



# Action Plan for the Decade on Ecosystem Restoration in Latin America and the Caribbean

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# I. Executive Summary

In 2019, the UN General Assembly declared the 2021-2030 as the Decade of Ecosystem Restoration. The motivation is the understanding that none of the 17 Sustainable Development Goals can be achieved unless a significant effort in ecosystem restoration is implemented. This declaration emanated from a proposal from the governments of El Salvador and the other countries in the Central American Integration System (SICA), and was supported by the 21st Forum of the Ministers of the Environment of Latin America and the Caribbean.

Latin America and the Caribbean is a diverse region in many dimensions: biological, geographic, political, social and cultural. It is also a biologically rich region, with seven of the most diverse countries in the world. Yet, in spite of protecting 20.3% of the terrestrial and marine areas, many ecosystems have been significantly degraded, threatening the region's well-being, potential for a sustainable future, and potential for adaptation to and mitigation of climate change. Ecosystem restoration can revert many of the negative impacts that are already manifesting and are likely to emerge in the near future.

The initiative taken by the region to promote and support the UN Decade of Ecosystem Restoration is indicative of the region's understanding of the need to advance on this front and of the importance of recovering the region's natural capital. It is also the result of several decades of previous work in ecosystem restoration both in terms of developing and strengthening the institutional and legislative infrastructure to promote and regulate the activities and in terms of the technical capacity to implement solutions on the ground.

This document describes the Action Plan that the region wishes to undertake for the next ten years promote, improve, accelerate and scale up ecosystem restoration in the region. It is a regional-level voluntary effort that focuses on cooperation mechanisms and enabling conditions designed to effectively support countries according to their national needs, priorities and capacities, while promoting synergies and complementarity with existing initiatives.

The Action Plan follows the approach and structure of the global strategy for the implementation of the UN Decade on Ecosystem Restoration, in particular regarding 10 region-specific actions under three pathways: i) a regional movement, ii) generating political support, and iii) building technical capacity. As recommended by Barbados as Presidency of the XXI Forum of Ministers of Environment, this Action Plan should also lead to project proposals to mobilize large-scale investments for ambitious ecosystem restoration initiatives, such as a Caribbean-wide project for coral reefs restoration.

The overarching vision is that, by 2030, Latin America and the Caribbean have significantly advanced in defining policies and plans and implementing projects in restoration of marine, terrestrial and inland water ecosystems at a spatial scale relevant to revert the negative impacts of degradation and, as a result, ecosystems and natural habitats across the region are in process of being restored, protected and managed sustainably.

In the context of the UN Decade, ecosystem restoration encompasses a wide continuum of activities that contribute to protecting intact ecosystems and repairing degraded ecosystems (Gann et al. 2019). Such activities include, for example, enhancing organic carbon in agricultural soils, increasing fish stocks in overfished zones, remediating polluted sites, restoring ecological processes, restoring biodiversity, and conserving fauna and flora that can assist in the restoration process.

## The Action Plan for Ecosystem Restoration in Latin America and the Caribbean in a nutshell

### THE ISSUE

Latin America and the Caribbean are affected by degradation and loss of ecosystems. A significant effort is required to halt ecosystems degradation and to ensure that healthy ecosystems underpin Sustainable Development across the region.

### THE VISION

By 2030, Latin America and the Caribbean have significantly advanced in defining policies and plans and implementing projects in ecosystem restoration at a spatial scale relevant to revert the negative impacts of degradation and, as a result, ecosystems and natural habitats across the region are in process of being restored, protected and managed sustainably..

### BARRIERS TO ACHIEVE THE VISION

Limited awareness across society about the positive role of healthy ecosystems.

Insufficient investment by policy makers.

Limited technical capacity

Scarcity of legislative and policy mechanisms specific for ecosystem restoration

Limited investment in scientific research:

Insufficient finance

### THREE PATHWAYS AND 10 ACTIONS TO PROMOTE, SUPPORT AND ACCELERATE ECOSYSTEM RESTORATION ACROSS THE REGION

#### PATHWAY I. REGIONAL MOVEMENT

**Action 1.** Promoting and facilitating public awareness.

**Action 2.** Giving visibility to ecosystem restoration champions.

**Action 3.** Bringing ecosystem restoration to schools.

#### PATHWAY II. POLITICAL ENGAGEMENT

**Action 4.** Building supporting materials for transformative leadership in ecosystem restoration.

**Action 5.** Developing and implementing a regional strategy for innovative financing of ecosystem restoration initiatives.

**Action 6.** Promoting and facilitating a regional dialogue.

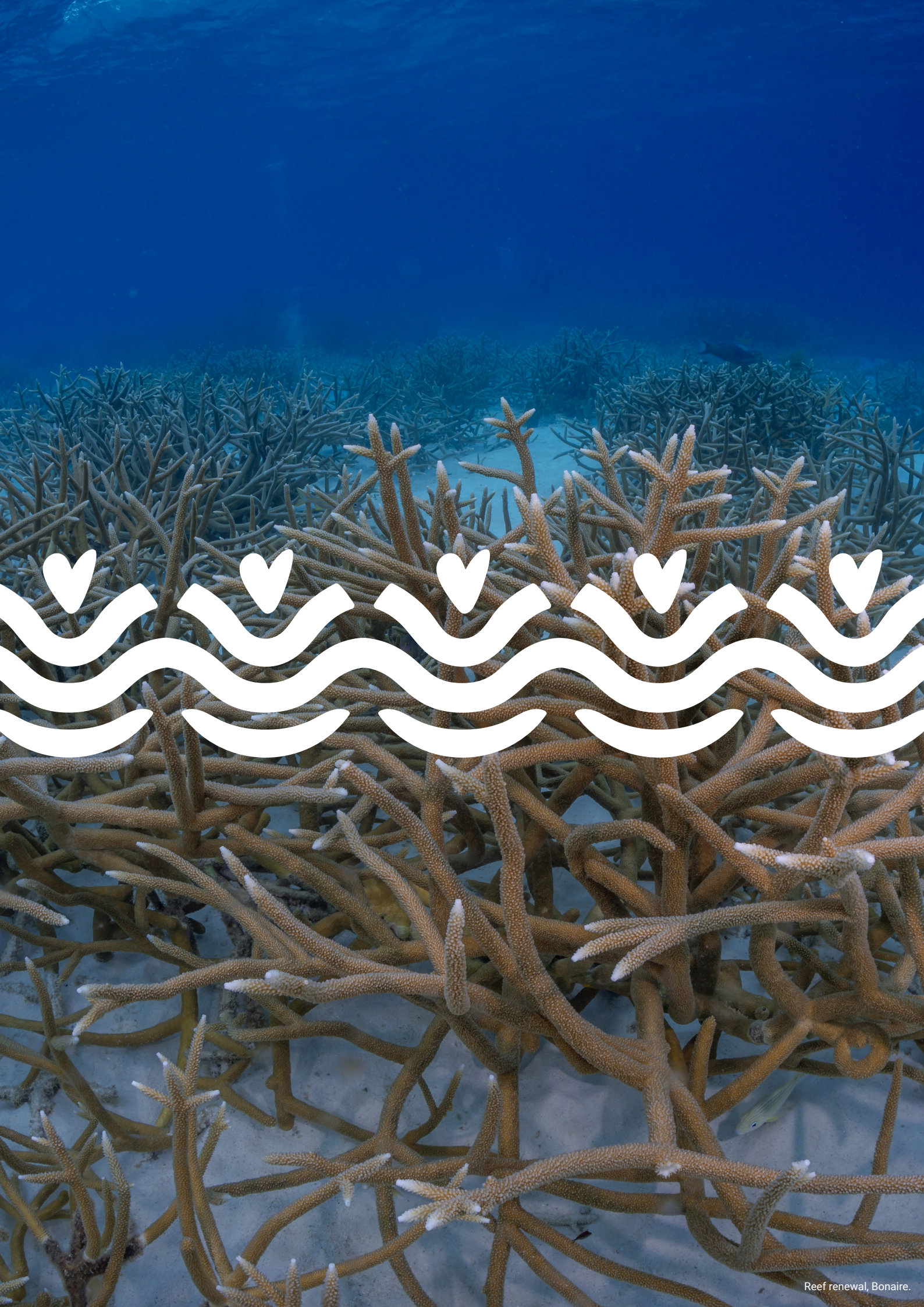
#### PATHWAY III. TECHNICAL CAPACITY

**Action 7.** Assessing opportunities for investment in long-term scientific research.

**Action 8.** Ensuring access to knowledge.

**Action 9.** Promoting collaboration for scientific analysis and synthesis.

**Action 10.** Training professionals in ecosystem restoration.



## II. Introduction

The 21st Forum of the Ministers of the Environment of Latin America and the Caribbean (Buenos Aires 9-12 Oct 2018) approved, in the Buenos Aires Declaration, Decision 4: Innovative solutions to enhance the benefits of biodiversity and ecosystems. This decision invites "... the countries of the Latin American and Caribbean region to take concrete actions for the restoration of ecosystems at the national and regional level during this decade, integrating them into policies and plans to address the current development challenges following established guidelines in the decision of the Convention on Biological Diversity (CBD/COP/DEC/XIII/5) on the Short-term Action Plan for Ecosystem Restoration" and encourages "...commitments and partnerships among countries, the international community, civil society, the private sector and other stakeholders, as well as among sources of financing, to address the restoration of degraded ecosystems through efficient production systems, in particular agro-ecological approaches, conservation agriculture, agroforest and cattle ranching systems, among other sustainable agriculture practices".

In addition, Decision 4, supports "...the proposal of the Government of El Salvador and the countries of the Central American Integration System (SICA), calling on the General Assembly of the United Nations in its 73rd session to designate the decade of 2021-2030 as "The United Nations Decade for Ecosystems Restoration". On March 1st, 2019, The General Assembly of the United Nations, declared the 2021-2030 decade as the UN Decade on Ecosystem Restoration with the aim to prevent, halt and reverse the degradation of ecosystems worldwide (UNGA 2019). An overview to the contributions of Ecosystem Restoration to achieve the 2030 Agenda on Sustainable Development is presented in Appendix 1.

