, n.d.)[95] that aims at transforming degraded, pastureland into native vegetation that is an integral part of the company's business model. Planting eucalyptus interspersed with native vegetation provides more value for the company, biodiversity and society. This Program occurs in four Brazilian biomes (Amazon Rainforest, Atlantic Forest, Cerrado and Caatinga). In nearly a decade, over 10.7 million native seedlings were planted, starting the restoration process for 31,200 hectares. Also, Suzano's preservation areas (Legal Reserves, Permanent Preservation Areas and Private Natural Heritage Reserves, among others) encompass over 925,600 hectares, 38% of its total area. As such, Suzano's sustainable environmental management **increases afforestation and reforestation in Brazil**, ensures conservation of important habitats, and strengthens Suzano's adaptive capacity to climate change. For each region in which the Program is present there is a diverse network of partners that includes NGOs (e.g. WWF, The Nature Conservancy), academia (e.g. UNESP and ESALQ), financial institutions and local SMEs.

Given the Restoration Program's complexity and geographical extension, there's several funding sources. Suzano was the first Latin American company to issue green bonds in US dollar in 2016 and is the largest Brazilian issuer of Green Bonds up to date. Both operations successfully raised in total

[95] Suzano's restoration program. In United Nations. n.d. Sustainable Development Goals Partnerships Platform Website. Retrieved from: https://sustainabledevelopment.un.org/partnership/?p=30660]

US$ 1.4 billion. The proceeds have been and will continue to fund environmental projects that meet certain eligibility criteria, one of which deals with conservation and restoration of natural ecosystems. Thus, the Green Bonds are an important enabling factor that anticipates the targets established in the Annual Restoration Plan, allows the investment in technological innovation and guarantees the financial sustainability of the Program. The average cost of restoration per hectare is currently US$1,716, which is compatible with the company's budget and financing mechanisms. In 2019, approximately US$9.4 million will be invested Suzano's Restoration Program (SDG 15.a).

Embrapa Project "Agroforestry Systems for the conservation of Brazil Southern Atlantic Forest"

Between 2000 and 2020 Embrapa has developed **agroforestry practices to restore Atlantic Forest** (United Nations, n.d.)[96]. One model was based on the planting of timber species to shade *Ilex paraguariensis* (mate) intercropped with food species and it was applied at family farms in Rio Grande do Sul. Another model was applied to the restoration of araucaria forest degraded by the selective extraction of wood and was conducted in properties of family farmers in Paraná and Santa Catarina. In this model degraded forest is replacement by natural regeneration of native species. The main beneficiaries were family farmers who have the extraction of mate their main source of income. The main partners were the Federation of the Workers in Family Agriculture, the Agronomic Institute of Paraná, EPAGRI, Ponta Grossa University, EMATER-RS and APROMATE. In addition to the **Embrapa resources**, other major donors were **TNC** and **Wilfried Laurier University** through the **FLEdGE** (Food: Locally Embedded, Globally Engaged). The current number of farms that produces mate is 19,000. About 11,000 already produce mate in traditional production systems that could be improved through the introduction of agroforestry practices developed by Embrapa and partners. Another action to encouraging the adoption of the practices was the criation of the "**Center for Education and Development of Traditional Mate Systems – CEDErva**" – which is a collaborative network of people who are interested in traditional mate production and development systems. This network is made up of small rural producers from Paraná and Santa Catarina, family agriculture unions, municipal, state and federal institutions, as well as researchers.

Federal Government Program "Water Producers"

Created in 2001, the focus of the Water Producer Program (ANA, 2018)[97] is to reward rural producers (through PES) for both water and soil conservation actions. The National Water Agency (ANA) supports Water Producer projects throughout Brazil, benefiting inhabitants of the metropolitan regions of São Paulo (SP), Rio de Janeiro (RJ), Palmas (TO), Rio Branco (AC), Campo Grande (MS), Goiânia (GO) and Brasília (DF). About 1,200 rural producers have already joined the initiative and these projects cover an **area** of about **400,000 hectares**, of which 40,000 have already been recovered by the Water Producer.

Produce, Conserve and Include (PCI)

The leading jurisdictional approach in Mato Grosso, Brazil aims to increase productivity, maintain native vegetation and engage smallholders and communities in economic opportunities. Mato Grosso's governor presented the PCI strategy at COP21 in December 2015 which commits to reduce

[96] Project Agroforestry Systems for the conservation of Brazil Southern Atlantic Forest - linked to SDG´s 2 and 15. In United Nations. n.d. Sustainable Development Goals Partnerships Platform Website. Retrieved from: https://sustainabledevelopment.un.org/partnership/?p=30044

[97] ANA. 2018. Nota Informativa do Programa Produtor de Agua. Retrieved from: https://www.ana.gov.br/todos-os-documentos-do-portal/documentos-sip/produtor-de-agua/documentos-relacionados/1-nota-informativa-programa-produtor-de-agua.pdf

deforestation by 90% in forests and 95% in the cerrado (tropical savannah). Government agencies and a broad coalition of organizations from the private sector and civil society helped to develop the PCI strategy. The strategy includes the **recovery of 2.5 million hectares of degraded pastures** (TFA, 2017)[98].

[98] TFA. 2017. Tropical Forest Alliance Annual Report 2016-2017. Retrieved from: https://www.tropicalforestalliance.org/assets/Uploads/TFA_Annual_Report_2017_v8-v2.1_Web-Report-Small.compressed.pdf

3.3. Description of the selected country Colombia

3.3.1. Country's Characterization

Country Commitments

Colombia's overall restoration commitment to Initiative 20x20, in support of the Bonn Challenge, was established in 2014 and corresponds to a total of **1,000,000 ha** of landscape in the process of restoration by 2020. This target is aligned with the country's National Restoration Plan, with national restoration targets estimated at **2,017,984 hectares** (IUCN, n.d.)[99]. In 2019 Colombia has done a new forest restoration and tree-planting pledge of 300 000 hectares to be restored by 2022 (180 million trees) and 900 000 hectares under agroforestry and sustainable forest management (FAO and UNEP, 2020).

The last Colombian's Government Plan (2014-2018) has set as a goal the restoration of 400,021 ha by 2018, which has been completed with 218,000 ha (Murcia, 2018)[100]. The current Government Plan (2018-2022) (Gobierno de Colombia, 2018)[101] establishes the goal of doubling the land under sustainable conservation systems (restoration, sustainable forest management, agroforestry and silvopastoral systems) from 701,000 hectares to **1,402,900 hectares**.

Colombia is a signatory to the NYDF and has a Joint Declaration of Intent with Norway, Germany, and the United Kingdom to reduce deforestation. In this context, the Colombian Government has launched an Initiative called "**Visión Amazonía**" (Ministerio de Ambiente y Desarrollo Sostenible, n.d.)[102] that seeks to reduce deforestation in the Amazon for the year 2020 through a new regional development model. With the support of the already mentioned European governments this initiative establishes the system of payment for results with the goal of zero net deforestation by 2020. For this purpose, deforestation average in the biome of the Colombian Amazon (zone of intervention of the Visión Amazonía) that between 2000 and 2012 was 82,863 hectares, which was defined as the reference level for compensation in the years to come. In this way, the country must join efforts not to exceed the reference level and to reduce it to reach the goal of net deforestation or to the year 2020. To achieve this goal, the governments that support the initiative have established a commitment of up to 125 million dollars in 5 years. The intervention of the program has been prioritized by phases, first advancing in the actions of the fight against deforestation in the departments of **Caqueta and Guaviare**, where the problem is located with the greatest deforestation crisis in the Colombian Amazon. Subsequently will work in the departments of **Putumayo, Meta, Guainía, Amazonas, Vichada and Vaupés**.

[99] Info FLR Colombia. In IUCN. n.d. Info-FLR website. Retrieved from https://infoflr.org/countries/colombia
[100] Murcia, Carolina. 2018. Retos y Oportunidades de la Restauración del Paisaje Forestal en Colombia. Quito, Ecuador: UICN-América del Sur. 52 p. Retrieved from: https://infoflr.org/sites/default/files/2020-04/challenges_and_opportunities_for_forest_landscape_restoration_in_colombia.pdf
[101] Gobierno de Colombia. 2018. Plan Nacional de Desarrollo 2018-2022. Retrieved from: https://colaboracion.dnp.gov.co/CDT/Prensa/Resumen-PND2018-2022-final.pdf
[102] Ministerio de Ambiente y Desarrollo Sostenible. n.d. Vision Amazonia website. Retrieved from https://visionamazonia.minambiente.gov.co/

Enabling Policies

The **National Plan for Restoration** (2015-2035) (PNR) (Ministerio de Ambiente y Desarrollo Sostenible, 2015)[103] is the main country's policy to help promoting and guiding ecological restoration, recovery and rehabilitation of degraded areas in a broad framework of biodiversity conservation and adaptation to climate change. It identifies over **23,000,000 ha** in need of restoration in Colombia, specifies 3 types of restoration interventions and establishes a goal of restoring and rehabilitating **1 million ha disturbed areas** by 2035.

Besides the PNR other important policies are the National Policy on Climate Change (PNCC), the Colombian Strategy for a Low Carbon Development (ECDBC), the Forest Policy (PB), the Policy on the Sustainable Management of Soils (PGSS) and the National Forest Development Plan (PNDF). The PNDF comprises three strategic programs: i) Management, conservation and **restoration of forest ecosystems**; ii) Promotion of productive chains based on forest resources and iii) Institutional development of the Forest Sector. The PGSS was published in January 2017 and is aligned with the SDGs, and specifically with indicator 15.3 related to the land degradation neutrality as there is a close relationship between deforestation and the degradation of soils, and between the degradation of soils and the possibilities of capturing carbon and ecosystem restoration (Gobierno de Colombia, 2017)[104]. The National REDD+ strategy is called "*Bosques Territorios de Vida- Estrategia Integral de control a la deforestación y Gestión de los Bosques*" (Gobierno de Colombia, 2017) and is aligned with the PNR and the other forest policies. The National REDD+ strategy has measures with restoration purposes, such as the measure M.1.4. (Implement conservation and restoration systems in territories of ethnic groups). In the context of this measure, the strategy aims at achieving 150.000 ha of restored land in territories of ethnic groups (2021-2024) and 300.000 ha (2025-2030).

Colombia's NDC includes the AFOLU (Agriculture, Forestry and Other Land Use) sector in its reduction target of 20% against business-as-usual (BAU) by 2030. Although the NDC refers to the role of reducing deforestation and enhancing carbon stocks through forestry, agroforestry and silvo-pastoral systems as important components to meeting the target, it does not define specific land-based targets aligned with FLR. The development of a new or updated NDC by 2020 could capture ongoing, planned, and future activities aligned with the FLR approach for the AFOLU sector. Advancing in public-private collaboration could be instrumental to better reflect the scale of Colombia's actions for climate change mitigation (Konig et al., 2018)[105].

The Ministry of Environment and Sustainable Development (MADS) along with the Regional Autonomous Corporations (CAR) and the Sustainable Development Corporations (CDS) have the

[103] Ministerio de Ambiente y Desarrollo Sostenible. 2015. Plan Nacional de Restauración: restauración ecológica, rehabilitación y recuperación de áreas disturbadas / Textos: Ospina Arango, Olga Lucia; Vanegas Pinzón, Silvia; Escobar Niño, Gonzalo Alberto; Ramírez, Wilson; Sánchez, John Jairo Bogotá, D.C.: Colombia. Ministerio de Ambiente y Desarrollo Sostenible, 92 p. Retrieved from: https://www.minambiente.gov.co/index.php/bosques-biodiversidad-y-servicios-ecosistematicos/gestion-en-biodiversidad/restauracion-ecologica

[104] Gobierno de Colombia. 2017. Bosques Territorios de Vida- Estrategia Integral de control a la deforestación y Gestión de los Bosques". Retrieved from: https://www.unredd.net/documents/un-redd-partner-countries-181/latin-america-the-caribbean-334/colombia-706/16790-bosques-territorios-de-vida-estrategia-integral-de-control-a-la-deforestacion-y-gestion-de-los-bosques.html

[105] König, Simon, María García Espinosa, Juan Pablo Castro and Felipe Orjuela. 2018. Greater Climate Action Through Public-Private Collaboration on Forest Landscape Restoration. Case study of advances in Colombia. IUCN & Climate Focus. Retrieved from: https://infoflr.org/sites/default/files/2019-09/colombia_flr_and_ndcs.pdf

responsibility of manage forest resources, including management of forest areas, monitoring and the restoration of degraded areas.

Funds

The PNR primarily uses existing economic and financial instruments with environmental/conservation-based objectives (*Fondo de Compensación Ambiental*, *Manual de Compensaciones*, *Fondo Nacional de Regalías*, *Fondo Nacional Ambiental*, *Findeter*). Priority regional projects may be financed by entities supporting local Development Plans (Initiative 20x20, n.d.)[106]. In 2019 FINAGRO (*El Fondo para el Financiamiento del Sector Agropecuario*) has started piloting the first agro-environmental line of credit as an incentive for sustainable livestock producers to protect forests and restore degraded livestock areas (UN-REDD Programme, 2019)[107].

Legislative and institutional mandates that promote investment in watershed management services through local and regional environmental authorities (CAR), have been enacted by the Colombian government (Beatty et al., 2018). CARs have been supporting investments such as payments to landowners for ES and direct land acquisition in source watershed areas. There's a requirement also in the context of PNR for hydropower companies to transfer a percentage of their earnings from energy production to CARs for watershed protection.

The National REDD+ Strategy's measure called "Cross-sectoral management for stabilization of the agricultural frontier (M.2.3.)" has a planned action of developing specific financial mechanisms to support **reforestation processes** (with commercial species) within the area of the agricultural frontier. This action seeks to improve and facilitate access to funding mechanisms in a post-conflict scenario in which the agricultural and forestry sectors play a key role in promoting the economic, social, and environmental development of rural areas. These financial mechanisms will consider the Forest Incentive Certificate (CIF), the Rural Capitalization Incentive (ICR), administered by FINAGRO, as well as the **Land Restoration Program** that is carried out at the region in the Amazon by Corpoamazonía in alliance with the Financial sector (Gobierno de Colombia, 2017, 2018).

Another funding source is the international cooperation. A value of US $ 446.6 million was confirmed by the Government, with US $ 53.7 million executed in 2018. Most of these resources (US $ 325 million) correspond to the commitments made by the Norwegian governments, Germany and the United Kingdom in the constitution of the **Colombia Sustainable Fund**, led by the Inter-American Development Bank (IADB), and the REM *Vision Amazonia* Initiative, structured by KFW and implemented by the Natural Heritage Fund (Gobierno de Colombia, 2017, 2018). Other sources are GEF, *Fondo Cooperativo para el Carbono de los Bosques FCPF* and Green Climate Fund.

Investors need reliable information on costs and benefits for investment proofing and decision-making on restoration. Colombia is involved in different initiatives that are helping the country to structure its database on the costs and benefits associated with natural capital conservation and restoration which will help the country to take strategic decisions related with investments. Examples are:

- The Biofin Initiative (UNDP, n.d.)
- The Economics of Ecosystems and Biodiversity Initiative (UNEP, n.d.)

[106] Initiative 20x20 website. Info for Colombia, Retrieved from: https://initiative20x20.org/regions-countries/colombia
[107] UN-REDD Programme. 2019. "Colombia's Financial Sector Engaged in Improving Forest Protection and Environmental Sustainability". UN-REDD Programme Newsletter. Retrieved from: https://www.un-redd.org/post/2019/05/23/colombia-s-financial-sector-engaged-in-improving-forest-protection-and-environmental-sust

- The Natural Capital Accounting through WAVES project in Colombia (World Bank, n.d.-a)

Technical capacity

Colombia has a National Forest Monitoring System (NFMS) which was supported by the UN-REDD Programme through the provision of **guidelines for monitoring restoration** among other contributions (UN-REDD Programme, 2019)

In 2016 the Ministry of Environment and Sustainable Development have published a **portfolio of opportunity areas to manage restoration processes** in Colombia, which was built with information at national scale. This document considered the existing information in protected areas, wetlands, areas affected by mining and other areas relevant to conservation. As a result of this prioritization, two possible scenarios were established, with their respective cartography at scale 1: 100,000: i) scenario 1 corresponding to areas of the PNN and other protected areas registered in RUNAP and ii) scenario 2: areas not included in any protection category but important for restoration. In the case of scenario 2 the total area mapped was **4,819,632** hectares, where 30% (1,453,900 hectares) are found in the territories of 74 indigenous ethnic groups. In relation to ethnic groups, 64% of the priority areas for restoration are in territories belonging to six ethnic groups: Emberá Katio, Paéz, Kogui-Malayo-Arhuaco, Pijao, Wayuu and Awá. One of the actions proposed in the National REDD+ strategy is the design and implementation of a **Restoration Program to collective territories of indigenous and black communities** (Gobierno de Colombia, 2017, 2018).

Coalitions and Partnerships

In May 2019 the **"Amazon Pact for Forests and Climate"** was signed by the Minister of Environment, Governors of Putumayo, Caquetá, Guaviare, Amazonas, Guainía and Vaupés, regional environmental authorities CORPOAMAZONIA and CDA, research institutes SINCHI and IDEAM, the UNDP and a representative of the government of Norway. The pact has the goal of developing and implementing a joint regional strategy for the protection and proper management of forests and implementing the necessary measures for territories to adapt to the effects of climate change, thereby reducing the vulnerability of the local communities and territories in the Colombian Amazon (ASL, 2019)

Supply chain companies at the national level are also making ambitious commitments to transition to sustainable land uses in ways that are broadly aligned with the FLR approach (such as restoring degraded lands for sustainable production). **Public-private collaboration can be an important success factor** for the **restoration** agenda bringing together private climate and sustainability objectives with public national and international climate and restoration pledges (Konig et al., 2018). The Colombian government is leading the development of **zero deforestation agreements** in key sectors including palm oil, cattle, and cocoa to drive sustainable growth. In the next table a compilation of the zero-deforestation agreements is shown.

Table 6. compilation of the zero-deforestation agreements (Konig et al., 2018)

	Palm	Cocoa	Cattle (beef/dairy)
Year signed	2017	2018	Expected 2019
Status	Being implemented	Being implemented	In development
Deforestation goals	Zero deforestation by 2020. Palm oil produced on areas deforested 1 January 2011 must ensure compensation to be considered deforestation-free.	Zero deforestation by 2020. Cocoa produced on areas deforested 1 January 2011 must ensure compensation to be considered deforestation-free.	Zero deforestation in the Amazon by 2020 and the whole country by 2030. Beef & dairy produced on areas deforested 1 January 2011 can only be considered deforestation-free if a conservation / restoration agreement is in place.
Landscape restoration activities	-Restoration of natural forests -Promote sustainable production	-Forest restoration -Sustainable production including agroforestry and intercropping	-Restoration of natural forests -Consideration of silvopastoral production systems
Signatories	39 signatories (22 growers, 2 buyers, 7 NGO, 4 government institutions, 2 main federations)	6 signatories (2 ministries, 1 buyer, 1 cocoa grower's federation, 2 NGO)	Total numbers to be determined but expected to include main ministries, federations, buyer, producers, and retailers.
Co-benefits	Positioning of Colombian palm oil in international markets	-Income diversification -Illicit crop substitution -Contribution to peace agreement	Positioning of Colombian beef for exports

3.3.2. Opportunities to restoration from ROAM analyses

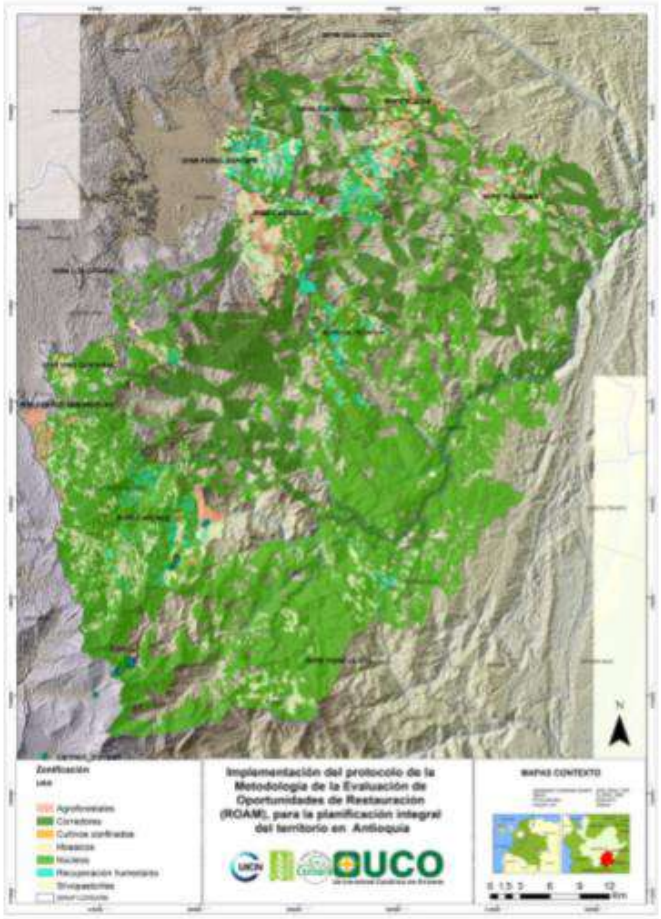
Colombia has applied the ROAM at the subnational level in one region – **eastern Antioquia**. This process was applied in the jurisdiction of Cornare from October 2016 to December 2017 and was coordinated by IUCN, in collaboration with the Alexander von Humboldt Research Institute of Biological Resources (IAvH), the Regional Corporation of the Basins of the Rivers Negro-Nare (Cornare) and the Catholic University of the East (UCO). IAvH led the process to evaluate the context and feasibility of ROAM implementation at the national level. This region was prioritized due to its richness in biodiversity and its high degree of pressure associated with the expansion of frontiers of agricultural and livestock land use and high level of deforested areas (IUCN, 2020a)[108]. From this first application of ROAM a proposal with priorities for restoration was designed to promote connectivity of protected areas through the productive matrix in the landscape of the south-eastern Antioquia (Isaacs-Cubides et al., 2018)[109] (BOX 7).

[108] IUCN. 2020. Colombia ROAM Country Brief. 2020. Retrieved from: https://infoflr.org/sites/default/files/2020-08/roam_country_brief_colombia_post.pdf

[109] Cubides, Isaacs Paola; Marin, Wilmer; Betancur, Carlos Andrés; Sierra, Jorge; Ochoa, Vivian; Correa, Camilo; Aguilar, Mauricio; Gómez, Mayra; Franco, Maria Cristina; Marin, Daniela; Talia Waldrón, Ramírez, Wilson; Echeverrí, David. 2018. Resumen ejecutivo. Resultados del proceso de evaluación de oportunidades de restauración (ROAM) en la jurisdicción de Cornare, Antioquia – Colombia. Quito, Ecuador: UICN-América del Sur. 24 p.

BOX 7. The ROAM implementation in eastern Antioquia

The ROAM's implementation developed spatial models based on the provision of ES generated by natural forests and made it possible to identify the areas with the highest potential to provide those services. Alternative production systems were also proposed to rehabilitate soils as well as to improve the productive options and the well-being of farmers.



So, among the contributions generated by the application of ROAM we can highlight: (i) the map (1:25,000) showing the areas where efforts to make FRL should be focused in order to maximize the connectivity of the existing forest remnants and the delivery of ES; (ii) a collection of spatially explicit information at scales 1: 100,000 and 1: 25,000 of environmental, social and economic variables of the region; and (iii) models of integrated production systems including agroforestry systems of coffee or cocoa for the lowlands, fruit trees for the highlands, and silvopastoral systems for the lowlands and highlands.

From the analysis of connectivity and ES, the areas due to land use conflict and the management guidelines in the protected areas were analysed in order to create a zoning of the area. In the PAs, productive activities must move to reconversion, seeking to gradually eliminate livestock of all kinds in the medium term.

Restoration areas were identified, especially in wetland areas, landslide areas and for the implementation of corridors. However, other restoration activities cannot be identified at that scale, so a local analysis is proposed at the farm level to manage it. For their part, the core areas must be preserved to guarantee connectivity and ecosystem services.

3.3.3. Opportunities to restoration from large Projects

The LUCID Database has identified a total of 36 restoration projects for Colombia. In the next Figure there's a distribution of the number of the projects per category of project area, where it's possible to see that 80% of the projects are being implemented in areas lower than 5,000 ha (29 projects).

From these 36 projects, 17 are supported by CIFOR, 7 by WRI, 1 by CIAT, 1 is funded by GEF, 7 are UNFCCC CDM projects, 2 are supported by Rare/CVC and 1 is funded by Nespresso company.

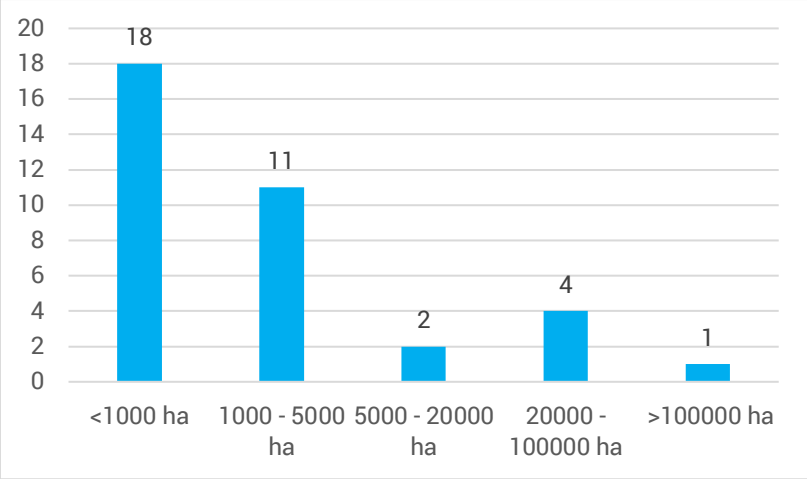


Figure 4. Number* of projects implemented in each category of area in Colombia according to the LUCID Database (*this doesn't correspond to the total number of restoration projects being implemented in Colombia)

In the next Table a list of the selected projects is shown. Since the LUCID Database was a work that collated information until 2018 the webpage of GEF Projects was also checked for new projects.

Table 7. Projects with restoration activities in implementation/completed

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	Colombian executing agencies (a)| Implementing agencies (b)
1)Project 1: Forest Conservation and Sustainability in the Heart of the Colombian Amazon – areas: **Serranía de Chiribiquete National Park (NP); Alto Fragua Indi Wasi NP; Paya NP; Serranía de Churumbelos Auka Wasi NP; Medicinal Plants Orito Ingi-Ande Flora Sanctuary; Corridor Paramos Miraflores/Picachos Regional Park, Bajo Caguan and Serrania La Lindosa, Capricho, Cerritos and Mirolindo; 22 indigenous reserves**	Amazon Sustainable Landscapes Program The ASL intervention in Colombia consists of two different complementary projects implemented by the WBG and UNDP: 1)Forest Conservation and Sustainability in the Heart of the Colombian	GEF Trust Fund (ID 9664) | In implementation	a) Promote sustainable practices in almost 89,784 hectares of productive landscapes (80,000 UNDP + 9,784 WBG) b) Restore 5,600 hectares of degraded lands (1,600 WBG + 4,000 UNDP) (ASL, 2019)	(a) Ministry of Environment and Sustainable Development (b) UNDP / WBG

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	Colombian executing agencies (a)| Implementing agencies (b)
2) Project 2: Connectivity and Biodiversity Conservation in the Colombian Amazon— Sustainable Amazon for Peace – areas: **Climate Change Management Strategy and Integrated Climate Change Plans developed for the Amazon region; two microfocalized areas for landscape design: Sabanas del Yarí (Caquetá -Meta) and La Perla Amazónica Campesino Reserve Zone (Putumayo); two microfocalized areas for strengthening conservation and sustainable, inclusive value chains: Piamonte (Cauca) and La Uribe (Meta)**	Amazon (with the WBG as implementing agency (represent a $12 million additional financing to the GEF project 5560) 2) Connectivity and Biodiversity Conservation in the Colombian Amazon— Sustainable Amazon for Peace (with UNDP as implementing agency)			
departaments of Caquetá, Guaviare and sur del Meta / municipalities of Solano, Cartagena del Chairá, San Vicente del Caguán, La Macarena, San José del Guaviare and Calamar. Indigenous territories: Yaguará II, Puerto Zábalo, Los Monos, Monochoa, Aduche, Mesaí, Charco del Niño Dios, Nonuya de Villazul, Miritĺ-Paraná.	GEF Corazón de la Amazonia - Forest Conservation and Sustainability in the Heart of the Colombian Amazon	GEF Trust Fund (ID 5560)| In implementation	Aim: to improve governance and promote sustainable land use activities in order to reduce deforestation and conserve biodiversity in the Colombian Amazon forests Target: 2.1 Areas under threat due to main deforestation drivers, areas already degraded and areas for restoration identified,	(a) Ministerio de Ambiente y Desarrollo Sostenible (MADS), Parques Nacionales Naturales (PNN), el Instituto de Hidrología, Meteorología y Estudios Ambientales (IDEAM), el Instituto Amazónico de

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	Colombian executing agencies (a)| Implementing agencies (b)
			prioritized and intervened outside of protected areas Results (2020): Formation of connectivity corridors in **50,000 hectares** of low and medium intervention areas	Investigaciones Científicas (SINCHI) y Patrimonio Natural. (b) World Bank
(i) the traditional livestock production region in the Cesar River Valley; **(ii) lower Magdalena River region;** **(iii) dairy cattle production regions of Cundinamarca, Antioquia, Boyacá and Santander (linked to the "Roble Corridor" in the two last provinces; (iv) the coffee producing ecoregion and upper Cauca river, and (v) the low foothill region in the eastern cordillera of Meta, Cundinamarca and Casanare**	Mainstreaming Biodiversity in Sustainable Cattle Ranching	GEF Trust Fund (ID 3574) | Closed (2015) (*)	a) 61,500 ha of previously degraded pastures under biodiversity-friendly production systems, including 4,000 new km of live fences and 15,000 ha in pastures with high tree density, secondary forest, or riparian corridors	(a) CIPAV, FEDEGAN (b) The World Bank

(*) Up-scaling (GEF, 2018)[110]: The practices that were promoted by the project are being significantly up-scaled by the Grasslands Alliance in collaboration with the Visión de la Amazonía and REDD+ Early Movers (REM) programs, which are expanding the scale of intervention from 325 families and 9,500 hectares to 1,400 families on 50,000 ha. Another initiative funded by the U.K. Business, Energy and Industrial Strategy has also built on the GEF project by channeling carbon sequestration payments to approximately 3,000 ranchers covering an area of 116,000 ha.

In terms of results, the **ASL Project** had the following accomplishments related with integrated landscape management in each of its projects (ASL, 2019):

1)Project 1: Forest Conservation and Sustainability in the Heart of the Colombian Amazon

[110] GEF. 2018. Evaluation of GEF's Support to Mainstreaming Biodiversity (Prepared by the GEF Independent Evaluation Office). Retrieved from: https://www.gefieo.org/sites/default/files/ieo/council-documents/files/c-55-me-inf-02.pdf

- Establishment of conservation, restoration, and non-deforestation agreements for an accumulated total of 362 agreements covering 43,745 hectares. 40 percent of the area of each of the farms has been conserved (with an effectiveness rate of 83 percent)
- By June 2019, 1,113 hectares of land is being managed with sustainable agroforestry practices, and 11,301 hectares are being conserved as standing forests. This gives a total of 12,414 hectares under low GHG management practices

2) Project 2: Connectivity and Biodiversity Conservation in the Colombian Amazon— Sustainable Amazon for Peace

- Two community nurseries for ecosystem restoration have been established and will produce plant material needed for restoration activities under the project. The nursery creation has been followed by capacity building in nursery matters;
- Six value chains have been identified to promote the sustainable use of biodiversity and transformation of Amazonian products including acaí, seje, and moriche palms, and nature tourism
- An ecosystems connectivity model has been developed and applied to identify the best areas to promote functional and structural connectivity among areas generating the highest ecosystem service values covering **70,561 hectares**.

Identification of opportunities in the agricultural sector with restorative potential

In 2019, the National Advisory Board for Restoration, WRI, the Inter-American Institute for Cooperation on Agriculture (IICA) and 3er Planeta SAS have started to identify the opportunities in the agricultural sector with restorative potential capable of attracting private investment and support the National Government in the implementation of its restoration goals. To date, **76 projects** have been identified in different stages (from ideas to consolidated projects), which cover around 253,309 hectares and are the basis for the "**Portfolio of Investment Projects with Restorative Potential from the Agricultural Sector**" (Borda et al., 2020)[111]. From the Portfolio a total of 22 projects were selected by the team as being the most advanced proposals, comprising different types of interventions, namely restoration, rehabilitation and reclamation so in the following table the group of restoration projects with a total area > 10 000 ha is shown.

Table 8. Projects from the subset of the Portfolio identified as the most advanced proposals that are focused on restoration activities and have an area > 10000 ha

Area (Department / Municipalities)	Project's name	Project's description	Organization (responsible for Project's management)	Total hectare (ha)	Phase
Meta / Ariari	Hemp for future	Establecimiento de 20 mil ha de Hemp (Cañamo - *Cannabis sativa* ssp. Sativa)	CORPROPAZ - HEMP FOR FUTURE (private company)	20000	Idea

[111] Borda, Maria Franco Chuaire, Andrea Carolina Palau, Ángela M. Betancourt, Miguel, Pinedo. 2020. https://initiative20x20.org/news/oportunidades-de-inversion-privada-en-la-restauracion-de-tierras-degradadas-en-colombia-y Retrieved from: https://initiative20x20.org/news/oportunidades-de-inversion-privada-en-la-restauracion-de-tierras-degradadas-en-colombia-y

Area (Department / Municipalities)	Project's name	Project's description	Organization (responsible for Project's management)	Total hectare (ha)	Phase
Vichada / La Primavera	RNSC (Reserva Natural de la Sociedad Civil) Irosebia - RESNATURE: Proyecto GEF: Fortalecimiento instiritucional y de politicas para incrementar la conservación de la biodiversidad en predios productivos en Colombia.	Reforestación de bosque de galería, protección de bosques en riesgo, restauración de rondas y areas protectoras de bosques de galería. Protección/Conservación de especies Danta, Jaguar, Venados, Osos y otras especies amenaza CITES.	RNSC Irosebia (civil society)	17000	Pilot

On March 3-4 of 2020 the meeting "*Opportunities for private investment in the restoration of degraded lands with a landscape approach from the agricultural sector*" (Initiative 20x20, 2020)[112] took place in Bogotá. The event brought together more than 100 participants, including project proponents and developers, investment funds, local companies and banks, government representatives, technical institutions and other interested parties with the aim of discussing the opportunities for productive restoration in Colombia identified in the Portfolio as well as to providing guidance for the formulation of business models capable of attracting private financing.

3.3.4. Opportunities to restoration from country and international studies

Suitability of Degraded Lands to Restore using Agroforestry Systems

Colombia holds significant potential to restore degraded lands and landscapes through activities encompassed in the FLR approach, including the establishment of forestry and agroforestry systems on degraded or deforested land so **the conversion of degraded lands to sustainable cocoa, timber, or palm oil plantations** represent significant opportunities (Konig et al., 2018).

El Sistema Para la Planificación Rural Agropecuaria (SIPRA)(Gobierno de Colombia, n.d.)[113] de Colombia has developed a series of **maps of suitability to different crops**, including cocoa, timber, potatoes, cotton and palm oil, as well as a map of current land-use in agriculture and pastureland., based on

[112] Initiative 20x20. 2020. Informe "Oportunidades de inversión privada en la restauración de tierras degradadas con enfoque de paisaje desde el sector agropecuario" (2020). Retrieved from: https://initiative20x20.org/sites/default/files/inline-files/Informe%20-%20Oportunidades%20de%20inversi%C3%B3n%20privada%20en%20la%20restauraci%C3%B3n%20de%20tierras%20degradadas%20en%20Colombia_1.pdf

[113] Gobierno de Colombia.n.d. SIPRA website. Retrieved from: https://sipra.upra.gov.co/

physical, social, and economic parameters. In the next Figure it's possible to see one of these maps showing the suitability for cocoa plantations. The darkest patches are the ones offering the highest suitability.

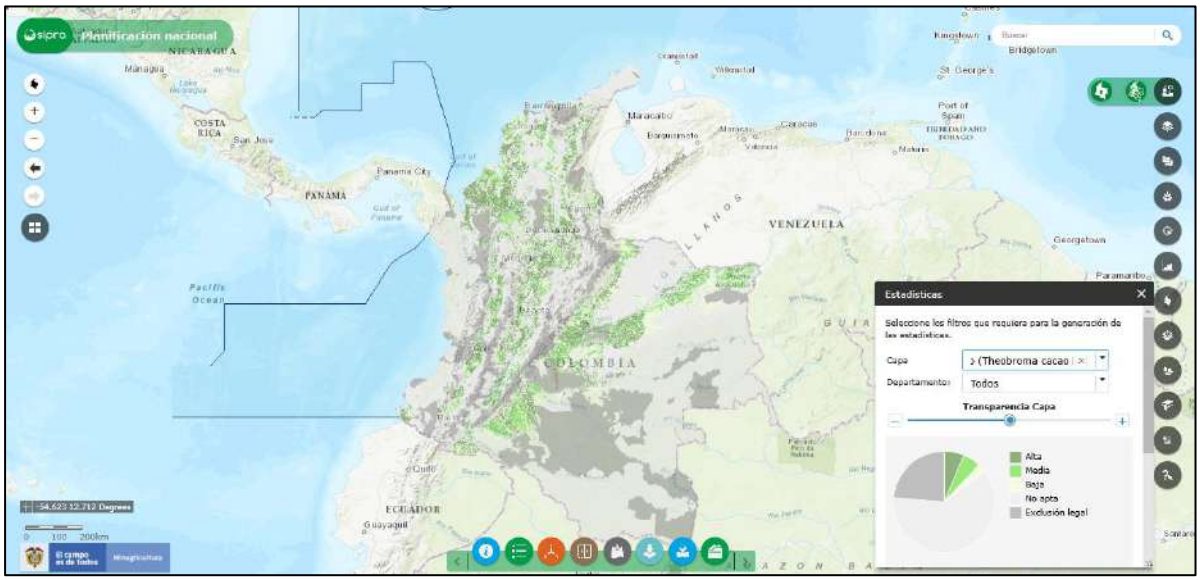


Figure 5 – Map of country's suitability for cocoa plantations (Source: SIPRA)

Across the country, most areas with high suitability for cocoa (**cocoa highly suitable on 4.7 Mha**), timber (**timber highly suitable on 7.5 Mha**) and palm oil (**palm oil highly suitable on 5.2 Mha**) plantations are currently used for extensive cattle grazing highlighting a significant opportunity for a sustainable land-use transition (Konig et al., 2018)

Prioritization of Areas to be Restored in Watersheds to Optimize Results for Nature and People

In Colombia there's a network of institutions, coordinated by TNC, working on native vegetation restoration plans in the **source watersheds** of most major cities in Colombia to contribute to the country FLR targets and one of the mechanisms to finance FLR activities is through a water fund (Beatty et al., 2018). Water Funds are organizations that design and enhance financial and governance mechanisms that unite public, private and civil society stakeholders around a common goal to contribute to water security through nature-based solutions such as restoring forest ecosystems. Since the first Water fund was established in 2000, 34 more Water Funds have been established around the world, with more than 40 additional Water Funds in design (TNC, 2020)[114]. To date, Colombia has seven operational water funds (Water Funds, n.d.) [115].