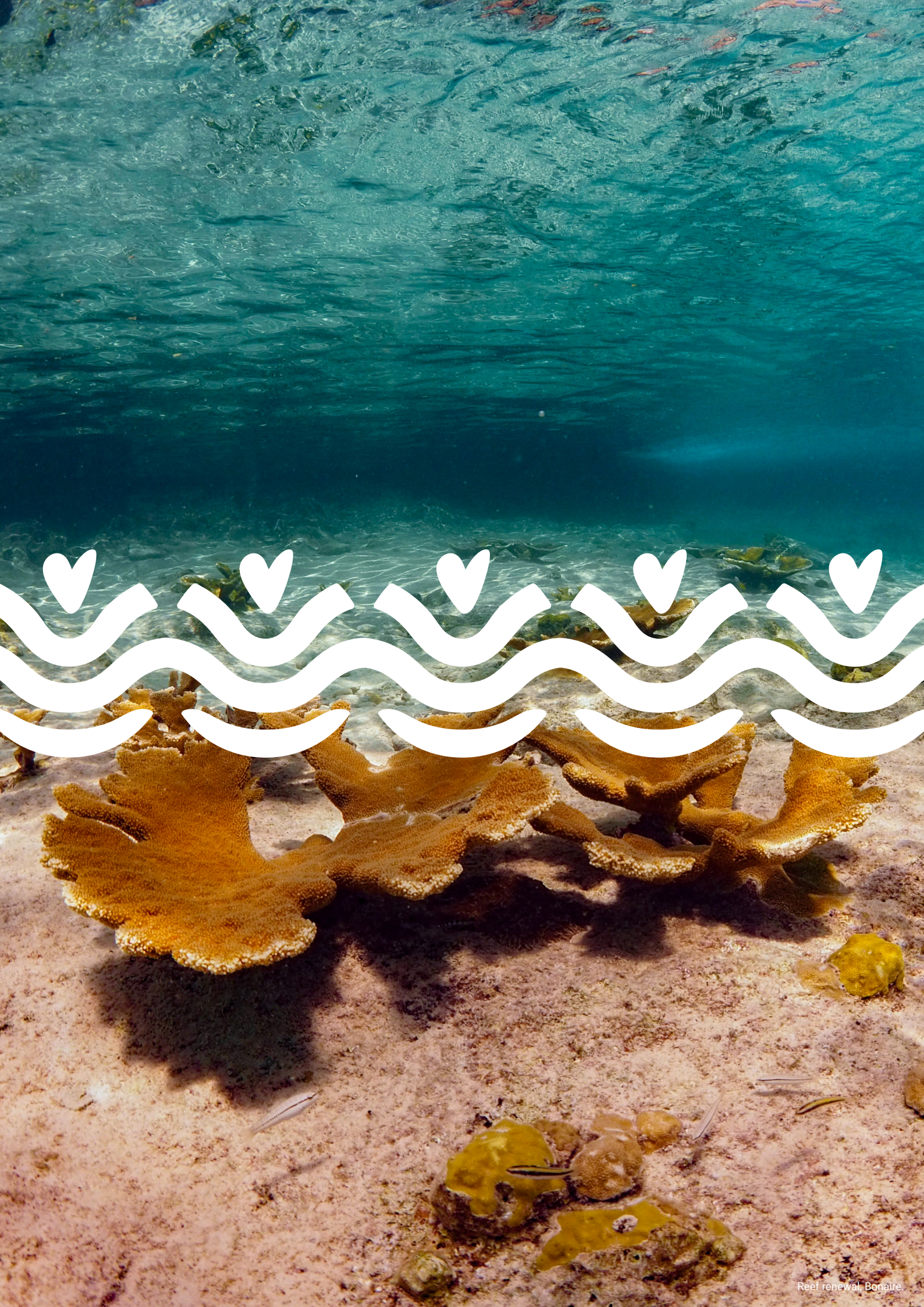
The Action Plan for the Decade on Ecosystem Restoration in Latin America and the Caribbean is a response to Decision 4 of the 2018 Minister's Forum and it is framed within the UN's Strategy of the Decade for Ecosystem Restoration (UNEP & FAO 2020). It describes the regional vision and road map to catalyze ecosystem restoration in the region. This Action Plan is formulated within the conceptual framework described in the Strategy of the UN Decade, which recognizes the wide continuum of restorative activities aimed at repairing degraded ecosystems (Gann et al. 2019), the major role that ecosystem restoration will play in achieving the objectives of the 2030 Agenda for Sustainable Development because of its cost-effectiveness,

compared to activities in other sectors (Blignaut et al. 2014, BenDor et al. 2015a), and its potential role in opening opportunities for the post Covid-19 pandemic socioeconomic recovery. This Plan has been formulated taking into consideration the various existing ecosystem restoration initiatives and installed capacities across the region, as well as the potential for consolidation and expansion of these activities (see Appendix 2 for an overview of the current situation and potential in the region).

This Action Plan for Ecosystem Restoration in Latin America and the Caribbean aims to help countries to initiate, improve or accelerate the implementation of their national restoration policies, programs and plans for marine, terrestrial and inland water ecosystems, and to identify opportunities to leverage public and private finance, while at the same time tackling poverty and improving human sustainable development. It is a regional-level effort that focuses on voluntary cooperation mechanisms and enabling conditions designed to effectively support countries according to their national needs, priorities and capacities, while promoting synergies and complementarity with existing initiatives. The Action Plan follows the approach and structure of the global strategy for the implementation of the UN Decade on Ecosystem Restoration, in particular regarding the three pathways for action: i) a regional movement, ii) generating political support, and iii) building technical capacity.

The overarching goal is that by the end of the decade, ecosystems of Latin America and the Caribbean are on the pathway of recovery, in particular those ecosystems that are critical for the long-term social, economic and environmental sustainability and wellbeing of the region.

This Action Plan is also designed to ensure that Member States are fully involved in the design and implementation of the proposed objectives and activities. The plan will have a mid-term review (after four years), under the revision of the Regional Cooperation Programme on Biodiversity, to guarantee that it is adequately adapted it to the needs and evolving conditions of Member States (Member States will approve proposed activities, but their participation in these activities and adoption of the resulting products is voluntary). UNEP as Secretariat of the Forum will engage with Member States in leading the formulation of project proposals to mobilize the funds needed for the implementation of the Action Plan.



### III. Vision and Theory of Change

The vision for this Action Plan is that, by 2030, Latin America and the Caribbean have significantly advanced in defining policies and plans and implementing projects in restoration of marine, terrestrial and inland water ecosystems at a spatial scale relevant to revert the negative impacts of degradation and, as a result, ecosystems and natural habitats across the region are in process of being restored, protected and managed sustainably.

#### A. Barriers

Latin America and the Caribbean is a complex and heterogeneous region from the economic, social and ecological points of view, and the direct and indirect barriers and enablers of ecosystem restoration are expressed differently among countries, even among neighbouring ones (Murcia et al. 2017a). Despite this heterogeneity, the following six barriers are common to the region:

##### Limited awareness across society about the positive role of healthy ecosystems.

Public support and participation are significant success factors in advancing policy and consolidating national and regional efforts (e.g., DeAngelis et al. 2020). However, public support of and participation in conservation and restoration are weak for lack of awareness of the current level of land degradation (IPBES 2018b, UNEP & FAO 2020) and its extent regarding the planet's carrying capacity (sensu Steffen et al. 2015).

This lack of public awareness is in part explained by the current level of urbanization that disconnects urban dwellers from the ecosystems that support them (Sanderson et al. 2018). Urban dwellers are often unaware of their dependency of nature because they supply their needs through the marketplace (Sanderson et al. 2018). Thus, they are spatially removed from the sources of water, food and other ecosystem service on which they rely and do not experience many benefits of green space and natural elements first-hand, nor are they aware of the environmental impacts of their own consumer patterns (IPBES 2018a). In Latin America close to 83% of the population lives in urban centers (most under poverty and in precarious living conditions), and in the Caribbean urbanization is now close to 75% (UNEP 2016). In contrast, indigenous peoples and traditional rural communities and fishermen are well aware, through work and labor, of their dependency on nature and the impacts of ecosystem degradation and ecosystem restoration on their livelihoods (Tomblin 2009). For them, culture and nature and intertwined. In this sense, the participation of indigenous peoples and local communities in policy and decision-making processes could be enhanced.

The effort required addressing ecosystem degradation in Latin America and the Caribbean requires significantly scaling up current ecosystem restoration efforts and engaging all sectors of society to ensure its sustainability. Awareness among all stakeholders about the role of healthy ecosystems in sustaining life on earth and their contribution to human well-being is the first step in generating public support and participation in ecosystem restoration. Furthermore, increased awareness that "renewable resources" are actually limited when their source is degraded could induce a shift of social and cultural norms to foster sustainable production and consumption patterns that would reduce pressure on ecosystems.

##### Insufficient investment by policy makers.

Ecosystem restoration generates direct benefits to many sectors of the economy and society (BenDor et al. 2015a, BenDor et al. 2015b) yet, in Latin America and the Caribbean, investment and public expenditure in environment (for all environmental activities) could be enhanced. Only three countries, Mexico, Brazil, and Costa Rica spend about 0.6% of their GDP (Quiroga et al. 2016). Ecological restoration, as a strategy for increasing the provision of ecosystem services, may be an efficient approach for poverty reduction (Suich et al. 2015; Levy 2017). However, for the past decade the region has dealt with poverty levels that have been relatively stable around 30%, but with an increase in extreme poverty to 11.5% in 2019 (CEPAL, 2019). Ecosystem Restoration it is not strategically positioned as an investment option for economic and social development. The low investment in restoration is also due to a lack of articulation in sectoral and land planning, in which other economic interests planning prevail over environmental planning, which has repercussions on the allocation of smaller budget items for biodiversity.

Lack of, or insufficient, investment in ecosystem restoration can be the result of several factors: One is insufficient awareness that the long-term solutions offered by ecosystem restoration address in a more permanent way many societal and sustainability challenges because they help recover the countries' natural capital (Blignaut et al. 2014), gain competitiveness (Quiroga et al. 2016), and reduce vulnerability to climate change and other threats (UNEP 2016). A second factor is the lack of incentives for the development of an economy of ecosystem restoration, including in relation to novel investment strategies that tap into both existing and non-traditional funding sources. A third factor is the difference in time scales between investment, funding, budgetary and political cycles (1-6 years) and ecosystem regenerative processes that take longer than two or three decades (Murcia et al. 2016, Murcia et al. 2017a, Brancalion et al. 2019). Finally, although ecosystem restoration is demonstrably cost-effective, the initial investment can be sizeable, especially at large scales, (BenDor et al. 2015a, BenDor et al. 2015b) potentially surpassing public spending capacity.

## Scarcity of legislative and policy mechanisms specific for ecosystem restoration.

Legislative and policy frameworks take time to build and revise and are always challenged by new technological and scientific developments that tend to move at a faster pace. Ecosystem restoration is a relatively new concept, with less than 20 years in the political lexicon (10 years in most of Latin America and the Caribbean) and with a quick conceptual evolution. In Latin America, for example, most legislation pertaining to ecosystem restoration has less than 20 years (Schweizer et al. 2019). At the global level, there is a "... relative scarcity of legislation, policies, regulations, tax incentives and subsidies that incentivize a shift in investments towards large scale restoration and production systems, value chains and infrastructure that do not degrade ecosystems" (UNEP & FAO 2020).