In Colombia the ROOT approach was applied to optimise the application of the available budgets to FLR activities. The locations of nature-based solution interventions in the **source watersheds** of six of the largest cities in the country was defined. The cities were: Bogotá (pop 6,840,000), Medellín (pop 2,214,000), Cali (pop 2,119,000), Barranquilla (pop 1,146,000), Cartagena (pop 892,500), Cúcuta (pop 587,000) and Bucaramanga (pop 516,500). That location of the interventions including agricultural best management practices (BMPs), forest restoration, riparian restoration and protection of native vegetation was defined to reach a target change in ES, including sediment retention, nitrogen retention

[114] TNC. 2020. Source Water Protection & Climate Adaptation Ecosystem based adaptation: The Role of Water Funds. Retrieved from: https://www.fondosdeagua.org/content/dam/tnc/nature/en/documents/latin-america/sourcewater.pdf
[115] Water Funds. n.d. Retrieved from https://www.fondosdeagua.org/en/the-water-funds/water-fund-maps/

and carbon storage. Water regulation co-benefits were also analysed using the InVEST seasonal water yield model. A total of **50,590 ha** was identified for restoration activities (BOX 8).

3.3.5. Restoration Initiatives involving multistakeholders

The Green-Blue Water Coalition

The Green-Blue Water Coalition is an initiative of TNC with support from the private sector and the collaboration of civil society for implementing nature-based solutions that promote water security in at-risk cities. The initiative works to conserve and restore forests in 21 watersheds that supply almost 42 million people. In **Colombia** it is being implemented in **in the metropolitan areas of Bogota, Medellin and Bucaramanga.**

"Implementing sustainable land use systems to contribute to forest conservation, climate protection (REDD+) and the peace-building process in Colombia"

The International Center for Tropical Agriculture (CIAT) in partnership with the Colombian Ministry of Environment and Sustainable Development (MADS), the Leibniz Centre for Agricultural Landscape Research (ZALF, Germany) and the Colombian Research Center for Sustainable Agricultural Production Systems (CIPAV) are implementing since november 2018 a IKI funded project (5.199.957,75 €) called "Implementing sustainable land use systems to contribute to forest conservation, climate protection (REDD+) and the peace-building process in Colombia" (BMUB, n.d.)[116]. The project, to be implemented until October 2022, aims at promoting sustainable land use systems with the focus on the agricultural sector (e.g. cattle farming). It is oriented on farmers in priority areas for carbon storage and landscape restoration and which are also affected or threatened by armed conflicts. The **departments of Caquetá and Cesar were prioritized** as the two regional nodes for piloting sustainable land use systems (SLUS). Similarly, restoration priorities are to be identified in coordination with these institutions.

Cocoa, Forests and Peace Initiative

In Colombia, the government along with its largest cocoa company, Casa Luker, and the National Cocoa Federation, signed the **Cocoa, Forest & Peace Initiative** to eliminate cocoa-related deforestation (Iniciativa Cacao Bosques & Paz Colombia, 2019)[117]. This is a commitment to eliminate deforestation from the country's cocoa supply chain by 2020 that will be supported by the WRI and IDH-the Sustainable Trade Initiative. One of the key priority areas is the **forest protection and restoration** and, in this way, the Action Plan incorporates the strategic result of achieving zero-deforestation cocoa productive models that integrate forest and resource conservation, restoration and management at the landscape scale based on public-private partnerships. One of the targets is to have 50% of the priority territories with public-private partnerships implemented in 2025 for cocoa productive models that integrate forest and resource conservation as well as restoration. The development of sector agreements on zero-deforestation and restoration in palm oil, beef, dairy, and cocoa through the

[116]BMUB. The IKI Initiative webpage. "Implementing sustainable land use systems to contribute to forest conservation, climate protection (REDD+) and the peace-building process in Colombia" IKI Project. Retrieved from: https://www.international-climate-initiative.com/en/details/project/implementing-sustainable-land-use-systems-to-contribute-to-forest-conservation-climate-protection-redd-and-the-peacebuilding-process-in-colombia-18_III_106-3047

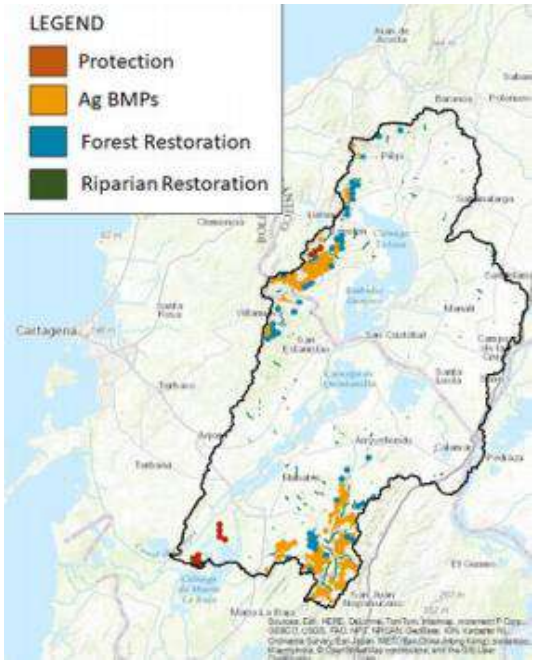
[117] Iniciativa Cacao, Bosques & Paz Colombia. 2019. Plan de Accion Cacao, Bosques & Paz 2020-2030. Retrieved from: https://www.worldcocoafoundation.org/wp-content/uploads/2018/08/Plan-de-Accion-2030-Colombia-CFP.pdf

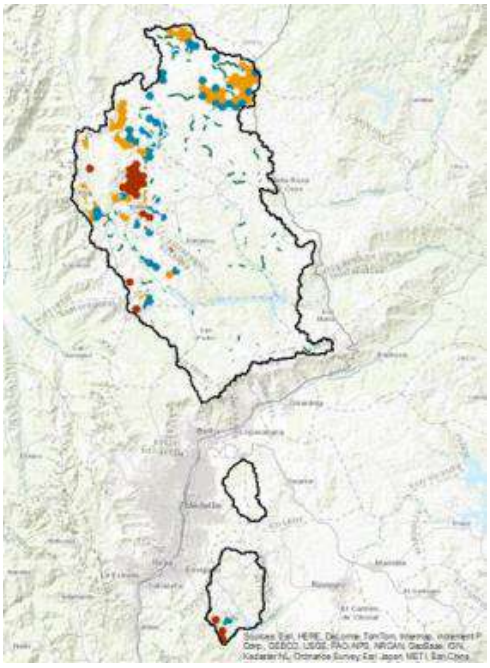
Cocoa, Forest, and Peace Initiative is a logical step for private sector engagement and cementing public-private collaboration (Konig et al., 2018).

BOX 8. Results of ROOT application in six source watersheds of 6 cities in Colombia to define areas for FLR (source: Beatty et al., 2018)

The two maps show the optimised FLR portfolios that meet the targets for improving and protecting sediment retention, nitrogen retention and carbon storage services in the source watersheds of Cartagena (map on the left) and Medellin (map on the right). Cost savings via multiple benefit optimisation have a range of 13–95% across the watersheds. In other words, in some watersheds, achieving equivalent nutrient, sediment and carbon improvements would cost nearly double if investments were made in achieving those benefits individually. The Table shows the total portfolio cost and hectares chosen for implementation of each of the four activities, in order to meet the target ecosystem service change for the city's watersheds, as well as the sum of the areas for restoration activities.

		Cartagena	Medellin	Cali	Bogota	Bucaramanga	Cucuta
Portfolio cost (million USD)		43.5	26.6	5.1	53.8	24.5	68.8
Area for each activity type (ha)	Agricultural best management practices	9,723	4,278	100	9,142	2,419	6,257
	Restoration	4,406	4,196	1,103	5,674	4,929	23,308
	Riparian restoration	2,522	1,681	293	1,724	374	380
	Protection	1,181	1,978	994	5,348	4,109	11,697
Total area for intervention (ha)		17,832 (7% of total area)	12,023 (10% of total area)	2,491 (14% of total area)	21,888 (8% of total area)	11,831 (15% of total area)	41,642 (17% of total area)
Total area for restoration (ha)		**6,928**	**5,877**	**1,396**	**7,398**	**5,303**	**23,688**





ISA “Building sustainable cocoa agroforestry systems in Colombia” Project

The **company ISA** operates throughout Latin America in the electricity, transportation, and telecommunications fields and has a sustainability program called Conexión Jaguar, in alliance with South Pole and Panthera, which helps to restores forests in the countries where ISA operates. The program has a target of supporting at least 20 projects that conserve or restore **400,000 hectares** of land in Latin America. In both **Cimitarra and Tierralta regions** in Colombia the company is supporting its local partner **UMAU Cacao** (Initiative 20x20, n.d.)[118] to access the carbon credit market and restore **3,081 hectares** with local farmers in the form of cocoa agroforestry systems.

12Tree Project

The 12Tree (12Tree, n.d.)[119] is a private company that mobilizes institutional investments into sustainable land uses at large scale. The 12Tree invests in the “Restorative cocoa farming in a coal mining landscape” rehabilitating a **400 ha cacao plantation** of unique potential in La Jagua de Ibirico, Cesar, in the Caribbean region of Colombia (Initiative 20x20, n.d.)[120].

Fundacion Natura “Revitalizing Colombia's dry tropical forest” Project

A consortium led by Fundación Natura launched the **Pilot Plan for the Restoration of the Tropical Dry Forest in Colombia's Huila Department** (Initiative 20x20, n.d.)[121], the country's largest restoration project to date. Over 20 years, the partners, including the energy **company Enel Group** and the Colombia's Natural National Parks department, aim to restore **11,079 hectares** and invest US$ 19.3 million. Enel Group is funding the project to comply with the Environmental License that was granted to build the El Quimbo dam.

[118] Initiative 20x20 website. Building sustainable cocoa agroforestry systems in Colombia. Retrieved from: https://initiative20x20.org/restoration-projects/building-sustainable-cocoa-agroforestry-systems-colombia
[119] 1-2-Tree. n.d. Retrieved from: https://www.12tree.de/
[120] Initiative 20x20 website. Growing sustainable cocoa in Colombia's coal country. Retrieved from: https://initiative20x20.org/restoration-projects/growing-sustainable-cocoa-colombias-coal-country
[121] Initiative 20x20 website. Revitalizing Colombia's dry tropical forest. Retrieved from: https://initiative20x20.org/restoration-projects/revitalizing-colombias-dry-tropical-forest

3.4. Description of the selected country Costa Rica

3.4.1. Country's Characterization

Commitments

The government of Costa Rica announced its contribution to the Bonn Challenge in 2012 during the 18th Conference of the Parties (COP) of the UNFCCC, held in Doha (Qatar). The country's overall restoration commitment was **1 mha**.

Costa Rica is one of the signatory countries of the Paris Agreement, committing to reach up to 60% forest cover.

In terms of national restoration targets, the country through its National Biodiversity Strategy 2016-2025 (ENB2), has established the goal M.9.: "*by 2020* ***1,000,000 hectares*** *of forested landscapes should suffer intervention (improve connectivity, climatic shelters, natural resources, dry forest restoration etc.) to avoid land degradation and favour biodiversity*". Some years before, in 2007, as part of its National Climate Change Strategy, the government announced the goal of becoming carbon-neutral by 2021, recognizing the role of the agricultural sector in achieving that goal – mainly the coffee, banana, livestock, sugarcane, pineapple and rice sectors (Beatty et al., 2018).

Policies

Costa Rica has a strong legacy in halting deforestation, and its national system on payments for environmental services (PES) has been internationally recognized for being the most successful of its kind (Wallbott et al., 2019)[122]. In the following table there's a description of several advances in the forest law that have favoured the forest restoration in the country.

Table 9. Costa Rican Laws Creating Financial Incentives for Forest Restoration and Conservation

Law	Year	Brief description
Forest Law No. 4475	1969	Made the costs of reforestation tax deductible. Wealthy or large landowners were the primary beneficiaries.
Forest Law No. 6184	1977	Required at least 2 percent of agricultural loans from commercial and state banks to be allocated for reforestation projects. Interest rates on reforestation project loans were capped at 8 percent and trees were permitted to be used as collateral.
Forest Law No. 7032	1986	Created "Certificates of Forestry Payments" that were awarded to landowners who reforested their properties. The certificates could be traded for cash or used to pay taxes and fees. These certificates broadened the benefits of tax-deductible forest restoration costs beyond large
Forest Law No. 7174	1990	Targeting Landowners and forest product companies, making fiscal incentives more accessible to lower income landowners. The certificate system was terminated, however, by the end of 1995 due to the conditions of the third structural adjustment loan from the World Bank, which cancelled many subsidies.

[122] Wallbott, L., G. Siciliano, and M. Lederer. 2019. Beyond PES and REDD+: Costa Rica on the way to climate-smart landscape management?. Ecology and Society 24(1):24. https://doi.org/10.5751/ES-10476-240124

Law	Year	Brief description
Forest Law No. 7575	1996	Created the payment for environmental services program (PSA), which helps to motivate and maintain restoration, in response to the structural adjustment loan. The environmental services include reducing greenhouse gas emissions, protecting water for downstream users, protecting biodiversity, and protecting nature for aesthetic and scientific purposes. Landowners could receive payments for reforestation through plantations, protection and management of existing forests, natural forest regeneration, or agroforestry systems.
Payments for Ecosystem Services Program (PPSA)	1997	Through the PPSA, landholders receive an annual payment for the conservation of forested lands, and for the establishment and maintenance of timber plantations, areas of natural regeneration and modified forest management. Incentives are also disbursed to landholders for the adoption of agroforestry systems.

Sources: (Buckingham & Hanson, 2014)[123], (Beatty et al., 2018)

The **National REDD + Strategy** (2010-2014) (MINAE, 2015)[124] within the framework of National Strategy Climate Change sets the guidelines for ensuring the integrity of forests, supporting the land tenure regularization, increasing coverage of the PPSA, improving management of the wildlife protected areas and developing the capacities across both the public and private forestry sector. An **Implementation Plan of the National REDD+ Strategy** was published in 2017 (MINAE, 2017)[125].

Because the restoration commitments will not be achieved through forest-based measures alone ((e.g., REDD+), a broader focus on land use has recently been adopted through the country's policy for agriculture and environment (***Política Agroambiental***). This has the potential to serve as an umbrella framework for integrating the isolated processes of REDD+, National Appropriate Mitigation Action (NAMA) livestock/cattle, NAMA coffee, nationally determined contributions, and other climate change mitigation and adaptation programs. The policy is supposed to initiate rehabilitation and restoration of the provision of ecosystem services without triggering a competition of land uses (Wallbott et al., 2019). Other relevant policies are the **National Climate Change Strategy** (2008), the National Carbon Market (2011) and the **National Development Plan (2011-2014)**, which rendered environment and land-use planning as national priorities (Wallbott et al., 2019).

Policy reforms that have reduced subsidies to farmers engaged in converting forests to pastures for livestock production, along with the recognition of the economic benefits of forest restoration, has helped to drive changes in land use.

Funds

In terms of funding, the country has available the **National Forest Financing Fund (Fondo Nacional de Financiamiento Forestal – FONAFIFO)**. FONAFIFO is a trust fund hosted under the structures of the State Forestry Administration but administered independently by a governing board. FONAFIFO is

[123] Buckingham, Kathleen and Hanson, Craig. 2014. The Restoration Diagnostic. Case Example: Costa Rica. World Resources Institute. Retrieved from: https://files.wri.org/s3fs-public/WRI_Restoration_Diagnostic_Case_Example_Costa_Rica.pdf

[124] MINAE. 2015. REDD+ Readiness Package. Retrieved from: https://forestcarbonpartnership.org/system/files/documents/R-Package_v7_EN%20%2800000002%29.pdf

[125] MINAE. 2017. Plan de implementación de la Estrategia Nacional REDD+ Costa Rica. Retrieved from: http://reddcr.go.cr/sites/default/files/centro-de-documentacion/plan_de_implementacion_enreddcr_v3.pdf

responsible for managing and coordinating the country's REDD+ strategy, for executing the "readiness package", for linking with stakeholders to undertake activities that reduce emissions from deforestation and forest degradation, conserve forests, promote FLR and enhance forest carbon stocks (FAO, 2015)[126]. In addition, Costa Rica receives funds for productive landscape management and conservation of biodiversity from the GEF, supported by institutions such as UNDP and FAO. GIZ is implementing the IKI Project called "Forest Landscape Restoration in Central America and the Dominican Republic (REDD-Landscape / CCAD) and implementation of the Green Development Fund for Central America (REDD Landscape) (2017-2022)" (BMUB, n.d.)[127] which supports Costa Rica and other three countries of the Central American Integration System (SICA) in establishing, developing and carrying out implementation and financing mechanisms for FLR. In terms of availability of funds, there are limited funds, finance and coordination between various national and multilateral agencies (Wallbott et al., 2019).

Investors need reliable information on costs and benefits for investment proofing and decision-making on restoration. Costa Rica is involved in different initiatives that are helping the country to structure its database on the costs and benefits associated with natural capital conservation and restoration which will help the country to take strategic decisions related with investments. Examples are:

- The Biofin-Costa Rica Initiative (UNDP, n.d.);
- The Economics of Ecosystems and Biodiversity case-study (UNEP, n.d.); and
- The Natural Capital Accounting through WAVES project in Costa Rica (World Bank, n.d.-a)

Coalitions and Partnerships

The Agro-Environmental Agenda was endorsed by the Environmental Sector Council in November 2016, representing an effort to **articulate policy and intersectoral coordination** between the agricultural sector and the environment sector to identify issues of common interest and to promote interrelation between agricultural productive activities and the conservation and sustainable management of natural resources with an ecosystem approach. One of its three thematic axes established the "management of productive and inclusive landscapes"(Brenes & Iniciativa, 2018).

Technical capacity

The National Land Use, Land Cover and Ecosystems Monitoring System (SIMOCUTE) is in development whilst the Monitoring Land Use Change Within Productive Landscapes (MOCUPP) became operational during 2017 and will progressively monitor five commodities until 2020. The SIMOCUTE development has been supported by a collaboration with the United States Forest Service (USFS)-Silva Carbon. Funds from the Inter American Bank for Development/ Tropical Agricultural

[126] FAO. 2015. Towards effective national forest funds, by Matta, R. FAO Forestry Paper No. 174. Rome, Italy. Retrieved from: http://www.fao.org/3/a-i4359e.pdf

[127] BMUB. n.d. International Climate Initiative (IKI) webpage. Forest Landscape Restoration in Central America and the Dominican Republic (REDD-Landscape / CCAD) and implementation of the Green Development Fund for Central America (REDD Landscape) IKI Project. Retrieved from: https://www.international-climate-initiative.com/en/details/project/forest-landscape-restoration-in-central-america-and-the-dominican-republic-reddlandscape-ccad-and-implementation-of-the-green-development-fund-for-central-america-redd-landscape-17_III_079-2880

Research and Higher Education Centre (BID/CATIE), Silva Carbon and FCPF were coordinated to adjust and conclude SIMOCUTE's methodologies (UN-REDD Programme, n.d.).

Results

According to the information in the First National Report on the Rehabilitation of Degraded Landscapes in Costa Rica (Brenes, 2018)[128] the country has rehabilitated a total of 355,762 ha of degraded lands between 2014 and 2017 due to the implementation of the following programmes (Table 10) (Brenes & Iniciativa, 2018).

Table 10. Summary of documented initiatives of degraded land rehabilitation in Costa Rica from 2014-2017

Initiative	**Implementing agency**	**Planned area (ha) (2014-2020)**	**Impacted area (ha) (until 2017)**
Payments for Ecosystem Services Program - PPSA	FONAFIFO/MINAE National budget.	600,000	278,581
Landscape restoration-REDD+	SINAC/MINAE/GIZ-CCAD	55,554	194
Barranca River Management Plan	SINAC/MINAE/CATIE/PPDPNUD-GEF/PNUD	47792	nd
Project of Community Development and Knowledge Administration for the Initiative Satoyama (COMDEKS) (Jesus Maria)	GEF/PNUD, FONAFIFO/SINAC/CADETI	37725	37987
NAMA Livestock	FUNDECOR- TNC, FENSA,BID, FMAM	160000	14000
Agua Tica	FUNDECOR- TNC, FENSA,BID, FMAM	160000	14000
PES	Empresa de Servicios Múltiples de Heredia. Tarifa hídrica	6000	1000
Reforesting Companies	Company funds	nd	18000
Lands rehabilitated in Costa Rica between 2014 and 2017			355,762 hectares

3.4.2. Opportunities to restoration from ROAM analyses

In order to support Costa Rica in achieving its commitment to Bonn Challenge, IUCN started the implementation of a ROAM assessment in August 2014. The first proposal was presented in 2016 and was based on unifying existing programmes in Costa Rica that had a restoration component (such as Livestock NAMA, PPSA, Coffee NAMA and Programmes of Good Agricultural Practices for pineapple,

[128] Brenes, Gilbert Canet. 2018. Primer informe Nacional de Rehabilitación de paisajes degradados en Costa Rica. Retrieved from: https://enbcr.go.cr/sites/default/files/mg3_informe_pais_restauracion_de_paisajes.pdf

oil palm, banana). In Costa Rica some criteria to select to identify restoration opportunities include increasing wood and bio-energy sources, recovering lost biodiversity, reducing climate vulnerability, enhancing soil conservation and food production, increasing / stabilising drinking water supplies and reducing water pollution and increasing the availability of water for hydro-electric projects. BOX 9 shows the results obtained in the ROAM assessment which allowed the identification of the main options to reach the goal of rehabilitation of one million hectares of degraded landscapes in Costa Rica. The identified programmes are implemented by both MINAE and MAG (Brenes & Iniciativa, 2018)
.

The ROOT approach was then applied as part of the implementation of the ROAM, carried out by the Regional Office for Mexico, Central America and the Caribbean of the International Union for Conservation of Nature (IUCN-ORMACC). ROOT was used to identify optimal areas for the implementation of each of the restoration actions, considering the impact on ES provision, the location of potential beneficiaries, and additional priority areas. In this analysis the spatial decision unit map was made up of hexagons of 400ha each. The use of impact potential and beneficiary maps allowed for relating those areas with the highest potential impact on sediment and nutrient export with those areas with the strongest demand for these changes, maximising the benefits to people of the different restoration actions. Spatial decision units with the highest optimisation scores were summed until they covered the target areas for each restoration action, creating the restoration priority maps (Beatty et al., 2018).

The map in BOX 9 shows the cartographic location of the prioritization that was carried out using the ROOT. The following criteria were used for this analysis: location of hydrographic basins for hydroelectric production; number of people without access to drinking water by district; location of surface sources for the collection of drinking water; location of the wetlands; and existence of biological corridors. The prioritization objectives for each restoration action were proposed in 2016 by the Technical Committee restoration as an analytical basis for the application of ROAM (BOX 9). The opportunity map shows an opportunity area of **2,622,050 ha** (IUCN, n.d.).

BOX 9. Restoration actions considered for the ROAM/ROOT assessment in Costa Rica

Table. Main options to reach the goal of rehabilitation of a million hectares of degraded landscapes in Costa Rica

	Uso Actual	Potencial de restauración Área (ha)	Aspiración de rehabilitación (ha)	Porcentaje del área bajo uso actual	Técnica de rehabilitación
NAMA GANADERIA	Pastos por debajo de 1600 m (producción de carne) y pastos por encima de 1600 m (producción de leche)	1,069,527	100,000	9%	Silvopasturas
	Pastos por debajo de 1600 m (producción de carne)		255,000	24%	Pasturas mejoradas
			100,000	9%	Enriquecimiento y regeneración pasiva en pastos abandonados (intensificación en pastos mejorados promueve el abandono de pastos)
REDD	Pastos para la producción de carne de vacuno y leche (no considerados en el NAMA Ganadero)	650,000	70,000	11%	Establecimiento de plantaciones forestales para la producción maderera
NAMA CAFÉ	Café de sombra (alrededor del 90% del área incluyendo 500-600 ha de café orgánico)	83,633	22,500	27%	Manejo de fertilizantes, uso de fertilizantes de liberación lenta para reducir la carga de P y N
	Café sin sombra (en torno al 10% del área, principalmente en el Valle Central)		2,500	3%	Sistema agroforestal y manejo de fertilizantes, plantación de árboles y uso de fertilizantes de liberación lenta
RBA	Piña, banano y palma aceitera	147,971	25,000	17%	Plantación de árboles en contorno para disminuir la erosión e incorporación de residuos de cultivos en el suelo, manejo de fertilizantes y restauración de bosques ribereños
REDD y Cluster Fo	Bosque secundario fuera de áreas protegidas	400,000	125,000	31%	Manejo de bosques secundarios para la producción de madera en áreas con riesgo previsto de deforestación
	Bosque maduro fuera de áreas protegidas (puede ser de hoja caduca, de tierras bajas y premontano, o bosque montano)	800,000	150,000	19%	Manejo de bosques maduros para la producción de madera en áreas con riesgo previsto de deforestación
			150,000	19%	Aumento del área en conservación con PSA
Total		3,151,131	1,000,000	32%	

Map of opportunities for Forest Landscape Rehabilitation in Costa Rica

3.4.3. Opportunities to restoration from large Projects

The LUCID Database has identified a total of **two restoration projects** for Costa Rica. In the next Table (Table 11) a list of the selected projects is shown.

Table 11. Projects with restoration activities in implementation/completed

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	Costa Rica executing agencies | Implementing agencies
Jesus Maria and Barranca river basins in San José & Puntarenas Province / municipalities of San Ramón, San Mateo, Esparza, Orotina, Garabito	Sixth Operational Phase of the GEF Small Grants Programme in Costa Rica (ID 9088)	GEF Fund Trust | In implementation (since 2016)	1.2.2 Reforestation and restoration campaigns implemented for riparian forests throughout the watershed, including the hedges in the lower basin native species. (Target: 120 million hectares under sustainable land management)	Implementing agencies: United Nations Development Programme Executing agencies: UNOPS
Perez Zeledon County; San Jose Province	Carbon Sequestration in Small and Medium Farms in the Brunca Region, Costa Rica (COOPEAGRI Project - COOPEAGRI is a cooperative of 10,162 farmers dedicated to agriculture activities such as coffee, sugarcane, and cattle raising) (ID 7572)	UNFCCC CDM project	Farmers associated with COOPEAGRI will introduce forestry activities in their owned farms. The project will have a total area of 892.42 ha distributed over three activities - agroforestry systems, assisted natural regeneration and forest plantations	COOPEAGRI

3.4.4. Opportunities to restoration from country and international studies

Implementation Plan for the ENREDD+

According to the Implementation Plan for the ENREDD+, there are some Policies, Actions and Measures (PAM) that are related with restoration. The **restoration of forest ecosystems and landscapes** is one of those PAM. Its goal is to increase carbon with the recovery of forest lands that were degraded in the past through reforestation with commercial purpose and by restoring degraded watersheds. A spatial analysis was carried out to evaluate the potential for multiple benefits that could be strengthened through the establishment of a program for restoration in secondary forests and bare soils. In this case, the benefits considered were: 1) mitigation of greenhouse gas emissions, 2) conservation of biodiversity, 3) support to water scarcity vulnerable communities, 4) potential for socioeconomic improvement, 5) control of soil loss due to erosion and 6) potential for governance improvements. The spatial concentration of benefits was evaluated using an overlay approach of layers. As a result, forest restoration could strengthen the provision of benefits in approximately **889,600 ha**. The **basins of Jesús María, Abangares, Grande de Tárcoles, Parrita and Tusubres** could be of special interest in this context as they were prioritized by the Strategy for the Restoration of Degraded Landscapes. The **basins** of **Tempisque and the Nicoya Peninsula**, also prioritized, cover the largest extension of areas with potential for restoration where at least one of the benefits is reported (BOX 10). Another PAM is the **promotion of low-carbon productive systems**. This PAM's goal is to promote the increase of forest C in productive lands (livestock and agricultural crops) and to avoid deforestation by economic actors whose economic benefit comes from others land uses other than conservation. One of the targets is to increase the application of Silvopastoral and Agroforestry systems by **254,923 ha** (approximately 19,300 farms). Given the importance of agroforestry in the national context, the potential convergence of multiple benefits that could be strengthened in agricultural areas to promote these practices was evaluated as part of the implementation of REDD + in Costa Rica. The benefits considered were: 1) support to water-scarcity vulnerable communities; 2) potential for socio-economic improvement; 3) control of erosion; and 4) potential for improved governance. Strengthening **agroforestry practices** could favour the provision of benefits at the national level in approximately **1,250,000 ha** (BOX 10).

3.4.5. Restoration Initiatives involving multistakeholders

Developing a sustainable wood products industry in rural Costa Rica (in the Guanacaste region)

Forestry and Climate Change Fund (FCCF) (Forest and Climate Change Fund, n.d.)[129] is working with local entrepreneur **Nestor Baltodano** and his two companies (Operaciones Forestales Sostenibles (OFS) and BluWood) to sustainably manage **400 hectares** of new secondary forests and create a thriving rural wood products economy. OFS is also protecting and restoring trees around the Guanacaste Dry Forest Conservation Area, home to 2.4% of the world's total terrestrial biodiversity. By working together, OFS and BluWood have pioneered a fair sourcing policy that ensures that forest owners receive an adequate price for their timber (Initiative 20x20, n.d.)[130].

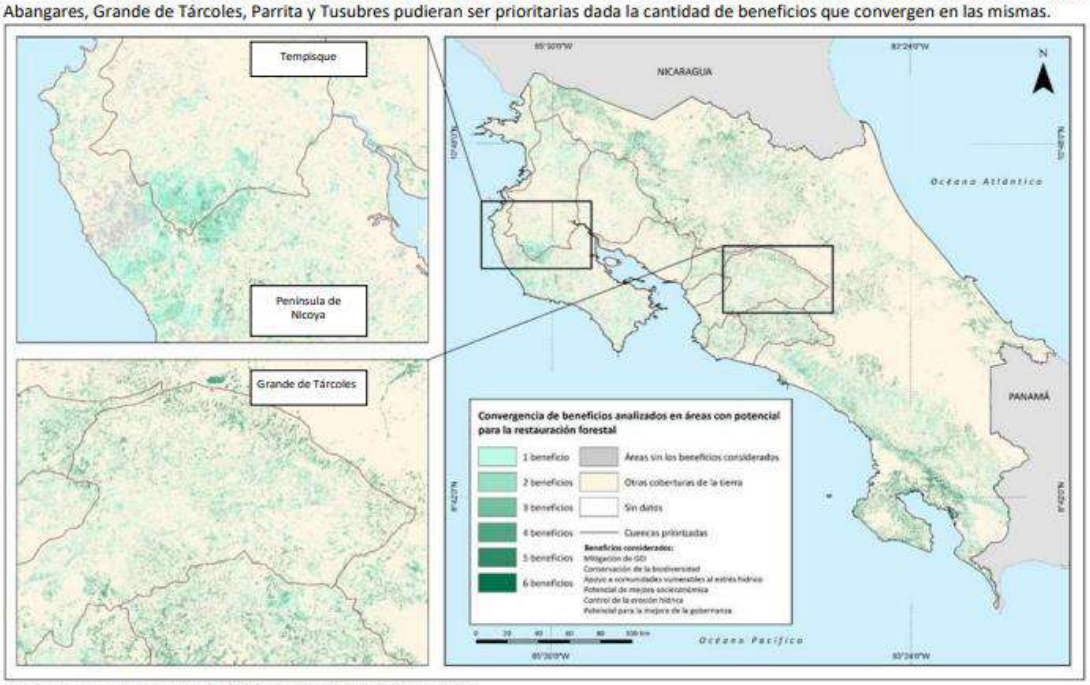
[129] Forest and Climate Change Fund. n. d. Retrieved from: https://www.forestryandclimate.com/

[130] Initiative 20x20 - Developing a sustainable wood products industry in rural Costa Rica. Retrieved from: https://initiative20x20.org/restoration-projects/developing-sustainable-wood-products-industry-rural-costa-rica

BOX 10. Maps to guide forest restoration programmes in Costa Rica in the context of the ENREDD+

Map. Convergence of prioritized benefits that could be enhanced by the establishment of a secondary forest restoration program in Costa Rica

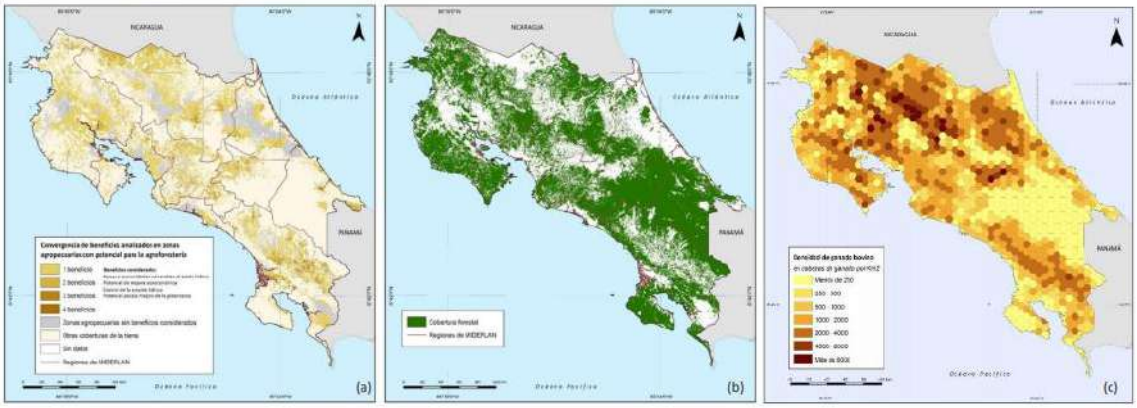
Este mapa presenta la convergencia de beneficios priorizados que podrían ser potenciados a través de la restauración de bosques en Costa Rica. El color oscuro indica zonas donde converge un mayor número de beneficios, lo cual se distribuye tanto fuera como dentro de las cuencas priorizadas por la Estrategia de Restauración del Paisajes Degradados. Dentro del conjunto de cuencas priorizadas, las cuencas de Jesús María, Abangares, Grande de Tárcoles, Parrita y Tusubres pudieran ser prioritarias dada la cantidad de beneficios que convergen en las mismas.



Fuentes de datos: WCMC-Secretaría REDD+, 2016.

Map. Convergence of prioritized benefits that could be enhanced by the establishment of agroforestry systems in agricultural areas in Costa Rica

El mapa (a) muestra el potencial para la provisión de beneficios múltiples que pudiera tener la implementación de prácticas agroforestales en zonas agropecuarias de Costa Rica. Los beneficios considerados incluyen: 1) apoyo a comunidades vulnerables al estrés hídrico, 2) potencial de mejora socio-económica, 3) control de la erosión hídrica y 4) potencial para la mejora de la gobernanza. El sombreado más oscuro indica las zonas donde convergen un mayor número de estos beneficios (hasta un máximo de cuatro). Estas áreas agropecuarias podrían ser de especial interés para la implementación de acciones REDD+ relacionadas con la agroforestería, particularmente en Brunca, Huetar Norte, Huetar Caribe y Chorotega. El mapa (b) presenta la cobertura forestal de Costa Rica. La promoción de prácticas agroforestales como parte de la implementación de REDD+ en el país pudiera contemplar el establecimiento de zonas de amortiguamiento colindantes a estos bosques para fortalecer esfuerzos de conservación de la biodiversidad. El mapa (c) muestra la densidad de cabezas de ganado a lo largo del territorio nacional.



3.5. Description of the selected country Chile

3.5.1. Country's Characterization

Commitments

Chile joined the Bonn Challenge in 2011. In the country's participation in the United Nations Climate Summit in New York on September 23, 2014, Chile president have announced the aim of recovering around 100,000 hectares of degraded soil for the next 20 years. Subsequently, at the UNFCCC Conference of the Parties (COP) in Lima, Peru, in December 2014, the President announced Chile's signature to the 20x20 Initiative with a national contribution estimated at 100,000 hectares of afforestation by 2020 (CONAF, 2015)[131]. In 2015, the government of Chile has committed a total of **500,000 hectares (until 2035)** to the Bonn Challenge (IUCN, n.d.)[132].

Policies

The protection and restoration of forest resources is one of the strategic lines of the **Chilean Forest Policy (2015-2035)**. Its goal is to conserve and increase the forest resources, to develop environmental goods and services and to restore and protect the biodiversity provided by forest ecosystem. The goal for restoration is to achieve at both 2020 and 2025 **50,000 ha** and **200 000 ha** of restored forests, respectively, with new tree and shrub cover, mainly native species, in priority areas determined by the Service State Forest (CONAF, 2016)[133].

The national strategy for REDD+ is called **Chilean Strategy on Forests and Climate** (Estrategia Nacional de Cambio Climático y Recursos Vegetacionales, ENCCRV) and aims at reducing the social, environmental and economic vulnerability generated by climate change, desertification, land degradation and drought on vegetation resources and human communities that depend on these in order to increase ecosystem resilience and contribute towards mitigating climate change, thus promoting the reduction of greenhouse gas emissions in Chile (CONAF, 2017)[134].

The ENCCRV has two main elements, the first focuses on the generation, registration and marketing of forest carbon credits that meet the international standards of the voluntary carbon market, focusing primarily on access to small and medium landowners. The second focuses on issues related to contributions to the National Inventory of Greenhouse Gases and other requirements agreed by the country, which are not related to carbon markets (IUCN, n.d.).

The established goals (Ministerio de Agricultura, n.d.)[135] of the ENCCRV for the period 2017-2025 correspond to:

[131] CONAF. 2015. Nota Informativa No. 01. "Chile's forest commitments to combat climate change and general considerations for the transfer of carbon rights". National Forestry Corporation. Retrieved from: https://www.enccrv.cl/informative-note-1
[132] IUCN. n.d. Info-FLR Chile. n.d. Retrieved from: https://infoflr.org/countries/chile
[133] CONAF. 2016. Política Forestal Chilena 2015-2035. Retrieved from: https://www.conaf.cl/wp-content/files_mf/1462549405politicaforestal201520351.pdf
[134] CONAF. 2017. Nota Informativa No. 15. "Land Restoration Project in the commune of Ovalle, Coquimbo Region within the framework of the implementation phase of the 2017-2025 National Strategy on Climate Change and Vegetation Resources (ENCCRV". Retrieved from: https://www.enccrv.cl/informative-note-15
[135] Ministerio de Agricultura. n.d. Estrategia Nacional de Cambio Climático y Recursos Vegetacionales website. Retrieved from: https://www.enccrv.cl/estructura-y-metas

- Mitigation: Reduce GHG emissions associated with degradation and deforestation by 20% by 2025, based on emissions for the period 2001-2013, as well as increase the capacity of vegetation resources as a carbon sink.
- Adaptation: Reduce the vulnerability associated with the risk of land degradation through the management of at least **264,000 hectares** of vegetation resources between 2017 and 2025. The contribution to the reduction of vulnerability will be evaluated in terms of indicators associated with biodiversity, provision of ES such as the supply and regulation of flows and water quality, as well as soil productivity.

Chile doesn't have a national long-term strategic plan for forest landscape restoration. Currently, forest restoration strategies have been carried out independently between forest companies, government agencies, and research groups (Bannister et al., 2018)[136].

Funds

The Recuperation of Native Forests Law establishes the **Fund for Conservation, Recovery, and Sustainable Management of Native Forests** (Fondo de Conservación, Recuperación, y Manejo Sustenable del Bosque Nativo), which provides competitive grants for conservation, recovery, or sustainable management of native forests. The size of the fund is determined annually as part of the national budget. The **Environmental Forestry Fund** (Fondo Forestal Ambiental) is a UNDP fund allocated to CONAF for REDD+ activities in Chile. Chile's restoration efforts are assisted by GEF grants/projects and World Bank, UNDP, and UNEP support (Initiative 20x20, n.d.)[137]. Recently Chile has signed an agreement with the Forest Carbon Partnership Facility (FCPF), a global partnership housed at the World Bank, unlocking up to $26 million to increase C sequestration and reduce emissions from forests being the first Latin American country to reach this milestone deal. With this Emission Reductions Payment Agreement (ERPA) in place, Chile is now eligible to receive results-based payments through its ambitious emission reductions program (World Bank, 2019)[138].