Latin America and the Caribbean are no exception to this appreciation (Chaves et al. 2015). Although most LAC countries have specific legislation on priority environmental issues, such as environmental management (25 of 25), water (15 of 25), forestry (23 of 25), protected areas (20 of 25) or biodiversity (19 of 25), few have legislation pertaining to soil (6 of 25), fisheries (12 of 25), or land use planning (13 of 25) (Quiroga et al. 2016). Even fewer have legislative and policy mechanisms pertaining directly to ecosystem restoration or a broader class of restorative activities (Schweizer et al. 2019). Brazil, for instance, is one of the few countries to include restoration in its Federal Constitution. Argentina also managed to make restoration a priority issue in environmental policy, including it as one of the application guidelines of its national law for the protection of native forests (Law No. 26,331) and as one of the mitigation measures contained in the National Action Plan for Forests and Climate Change.

Schweizer et al. (2019) classified 17 Latin American countries in three groups, based on data available in 2017: Countries in the first group (Brazil, Colombia, Costa Rica, Ecuador, Guatemala y Mexico) have a wide array of legal frameworks, inter-sectoral coordination mechanisms and mechanisms for implementation. The second group (Argentina, Chile, El Salvador, Honduras, Nicaragua and Peru) are in the process of developing their legal frameworks, but are still lacking implementation mechanisms. The third group (Bolivia, Panama, Paraguay, Uruguay and Venezuela) have yet to start addressing this need. Even if some progress may have been achieved, countries in the first group still need to fill gaps with respect to mechanisms to incentivize, evaluate, monitor, regulate and finance ecosystem restoration, especially at large scales (Ruiz-Jaén & Aide 2005, Murcia et al. 2016, Murcia et al. 2017a, Murcia et al. 2017b, Schweizer et al. 2019). A notable example of a good practice is the State of Sao Paulo (Brazil) that has a legal instrument to regulate in sufficient detail restoration practice (SMA 08-2008) (Aronson et al. 2011).

In addition, it formalized its National Restoration Plan through Resolution 267/2019. It is also important to note that several National Biodiversity Strategies and Action Plans (NBSAPs) and Nationally Determined Contributions (NDCs) have restoration targets, especially in the countries with relatively strong policy frameworks. However, the capacities to implement them have been insufficient, as well as the promotion of regulatory efforts to enable their achievement. In addition to legislative and policy mechanisms and legal frameworks that address ecosystem restoration specifically, a further step is necessary in LAC. When they exist, coordinated implementation of other environmental instruments across agencies as well as enforcement are still weak (Quiroga et al. 2016, UNEP 2016). Challenges to progress include the development of standards and of programs for evaluation and monitoring (UNEP 2016). It follows that development of legislative and policy mechanisms in ecosystem restoration must be complemented with instruments to ensure and improve implementation.

## Insufficient finance.

Ecosystem restoration requires significant investment of financial and human resources over several decades, with returns manifesting in the medium and long-term. This departure from fast-paced investment-return timings creates a perception of uncertainty and risk associated with investment in ecosystem restoration. The consequence is the relative small amount of funding (both public and private) that society is willing to allocate in such endeavor. This is even more noticeable in Latin America when financial constraints and uncertainty exacerbate risk-averse financial behavior (Cardenas & Carpenter 2013).

Ecosystem restoration is expensive, especially when soils or water are very contaminated, and the substrate is severely disturbed. The Bonn Challenge estimates that circa USD 36 billion are need on an annual basis to restore 150 million hectares for terrestrial ecosystems. There is a significant gap between the amount of finance required to restore degraded ecosystems and the amount that is readily available for doing so.

Latin America and the Caribbean harbor an extraordinary wealth in Natural Capital, but lack sufficient funds to invest in restoration, which demands considerable financial resources, therefore, International cooperation, and Official Development Assistance in line with the principle of common but differentiated responsibilities taking into consideration, inter alia, Article 20 of the Convention on Biological Diversity, which remains a relevant source of financial resources to complement national efforts. Countries should strive to develop, in accordance with national capacities and circumstances, innovative financial mechanisms with



the necessary ambition, to implement the action plan. In addition to the extraordinary biodiversity, the region has five million km<sup>2</sup> of arable land, 23 % of the world's forests, 29% of the rainfall and approximately 30% per cent of the world's renewable water resources (United Nations Convention to Combat Desertification (UNCCD) 2019), as well as significant oil, gas, mineral and other non-renewable resources. Nevertheless, LAC has based its growing economy largely on primary sectors and it has maintained a tendency to unsustainably exploit nature-based goods (IPBES 2018a). Meanwhile, societal needs such as health care, education and food security that demand significant public resources continue to impose increasing and competing demands on already strained central budgets.

Efforts needed to scale up ecosystem restoration require financial mobilization from all sources, including through international cooperation, to cover the costs of implementing ecosystem restoration, particularly given the high return on investment shown in many restoration projects that can reach at least 13:1 (Strassburg et al. 2020, World Economic Forum 2020) and may go as high as 35:1 for some ecosystems, especially those less degraded (de Groot et al. 2013). A number of mechanisms have been proposed that incorporate novel entrepreneurial approaches and that weigh the cost of restoring against the cost of no action (Holl & Howarth 2000). In addition, new techniques on sensitivity analyses allow more refined cost-benefit estimations to inform policy making and investment (e.g., Logar et al. 2019), and potentially unlocking private capital.

### Limited technical capacity

The design and implementation of ecosystem restoration initiatives requires technical knowledge and capacity of national and subnational governments, as appropriate, indigenous peoples and local communities, private companies and other related actors.

In Latin America and the Caribbean there is a high degree of variability in installed capacity and technical expertise in ecosystem restoration. Many countries are in the process of gaining familiarization with the relevance of ecosystem restoration for their wellbeing, but lack local technical capacity in how to adapt solutions and approaches within local management contexts. Nevertheless, Brazil and Colombia have been developing the scientific knowledge, technical expertise, institutional structures and legal frameworks to advance in ecosystem restoration for several decades (Meli 2003, Rodrigues et al. 2009, Murcia et al. 2016, Murcia et al. 2017a), but costs and financing issues are crucial and a bottle neck for the process. Other countries

like Mexico, Ecuador, Costa Rica, El Salvador, Argentina, and Cuba are already making significant progress in at least some of these components (Rovere 2015, Zuleta et al. 2015, López-Barrera et al. 2017, Murcia et al. 2017a). Furthermore, in addition to national level networks (REDCRE In Colombia, SOBRADE in Brazil, REA in Argentina, REPARA in Mexico, RECRE in Chile), there is already a regional network of experts (Sociedad Ibero-Americana y del Caribe para la Restauración Ecológica -SIACRE) that meets regularly to share lessons learned, discuss new ideas and bolster their collective capacity. Lessons learned are also disseminated through other networks such as Red Latinoamericana de Bosques Modelo.

Notwithstanding the rapidly growing expertise in ecosystem restoration, the capacity to scaling up the projects to a meaningful size requires additional capacities that are yet to be developed or disseminated (Rodrigues et al. 2011, Murcia et al. 2016, Murcia et al. 2017a). So far, only one large-scale ecosystem restoration project (15 million hectares) exists in LAC, after 30 plus years of research, i.e., the Pact for Restoration of the Mata Atlantica in Brazil (Rodrigues et al. 2011). Most of this expertise is focused on forested ecosystems. There is a paucity of technical expertise in restoring non-forest systems such as peatlands, high- elevation puna and paramo, lakes, rivers, wetlands, and coastal and marine ecosystems.

Thus, the challenge is to assist with (a) creation of new capacity on ecosystem restoration in some countries, (b) enhancing capacity and access to tools in countries that are already developing their own ecosystem restoration agendas, (c) bolstering the capacity of countries to develop and implement large scale ecosystem restoration programs, and (d) enhancing technical capacity of non-forested terrestrial, aquatic and marine ecosystem restoration.



© Fundación Natura. Green race - tree planting. El Silencio Natural Reserve. Antioquia, Colombia.

## Limited investment in scientific research and monitoring

The development of the field of ecosystem restoration is advancing at a quick pace, with significant engagement from developed nations in social and natural sciences. Lack of technical capacity was the highest barrier identified by the Regional Working Group on Biodiversity during the second technical meeting on October 3rd, 2020, and by a diversity of stakeholders polled in other events (Murcia et al. 2017a). However, because of the site-specific nature of restoration, defined by the idiosyncratic combination of ecological, social, cultural and economic context of each site, direct translation of technological packages or lessons learned in other countries is not necessarily appropriate or convenient. Latin American and Caribbean countries require science-based innovation and long-term research in ecosystem restoration that is tailored to their unique and diverse ecosystems as well as the unique and diverse cultures in which they are immersed (Armesto et al. 2007). International cooperation, including academic cooperation and technological transfer, can be very beneficial in this regard. Academics in Brazil (Rodrigues et al. 2009), Colombia (Murcia & Guariguata 2014), Mexico (López-Barrera et al. 2017), Argentina (Zuleta et al. 2015), and Costa Rica (Holl et al. 2000) have been conducting scientific research in ecosystem restoration for two to three decades, mostly focused on the ecological aspects of restoring forested ecosystems. However, the region's allocation to research and development is less than 2% of GDP, well below developed countries that invest 2-20% of their GDP (UNEP 2016). Future research into restoration should also encompass social and economic aspects, in addition to ecological ones, trying to address and solve the region's sustainable development challenges.

Ecosystem restoration involves more than planting trees; it applies to all ecosystem types and it is a transdisciplinary effort that transcends ecology. It requires knowledge on the social and economic milieu, understanding the drivers of degradation and designing tools for socioeconomic recovery and sustainability of the restorative effort (e.g., Aguiar & Román 2007), and the need to understand where there are opportunities for restoration (large-scale, and also scaling up). It also requires methods for evaluation and monitoring (Murcia et al. 2015), and for quantification of the return in goods, services and intangible benefits, both at the project scale and beyond its boundaries (Gann et al. 2019).

In addition to increasing the level of investment on research projects, further developments are required. The first is an adjustment related to grant cycles. A typical research grant lasts 1-3 years. However, due to the long-term nature of ecosystem restoration (e.g., Brancalion et al. 2019), grant cycles should span at least 5-year periods, but costs are high and investments amount must increase to achieve good results.

Secondly, there is a need to synchronize information needs by policy and decision makers with scientific research and of a mechanism to ensure direct and effective flow of information among the two (e.g., Murcia & Kattan 2009). Thirdly, there is a need to periodically synthesize and consolidate information through to generate broad science-based recommendations based on accumulating research. So far, none of these enabling mechanisms are sufficiently mature across many countries in Latin America and the Caribbean, and there is a lack of a regional vision and approach to scientific and technical cooperation in the region, in particular for Caribbean countries.

## B. Implementation: Three pathways of change and proposed activities

In alignment with the global strategy of the UN Decade on Ecosystem Restoration, this action plan is structured along three pathways of change: (1) Generating a regional movement that engages society in ecosystem restoration, (2) Fostering the political will so that decision makers in public and private entities champion restoration, and (3) Catalyzing research and development so that there is technical capacity to restore ecosystems at the relevant scale. The theory of change, highlighting barriers, pathways and associated activities is illustrated in Figure 1.