Investors need reliable information on costs and benefits for investment proofing and decision-making on restoration. Chile is involved in different initiatives that are helping the country to structure its database on the costs and benefits associated with natural capital conservation and restoration which will help the country to take strategic decisions related with investments. Examples are:

- The Biofin-Chile Initiative (UNDP, n.d.)
- The Economics of Ecosystems and Biodiversity related initiative of Natural Capital Accounting in Chile (UNEP, n.d.)

Technical capacity

In 2018 the ENCCRV Monitoring and Measuring System (SMM) was published and the UN-REDD national programme in Chile has been instrumental in supporting the integration of existing monitoring systems and in promoting internal consistency (UN-REDD Programme, n.d.). In terms of technical capacity, forest restoration is still an emerging discipline in Chile and only in 2015 an Ecological Restoration Network was created in Chile that included researchers, professionals and restoration practitioners. There's also a need to significantly increase the supply, diversity, and quality

[136] Bannister, Jan R., Rodrigo Vargas-Gaete, Juan F. Ovalle, Manuel Acevedo, Andrés Fuentes-Ramirez, Pablo J. Donoso, Alvaro Promis, Cecilia Smith-Ramírez. 2020. Major bottlenecks for the restoration of natural forests in Chile. Restoration Ecology Vol. 26, No. 6, pp. 1039–1044. Retrieved from:
[137] Initiative 20x20 n.d. Initiative 20x20 Chile Retrieved from: https://initiative20x20.org/regions-countries/chile
[138] World Bank, 2019. Retrieved from: https://www.worldbank.org/en/news/press-release/2019/12/05/world-bank-and-chile-sign-agreement-to-reduce-forest-emissions-improve-local-livelihoods

of native plant species in local nurseries. A deficit of 250 million native seedlings (considering at least 500 seedlings per hectare) was identified that needs to be solved to allow Chile to achieve its FLR challenges within the next few decades (Bannister et al., 2018).

Private sector engagement

Chile has a tradition of plantations with exotic species for commercial timber production which was facilitated by the application of a subsidy for forest companies that helped to stimulate the industrial forest sector in Chile, becoming the second largest national export. This incentive has promoted the conversion of native forests to exotic plantations and nowadays, in order to maintain the FSC (Forest Stewardship Council) certification, forest companies must convert over 45,000 ha of exotic plantations to native forests which represents an enormous opportunity for forest landscape restoration in the country (Bannister et al., 2018).

3.5.2. Opportunities to restoration from ROAM analyses

Chile doesn't have ROAM analyses performed nor at the national nor at the subnational level. The recent agreement with the FCPF will cover more than **15 million hectares** across six of the country's administrative regions (Araucanía, Biobío, Los Lago, Los Ríos, Maule, and Ñuble). These regions are home to 5.3 million people and encompass the area where most of the country's forest emissions are produced (World Bank, 2019).

3.5.3. Opportunities to restoration from large Projects

The LUCID Database has identified a total of 24 restoration projects for Chile. In the next Figure there's a distribution of the number of the projects per category of project area, where it's possible to see that around 80% of the projects are being implemented in areas lower than 1,000 ha (20 projects). From these 24 projects, 2 are funded by GEF, 2 are UNFCCC CDM projects and the other 20 are projects registered in the National Registry of Ecological Restoration Initiatives maintained by the Ministry of Environment.

A recent review reported that there have been circa 60 restoration experiences across different types of vegetation in Chile but that most of these efforts are small-scale experiences (i.e. <1 ha), with very few initiatives encompassing large areas (i.e. >100 ha) (Smith-Ramírez et al., 2015)[139].

[139] Smith-Ramírez C, González ME, Echeverría C, Lara A. 2015. Estado actual de la Restauración ecológica en Chile, perspectivas y desafíos. Anales del Instituto de la Patagonia 43:11 –21

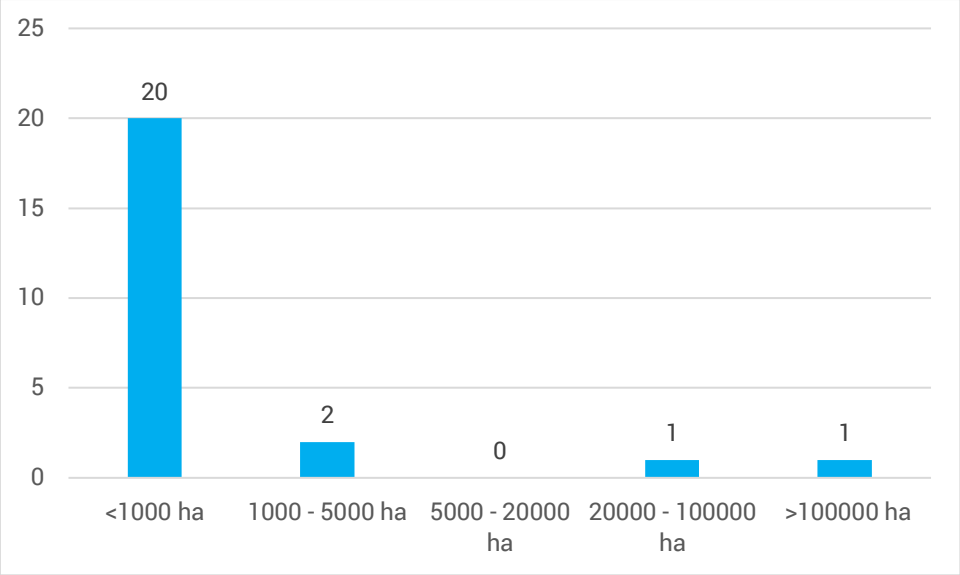


Figure 6. Number* of projects implemented in each category of area in Chile according to the LUCID Database (*this doesn't correspond to the total number of restoration projects being implemented in Chile)

In the next Table a list of the selected projects is shown.

Table 12. Selected Projects with restoration activities in implementation/completed

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	Chilean executing agencies (a) | Implementing agencies (b)
4 priority regions: (a) Central Andean Dry Puna; (b) Central Chile Matorral; (c) Winter Rainfall forest – Valdivian Temperate Rainforest; and (d) Magellanic Patagonian Steppe	Sustainable Land Management (ID 4104)	GEF Trust Fund | Project closed (2018)	Improved land management in approximately 100,000 ha: - Biological corridors established in pilot areas - Increased application of sustainable forest management practices by beneficiaries, including reforestation with native species - Restoration activities in priority biodiversity habitats	(a) Office of Agrarian Studies and Policy (Ministry of Agriculture) (b) The World Bank
Metropolitan Region of Santiago and part of Valparaiso Region	Protecting Biodiversity and Multiple Ecosystem Services in	GEF Trust Fund | Project in implementation (since 2016)	Integrated Conservation Districts for soil, forest and water implemented on 100,000 ha of	(a) Environment Ministry Chile, Sendero de Chile Foundation

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	Chilean executing agencies (a) | Implementing agencies (b)
	Biological Mountain Corridors in Chile's Mediterranean Ecosystem (ID 5135)		production /conservation pilot areas. Pilot 2: 100,000 ha (livestock, cultivation, walnut trees, and nature tourism)	(b) United Nations Environment Programme (UNEP)
- Darwin's fox in Cordillera de Nahuelbuta, including Contulmo, Los Álamos, Curanilahue and Cañete communities (Biobio Region) **- Chilean huemul in the Biosphere Reserve Nevados de Chillán that includes Antuco, Pinto and San Fabián communities (Biobio Region)** **- Keule in Talcahuano, Tomé and Curanipe communities (Biobio Region)** **- Chilean woodstar, in Camarones, Vitor, Azapa Valleys (Arica y Parinacota Region)**	Mainstreaming conservation and valuation of critically endangered species and ecosystems in development-frontier production landscapes in the regions of Arica y Parinacota and Biobío (ID 5429)	GEF Trust Fund | Project in implementation (since 2017)	300,000 ha sustainably managed landscapes including agro-ecosystems, production forests, biological corridors, and species refuges (p. 15) Implementing conservation agriculture, sustainable livestock production, sustainable timber and NTFPs, and restoration of ecosystem services in pilot areas (p. 15)	(a) Ministry of Environment and Ministry of Agriculture (National Forest Corporation - CONAF - and Livestock and Agriculture Service - SAG) (b) Food and Agriculture Organization (FAO)
core areas in O´Higgins and Los Rios	Integrated National Monitoring and Assessment System on Forest Ecosystems (SIMEF) in Support of Policies, Regulations and SFM Practices Incorporating	GEF Trust Fund | Project in implementation (since 2015)	Global Environmental Benefit Section: with the implementation of the SIMEF pilots there will be a recuperation of 100,000 ha degraded forest (after 20 years) and 1,000,000 ha (after 50 years) (p. 14)	(a) Centro de Información de los Recursos Naturales (CIREN)Corporación Nacional Forestal (CONAF); Instituto Nacional Forestal (INFOR)

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	Chilean executing agencies (a) | Implementing agencies (b)
	REDD+ and Biodiversity Conservation in Forest Ecosystems (ID 4968)			(b) Food and Agriculture Organization

3.5.4. Opportunities to restoration from country and international studies

Land Restoration Project in the commune of Ovalle, Coquimbo Region within the framework of the implementation phase of the 2017-2025 National Strategy on Climate Change and Vegetation Resources (ENCCRV)

With UN-REDD support, **ecological restoration projects** are being piloted in Cerro Blanco, Penablanca and the Andes regions (UN-REDD Programme, n.d.).

So, with the purpose of advancing in the implementation of Action Measure No.5 (MT.5) of the ENCCRV ("Strengthening of ecological restoration program in prioritized communes/areas"), CONAF designed a project "Development of a SocioEnvironmental Investment Model for the Restoration of Semi-Arid Lands in Chile" which aims to restore 200 hectares in the Agricultural Communities of Penablanca and Cerro Blanco, located in the commune of Ovalle within the Coquimbo Region. The Coquimbo Region has 2.2 million hectares in n the severe land degradation category, covering 50% of the regional surface area (CONAF, 2017).

The objective of the project is to lay the foundations that allow communities to approach an investment model and promote the recovery of the ecosystem balance in the intervention sites through different techniques, the construction of soil conservation works, the exclusion of exotic herbivorous animals, afforestation and revegetation ideally with native species, and to monitor medium term actions (CONAF, 2017). The program aims to train 3,000 people by 2020 and 8,000 by 2025 on climate change, biodiversity, desertification, land degradation and drought. This project is framed within the partnership established between CONAF and the UN-REDD Program and includes the technical and financial contribution of the CBD Secretariat, in cooperation with FERI, sponsored by the South Korean Government.

In Cerro Blanco, Chile has been supporting the participation of women farmers in ecological restoration activities. A group of 20 women from the Ovalle community were trained in ecological restoration activities not traditionally undertaken by women. Based on these early successes, UN-REDD technical support focuses on replicating these experiences in other parts of the country, providing financial incentives through PES and developing proposals to update the annual workplans for the regions, with the objective of ensuring budget allocation for gender-related activities (UN-REDD Programme, n.d.).

Identification of areas for the restoration of native vegetation affected by megafires 2017, in the Biobío Region

In 2017 Chile has faced a catastrophe that had a negative effect on its vegetation. The mega-fire that occurred that year affected 599,494 ha of exotic plantations and vegetation native, between the regions of Valparaíso and Biobío (CONAF, 2020)[140]. The BioBio region established a strategy of FLR which will allow to reduce short-term environmental problems caused by the mega fire and initiate a restoration process of the vegetation.

A map with the priorities for restoration at the regional scale was developed, based on ecological criteria: irreplaceability, representativeness and vulnerability; in addition to social criteria: provision of ecosystem services (regulation of water flows). This map allows evaluating whether the areas affected by the megafire effectively correspond to priority areas to restore in the region and to take into consideration other areas for future decisions in the management of vegetation resources. Other set of criteria were established to develop a map with the priorities of restoration at local scale: (i) Environmental relevance: Areas close to water courses or identified in strategic areas of a basin hydrographic; (ii) Ecological relevance: Presence of threatened species in the forest fragment and within a radius of 200 m around it; (iii) Cultural relevance: proximity to populated areas, evaluated within a radius of 2 km; and (iv) Threats and / or degradation: Frequency of fires in the site in the last 10 years.

In terms of results, the map with the priorities for restoration at regional scale indicates that the **highest priority of restoration** is concentrated in the **coastal area of the Region of the Biobío**. Through cartographic analysis, the surface with native vegetation affected by the megafire of 2017 corresponds to 6,290 hectares, which are distributed in 1,074 fragments scattered in the landscape that were then characterized based on prioritization criteria. A total of **15 priority areas** were identified as having the greatest opportunity to restore native vegetation and contribute to maintaining and / or recovering the associated ecosystem services (BOX 11).

3.5.5. Restoration Initiatives involving multistakeholders

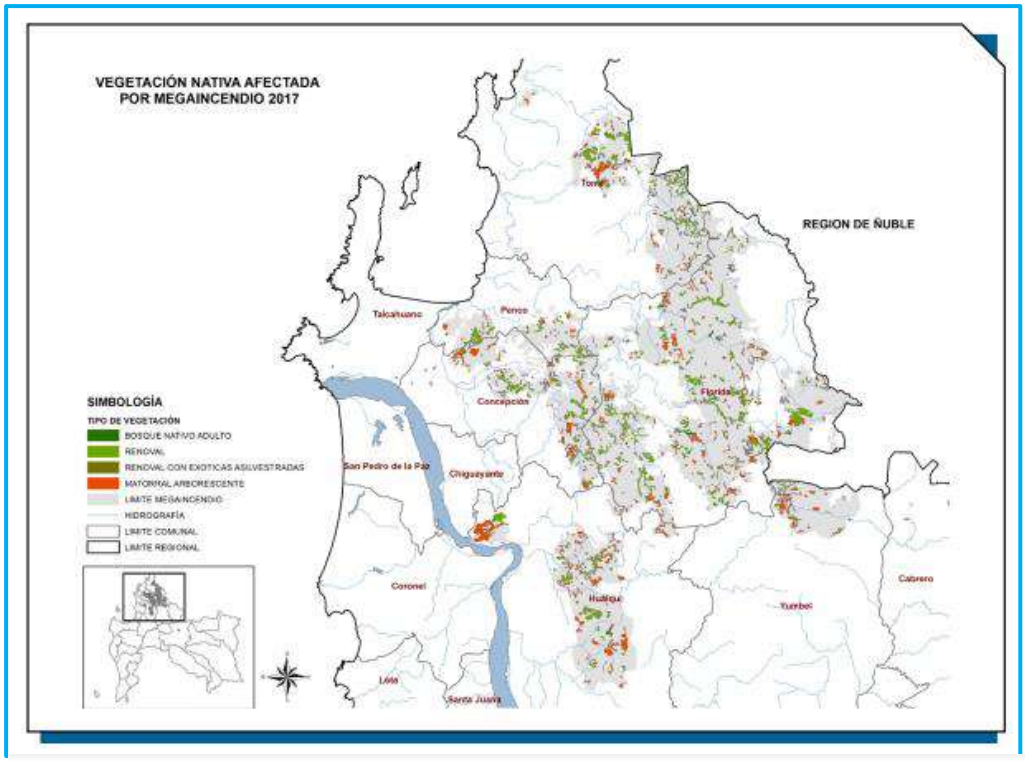
Ecological Restoration in the Chacabuco Valley (Patagonia)

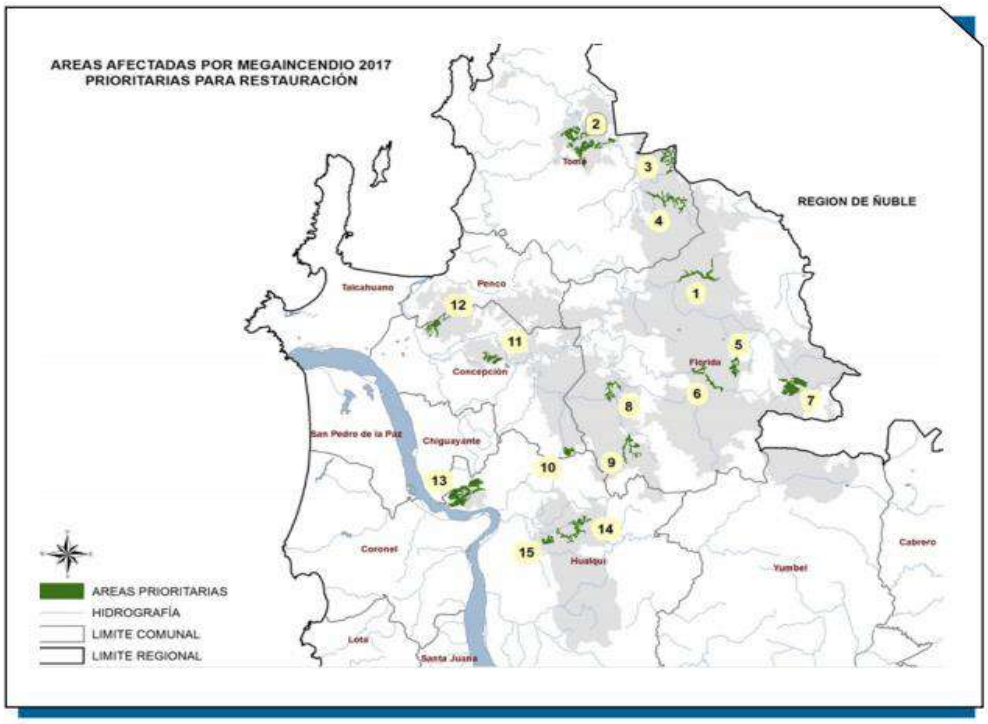
In Chile's Patagonia region grasslands were severely degraded but in 2004 **Fundación Patagonica** has purchased a **69,000-hectare farm** known as Estancia Valle Chacabuco, located in Chile's Aysén region and nowadays manages and recovers **81,000 hectares**. Collaboration among Conservacion Patagonica, the Conservation Land Trust, Fundación Pumalin, Fundación Yendegaia and the Foundation for Deep Ecology has promoted the adoption of advanced sustainable agriculture, the development of local communities and a culture of activism that inspires local people and tourists to respect and defend wildlife (Initiative 20x20, n.d.)[141].

[140] CONAF. 2020. Nota Informativa No. 36 National Forestry Corporation. Identificación de áreas para la recuperación de vegetación nativa afectada por megaincendio 2017, en la Región del Biobío. Retrieved from: https://www.enccrv.cl/nota-informativa-36

[141] Initiative 20x20. n.d. Initiative 20x20 website. Ecological Restoration in the Chacabuco Valley. Retrieved from: https://initiative20x20.org/restoration-projects/ecological-restoration-chacabuco-valley

BOX 11. Results for the priority areas to restore in the in the Biobío Region





The **Protecting Mountain Biological Corridors** project is supporting local communities to work with native animal species to control pests and restore more drought-tolerant native trees. This project is run by Chile's Ministry of Environment and funded by the Global Environment Facility (GEF).

Ecosystem Restoration Programme Cayumanque

Funded by the Chilean Government, the Ecosystem Restoration Programme Cayumanque raises awareness among the general public in rural communities and cities about how nature can help people adapt to climate change and provide multiple ecosystem services. The project also nurtures local champions for nature-based solutions (Hou Jones, 2019)[142].

[142] Hou-Jones, X. 2019. Nature-based solutions to climate change: stories from Chile. IIED. Retrieved from: https://www.iied.org/nature-based-solutions-climate-change-stories-chile

3.6. Description of the selected country Argentina

3.6.1. Country's Characterization

Commitments

Argentina joined Initiative 20x20 with an ambition to restore **1 million hectares** through the leadership of the Secretary of Environment and Sustainable Development. The government of Argentina announced its contribution to the Bonn Challenge in 2015. A total of **1,000,000 ha** was committed by the country, a goal to achieve until 2020 (IUCN, n.d.)[143]. In terms of national restoration targets, the National Program for the Protection of Native Forests (*Plan Nacional de Protección de Bosques Nativos - PNPBN*) proposes to develop a program for a first period of six years (2018-2023) in order to reach the goal of 18,000 hectares of native forest restored by 2023 (Gobierno de Argentina, 2018)[144].

Recently the country launched the **ForestAr 2030 Initiative** (Gobierno de Argentina, n.d.)[145], whose objective is to accelerate investments in reforestation and reach the goal of **2 million hectares by 2030**. Alongside the launching of the ForestAr 2030 Initiative, Argentina also set the goal of reaching **20,000 annual hectares of native forest restored** by 2023 in its National Forest Restoration Plan (UN-REDD Programme, n.d.)

Policies

The **Law 26.331** on Environmental Protection of Native Forests (*Presupuestos Mínimos de Protección Ambiental de Bosques Nativos*) is the main law for combating deforestation in Argentina. Due to its implementation, the deforestation rates have fallen significantly since 2010. According to the Biennial Update Report (BUR) a decrease in deforestation rates from 375,000 hectares in 2010 to 185,000 hectares in 2014 was reported. Argentina's NDC unconditional goal is "not to exceed the net emission of 483 $MtCO_2$ eq. by 2030" (UN-REDD Programme, n.d.).

The REDD+ National Strategy called "**National Action Plan on Forests and Climate Change** (PANByCC)" is integrated into the country's NDCs and sets an unconditional emissions reduction target of 27 $MtCO_2eq$ and a conditional goal of 81 $MtCO_2eq$ by 2030 (UN-REDD Programme, n.d.). It aims at reducing emissions and increasing GHG captures associated with deforestation and degradation of native forests based on adequate land use planning, sustainable and competitive land use, and conservation and **recovery of productive landscape** in the mitigation agenda. One of its strategic actions is **restoration and recovery** of degraded lands (Gobierno de Argentina, 2017)[146].

Alongside the implementation of the PANByCC the country also launched the **National Forest Restoration Plan** – framed in the Forest Law – which outlines a program for an initial period of six years (2018–2023).

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[143] IUCN. n.d. Info-FLR website. Info FLR Argentina. n.d. Retrieved from: https://infoflr.org/countries/argentina

[144] Gobierno de Argentina. 2018. Plan Nacional de Restauración de Bosques Nativos (PNRBN). 2018. Retrieved from: https://www.argentina.gob.ar/sites/default/files/resumen_pnrbn.pdf

[145] Gobierno de Argentina n.d. ForestAr 2030. n.d. ForestAr 2030 website. Retrieved from: https://www.argentina.gob.ar/forestar2030

[146] Gobierno de Argentina. 2017. Plan de Acción Nacional de Bosques y Cambio Climático. Versión I - 2017. Retrieved from: http://www.fao.org/faolex/results/details/es/c/LEX-FAOC189818/

Funds

The PANByCC allocates resources to provinces for the restoration and conservation of forests under the **National Program for the Protection of Native Forests** (*Plan Nacional de Protección de Bosques Nativos - PNPBN*) and the National Fund for Enrichment and Conservation of Native Forests (*Fondo Nacional para el Enriquecimiento y Conservación de Bosques Nativos* -FNECBN). The GEF supports land restoration efforts in Argentina through projects that are implemented and supported by organizations such as FAO and UNDP (Initiative 20x20, n.d.)[147]. The PNPBN mentions also the Project "Native Forests and Community" (IBRD 8493-AR), the Project "UN-REDD" as well as other sources of financing such as contributions from International Funds, contributions from Private Sector Funds and financial schemes for loans to companies or owners (Gobierno de Argentina, 2018).

Technical capacity

The **National Monitoring System of Native Forests** was enhanced in its design and in its three main elements: national forest inventory, satellite land monitoring system and GHG-inventory. Main achievements with the support of the national UN-REDD Programme include: (1) support in the development and implementation of the Second National Inventory of Native Forests, including pilots on carbon measurement; (2) support in the strengthening of the satellite monitoring system also bringing in cutting edge technologies, specific pilots (for example on fire monitoring), and introducing for the first time the evaluation of accuracy of forest cover maps; (3) support for the development and implementation of the Early Warning System on Deforestation; (4) the development of a web platform for the National Monitoring System of Native Forests, allowing for enhanced transparency of the monitoring data; (5) support for the National Greenhouse Gas Inventory (Agriculture, Forestry and Land-use sector) and consistency between FREL and GHG-Inventory, following principles agreed by UNFCCC parties (Van der Elstraeten, 2019)[148].

Coalitions and Partnerships

ForestAr 2030 is a concerted initiative initiated in 2018 under the steer of Argentina's Secretary of Environment, set to develop a broad stakeholder vision and strategy to both conserve natural forests and create a new forest economy, to deliver on the country's commitment to reducing climate change, while positively impacting its SDG Agenda and Bonn Challenge commitments. The initiative is a multi-sectoral approach that involves partnerships among **forestry industry, civil society and government** to protect existing forests and sustainably expand forest cover, raising the agenda to public policy status (BMUB, n.d.)[149]

[147] Initiative 20x20. n.d. Initiative 20x20 website. Argentina. Retrieved from: https://initiative20x20.org/regions-countries/argentina#:~:text=Argentina%20joined%20Initiative%2020x20%20with,for%20forests%20and%20forestry%20plantations.

[148] Van der Elstraeten, A. 2019. Celebrating UN-REDD and REDD+ Achievements in Argentina. Part 2: Strengthening the National Monitoring. UN-REDD Programme Newsletter. Retrieved from: https://www.un-redd.org/post/2019/08/20/celebrating-un-redd-and-redd-achievements-in-argentina

[149] BMUB. n.d. International Climate Initiative (IKI) website Programa ForestAr 2030. Retrieved from: https://www.international-climate-initiative.com/fileadmin/Dokumente/2019/20190423_Amendment_Funding_Information_ARG.pdf

Figure 7. ForestAr 2030 multi-sectoral approach

3.6.2. Opportunities for restoration from ROAM analyses

Argentina doesn't have ROAM analyses performed at the national or at the subnational level. In a preliminary analysis of potential areas for restoration, the PNRBND has identified six main areas comprising several provinces and covering six regions: **Espinal, Monte, Parque Chaqueño, Selva Misionera, Yungas and Andean-Patagonian Forest** (Gobierno de Argentina, 2018). In the following Table the detailed information about the areas prioritized can be found. In the document is also possible to have access to the main restoration and land management actions recommended for each region.

Table 13. Preliminary analysis of potential areas for restoration in Argentina (Gobierno de Argentina, 2018)

Region	Potential Area for Restoration (ha)	Degradation Drivers
NUCLEO 1: Yungas y bosque pedemontano province of Jujuy	2,734,437	Main: Advance in agricultural frontier Others: Extensive livestock, fires, non-sustainable forest use
NUCLEO 2: Corredor Yungas – Chaco Seco province of Salta	6,175,698	Main: Advance in agricultural frontier Others: Extensive livestock, fires, non-sustainable forest use
NUCLEO 3: Cuenca Salí-Dulce provinces of Tucumán, Catamarca and Santiago del Estero	2,922,289	Main: Advance in agricultural frontier Others: Extensive livestock, fires, non-sustainable forest use
NUCLEO 4: Monte y Espinal provinces of Mendoza, San Luis, Córdoba and La Pampa	5,000,000	Main: Non-sustainable forest use, overgrazing, fires, advance of the agricultural border Others: Extreme climatic conditions, urbanization and infrastructure
NUCLEO 5: Bosque Andino-patagónico provinces of Neuquén, Rio Negro, Chubut, Santa Cruz and Tierra del Fuego	6,486,075	Main: forest fires Others: Extensive livestock, invasive species, urban expansion

NUCLEO 6: Selva Misionera Provience of Misiones	825,958	Main: Advance in agricultural frontier (annual crops, yerba mate and forestation with exotic species) Others: Non-sustainable forest use, overgrazing
TOTAL AREA (ha): 24,144,457		

In the case of Nucleo 5, a total of 75.269 ha was further identified as the priority area for restoration, divided by the provinces of Neuquén (1,523 ha), Río Negro (5,422 ha), Chubut (53,439 ha), Santa Cruz (2,952 ha), Tierra del Fuego (4,607 ha) and APN (7,325 ha) (Gobierno de Argentina, 2018)

3.6.3. Opportunities to restoration from large Projects

The LUCID Database has identified a total of **3 restoration projects** for Argentina: a GEF-funded one, a UNFCCC CDM project and a private company funded project. In the next Table a list of the selected projects is shown.

Table 14. Projects with restoration activities in implementation/completed

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	Argentinean executing agencies | Implementing agencies
Patagonia	Sustainable Management of Arid and Semi Arid Ecosystems to Combat Desertification in Patagonia (ID 2379)	GEF Trust Fund | Closed (in 2016)	Results achieved: a) 358 MARAS (Systems of environmental management) were established at the end of the project in the provinces of Chubut Trelew (49), La Pampa (12), La Rioja (4), Neuquen (39), Rio Negro (78), Santa Cruz (128), Tierra del Fuego (1) and Chubut Esquel (47) b) 150.000 hectares of pilot sites of National Institute of Agricultural Technology (INTA) were monitored where MST practices were carried out.	Executing agencies: Secretaria de Ambiente y Desarollo Sustentable (SAyDS) and the Secretaria de Agricultura (SAGPyA) Implementing agencies: United Nations Development Programme
Pampa, Patagonia	OVIS21 (Initiative 20x20)	In implement ation	The company manages a network of more than 60 field professionals and 160 farms that cover the Argentinean and Chilean Patagonia and other	OVIS21 - a company that regenerates degraded grasslands and

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	Argentinean executing agencies | Implementing agencies
			livestock producing areas like the pampas region of northeast Argentina and Uruguay in a total of more than 500,000 hectares of well-managed land. In collaboration with Initiative 20x20 partner The Nature Conservancy, Ovis 21 developed the GRASS Standard for sustainable rangeland management, which currently has 1.3 million hectares under certification.	protects biodiversity so Patagonia's land can sustain people, their businesses and communities.

3.6.4. Opportunities for restoration from country and international studies

Project "Native Forests and Community"

Project "Native Forests and Community" (IBRD 8493-AR) seeks to strengthen livelihoods of local communities in their territories helping to combat forced-migration through land management planning, capacity-building processes, promotion of sustainable production, enhanced access to water and support to product marketing. Integral Community Plans (PICs) are prepared in a participatory manner for each project intervention to arrive at a territorial management plan with a broad base of agreements that avoids negatively affecting the livelihoods of local and indigenous communities. This long-term project has provided MAyDS and sub-national agencies with important inputs and capacities in participatory processes with indigenous and other forest-dependent communities. At present, there is a portfolio of 80 PICs covering more than **400,000 ha** and approximately 2,500 families of indigenous peoples and local communities in departments with more needs of Chaco, Salta and Santiago del Estero provinces. The average forest cover in these PICs territories is 90%, with management units of approximately 6,000 ha administered, on average, by more than 30 families (FAO, 2020)[150].

Restoration of drylands in Patagonia

The Patagonia region of Argentina has 78.5 million ha of arid and semi-arid ecosystems, of which 73.5 million (93.6%) are suffering a desertification process by cattle ranching and hydrocarbon

[150] FAO. 2020. Annex to the Funding Proposal Argentina REDD-plus RBP for results period 2014-2016 within the framework of the GCF Pilot Programme for REDD+ Results-based Payments. 01 October 2020. Retrieved from: http://www.fao.org/3/cb1395en/cb1395en.pdf

extraction activities (Busso & Perez, 2019)[151]. In the recent years several interventions have been made including disturbance control for grassland recovery, transplanting of topsoil and soil amendment techniques, direct seedling and plantation. A process to consolidate sustainable productive units aiming to resolve the drivers of the initial arid zone degradation and provide ecological literacy to the local community was also developed showing the importance of local communities' involvement and participation. Socio-Productive Environmental Units (USPAS) were implemented on a pilot scale in severely degraded areas which have implied the formulation of joint working plans between three components: Municipalities or local development commissions, local producers (livestock or equivalent) and schools (Busso & Perez, 2019).

[151] Busso, C. A. & D. R. Pérez. 2019. Opportunities, limitations and gaps in the ecological restoration of drylands in Argentina. Annals of Arid Zone 57:191-200. Retrieved from: https://www.researchgate.net/publication/332246759_Opportunities_Limitations_and_Gaps_in_the_Ecological_Restoration_of_Drylands_in_Argentina

3.7. Description of the selected country Peru

3.7.1. Country's Characterization

Commitments

Peru joined Initiative 20x20 in 2014 with a pledge by the Directorate General of Agricultural Environmental Affairs (Dirección General de Asuntos Ambientales Agrarios) to restore **3.2 million hectares** of degraded land (Initiative 20x20, n.d.)[152].

Of these 3.2 million hectares, 2 million are to be restored through sustainable commercial exploitation under Peru's National Forest Service (SERFOR). To this end, SERFOR promotes the national pact Madera Legal, the Forestry Development Fund (*Fondo Fomento Forestal*), and the National Program for the Promotion of Timber Plantations (*Programa Nacional de Promoción de Plantaciones Forestales con Fines Maderables*). The remaining 1.2 million ha is degraded land to be recovered for productive use under the Directorate General of Agricultural Environmental Affairs (DGAAA). Peru has established an INCD of 30% in emissions reduction in 2030, from which 67% corresponds to the LULUCF (land use, land use change and forestry) (Gobierno del Perú, 2015)[153].

Policies

In the last ten years there were several developments in the policy framework related with Forest Management and Climate Change. Both Ministry of Environment (MINAM - *Ministerio del Ambiente*) and Ministry of Agriculture (MINAGRI - *Ministerio de Agricultura y Riego*) are the leading government institutions in these subjects (Ministerio del Ambiente del Perú - MINAM, 2018)[154]. The National Program for the Conservation of Forests for the Mitigation of Climate Change - PNCBMCC (in charge of MINAM) and the SERFOR (MINAGRI's agency) have been designated as leading institutions for the development of several plans, programmes and projects in both areas.

In 2015 a **National Plan for the Recovery of Degraded Areas** (PN-RAD named *PRO REST - Programa Nacional de Restauración de Ecosistemas y Tierras Degradadas*) started to be developed in a process coordinated by SERFOR and a Technical Commission for the Recovery of Degraded Areas was created. This Technical Commission integrates the public and private sector and aimed to support the generation of information and formulation of strategies for the recovery of degraded areas (IUCN, 2018)[155]. The application of the ROAM analysis is one of the inputs for the plan in development. Another input for the Plan was a cost-benefit analysis study to consider the costs and benefits associated with the different FLR activities (UICN, 2018)[156].

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[152] Initiative 20x20. n.d. Initiative 20x20 website. Peru. Retrieved from: https://initiative20x20.org/index.php/regions-countries/peru

[153] Gobierno del Peru. 2015. INFORME FINAL COMISIÓN MULTISECTORIAL - Resolución Suprema N° 129-2015-PCM. Retrieved from: http://www.minam.gob.pe/wp-content/uploads/2015/12/Informe-T%C3%A9cnico-Final-CM-_-R-S-129-2015-PCM_Secretar%C3%ADa-T%C3%A9cnica-18-09-2015-vf.pdf

[154] Ministerio del Ambiente – MINAM. 2016. Estrategia Nacional sobre Bosques y Cambio Climático. Retrieved from: http://www.bosques.gob.pe/archivo/ff3f54_ESTRATEGIACAMBIOCLIMATICO2016_ok.pdf

[155] IUCN. 2018. Issues Brief - Lecciones aprendidas y recomendaciones a partir del proceso ROAM en Perú. Retrieved in: https://infoflr.org/sites/default/files/2020-04/brief_peru_rpf.pdf

[156] UICN, 2018. Análisis Costo-Beneficio de la restauración de paisajes forestales en Perú. Quito, Ecuador: UICN-América del Sur. 28 p. Retrieved from: https://infoflr.org/sites/default/files/2020-04/flr_peru_analisis_economico_flr.pdf

The National REDD+ Strategy is called **National Strategy on Forests and Climate Change** (Estrategia Nacional sobre Bosques y Cambio Climático - ENBCC) and was published in 2016 by the Decree Number 007-2016-MINAM, having both PNCBMCC and SERFOR as the leading institutions. It aims at reducing emissions from deforestation and degradation of natural forests, in addition to promoting the conservation of C forest reserves, increasing C forest stocks and managing sustainable development of forests. This strategy is aligned with the National Strategy on Climate Change (Estrategia Nacional ante el Cambio Climático).

The next table shows the main policy framework in Peru related with Forests and Climate Change developed along the last years.

Table 15. Policy Framework in Forests and Climate Change (Ministerio del Ambiente del Perú - MINAM, 2018)

Year	Policy
2009	Action Plan for Climate Change Adaptation and Mitigation (*Plan de Accion de Adaptacion y Mitigacion frente al Cambio Climatico – PAAMCC*)
2010	Forest Conservation National Program for the Mitigation of Climate Change (*Programa Nacional de Conservacion de Bosques para la Mitigacion del Cambio Climatico*)
2013	National Forest and Wildlife Policy (*Ley Forestal y de Fauna Silvestre*) (Decreto Supremo Nº 009-2013-MINAGRI)
2014	National Strategy of Biological Diversity y Action Plan (*Estrategia Nacional de Diversidad Biologica y Plan de Accion 2014-2018*)
	Law on Compensation Mechanisms for Ecosystem Services (*Ley de mecanismos de retribuiccion por servicios ecosistémicos*)
2015	National Strategy on Climate Change (*Estrategia Nacional ante el Cambio Climático*) (Decreto Supremo N°011-2015-MINAM)
	INDC
2016	National Strategy on Forests and Climate Change (*Estrategia Nacional sobre Bosques y Cambio Climático - ENBCC*)
In development since 2015	National Plan for the Recovery of Degraded Areas (PN-RAD named PRO REST - Programa Nacional de Restauración de Ecosistemas y Tierras Degradadas)

Funds

Peru has plenty of **public funds** available to support FLR investments. The National Fund for Protected Areas (**Profonanpe**) provides grants to project developers in sustainable forestry and conservation and is financed by a GEF grant and government funds. The Forest Conservation National Program for the Mitigation of Climate Change (Programa Nacional de Conservación de Bosques para la Mitigación del Cambio Climático) also provides incentives for forest conservation. IKI is a major supporting partner of FLR in Peru.

In terms of private investments, the **Althelia Climate Fund** has invested in several FLR projects across Peru, focusing on restoration of degraded lands in national park buffer zones with shade coffee and

cocoa systems. **Root Capital** is also an active investor in shade coffee restoration and other FLR projects (Solymosi, 2019)[157].

Coalitions and Partnerships

A **public-private coalition for deforestation-free commodities** has been established and is under implementation through a multi-stakeholder process, under the collective leadership of the Ministries of Agriculture and Environment and the Regional Governments. To date, the coalition has 37 members (public, private, and civil society members) and is targeting efforts on the implementation of the National Coffee and Cocoa Plans among other commodities, as well as in the construction of a portfolio of jurisdictional initiatives to be supported and accelerated. The Tropical Forest Alliance (TFA) is being engaged in the coalition as well (ASL, 2019).

A detailed roadmap to formulate a National Development Plan for the Cocoa and Chocolate Value Chain has been defined under the **Global Green Commodities Program (GCP).** GCP is a multi-stakeholder dialogue platform, under the leadership of the Ministry of Agriculture (ASL, 2019).