### Pathway 1. Regional movement toward societal commitment or engagement.

Ecosystem degradation is largely the result of a confluence of human activities driven by multiple social and economic conditions and motivations, among other causes. It is related to changes that reduce the functionality of the ecosystem. The ways we produce and consume may have an impact in our ecosystems. Soil erosion and desertification affect 15% and 41% respectively in Bolivia, 43% and 14% respectively in Cuba, 50% and 15% respectively in Ecuador, 49% and 62% respectively in Chile, and 80% of the Andean region and 17% of the national territory in Colombia (UNEP 2016).

Recovering ecosystem health and reverting the negative effects of their degradation requires a comprehensive cross-sectoral solution anchored in public support. Pathway 1 seeks a shift in societal norms and perceptions based on increased and widespread awareness of the need for, and the social, economic and environmental benefits of, ecosystem restoration in Latin America and the Caribbean. The ultimate

goal is to place ecosystem restoration at the core of its socio-economic recovery and transition towards sustainability through participative engagement.

To achieve this, it is necessary to increase the amount of information and its availability to all elements of society regarding the importance of restoring the region's natural capital, the needs and opportunities associated with ecosystem restoration, and the benefits to society. It is expected that this improved awareness will result in stakeholder's-initiated calls for action to divest from activities and businesses that degrade the remnant ecosystems and invest in sustainable ones. This pathway address barrier 1 (Limited awareness across society about the positive role of healthy ecosystems), and lays the foundation through public support to address barriers 2 (insufficient investment by policy makers), 3 (scarcity of legislative and policy mechanisms specific for ecosystem restoration), 4 (insufficient financial resources) and 6 (limited investment in scientific research).

The objective is that by 2030, ecosystem restoration will be a widely understood and appreciated concept in Latin America and the Caribbean, associated with health, well-being, prosperity, and a connection with nature. This should translate in ecosystem restoration actions initiated by both civil society and local and sub-national government agencies throughout the region, and undertaken in rural and urban settings, at all spatial scales, and stemming from a cultural shift of reconnection with nature and from an intergenerational commitment that positively involves all stakeholders.

To achieve this objective, the following voluntary actions are proposed.

- **Action 1. Promoting and facilitating public awareness.** As a starting point to facilitate a regional movement on ecosystem restoration, a toolkit based on the communication materials developed by the UN Decade but approved by countries and customized and adapted to the specific needs and conditions of countries in Latin America and the Caribbean will be developed. This toolkit will provide materials and guidelines for undertaking regional and national campaigns to increase awareness on the general public and all stakeholders on the importance of ecosystem restoration. It is particularly focused on urban dwellers whose lives are most removed from nature, but that represent most of the region's population. Such campaigns will focus primarily on: (a)

young people (14-25 years old), (b) teachers and schoolchildren, (c) women, (d) mid- to high-level decision makers, (e) private sector, (f) indigenous peoples and local communities, (g) and subnational governments, as appropriate. Other sectors of society may be engaged, but at this point, these three are proposed as starting points.

These campaigns will also contribute to improve environmental awareness across the region (particularly on the contribution of nature to people, i.e., the link between ecosystem health and human health and the importance of healthy ecosystems (even distant ones like open seas) for human health, well-being, prosperity and economic development), and will help increasing general knowledge about ecosystem restoration.

In addition to the toolkit, strategic alliances with communication organizations and experts will be established, to create relevant content and choose the best outlets and dissemination channels in the region. Topics, activities and materials will be approved by the countries and, once produced, the campaign materials will be available to the countries to adapt and tailor to their own needs and to disseminate and implement them internally according to their own priorities and capacity.

**Action 2. Giving visibility to ecosystem restoration champions.** This is a program to bestow public recognition to restoration leaders. Depending on the mobilization of funding, supporting donors and approval by the countries, a special award would be created and conferred at the meetings of the Forum of Ministers during the 2021-2030 period. The purpose is to provide visibility and stimulus to restoration community leaders. The awards would have different categories. Specific attention would be placed to groups such as: children, youth, indigenous peoples and local communities, local NGOs, the private sector and religious groups. The awardees would receive the title of restoration champions and would be invited to record communication materials that would be used in the public awareness campaigns described above.

**Action 3. Bringing ecosystem restoration to schools.** A basic curriculum on ecosystem restoration for different school levels (K-12) will be developed in collaboration with the Environmental Training Network of Latin America and the Caribbean, Biodiversity Focal Points of the Forum of Ministers, and key strategic partners from the region. The basic curriculum shall also be approved by the countries. This curriculum will be designed to be easily adopted and adapted by schools across the region, and it will include education materials

as well as guides for schoolyard restoration practical exercises to promote hands-on learning. In addition to fundamentals of ecosystem restoration, the course content will cover topics such as fundamental concepts of ecosystem ecology, ecosystem services, ecosystem's carrying capacity, the contribution of nature to people, the link between human health and ecosystem health, the role of all individuals in contributing to a healthy planet, sustainable ecosystem management and sustainable development.

Success along Pathway 1 would result in the following expected changes:

- Ecosystem restoration becomes a widely understood and appreciated concept with a positive connotation.
- The general public and decision makers (governmental and private) understand what ecosystem restoration is, are aware of the urgency to engage in ecosystem restoration and of the long-term benefits for society and the planet, and promote and support ecosystem restoration.
- Ecosystem restoration initiatives are spearheaded by leaders in all societal groups throughout the region, and their efforts are recognized and commended.
- There is active community and private sector participation in ecosystem restoration initiatives.

#### Pathway 2. Political will to drive action.

This pathway will create the necessary conditions to promote political support and commitment to the restoration of degraded ecosystems in Latin America and the Caribbean. The objective is to facilitate improvements in legislative, regulatory and policy frameworks to reduce degradation of ecosystems and catalyze ecosystem restoration, focusing on the implementation of existing legislation and commitments such as national legal frameworks, NBSAPs and NDCs. This involves (a) providing decision makers with the necessary information and the tools to facilitate the incorporation of ecosystem restoration in public and private policy and (b) fostering regional dialogues across sectors, within and between governments, and with the private sector, on the most appropriate interventions that are necessary to halt ecosystem degradation and promote ecosystem restoration within each country.

Dialogues will be informed by commissioned studies, analyses and syntheses of innovative and alternative ecosystem restoration strategies, including on the cost effectiveness of ecosystem restoration in different

terrestrial, marine and coastal ecosystems of the region, and on optimal ways to engage productive sectors (such as agroindustry, infrastructure and extractive industries) in ecosystem restoration as part of their transition to sustainability. It is expected that the dialogue and ensuing exchange among countries regarding policies, regulations, incentives, subsidies, lessons learned, and good practices; will result in enhanced cooperation and joint work in the design of innovative instruments. This pathway addresses barriers 2 (insufficient investment by policy makers), 3 (scarcity of legislative and policy mechanisms specific for ecosystem restoration) and 4 (insufficient financial resources).

The first objective is that, by 2025, country leaders, their Ministers (Secretaries) of Environment, State, Finance, Agriculture, Fisheries, and other relevant areas, and leaders of regional and local governments, business, guilds and productive associations have access to information and tools to position Ecosystem Restoration as a relevant issue in national sustainable development programs and have access to information on funding and investment portfolios. This pathway will focus on providing technical assistance and information to promote changes in legal, regulatory, financial and public policy frameworks conducive to reducing stress on ecosystems and promote restoration of degraded ecosystems. It will also focus on promoting political inter-sectoral dialogue in search for common ground on the need to, and the benefits of, incorporating Ecosystem Restoration in development strategies.

A second objective is that by 2030, at least 50% of the countries in the region are in the process of integrating ecosystem restoration in regional and national development policies, plans and programs.

To achieve these voluntary objectives, the following actions are proposed.

#### *Action 4. Building supporting materials for transformative leadership in ecosystem restoration.*

In the context of the Action Plan a series of commissioned studies selected and approved by the countries to inform decision makers across the region will be developed. These on the following topics:

##### *a. The economy of ecosystem restoration in LAC.*

During the first two years of implementation of this plan, and depending on available funding, a panel of experts will be chosen by the countries and established to conduct a suit of studies to assess the economic and social benefits and impacts of ecosystem restoration in the region. These studies should produce practical, relevant realistic and not mandatory recommendations on how to use ecosystem

restoration to promote sustainable development and achieve sustainable consumption and production patterns. To strengthen the policy relevance of these studies, the approval from the countries and transparent methodologies that reflect the broad range of concerns shared by LAC countries regarding restoration will be required. This includes selecting and vetting a panel of experts through an inclusive selection process and ensuring a multidisciplinary composition. The panel will hold party-led consultations for approval of study topics and scope and for endorsement of potential summaries. These studies should consider the linkages between restoration activities and the social and economic dimensions of sustainable development, in order to provide a better understanding on how restoration policies could help LAC countries tackle the most pressing socioeconomic challenges of the region, such as poverty alleviation and generation of employment. Guide to alternative political, administrative, legislative and regulatory frameworks that could catalyze ecosystem restoration. This document will stem from an in-depth review and analysis of different model frameworks, and the requisite conditions for their voluntary applicability in national sustainable development, economic recovery, and territorial and sector planning. The analysis will consider principles of ecosystem-based adaptation, environmental risk reduction, and the contribution of nature to people. The resulting guide will explain the different mechanisms used in different countries, analyze the requirements for implementation, and make recommendations.

- b. Guide to tested and innovative strategies for shifting investment. This document will review and analyze the existing strategies for shifting investment towards sustainable projects. It will explain the context under which each strategy has been applied and the necessary conditions to implement each one, and the risks and benefits. Based on a series of workshops with focal points, it will assess and discuss the applicability to different LAC countries according to their predominant economies.
- c. How-to guide for governments on formulating national or subnational Ecosystem Restoration Plans. A process to facilitate cooperation and exchange of knowledge, best practices and lessons learned between countries in the region will be designed and implemented, aligned with National Ecosystem Assessments (NEAs) and with the NBSAPs. This process will lead to the development of a guide that will provide basic concepts, detailed information on the necessary steps for developing or revising national or subnational restoration plans, such as evaluating and prioritizing needs

and opportunities for ecosystem restoration. It will also provide available tools for conducting baseline assessments, spatial prioritization, and strategic and operational planning, as well as guidance on establishing a national evaluation and monitoring program.

- d. How-to guides for monitoring and evaluating Ecosystem Restoration Projects. These documents will provide Latin American and Caribbean decision makers, government agencies, donors and investors with a list of criteria and some templates for evaluating the progress and impact of ecosystem restoration projects along ecological, social and economic dimensions. These documents will be based on existing initiatives, in particular those led by FAO, such as the System for Earth Observation Data Access, Processing and
- e. Analysis for Land Monitoring (SEPAL), among others. The intention is to promote tools that will assist countries in investment prioritization and in discriminating among projects in national restoration accounting and reporting.