Investors need reliable information on costs and benefits for investment proofing and decision-making on restoration. Peru is involved in different initiatives that are helping the country to structure its database on the costs and benefits associated with natural capital conservation and restoration which will help the country to take strategic decisions related with investments. Examples are:

- The Biofin-Peru Initiative (UNDP, n.d.)
- The pilot in Natural Capital Accounting in San Martin through the WAVES partnership (World Bank, n.d.-a)

Technical capacity

In 2018 SERFOR started to develop a protocol for defining the organizational structure of the **National Forestry and Wildlife Information System (SNIFFS)** and its modules, including the forest-cover monitoring module with the support of the UN-REDD Programme.

3.7.2. Opportunities to restoration from ROAM analyses

In Peru, with the support of IUCN, the ROAM analysis was applied in 2016 at the subnational level to support the planning process for the restoration and degraded areas recovery in the country, with the selection of five departments: one in the region of Sierra (**Apurímac**) and 4 in the Amazon region (**Amazonas, Madre de Dios, San Martín y Ucayali**) (Yalle, Sara y McBreen, 2018)[158]. The ROAM application in Peru has been led by SERFOR, with the support of Regional Governments, and multiple actors from the public, private and society sectors. Following several workshops to identify the purpose of restoration in each of the 5 departments and the criteria to be used to prioritize the areas, maps of priority areas were developed along with the intervention strategies. A total of **1,265,518 ha**

[157] Solymosi. K.2019. Upscaling private Forest landscape restoration investments in latin America. Retrieved from: https://www.flila.org/wp-content/uploads/2020/03/2019-02-25-FLR-Peru-Web.pdf

[158] Yalle, Sara y McBreen, James. 2018. Experiencias de la restauración del paisaje forestal con aplicación de ROAM en Perú. Quito, Ecuador: UICN-América del Sur. 30 p. Retrieved from: https://www.iucn.org/sites/dev/files/content/documents/flr_peru_experiencias_roam.pdf

was prioritized for restoration in the five departments (BOX 12). The results for the five departments are shown in the next Table.

Table 16. Results of ROAM application at the subnational level (Yalle, Sara y McBreen, 2018)

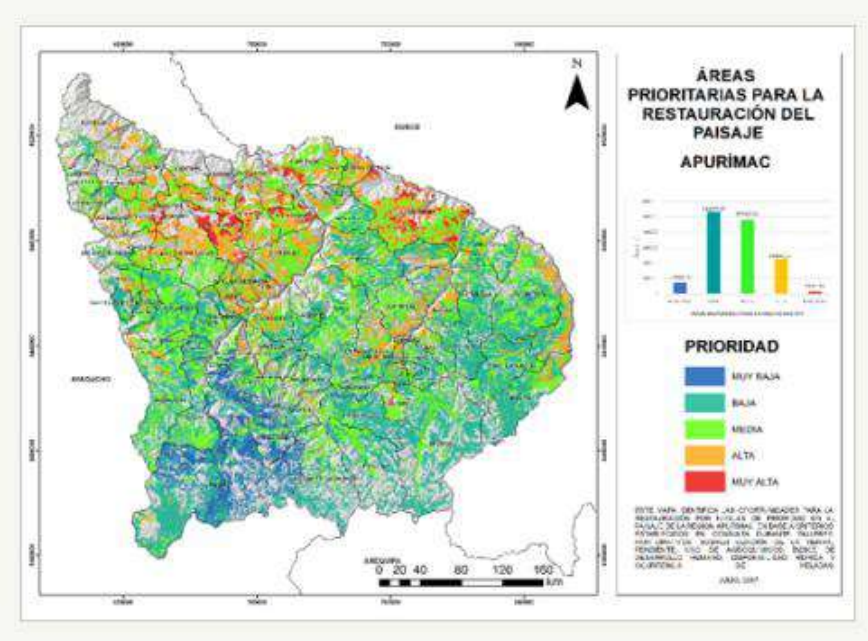
Department	Department's total area (ha)	Area of high and very high priorities for restoration (ha)	Main intervention strategies for landscape restoration
Apurimac	2 089 579	**244,307**	reforestation, plantations with exotic species, closure of pastures, rotational grazing, enrichment, crop rotation, forest fire prevention and agroforestry
Amazonas	4 205 038	**308,826**	reforestation with native species, plantations with exotic species, closure of temporary pastures, rotational grazing, enrichment with desired species, crop rotation and fire prevention forestry
Madre de Dios	8 530 123	**152,307**	agroforestry, agrosilvopastoral systems, perennial crops, forest management, natural regeneration
San Martín	5 125 331	**300,917**	reforestation with native species, plantations with exotic species, closure of temporary pastures, rotational grazing, enrichment with desired species, crop rotation and forest fire prevention
Ucayali	10 241 055	**259,161**	agroforestry, management and recovery of wetlands, silvopastoral, forest plantations, enrichment in strips and natural regeneration
Total area prioritized for restoration (ha):			**1,265,518**

Moreover, ICRAF, National Forestry and Wildlife Service and IUCN were responsible for the application of ROAM in the Padre Abad province, located in central Amazon region of Ucayali. After mapping the degraded areas and prioritising zones in Padre Abad Province, a total of **78,510 ha** was identified as having potential to implement selected practices for FLR, grouped according to: (1) practices aimed at restoration/protection; (2) practices oriented to forestry production; and (3) practices focused on agricultural production (IUCN, 2020c; Quiñones et al., 2018)[159][160].

[159] IUCN. 2020. Peru ROAM Country Brief. Retrieved from: https://infoflr.org/sites/default/files/2020-08/roam_country_brief_peru_post.pdf

[160] Quiñones L., Reyes M., Chero J., Valverde J., Suber M., Blare T. and Robiglio, V*. 2018. Opciones de restauración del paisaje forestal en Padre Abad: implementación de ROAM a nivel subnacional como insumo a la formulación de una estrategia de restauración. Lima, ICRAF: Oficina Regional para América Latina. Retrieved from: https://infoflr.org/sites/default/files/2020-04/forest_landscape_restoration_opportunities_in_padre_abad.pdf

BOX 12 . Results of ROAM application at the subnational level in Peru for the Apurimac Department



From this first effort, SERFOR has promoted the development of maps of restoration opportunities and priority areas in 17 of the 24 regions nationwide.

3.7.3. Opportunities to restoration from large Projects

The LUCID Database has identified a total of **33 restoration projects** for Peru.

In the next Figure there's a distribution of the number of the projects per category of project area, where it's possible to see that around one third of the projects are being implemented in areas higher than 20,000 ha (10 projects) whereas 50% are projects implemented in areas less than 1,000 ha (18 projects). From these 33 projects, 3 are funded by GEF, 1 is a UNFCCC CDM project, 3 are funded by FIP, 2 are funded by Althelia, 1 is supported by CIAT and the other 23 are divided between Bioversity/ICRAF/SERFOR (15 projects) and WRI-RAD (8 projects).

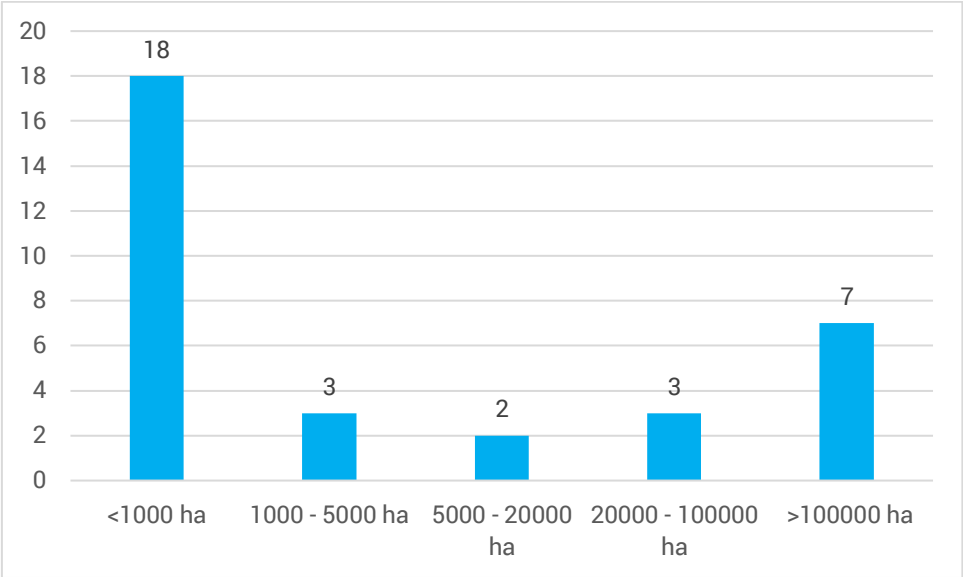


Figure 8. Number* of projects implemented in each category of area in Peru according to the LUCID Database (*this doesn't correspond to the total number of restoration projects being implemented in Peru)

In the next Table a list of the selected projects is shown.

Table 17. Projects with restoration activities in implementation/completed

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	Peru executing agencies (a) | Implementing agencies (b)
Amazon (in Peru, Brazil and Colombia) / Project sites in Peru: Eleven districts located in the regions of Ucayali and Huánuco	Amazon Sustainable Landscapes Program (ASL) [SUSTAINABLE PRODUCTIVE LANDSCAPES IN THE PERUVIAN AMAZON]	GEF Trust Fund (ID 9664) | In implementation	- Promote sustainable practices in 12,195 ha of productive landscapes - Restore 1,655 hectares of degraded lands in Peru (ASL< 2019)	(a) Ministry of Environment (MINAM) (b) UNDP
The Eastern side of the Andes, stretching from the altiplano to the lowland rainforests as far as the Brazilian border. The Southwest Amazon moist forest ecoregion; The Peruvian yungas ; The Central Andean puna ecoregion [The Eastern side of the Andes, stretching from the altiplano to the lowland rainforests as far as the Brazilian border. The Southwest	Transforming Management of Protected Area/Landscape Complexes to Strengthen Ecosystem Resilience	GEF Trust Fund (ID 5080) | In implementation (since 2014)	Output: CC-resilient sustainable forest management practices which allow effective conservation of forest ecosystems in the landscape (yungas and southwestern amazon moist forest), including: - Low impact production systems (e.g. Climate resilient shade coffee, Sustainable management of forests for non-timber forest products, Integrated fire management, - Enrichment planting and/or selective thinning to maintain ecosystem structure and connectivity	(a) Ministry of Environment (MINAM) (b) UNDP

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	Peru executing agencies (a) | Implementing agencies (b)
Amazon moist forest ecoregion; The Peruvian yungas ; The Central Andean puna ecoregion]				
National Reserve of Tambopata and the National Park of Bahuaja-Sonene / municipality of Madre de Dios	Tambopata-Bahuaja REDD+ and Agroforestry Project	Althelia Climate Fund (ACF) + Peru-U.S. debt swap fund 'Fondo de las Americas' (FONDAM)	a) restoration of 4,000 hectares of degraded land in a buffer zone around the 2 parks through improved agroforestry systems that aim to produce fine aromatic 'deforestation-free' cacao and improve the livelihoods of the farming communities	Partners: Althelia, Asociacion para la Investigacion y el Desarrollo Integral (AIDER) e SERNANP
At the intersection of the Andes mountain range and the Amazon Basin / Cordillera Azul National Park	Cordillera Azul National Park REDD+ Project	Althelia Climate Fund (ACF)	a) restore degraded lands with agroforestry systems (cocoa & coffee) in the buffer zone (**3.7 million hectares**) relied upon by small farmers and local communities for their livelihoods	National Service of Protected Areas-SERNANP, Centro de Investigación y Manejo de Áreas Naturales–CIMA Cordillera Azul and Althelia
Apurimac (Chincheros, Andahuaylas, Aymaraes, Abancay, Grau,Cotabambas y Antabamba), Yungas and PuN/A in the High Andes	Bosques manejados Sacha Tarpuy para recuperación de servicios ecosistémicos (20x20 Initiative)	Bioversity/ICRAF/SERFOR	a) to plant about **29,731.50 ha** under systems of massif plantations, agroforestry, silvopastoral and protection systems. [In July 2017: total of 15,643 ha planted	COSUDE, HELVETAS Swiss Inter cooperation, CONDESAN and Gobierno Regional de Apurímac.
Alto Amazonas province / The departments of San Martín and Loreto. Provinces of Lamas, San Martín, Yurimaguas and	Integrated forest landscape management along the main route between Tarapoto and	FIP	Component 3: Enhancement of the value of environmental assets of forests and degraded areas - Measures taken under this component will be designed to increase the competitiveness and sustainability of forest	Leading institutions: Ministry of the Environment (MINAM) and the Inter-American Development Bank (IDB)

Region/ Province	Project's name	Funding source | current phase	Restoration targets established	Peru executing agencies (a) | Implementing agencies (b)
Balsapuerto. / Bi-regional main route from Tarapoto to Yurimaguas. Tarapoto – Yurimaguas área (1,200,000 hectares)	Yurimaguas in the Regions of San Martín and Loreto		resource use, contribute to recovery of degraded and reforested forests and agroforestry systems and promote ecotourism activities with native communities and agricultural producers.	Executing institutions: MINAM + regional governments of San Martín and Loreto
Ucayali region; Atalaya Province/ district of Raymondi - 1,235,074 hectares (31% of Atalaya province)	Forest Planning and Management to prevent deforestation and illegal logging in Atalaya, region of Ucayali	FIP	Component 3: Enhancement of the value of the environmental assets of forests and degraded areas - The action taken under this component will be oriented toward making sustainable forest resource use more competitive by helping to establish agroforestry systems and promote other activities amenable to native communities and small producers, in collaboration with suitable business partners.	Leading institutions: MINAM, World Bank (BM) Executing institutions: MINAM + Ucayali regional government
Madre de Dios / Along the main route from Puerto Maldonado to Iñapari (1,776,181 hectare)	Integral forest landscape management on the main route between Puerto Maldonado and Iñapari and in the Amarakaeri communal reserve and beneficiary communities of the Madre de Dios region	FIP	Component 3: Enhancement of the value of the environmental assets of forests and degraded areas - The action taken under this component will be oriented toward making sustainable forest resource use more competitive by helping to establish agroforestry systems and promote other activities amenable to native communities and small producers, in collaboration with suitable business partners.	Leading institutions: Ministry of the Environment (MINAM) and the Inter-American Development Bank (IDB) Executing institutions: MINAM + regional government of Madre de Dios

In terms of results achieved, the ASL project reported that the planning and governance processes in Ucayali are being supported. The support includes the provision of technical assistance to incorporate environmental and sustainability issues and to develop environmental indicators. By supporting the integration of these elements into the Regional Development Plan for Ucayali, at least **1,135,507 hectares** will benefit from instruments and improved planning frameworks which include environmental and sustainability issues and indicators. Similarly, **1,021,341 hectares** in Puerto Inca in Huánuco will benefit from improved management through forest zoning (ASL, 2019)

3.7.4. Restoration Initiatives involving multistakeholders

IKI Funded Project "Upscaling of private FLR investments in Latin America"

Peru is one of the countries where the project "*Upscaling of private FLR investments in Latin America*" (BMUB, n.d.)[161] is being implemented (03/2019 until 02/2022) by **UNIQUE forestry and land use GmbH**. With the partnership of the Ministry of Agriculture and Irrigation (MINAGRI) of Peru, the project has the objective to help countries meet their Forest Landscape Restoration targets and commitments made under the Paris Agreement. It aims at helping investors developing viable projects, monitoring the positive impacts and delivering technical assistance to farmers implementing restoration activities. A FLR Impact Framework (methods + instruments) was developed which enables cost-effective monitoring and transparent reporting of environmental and social impacts of FLR projects based on the requirements of investors. The framework will be tested and applied to relevant credit products (e.g. for sustainable coffee production, or silvo-pastoral systems), a project pipeline and pilot investments in Peru, El Salvador and Paraguay. According to the country profile of Peru, most agricultural producers are small family farms with much potential to increase production efficiency (Solymosi, 2019). **FLR investments are most promising in shade coffee, tree-based products and silvopastoral systems**. Low commercial interest rates make private investments for FLR attractive for equity investors. Peru is the world's 10th largest coffee producer and second largest in organic coffee. Sustainably grown in shade systems is a promising FLR green field investment on nonforest land or if trees are introduced into existing no-shade systems as coffee was responsible for 26% of total deforestation between 2001 and 2016. Regarding the forestry sector, it remains underdeveloped, with natural forests as the main source of timber. Replacing unsustainable wood supply from deforestation with a sustainably managed supply from plantations and well-managed natural forests is a major FLR investment opportunity.

IKI Funded Project "Utilising landscape scale forest ecosystem rehabilitation as a cost-effective bridge for the integrated deployment of national land-based mitigation and adaptation strategies"

IUCN's Project "Utilising landscape scale forest ecosystem rehabilitation as a cost-effective bridge for the integrated deployment of national land-based mitigation and adaptation strategies" (BMUB, n.d.)[162] was implemented between 2015 and 12/2018 by in seven countries including Peru. The

[161] BMUB. n.d. International Climate Initiative (IKI) website. Project "Upscaling of private FLR investments in Latin America". Retrieved from: https://www.international-climate-initiative.com/en/details/project/upscaling-of-private-flr-investments-in-latin-america-19_III_090-3034 and https://www.flila.org/#

[162] BMUB. n.d. International Climate Initiative (IKI) website. Project "Utilising landscape scale forest ecosystem rehabilitation as a cost-effective bridge for the integrated deployment of national land-based mitigation and adaptation strategies".

project has worked on Forest Landscape Restoration (FLR) in the context of the Bonn Challenge and has SERFOR and World Agroforestry Center (ICRAF) as partners.

IKI Funded Project "Restoration in supply chains from zero net deforestation to net positive action (RESUPPLY) - Catalysing private sector commitment to the Bonn Challenge"

Peru is one of the three countries where the project RESUPPLY (BMUB, n.d.; IUCN & Global Agribusiness Alliance, n.d.)[163][164] is being implemented (01/2019 until 01/2022) by **IUCN** with a BMU grant of 1.999.725,00 €. The project is designed to technically support companies and other landscape actors in identifying landscape restoration opportunities, costs and benefits in supply chains. In the country the project works with **ECOM** and other key actors in the landscape to understand degradation and to **identify restoration opportunities in the cocoa supply chain** using the Restoration Opportunities Assessment Methodology (ROAM).

The business case of interventions emerging from the ROAM process in the landscape of **San Martin** will clearly spell out socio-environmental and economic costs and benefits, trade-offs, an action plan, and an investment analysis to identify public and private funding sources for the intervention.

IUCN and the **Global Agribusiness Alliance** co-host a series of shared learning journeys with agribusinesses to solidify a **community of practice** and understanding around incorporating FLR into supply chains (IUCN & Global Agribusiness Alliance, n.d.).

The overall goal of this project is to share, communicate, and technically **support companies in implementing the FLR approach in their supply chains**. IUCN will also establish a Community of Practice on FLR in supply chains, based on the business cases and other learning experiences, with key private sector actors, to support companies with their FLR and Zero Net Deforestation initiatives in support of the Bonn Challenge.

"Implementation of the Forest and Landscape Restoration Mechanism (FLRM)" Project

Peru was one of the beneficiary countries of the project "Implementation of the Forest and Landscape Restoration Mechanism (FLRM)" (FAO, n.d.)[165] established in November 2014 with the financial support of the Korea Forest Service (KFS) of the Republic of Korea (RoK). So, between 2014 and 2020 technical assistance and monitoring actions for FLR implementation have been conducted in the country. Key achievements from 2016 to 2018 were: (a) Support the process of mapping potential areas for restoration in Peru; (b) Establish appropriate FLR actions in two pilot sites with potential for scaling-up; (c) Promote strategic and innovative activities of potential impact for FLR; and (d)

Retrieved from: https://www.international-climate-initiative.com/en/details/project/utilising-landscape-scale-forest-ecosystem-rehabilitation-as-a-cost-effective-bridge-for-the-integrated-deployment-of-national-landbased-mitigation-and-adaptation-strategies-15_III_076-473

163 IUCN and Global Agribusiness Alliance. n.d. Restoration in supply chains from zero net deforestation to net positive action (RESUPPLY). Retrieved from: https://www.iucn.org/theme/forests/projects/restoration-supply-chains-zero-net-deforestation-net-positive-action-resupply

164 BMUB. n.d. International Climate Initiative (IKI) website. Project "Catalyzing private sector commitment to implement the Bonn Challenge – a platform for success". Retrieved from: https://www.international-climate-initiative.com/en/details/project/catalyzing-private-sector-commitment-to-implement-the-bonn-challenge-a-platform-for-success-18_III_097-3040

165 FAO. n.d. Food and Agriculture Organization of the United Nations (FAO) website. The Forest and Landscape Restoration Mechanism. Retrieved from: http://www.fao.org/in-action/forest-landscape-restoration-mechanism/our-work/projects/kfs/en/

Complete the process of elaboration, consultation, validation and publication of the Nation Program for Degraded Land Recovery.

4. Conclusions

This study shows that all the six countries have conditions to scale up FLR in their territories. A **strategy of large-scale landscape restoration in the LAC region** will be an economically attractive opportunity to slow agricultural expansion, counteract land degradation and deforestation, and maintain the provision of ecosystem services and biodiversity, all while generating income in rural landscapes and contributing to the efforts of reducing carbon emissions in the regional economy. In the following Table (Table 18) a compilation of the evaluated enabling conditions is showed for Brazil, Colombia, Argentina, Chile, Costa Rica and Peru, along with some of the success factors that are helping those countries moving forward in the restoration of their landscapes. Following Table 18, a compilation of the enabling conditions of the countries is shown.

Table 18 – Enabling conditions and success factors to scale-up restoration

Category	Enabling conditions	Success factors
Commitments	Bonn Challenge commitments	▪ Pledges to the Bonn Challenge are fully voluntary but indicative of a political commitment to the agenda that is reflected in the national strategies and plans with even more ambitious targets ▪ Pledges to the Bonn Challenge help to provide momentum for restoration action mobilizing the relevant stakeholders in the country and are the catalyst for the development of broad stakeholder vision and strategies *[see example of the ForestAR 2030 Initiative* - Argentina*]*
Policy framework	Legislative and policy mechanisms for ecosystem restoration	• The existence of national strategies and plans for restoration helps governments to define not only targets, but also coordination structures and are important to set cost-effective large-scale solutions and to deliver synergies with the ongoing plans at both subnational and local level *[see example of PLANAVEG* - Brazil*]* • National plans are evidence of a long-term political commitment with the agenda and of a defined and sustainable strategy for the *territory*. This long-term vision is essential because a long timeframe is necessary to fund, implement, monitor, and sustain a broad forest landscape restoration programme *[see example of the Colombian National Plan for Restoration with a horizon of twenty years 2015-2035]* • The consideration of FLR in existing policies or frameworks can also provide an effective means of securing its sustainability. We found in the different countries that restoration is embedded in the national REDD+ strategies. • The institutional coordination between agendas is also important for restoration efforts *[see example of Peru where a strong partnership between both Ministries of Environment and*

Category	Enabling conditions	Success factors
		Agriculture in forests and climate change was identified as a factor favouring restoration]
Available funds	Public funds	• For restoration to be fully implemented a diverse basket of public funds and sources is key to ensure long-term viability of restoration actions and programmes. [*see example of Brazil with different public funds available for restoration activities*]
	Diversification of financial sources	• The diversification of financial sources including public funds, investors, private sector, international donors and non-governmental organizations is key for countries to reach a full national landscape strategy since the implementation of restoration involves usually high costs.
	Identification of funding gaps	• A fully economic analysis of landscape restoration that can capture all costs categories as well as the public benefits is of great importance not only to prioritize public investments but also to ensure a proper landscape restoration planning. All countries that were analysed have Initiatives (TEEB, BIOFIN, WAVES, Natural Capital Accounting, Environmental Economic Accounting, National Ecosystem Assessments) with data for a more complete assessment of the costs and benefits of their restoration strategies.
Technical capacity	Monitoring systems available	• The presence of an effective monitoring framework for the restoration of forest landscapes is essential and should be established to follow the results of restoration implementation • All countries have national monitoring systems available that can help also to adjust the strategies in the long term to improve results and are important also to communicate to the different stakeholders the degree of target achievement
	Public support and participation of civil society and NGOs	• Successful forest restoration at the landscape level depends on several variables, not least of which are socioeconomic considerations, particularly livelihood needs of local communities and the other interests of the different stakeholders in the landscape. Both local and public support is fundamental to sustain forest restoration, and this can only be obtained if the different needs are considered. Each stakeholder is likely to have different objectives and priorities with respect to forest and land use.
	ROAM application at national or sub-national levels	• The existence of participatory methodologies at the landscape level that consider the needs of the different actors as well as the areas where environmental and socioeconomic benefits of restoration can be maximized are important to set realistic and cost-effective restoration strategies; the Restoration Opportunities Assessment Methodology (ROAM), produced by IUCN and the World Resources Institute (WRI), provides a flexible and participative framework to rapidly identify and

Category	Enabling conditions	Success factors
		analyse areas that are primed for FLR and to identify specific priority areas at a national or sub-national level • Brazil, Colombia, Costa Rica and Peru have applied the ROAM methodology to identify priority areas for restoration at either the national (Costa Rica) or subnational level (Brazil, Colombia and Peru).
	Other national-level studies of potential areas for restoration	• Just as landscapes vary, so does land restoration, and therefore, there is no one-size-fits-all solution. Setting priorities for restoration and management using multicriteria approaches and exploring the potential of the different strategies for restoration (natural regeneration, agroforestry, tree planting, etc) is key to set an affordable and effective strategy of restoration. • A strategy of restoration should consider the different contexts of the landscapes to establish the different objectives that are involved and that can be: ecological (connectivity for wildlife, ecosystem resilience), focused in the nature provision of benefits to people (water protection, soil stabilization, carbon sequestration) and also of socio-economic nature (alternate income generation, job creation, education). • Brazil, Argentina and Colombia have studies where opportunity areas for restoration were identified, including the potential for natural regeneration, illustrating that restoration is not always a matter of planting trees. In Brazil, areas with high and very high natural regeneration potential sum 41 Mha. A total of 4.8 Mha of opportunity areas to manage restoration was identified in Colombia. Argentina has prioritized six main areas for totalling 24 Mha.
	Technical knowledge	• It's important that the technical knowledge about restoration is available in national and local governments and that it can be delivered through the technical assistance structures to people who are restoring landscapes in the ground.
Projects in the ground	Large-scale projects and initiatives being already implemented	• The existence of large restoration projects being implemented in the ground should be considered not only by the lessons learned that they generate but also by the local capacities they develop in the ground (local communities' capacity development for both restoration planning and implementation) and by the value chain associated with the restoration. The local knowledge is also used and collated in situ and is part of the local engagement.
Private sector engagement	Coalitions and partnerships	• The existence of coalitions with the private sector for restoration activities as well as the private sector commitments to sustainability help to strengthen the articulation between the

Category	Enabling conditions	Success factors
		different actors in the landscape, to conciliate the interests and find and to align common goals

BRAZIL

Commitments

- **Bonn Challenge: 22 Mha (2016 to 2030) involving** 12 Mha forest regeneration (2030), 5 Mha integrated agricultural systems combining farming, livestock and forests (2030) and 5 Mha degraded pastures recovery (2020)
- **1 Mha of Atlantic Forest** (PACTO commitment to Bonn Challenge)

Policy frameworks

- **Several policies establishing restoration targets, actions and incentives:**
  - Native Vegetation Protection Law (Forest Code)
  - National Policy for the Recovery of Native Vegetation (PROVEG)
  - National Plan for the Recovery of Native Vegetation (PLANAVEG)
  - Sectoral Plan of Agriculture and Livestock (ABC Plan)
  - National REDD+ Strategy (ENREDD)

Available funds

- **Public funds** (National Fund for Forest Development, Amazon Fund, Climate Fund, BNDES Forest, ABC Program, Water Producers Program)
- **Donors** (GEF, FIP, GCF, Norad, IKI, UK-Aid)
- **Companies and investors** (AES Tietê S.A., Althelia, Cargill, Suzano S.A.)
- NGOs

Technical capacity

- **National Monitoring systems available**
- Areas prioritized at national scale **for natural regeneration (41 Mha high potential)**
- **ROAM for 6 states + Federal District** (with prioritized areas for restoration >0.9 Mha)
- **National study on costs of recovering native vegetation**
- **Studies with priority areas for Atlantic Forest biome**
- Engagement of important **NGOs** in the restoration agenda in the country (SOS Mata Atlantica, TNC, WWF, WRI)

Projects in the ground

- **12 large restoration projects** (LUCID Database), 7 in areas > 100000ha
- **Large projects that sum restoration targets of > 150000 ha**
- **Other projects:**
  - Mantiqueira Restoration Project (RJ, SP, MG states) - 230000 ha until 2022 (potential for 1.2 Mha restoration)
  - PCI (MT state) - 2.5 Mha restoration potential

Private sector engagement

- **Coalitions involving private sector** (PACTO, Alliance for Restoration of Amazon, Brazilian Coalition on Climate, Forests and Agriculture)
- **Multistakeholder commitments:**
  - Restaura Brazil (400000 ha by 2030)
  - Green Blue Water Coalition (restoration for water supply - Water Funds)
  - Forest Cocoa Project (22000 ha by 2022)

COLOMBIA

Commitments

- **Bonn Challenge: 1 Mha (2020)**
- A more ambitious target than the one commited in the Bonn Challenge : **1.4 Mha (Government Plan 2018-2022)**
- Speficic target for restoration of degraded land in territories of ethnic groups: **300 000 ha** (established in the REDD+ National Strategy)
- **Vision Amazonia** (initiative to decrease deforestation in the Amazon through a regional development model of sustainable land use) - **Joint Declaration of Intent with Norway, Germany, and the United Kingdom**

Policy framework

- **Several policies establishing restoration targets, actions and incentives:**
- National Plan for Restoration 2015-2035 (PNR)
- National Forest Development Plan (PNDF)
- National REDD+ Strategy ("Bosques Territorios de Vida")
- Colombian Strategy for a Low Carbon Development (ECDBC)
- **Government Zero Deforestation Agreements with palm oil, cattle and cocoa producers** (public-private collaboration)

Available funds

- **Public funds** (Fondo Compensacion Ambiental, Fondo Nacional Ambiental, Findeter, Finagro)
- **Donors** (GEF, Colombia Sustainable Fund - IADB, BMU-IKI, *FCPF* and GCF)
- **Companies and investors** (Nespresso Company, Enel Group, ISA, 12Tree)
- NGOs

Technical capacity

- **National Monitoring System available**
- Portfolio of opportunity areas to manage restoration processes done by the Government in 2016 at national scale: **4.8 Mha (30% in 74 indigenous ethnic groups: 1.4 Mha)**
- **ROAM in the eastern Antioquia** (with prioritized areas for restoration)
- **Restoration Program to collective territories of indigenous and black communities** is planned to be developed in the National REDD+ strategy
- Engagement of important **NGOs** in the restoration agenda in the country (CIFOR)

Projects in the ground

- **36 restoration projects** (LUCID Database), 80% of small size (in areas <5000 ha), 7 are UNFCCC CDM projects
- **Large projects that sum restoration targets of > 66000 ha**
- **Portfolio of Investment Projects with Restorative Potential from the Agricultural Sector (2019)** done by WRI, 3er Planeta SAS, IICA and National Advisory Board for Restoration
- **"Sustainable land use systems in cattle farms"** (IKI Funded Project 2018-2022) - CIAT, ZALF, MADS, CIPAV: departments of Caqueta and Cesar

Private sector engagement

- **Multistakeholder commitments:**
- **Green Blue Water Coalition** (restoration for water supply - Water Funds): prioritization of 50590 ha of area to restore in the sources watersheds of 6 large colombian cities (ROOT methodology)
- **Cocoa, Forests and Peace Initiative** (Government, company Casa Luker, National Cocoa Federation) - reduce deforestation in the cocoa productive chain
- **Supply chain companies commitments to sustainability**

COSTA RICA

Commitments

- **Bonn Challenge: 1 Mha**
- 2021 carbon neutrality goal (2008) - recognizing the role of the agricultural sector in achieving that goal – mainly the coffee, banana, livestock, sugarcane, pineapple and rice sectors

Policy framework

- **Policy for agriculture and environment** (*Política Agroambiental*)
- **Forest Law**
- **Payment for Ecosystem Services Program (PPSA)**
- **National REDD+ Strategy** (2015)
- **National Climate Change Strategy** (2008)
- National Development Plan (2011-2014)
- **Several programmes with a restoration component** (Livestock NAMA, Coffee NAMA and Programmes of Good Agricultural Practices for pineapple, oil palm, banana)

Available funds

- **Public funds** (National Forest Financing Fund - FONAFIFO)
- **Donors** (GEF, BMU-IKI)
- **Companies and investors** (Forestry and Climate Change Fund + Operaciones Forestales Sostenibles – OFS and BluWood)
- IKI Funded Project "FLR in Central America and the Dominican Republic and implementation of the Green Development Fund for Central America" (2017-2022) - help structuring finance mechanisms for FLR
- **Limited funds, finance** and coordination between various national and multilateral agencies (Wallbott et al., 2019)

Technical capacity

- **National Land Use, Land Cover and Ecosystems Monitoring System (SIMOCUTE) in development**
- **ROAM/ROOT applied at national scale to prioritize areas for restoration (2.6 Mha)**
- **Both PES and REDD+ governance are characterized by strong institutional and technical capacity**

Projects in the ground

- **2 restoration projects** (LUCID Database), 1 GEF funded + 1 UNFCCC CDM project
- **Implementation Plan for REDD+ : has identified that restoration of 889,600 ha of degraded land could provide multiple benefits** (in the basins of Jesus Maria, Abangares, Grande de Tárcoles, Parrita and Tusubres)

Private sector engagement

- Engagement of some companies in financing restoration projects

CHILE

Commitments

- **Bonn Challenge: 0.5 Mha (2020)**
- A more ambitious target than the one commited in the Bonn Challenge : **0.6 Mha (national policy)**

Policy framework

- National REDD+ strategy: **Chilean Strategy on Forests and Climate (ENCCRV)**
- **National Forest Policy`**

Available funds

- **Public funds** (Fund for Conservation, Recovery and Sustainable Management of Native Forests, Environmental Forestry Fund)
- **Donors** (GEF, Forest Carbon Partnership Facility - **FCPF**)
- Others (Fundacao Patagonia)

Technical capacity

- During 2018, the ENCCRV published the SMM - Monitoring and Measuring System
- UN-REDD Programme have supported some pilots on ecological restoration in the regions of Cerro Blanco, Penablanca and in the Andes located in the commune of Ovalle within the Coquimbo Region. The Coquimbo Region has 2.2 million hectares in n the severe land degradation category, covering 50% of the regional surface area (CONAF, 2017).
- **Biobio region (2017)** - Huge fires - study defined 15 priority areas for restoration
- Without ROAM

Projects in the ground

- **24 restoration projects** (LUCID Database), 80% of small size (in areas <1000 ha), 20 are projects registered in the National Registry of Ecological Restoration Initiatives
- **4 Large Projects (GEF funded) represent > 500,000 ha** of sustainably managed landscape targetd
- **Fundacao Patagonia (81 000 ha in the Chacabuco Valley, Patagonia)**
- Ecosystem Restoration Programme Cayumanque

Private sector engagement

- **Engagement of some companies in financing restoration projects**
- Opportunity for FLR involving the private sector: in order to maintain the FSC (Forest Stewardship Council) certification, forest companies have to convert over **45,000 ha** of exotic plantations to native forests

ARGENTINA

Commitments

- **Bonn Challenge: 1 Mha (2020)**
- **Goal of become carbon meutral in 2021**
- **ForestAR 2030 Initiative: commitment of restoration of 2 Mha until 2030** (20000 annual ha native forest restored by 2023)

Policy framework

- **Law 26.331 on Environmental Protection of Native Forests**
- National REDD+ Strategy: **National Action Plan on Forests and Climate Change (PANyByCC)** - strategic actions of restoration and recovery of degraded lands
- **National Forest Restoration Plan** (2018-2022)
- **National Program for the Protection of Native Forests (PNPBN)**

Available funds

- **Public funds** (Funds from the PNPBN and National Fund for Enrichement and Conservation of Native Forests)
- **Donors** (GEF)
- **Companies** ((OVIS21 - regenerates degraded grasslands and protects biodiversity in Patagonia))

Technical capacity

- **National Monitoring System of Native Forests available**
- In a preliminary analysis of potential areas for restoration, the Action Plan for designing the National Program for Restoring Degraded Native Forests (PNRBND) identified six main areas comprising several provinces and covering seven regions: **Espinal, Monte, Parque Chaqueño, Selva Misionera, Yungas and Andean-Patagonian Forest**
- **Mobilization of civil society in priority regions (Gran Chaco, Atlantic Forest regions)**
- **Without ROAM analysis**

Projects in the ground

- **3 restoration projects** (LUCID Database), 1 GEF funded, 1 funded by a company and the last one an UNFCCC CDM project
- Project "Native Forests and Community" (IBRD 8493-AR) - 80 Integral Community Plans (PICs) covering **400,000 ha**

Private sector engagement

- Engagement of some companies in financing restoration projects
- ForestAR Initiative - multistakeholder platform involving forestry industry, civil society and government
- There's an opportunity to support private sector development

PERU

Commitments

- **Bonn Challenge: 3.2 Mha** (from these 3.2 Mha, 2 Mha is to be restored through sustainable commercial exploitation and 1.2 Ma by productive use)

Policy framework

- **National Program for the Conservation of Forests for the Mitigation of Climate Change - PNCBMCC** (in charge of MINAM) and the SERFOR (MINAGRI's agency) have been designated as leading institutions for the development of several plans, programmes and projects in both areas
- **National Plan for the Recovery of Degraded Areas** (PN-RAD named *PRO REST)*
- National REDD+ Strategy - **National Strategy on Forests and Climate Change** (ENBCC) (2016)
- Forest Conservation National Program for the Mitigation of Climate Change

Available funds

- **Public funds** (National Fund for Protected Areas - Profonanpe; the Forest Conservation National Program for the Mitigation of Climate Change also provides incentives for forest conservation)
- **Donors** (IKI - major supporting partner of FLR)
- **Private/ Investors**: **Althelia Climate Fund** has invested in several FLR projects across Peru, focusing on restoration of degraded lands in national park buffer zones with shade coffee and cocoa systems. **Root Capital** is also an active investor in shade coffee restoration and other FLR projects

Technical capacity

- **National Forestry and Wildlife Information System (SNIFFS)**
- **1.3 Mha** was prioritized for restoration - ROAM application in five departments: one in the region of Sierra (**Apurímac**) and 4 in the Amazon (**Amazonas, Madre de Dios, San Martín y Ucayali**)
- Strong partnership between MINAM and Ministry of Agriculture (MINAGRI) in forests and climate change
- **One of the beneficiary countries of the project "Implementation of the Forest and Landscape Restoration Mechanism (FLRM)" FAO -** technical assistance and monitoring actions for FLR have been conducted (2014-2020)

Projects in the ground

- **33 restoration projects** (LUCID Database), 50% are projects <1,000 ha (18 projects) 3 are funded by GEF, 1 is a UNFCCC CDM project, 3 are funded by FIP, 2 by Althelia, 1 is supported by CIAT and the other 23 are divided between Bioversity/ICRAF/SERFOR (15 projects) and WRI-RAD (8 projects).
- **Large Projects involve restoration targets of more than 6.7 Mha**
- IKI Funded Project "RESUPPLY" **(2019 - 2022)** – implemented by IUCN + Global Agribusiness Alliance + ECOM - **Identification of restoration opportunities in the cocoa supply chain** using ROAM - landscape of San Martin

Private sector engagement

- **Multistakeholder commitments:**
- A **public-private coalition for deforestation-free commodities** was established - 37 members (public, private, and civil society members) - targeting efforts on the implementation of the National Coffee and Cocoa Plans among other commodities
- **Global Green Commodities Program (GCP) -** multi-stakeholder dialogue platform, under the leadership of the Ministry of Agriculture

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