*Action 5. Developing and implementing a regional strategy for innovative financing of ecosystem restoration initiatives.*

Based on the financing mechanisms developed in the context of the UN Decade on Ecosystem Restoration (such as the Multi-Partner Trust Fund for the UN Decade on Ecosystem Restoration, or the Restoration Seed Capital Facility), and taking into account the priorities and needs of countries in Latin America and the Caribbean, as well as relevant existing initiatives (like the Global Fund for Coral Reefs or Terra Match ), a strategy for innovative financing of ecosystem restoration in LAC will be developed. The strategy will focus on the development of two main portfolios three main areas (described below) that can be used by countries in the region to expand their options for financing ecosystem restoration projects. It will seek to add value and integrate existing platforms and mechanisms, responding to the specific circumstances of the countries in the region.

- a. Portfolio of investment opportunities in ecosystem restoration. Through an online platform (available in four languages) ecosystem restoration initiatives will be able to present their projects, explain their objectives and accomplishments, convey their expected impact and communicate their funding needs. This portfolio will be presented and advertised to potential donors and investors through different mechanisms, as well as in the context of a Regional Ecosystem Restoration Portfolio Roundtable (described below). Special attention will be given to the identification and facilitation of investments in large-scale ecosystem restoration initiatives.



- b. Portfolio of innovative financing mechanisms for ecosystem restoration. In partnership with the finance sector, new financing mechanisms will be developed to catalyze investment in ecosystem restoration. Such mechanisms may involve global and local impact funds, microfinance, credit lines in banks, payment incentive schemes, public private partnerships, state budget lines (national and sub-national) and official development assistance projects. It will build upon the experience and solutions developed by initiatives such as Microfinance for Ecosystem Based Adaptation or BIOFIN. Bankable business plans and value chains that facilitate ecosystem restoration will also be developed and supported.
- c. Round Table of Investment Portfolios for Ecosystem Restoration. Depending on the mobilization of funds and the engagement of strategic partners, it is proposed to hold a meeting that will bring investors, donors, financial institutions and international cooperation agencies together with government representatives, large-scale ecosystem restoration project developers and leaders, as well as key international restoration experts, to discuss investment and financing options for the region. The round tables will be also an opportunity to organize special sessions for ecosystem restoration entrepreneurs and start-ups.

#### *Action 6. Promoting and facilitating a regional dialogue.*

Mechanisms to promote and facilitate a regional conversation and high-level discussions about ecosystem restoration.

- a. High level events. To promote political engagement, five high level events to discuss about progress and impact of ecosystem restoration in Latin America and the Caribbean will be organized during the 2022-2030 period. These events (which, if so decided by the countries could be included in the agenda of the meetings of the Forum of Ministers), will be designed for Ministers of Environment to have peer-to-peer discussions about ecosystem restoration policies, initiatives and challenges in the region, as well as developing capacities in mainstreaming biodiversity, ecosystems and ecosystem services into sectoral development planning. Dialogue with other leaders from public and private sectors will be considered as part of these events. A methodological guide to replicate these events at the national level will be produced. The intention is that governments and organizations across the region have access to a standardized format to hold their own high level events, making it possible to share notes, recommendations, agreements, commitments and conclusions between these events as part of a region-wide and ongoing conversation.

- b. TED-ER talks. A series of periodically scheduled short talks (15 min) modeled after the TED talks. The “-ER” suffix stands for ecosystem restoration. They would differ from standard TED talk format in that it allows for a Q&A session afterwards allowing clarification and discussion. These talks would focus on topics of interest to LAC countries regarding ecosystem restoration, followed by 30-40 minutes of questions and answers by the audience. International and regional experts on specific topics would be invited to explain a concept a challenging issue related to restoration, or propose a new idea, or present a successful project in ecosystem restoration. These would be conducted on a virtual platform and recorded, archived, and posted online afterwards. Countries could submit proposals or requests for topics to be addressed. Presentations of successful projects would follow a standard format to ensure that all three dimensions of the projects (ecological, social and economic) are covered.

Success along this pathway will result in the following expected voluntary changes:

- New or updated National Restoration Plans, in accordance with national capacities and circumstances, and explicit strategies for financing and ensuring a long-term sustainability of the initiatives, as well as coordination between biodiversity and climate co-benefits.
- New economic approaches that foster sustainable economies and productive systems, create jobs and reduce their environmental footprint.
- Explicit policies that regulate what is acceptable as a restorative action, and thus eligible to be considered towards national goals or incentives.
- New or revised legal structures that create incentives for ecosystem restoration and disincentives for ecosystem degradation.
- Increased investment in ecosystem restoration for large, medium and small-scale projects.

#### *Pathway 3. Technical capacity for developing and implementing solutions.*

Designing, implementing and sustaining large-scale ecosystem restoration projects requires site-specific relevant knowledge. This involves, in first place, the capacity for ecosystem restoration planning that optimizes needs and opportunities. This needs baseline ecological, social and economic information such as, but not limited to, ecosystem distribution and degradation status, land tenure, land use and land change, and existing and projected infrastructure. In second place, technical capacity is required to design methods to implement sustainable

land stewardship knowledge, and informed by long-term monitoring of restoration projects, and that allow upscaling ecosystem restoration regionally. In third place, it requires careful operational planning to manage the complexity of an interdisciplinary project. Finally, technical capacity is required to design and implement evaluation and monitoring tools at the project and national level, to allow countries to track their progress relative to baseline information and improve and adapt to more effective techniques.

To increase a country's technical capacity it is necessary to (a) create training structures for different stakeholder types, from restoration practitioners, to decision makers, to the public in general; (b) strengthen, support and empower the scientific community responsible for generating locally relevant information that addresses the country's needs; and (c) create new platforms to facilitate the generation of this scientific information, its dissemination and application to decision making. This pathway addresses Barriers 5 (limited technical capacity) and 6 (limited investment in scientific research).

Thus, actions along this pathway will focus on (a) supporting the generation of scientific information, (b) supporting information management and systematization, exchange and transference, (c) promoting the technical training of a new generation of professionals and technicians that participate in the design, implementation, evaluation and monitoring of ecosystem restoration projects and programs. In particular, this pathway will focus on equalizing technical capacity across the region by leveraging installed capacities in countries with longer experience in ecosystem restoration. It will also focus on non-forested ecosystems, and in particular fresh water and marine ecosystems.

The objective is that by 2025 there is (a) an information management structure that allows for generation, dissemination, synthesis and exchange of scientific, technical and traditional knowledge as appropriate on ecosystem restoration and (b) a platform to facilitate formal and non-formal training for different stakeholders at technical and professional levels.

A second objective is that by 2030, there is (a) a critical mass of researchers conducting long-term research on ecological, social and economic aspects of ecosystem restoration, (b) a significant body of ecosystem restoration know-how supported by scientific research and traditional knowledge as appropriate, (c) a vibrant network of practitioners in all ecosystems, that are capable of designing, implementing, evaluating and monitoring ecosystem restoration projects at all spatial scales, following clear best-practice principles and (d) effective mechanisms for transferring knowledge to inform regulation, motivate business practice and foster adoption of best practice.

To achieve these objectives, the following actions are proposed.

*Action 7. Assessing and identifying opportunities for investment in long-term scientific research in ecosystem restoration.* The objective of this assessment is to identify best practices, modalities, institutional arrangements for resource mobilization and investment in long-term research in ecosystem restoration, that can be used by science ministries and research and development institutions in Latin America and the Caribbean. The assessment will also look into different models used worldwide that can be adapted to the specific conditions of the countries in the region. The goal is to assist countries in the development of their internal capacity to invest on research projects that address national information needs on ecosystem restoration, as well as to develop capacities in the private sector for a greater understanding of the opportunities of restoration in the context of corporate strategies to achieve financial return, social responsibility, and/or environmental performance.

*Action 8. Ensuring regional access to knowledge in ecosystem restoration.* This is an information facility designed to manage information on ecosystem restoration and promote its dissemination and knowledge exchange. It will be based on a policy of open access and will use emerging solutions and technologies from UNEP's digital transformation strategy, including data mining and analysis tools. The platform will enable access to several types of information, such as, but not restricted to: (a) data generated by scientific research and monitoring programs; (b) photographic records of projects - images of before-and-after intervention and along the life of a project are highly valuable records that cannot be reflected in numeric databases or narratives, and may be re-used for further research; (c) scientific publications and reports- this component will operate as a reference library on research conducted in the region and allow document downloading; (d) documents based on traditional knowledge, as made available by (or with the free, prior and informed consent) of indigenous peoples and local communities, in particular those that describe their ecosystem restoration and species propagation experience and techniques. In the development of this platform special attention will be given to the identification of existing solutions that could be adapted or that could provide the main functionalities to cater for the needs regarding access to technical information on ecosystem restoration in the region.

*Action 9. Promoting collaboration for scientific analysis and synthesis in Ecosystem Restoration.* During the first year of implementation of this Action Plan, a series of meetings with leading biodiversity research centers in the region will be convened to agree on collaboration modalities to create a virtual environment to monitor and analyze patterns and trends of ecosystem restoration and conservation in the region. This collaborative

projects in complex socio-economic landscapes and to generate scientifically-based and tested techniques and protocols that are enriched with indigenous and traditional environment will operate as a regional think tank based on open science principles, facilitating the participation of experts and research groups in the production of documents that distill available information, draw general conclusions supported by the evidence and make practical recommendations. This mechanism will allow scientists in ecosystem restoration from the LAC region, to work with professionals in the social and economic sciences, managers and implementers, and with support from guest international experts. The objective of this initiative that the Forum of Ministers as well as key stakeholders have access to the scientific information needed to inform policy and decision making in the region. UNEP will work with science and research partners in the region as well as other strategic partners, to design the modalities and mobilize the funding needed to initiate the activities of the collaborative and voluntary environment around the preparation of high-level scientific analysis such as ecosystem restoration opportunity maps for Latin America and the Caribbean.

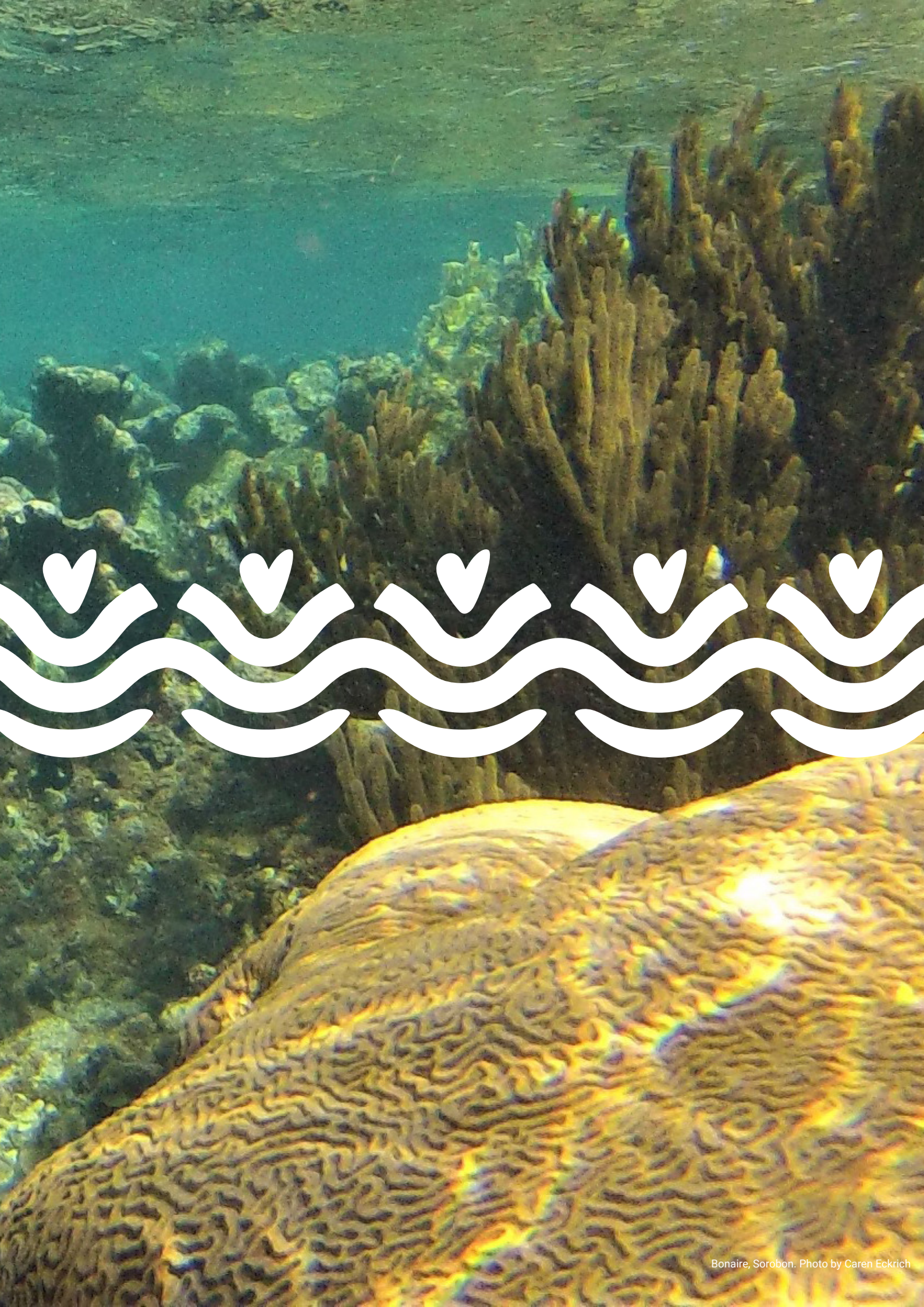
*Action 10. Training professionals in ecosystem restoration.* In collaboration with universities from the region and abroad, a series of training curricula that follow a training sequence will be designed. This platform will contain two levels, one at the technical level for technicians and operators that are responsible for day-to-day project implementation and field tasks, and another for professionals that will be responsible for designing, supervising, evaluating and monitoring projects. These programs would have a modular structure and be comprised of formal and non-formal courses that are already available at different institutions or that are created as stand-alone events. Distance learning will be promoted to reduce

costs and improve accessibility. UNEP, and other agencies, produces a vast number of guidelines and experience documents which can be transformed into online learning resources. In the short term, a MOOC (Massive Open On-line Course) available in Spanish, English, Portuguese and French, will be produced, as a “signature virtual classroom” which can contribute to the professional and educational development of students and organizations. UNEP will mobilize the funding necessary to pay the costs of this training initiative in Latin America and the Caribbean.

Success along this pathway will result in the following expected changes:

- Scientific research on ecosystem restoration is actively supported, and results are published and well disseminated.
- There is available scientific information on ecological, social and economic methods and approaches for ecosystem restoration for most ecosystems in the region
- Information is accessible to researchers, professionals, technicians and anyone interested
- Programs and decisions are based on the best scientific knowledge available, which synthesizes and integrates knowledge produced regionally and elsewhere.
- A new generation of professionals and technicians are trained on methods, techniques, and best practices for designing, implementing, monitoring and evaluating ecosystem restoration projects.





## IV. Implementation Mechanisms.

### General approach

UNEP's Office for Latin America and the Caribbean will serve as the Secretary for this Action Plan together with FAO as co-lead agencies for the UN Decade on Ecosystem Restoration. The Working Group on Biodiversity of the Forum of Ministers of Environment of Latin America and the Caribbean will steer, guide and oversee the implementation of this Action Plan. This will ensure that Member States are fully involved in the planning, execution, monitoring, and evaluation of the activities and initiatives under the Action Plan. Progress reports on the implementation of the plan will be presented at the official meetings of the Forum of Ministers. Such reports, which will be prepared by the Secretariat and approved by the Member States in the region, will also be presented to the Secretariat of the UN Decade on Ecosystem Restoration to inform about region-wide outcomes and outputs contributing to the Decade.

Once approved, the Secretariat will use this Action Plan to prepare a project document that will be presented to donors as to ensure that the general activities of the Plan can be implemented. Specific actions proposed in the Plan will be converted into child projects. This modular approach gives flexibility to the options and modalities for the implementation of the Plan.

Member States in the region will set the priorities for the implementation of the Action Plan. The Secretariat will ensure that the implementation effectively adds value, its participative and delivers according to the needs and priorities of the countries. It will avoid any kind of duplications, it will promote synergies and region-wide cooperation, and it will not add burdens regarding reporting (or of any other kind) to the countries.

Participation of the countries in the activities of the Action Plan, and in the use of the products and services provided by this plan will be voluntary and will be adapted to the specific conditions of each country.

The Action Plan will also foster strategic partnerships relevant for Latin America and the Caribbean, and according to the guidelines of the Partnership Framework of the UN Decade on Ecosystem Restoration.

### Support to the development of specific ecosystem restoration projects

In addition to the actions towards the development of cooperation mechanisms and enabling conditions at the regional level, this Action Plan will also seek to support the development of ecosystem restoration projects across the region, especially at the subregional level in transboundary biomes or ecoregions. As requested by Barbados, in their role as Presidency of the XXI Forum of Ministers of Environment, the overall approach is to translate the framework into project proposals to help mobilizing large-scale investments for ambitious ecosystem restoration projects, such as for instance a large-scale project to restore coral reefs in the Caribbean. Such projects should aim at attracting development and commercial banks, international cooperation agencies, and other potential donors, interested in working with governments in supporting these ecosystem restoration and recovery initiatives.

Such projects might follow the structure and approach proposed by Barbados:

*Component 1. Voluntary identification of Target Areas for Ecosystem restoration.*

*Component 2. Support by UNEA for restoration areas identified voluntarily by each country.* For each of the identified areas an Implementation Plan will be prepared, with suggestions, as appropriate outlining policies and plans to prevent ecosystem degradation, in line with national laws, capacities and priorities.

Countries might consider the following criteria, when voluntarily defining the identified areas

- The importance of the ecosystem approach for the integrated and sustainable management of land, water and living resources and the need to step up efforts to tackle desertification, land degradation, erosion and drought, biodiversity loss water scarcity, climate change, and agricultural productivity and food production, which are seen as major environmental, economic and social challenges for global sustainable development, in accordance with national circumstances, capacities and priorities.
- The contribution to the implementation of the post-2020 global biodiversity framework, as appropriate.

- The need for collective efforts to promote sustainable development in the following dimensions—innovative, integrated, coordinated, environmentally sound, open and shared approaches.
- Achievement of the several targets related to ecosystem restoration contained in the 2030 Agenda for Sustainable Development and strategies for achieving them.
- The role of ecosystem restoration in climate change adaptation and its co-benefits for mitigation, in accordance with the UNFCCC and its Paris Agreement.
- The presence of social, cultural, administrative, productive, and economic conditions that favour the implementation of restoration actions.

**Component 3.** Development of alternative livelihood strategies for maintaining, creating, and improving livelihood opportunities in each of the identified ecosystem areas by Member States in the region: To build on and reinforce existing restoration initiatives to scale up good practices.

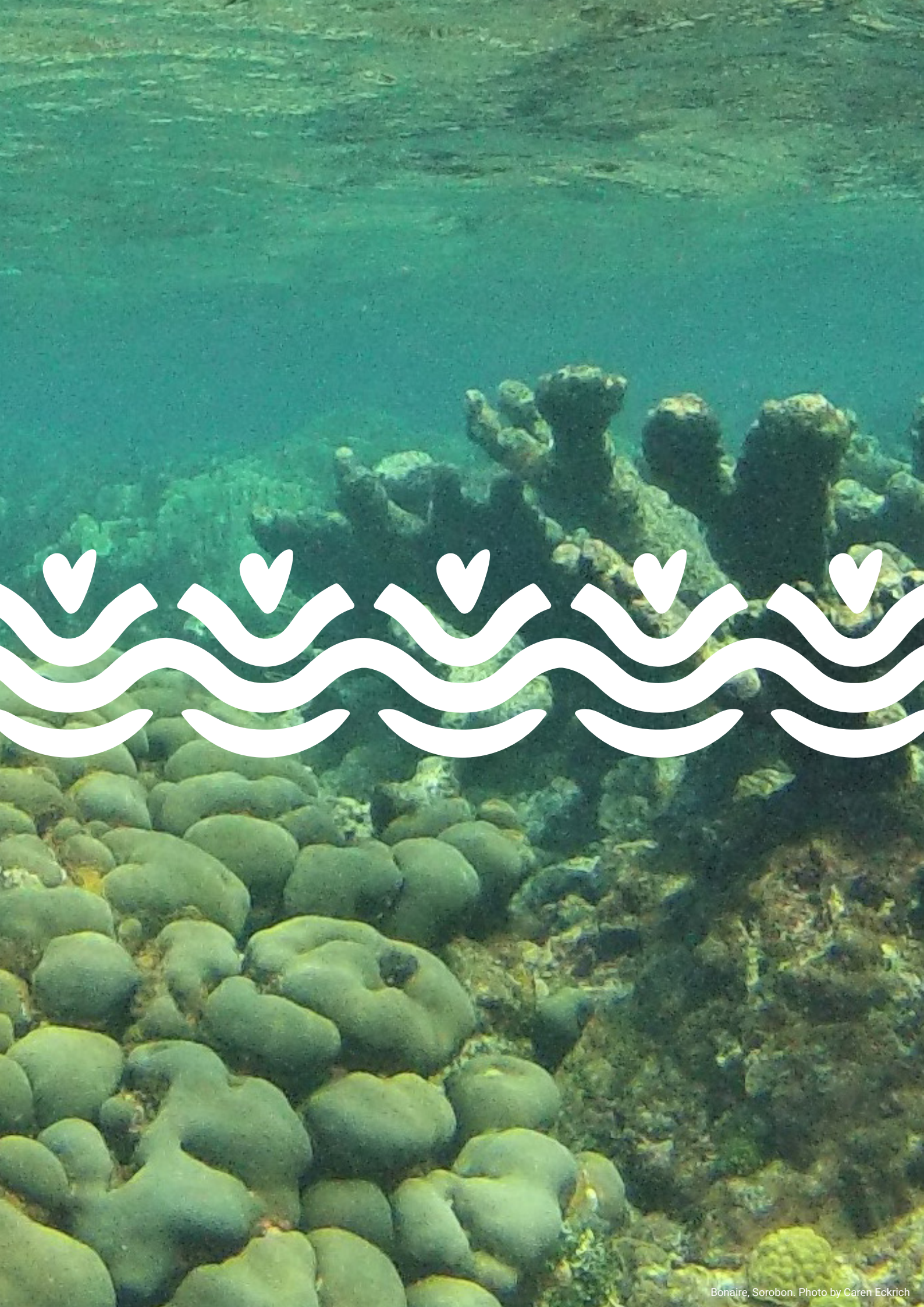
Attention will be provided to those initiatives developed by indigenous peoples and local communities, as well as projects that are co-developed by actors such as governments, non-governmental institutions, academy, local communities, private sector, and ongoing projects with long histories on restoration action, as appropriate

**Component 4.** Increasing the adaptive capacity of the Identified Ecosystems through mainstream ecosystem restoration into policies and plans to address current national, regional, sub-regional and hemispheric development priorities and challenges: To facilitate synergies and a holistic view of how to achieve international commitments and national priorities through the restoration of ecosystems. To increase the appropriation of restoration projects by local communities, in order to enhance restoration impact and facilitate its endurance for the long-term.

**Component 5.** Building Capacity including Financial Support, Promotion of Scientific Research and Regional Cooperation for ecosystem restoration at the local, national, regional, sub-regional and hemispheric levels:

- To support financially Latin America and the Caribbean countries
- To promote the sharing of experiences and good practices in ecosystem conservation and restoration.
- Development of a Knowledge Platform.
- Development of financing mechanisms dedicated to ecosystem restoration for the long-term, and better engagement of the private sector, the academy, and indigenous peoples and local communities in restoration initiatives, at the national and regional level.
- Documenting and incorporating local knowledge on restoration actions.





## V. Financial mechanisms

Implementation of this Action Plan for the Decade of Ecosystem Restoration in Latin America and the Caribbean will require financial resources both for the regional initiatives detailed here as well as for the activities carried out by each country.

The Secretary of the Action Plan will formulate a proposal (or proposals) to seek funds to implement the activities described in this Action Plan. As part of the implementation, it is envisioned the identification of mechanisms to facilitate access to financial and other resources to catalyze access by the countries to untapped funding sources, so that they can implement their national activities. In particular, efforts to implement this Action Plan will seek to leverage public finance and unlock large scale private capital by strategically mobilizing international environmental funds such as the Global Environment Facility (GEF) and Green Climate Fund (GCF) as well as different types of private investors.

A zero draft of the resource mobilization strategy will be developed with the support and guidance of the Working Group on Biodiversity and will be presented at the next intersessional meeting of the Forum of Ministers of Environment. The strategy will be formulated acknowledging the need for resources to scale up ecosystem restoration initiatives across, and recognizing the common but differentiated responsibilities of Member States, and the role of developed countries in supporting the financial national efforts of developing countries to implement these actions, as stated in Principle 7 of the Rio Declaration of 1992. Financing options must include clear social and environmental safeguards, including with regards to protecting native biodiversity and ecological processes.





## VI. Appendices

### Appendix 1. The role of Ecosystem Restoration to achieve the 2030 Agenda on Sustainable Development

Large-scale ecosystem degradation, transformation and loss affect earth's life support system. Large scale changes in biogeochemical cycles affect water availability, soil fertility, atmospheric composition, and climate regulation mechanisms (carbon sinks, evapotranspiration dynamics and atmospheric rivers) (Rockström et al. 2009, IPBES 2018a). Worldwide, forest and wetland loss continues on a net loss trend (FAO & UNEP 2020) increasingly jeopardizing the sustainability of life on earth. Furthermore, 14 of the 18 categories of ecosystem services recently analyzed by IPBES have a negative trend over the last 50 years (IPBES 2019b). Consequently, the current state of natural ecosystems is such that land degradation is already affecting negatively 3.2 billion people (over 1/3 of the global population) (UNEP & FAO 2020).

Ecological restoration has been recognized as critical to maintain or recover biodiversity, natural capital, and human wellbeing (Costanza et al. 1997, Aronson et al. 2007, Blignaut et al. 2014) in both marine and terrestrial ecosystems. Furthermore, available evidence shows that it is possible to halt and reverse the current degradation trends by scaling up restoration and conservation efforts and an overall transitioning towards sustainability (CBD 2020). Therefore, there is hope of achieving well conserved land and aquatic ecosystems that sustain life and provide services such as clean water, climate and disease outbreak control. In other words, the end result should be one where humans ensure the health of ecosystems and ecosystems support healthy human life.

The United Nations General Assembly has acknowledged that the current Sustainable Development Goals will not be achieved unless a significant effort is made to halt and reverse marine and terrestrial ecosystem degradation (UNGA 2019). Most importantly, it recognizes that Ecosystem Restoration will contribute significantly to all 17 Sustainable Development Goals, i.e., it 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 & FAO 2020).

The transition towards sustainable pathways requires a significant effort on conservation and restoration of ecosystems with a concerted and integrative cross-sectoral effort (World Economic Forum 2020). In the last decade, ambitious goals have been established throughout the world. Noteworthy is the Bonn Challenge, where more than 30 countries, including 13 from the Americas, committed to restore 150 million hectares of the world's deforested and degraded lands by 2020 (including 44.9 million hectares in the Americas), and 350 million hectares by 2030 (Sizer et al. 2015, Seixas et al. 2018).

In this context, the United Nations General Assembly declared 2021-2030 as the UN Decade on Ecosystem Restoration (UNGA 2019). The aim is to prevent, halt and reverse the degradation of marine and terrestrial ecosystems worldwide. The rationale is that ecosystems support all life on Earth, and that support is only possible if ecosystems retain or recover their health (UNEP 2015), i.e., their capacity to maintain over time their composition, processes and services (Costanza & Mageau 1999).

The UN's strategy for the Decade of Ecosystem Restoration is a call to Member States to scale up existing ecosystem restoration efforts, raise awareness of the importance of restoration, and build synergies between different economic sectors, urban development, and conservation and restoration initiatives. More specifically, it asks that Member States "... 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..."

The actions proposed as part of the UN's Strategy for the Decade in Ecosystem Restoration will not happen on a vacuum. Rather, they aim to contribute to meeting targets established by the UNFCCC Paris Agreement, the UNCCD's Land Degradation Neutrality Program, the Bonn Challenge and UNREDD+, as well as CBD's Post-2020 Global Biodiversity Framework. Simultaneous with the Decade on Ecosystem Restoration, three other new complementary initiatives are taking place: The UN Decade of Ocean Science for Sustainable Development (2021–2030), the UN Decade of Family Farming (2019–2028) and the International Decade for Action on Water for Sustainable Development (2018–2028). The actions proposed also build upon expertise emanated from a growing community of scientists and practitioners in Ecosystem Restoration and from many member countries that have been making big strides in learning how to halt degradation and catalyze restoration. Finally, a number of international stakeholders are already committed to contribute to the success of this international initiative, e.g., the Rio Convention Secretariats, the Regional Seas Convention Secretariats, IUCN, UNESCO, the Global

Landscapes Forum, the World Economic Forum, the World Bank, the World Resources Institute, and UNDP (UNEP & FAO 2020).

## Appendix 2. An overview to Ecosystems Restoration in Latin America and the Caribbean: progress and potential

Latin America and the Caribbean is a highly diverse region, biologically, geographically, politically, socially and culturally. Seven of the most biodiverse countries in the world are in the LAC region (IPBES 2018a), which is collectively comprised of 14 units of analysis (terrestrial biomes) that span from the northern temperate in Mexico to the austral forests of Patagonia, and from sea bottom to unique and extremely endemic high-elevation tropical ecosystems in the Andes and Guiana shield. A quarter of the world's forests and 40% of the Earth's known biodiversity are contained in South America, as well as the large extensions of the most diverse wetland and temperate grasslands. The Caribbean is home to 12% of the world's mangroves and 10% of the coral reefs, with 90% endemism levels (UNEP-WCMC 2016). Chile and Peru are among the top ten fish capture producers, with 3% and 8% of the world's total respectively (FAO 2020). The region also supports a human population of over 626 million (in 2015), highly concentrated in cities (80%) and with an increasing urbanization trend (UNEP 2016) that is likely to increase the demand of water and energy by 25% and 50% respectively by 2030 (Quiroga et al. 2016).

Although 20.3% of the terrestrial and marine areas are under protection, the region's natural ecosystems continue to be transformed by degradation or replacement (UNEP 2016). Transformation into human dominated landscapes has occurred in 66% and 72% of Caribbean and Central America dry forest respectively, 88% of the Atlantic tropical forest, 70% of the Rio de La Plata grasslands, 50% of tropical savanna (Cerrado) and Mediterranean forest, 15% of Mediterranean forest, 17% of the Amazon forest (IPBES 2018a), 40% of the mangroves (Valiela et al. 2001) and 66% of the coral reefs (Quiroga et al. 2016). It has been estimated that by the end of the 20th century, forest cover in the region was already below 50% (UNCCD 2019).

Although South America's rate of net forest loss decreased by about half during the 2010-2020 (relative to the previous decade), forest area in the region is still declining, with a net loss of 2.6 million hectares of forest every year in the 2010-2020 period (FAO & UNEP 2020). The exception to this downward trend is

the Caribbean, where forests increased by 45% in the last 30 years, mostly due to natural regeneration after agricultural abandonment following a transition to a tourism-based economy (UNCCD 2019). Marine and coastal ecosystems have been significantly affected as well, with only 10% coral reef remaining, and a significant loss of sea grass beds and mangroves (IPBES 2018a). Negative trends in these ecosystems are largely linked with direct exploitation (IPBES 2019b).

In spite of advances in delimitation and conservation of protected areas (CBD 2020), the high levels of loss and degradation impose a heavy burden on LAC economies (e.g., growing environmental debt on Natural Capital) and competitiveness (e.g., missed innovative business opportunities and environmental investment) (Quiroga et al. 2016). Ecosystem degradation also reduces resilience to extreme climate events. For example, mangroves and coral reefs protect beaches from erosion and infrastructure damage that result from high energy events (i.e., hurricanes and tropical storms). The frequency and intensity of these events have increased in the last few decades, causing severe beach erosion and economic loss in Cuba and other parts of the Caribbean (UNEP/GPA 2003, Paneque & Finkl 2020 and references therein).

Ecosystem degradation reduces Nature's Contribution to People (NCP) represented in ecosystems goods and services and human health and quality of life through non-material contributions and environmental regulation (IPBES 2019a). Ecosystem restoration, in turn, has been demonstrated to revert some of the negative impacts of nature's degradation (Gann et al. 2019). Restoring terrestrial ecosystem areas and connecting corridors promote the maintenance of species in multiple-use landscapes and the potential for adaptation of natural ecosystems, because corridors allow species migration across the landscape and improves their resilience to climate change (Robillard et al. 2015). Ecosystem restoration at the scale of the landscape may include urban or sub-urban settlements. In Colombia, for example, the Medellin Green Belt project's seeks to restore landscape connectivity through ravine restoration and eventually support native biodiversity and improve quality of life, while ensuring that urban centers enjoy better water availability and a closer connection of people to nature (Patiño & Miralles Garcia 2015).

Ecosystem restoration is also essential to preventing and mitigating the impacts of climate change and to increase resiliency after extreme climatic events. Mangrove restoration is an ecosystem-based approach to reduce beach erosion and protect coastal areas, especially estuaries, from extreme weather events (Barbier 2016,



Huxham et al. 2017). The interest in recovering historical ecosystems is implicit; however, it is pertinent to note that we must consider that climate change is one of the major drivers of biodiversity loss and create new environmental conditions, where current species and ecosystems may not find optimal conditions.

The link between human health and ecosystem health is well demonstrated, and the evidence is mounting. Aside from the more obvious effects of extreme climatic events on human health, a wide range of health conditions, such as allergies and immune disorders, emerging zoonoses (diseases that cross from animals to humans, as suspected with SARS-CoV2), and mental health disorders, have been linked to environmental degradation (Breed et al. 2020). As urbanization removes humans' bond to natural ecosystems and as ecosystems degrade, threats to human health will only accumulate, with their concomitant reduction in quality of life, loss of lives and negative economic impacts. Restoring ecosystems restores and secures human well-being, including that of urban dwellers. In Brazil, for example, the Mamirauá Sustainable Development Reserve, which started with a community-based fish population restoration, has resulted in a significantly improved quality of life that includes improvement in health parameters (Moura et al. 2012, Peralta & Lima 2013). Furthermore, the GEO-6 overarching theme "Healthy Planet-Healthy People" recognized the merit of this connection (UNEP 2016).

While starting and scaling up ecosystem restoration is challenging for the region, it also opens many opportunities beyond the recovery of species and ecosystem attributes and services. In the LAC region, many countries have moved forward with the elaboration of their national REDD+ Strategies and the corresponding analysis of the main drivers of deforestation and forest degradation. For example, Ecosystem Restoration programs begin with an analysis of the factors that contribute to the degradation in the first place. This

analysis is conducive to addressing baseline societal and economic issues (Gann et al. 2019, Ceccon et al. 2020). An effort to restore arid zones in Patagonia, for example, Argentina has initiated a process to consolidate sustainable productive units that aim to resolve the drivers of the initial arid zone degradation and provide ecological literacy to the local community (Busso & Pérez 2018).

Community engagement is among the key foundations of restoration success. Community-based restoration and management not only improve ecosystem services and benefits, but is integral to income security and increasing social capital (Jacobs et al. 2015). In Colombia, for instance, ecosystem restoration engages local communities that include indigenous peoples, rural communities (recently involving also reintegrated FARC ex-combatants), academics, and government agencies in a collective development of ecosystem restoration in a productive landscape (Ceccon et al. 2020). Two of its goals are to "facilitate the social understanding of the meaning of ecological restoration and its ecological, human, socio-economic, and cultural values" and to "promote a collective learning process about basic concepts of ecology related to environmental problems in rural communities".

Finally, in light of the undeniable severe effects on society and the global economy, ecosystem restoration rises as an alternative of hope, in the post-CoVid19 recovery phase. Ecosystem restoration provides excellent opportunities to quickly reactivate local economies through new jobs that may evolve as ecosystems develop and project stewardship and management needs change. In the US, for example, restoration supports on average 33 direct jobs per \$1 million invested, which exceed by 6 the oil and gas industry with 5.2 jobs per \$1 million invested (BenDor et al. 2015a, BenDor et al. 2015b); in Ghana, it is estimated that restoring 2 million hectares by 2030 will create about 89,000 jobs (Dave et al. 2019).



## VII. REFERENCES

- Aguiar, M. and M. Román. 2007. Restoring forage grass populations in arid Patagonian rangeland. Pages 112-121 in J. Aronson, S. J. Milton, and J. Blignaut, editors. *Restoring natural capital: science, business, and practice*. Island Press, Washington, DC, USA.
- Armesto, J. J., S. Bautista, E. Del Val, B. Ferguson, X. García, A. Gaxiola, H. Godínez-Álvarez, G. Gann, F. López-Barrera, and R. Manson. 2007. Towards an ecological restoration network: Reversing land degradation in Latin America. *Frontiers in Ecology and the Environment* 5:w1-w4.
- Aronson, J., S. J. Milton, and J. N. Blignaut. 2007. Restoring Natural Capital: Definitions and rationale. Pages 3 - 8 in J. Aronson, S. J. Milton, and J. N. Blignaut, editors. *Restoring Natural Capital: Science, Business and Practice*. Island Press, Washington, D. C. USA.
- Aronson, J., P. H. S. Brancalion, G. Durigan, R. R. Rodrigues, V. L. Engel, M. Tabarelli, J. M. D. Torezan, S. Gandolfi, A. C. G. de Melo, P. Y. Kageyama, M. C. M. Marques, A. G. Nave, S. V. Martins, F. B. Gandara, A. Reis, L. M. Barbosa, and F. R. Scarano. 2011. What role should government regulation play in ecological restoration? Ongoing debate in São Paulo State, Brazil. *Restoration Ecology* 19:690-695. DOI:10.1111/j.1526-100X.2011.00815.x
- Arora, N. K. and J. Mishra. 2020. COVID-19 and importance of environmental sustainability. *Environmental Sustainability* 2020:1-3. DOI:10.1007/s42398-020-00107-z
- Barbier, E. B. 2016. The protective service of mangrove ecosystems: A review of valuation methods. *Marine pollution bulletin* 109:676-681. DOI:10.1016/j.marpolbul.2016.01.033
- BenDor, T., T. W. Lester, A. Livengood, A. Davis, and L. Yonavjak. 2015a. Estimating the size and impact of the ecological restoration economy. *PLoS ONE* 10:e0128339. DOI:10.1371/journal.pone.0128339
- BenDor, T. K., A. Livengood, T. W. Lester, A. Davis, and L. Yonavjak. 2015b. Defining and evaluating the ecological restoration economy. *Restoration Ecology* 23:209-219. DOI:10.1111/rec.12206
- Blignaut, J., J. Aronson, and R. de Groot. 2014. Restoration of natural capital: A key strategy on the path to sustainability. *Ecological Engineering* 65:54-61. DOI:/10.1016/j.ecoleng.2013.09.003
- Brancalion, P. H. S., P. Meli, J. R. C. Tymus, F. E. B. Lenti, R. M. Benini, A. P. M. Silva, I. Isernhagen, and K. D. Holl. 2019. What makes ecosystem restoration expensive? A systematic cost assessment of projects in Brazil. *Biological Conservation* 240:108274. DOI:10.1016/j.biocon.2019.108274
- Breed, M. F., A. T. Cross, K. Wallace, K. Bradby, E. Flies, N. Goodwin, M. Jones, L. Orlando, C. Skelly, and P. Weinstein. 2020. Ecosystem Restoration: A Public Health Intervention. *EcoHealth*. DOI:10.1007/s10393-020-01480-1
- Busso, C. A. and D. R. Pérez. 2018. Opportunities, limitations and gaps in the ecological restoration of drylands in Argentina. *Annals of Arid Zone* 57:191-200.
- Cai, Y., K. L. Judd, T. M. Lenton, T. S. Lontzek, and D. Narita. 2015. Environmental tipping points significantly affect the cost-benefit assessment of climate policies. *Proceedings of the National Academy of Sciences* 112:4606-4611. DOI:10.1073/pnas.1503890112
- Cardenas, J. C. and J. Carpenter. 2013. Risk attitudes and economic well-being in Latin America. *Journal of Development Economics* 103:52-61. DOI:10.1016/j.jdeveco.2013.01.008
- Ceccon, E., C. H. Rodríguez León, and D. R. Pérez. 2020. Could 2021–2030 be the decade to couple new human values with ecological restoration? Valuable insights and actions are emerging from the Colombian Amazon. *Restoration Ecology* 28:1036-1041. DOI:10.1111/rec.13233
- Chaves, R. B., G. Durigan, P. H. Brancalion, and J. Aronson. 2015. On the need of legal frameworks for assessing restoration projects success: new perspectives from São Paulo state (Brazil). *Restoration Ecology* 23:754-759. DOI:10.1111/rec.12267
- Costanza, R., R. d'Arge, R. De Groot, S. Farber, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R. V. O'Neill, and J. Paruelo. 1997. The value of the world's ecosystem services and natural capital. *Nature* 387:253-260.
- Costanza, R. and M. Mageau. 1999. What is a healthy ecosystem? *Aquatic ecology* 33:105-115.
- Dave, R., C. Saint-Laurent, L. Murray, G. Antunes Daldegan, R. Brouwer, C. A. de Mattos Scaramuzza, L. Raes, S. Simonit, M. Catapan, G. García Contreras, A. Ndoli, C. Karangwa, N. Perera, S. Hingorani, and T. Pearson. 2019. Second Bonn Challenge progress report. Application of the Barometer in 2018. IUCN. Gland, Switzerland. <https://portals.iucn.org/library/sites/library/files/documents/2019-018-En.pdf> Retrieved 1 Dec 2020 de Groot, R. S., J. Blignaut, S. Ploeg, J. Aronson, T. Elmqvist, and J. Farley. 2013. Benefits of investing in ecosystem restoration. *Conservation Biology* 27:1286-1293. DOI:10.1111/cobi.12158

- DeAngelis, B. M., A. E. Sutton-Grier, A. Colden, K. K. Arkema, C. J. Baillie, R. O. Bennett, J. Benoit, S. Blitch, A. Chatwin, and A. Dausman. 2020. Social factors key to landscape-scale coastal restoration: lessons learned from three US case studies. *Sustainability* 12:869. DOI:10.3390/su12030869
- FAO. 2020. The state of the world fisheries and aquaculture: Sustainability in action. Food and Agriculture Organization of the United Nations, Rome, Italy. <http://www.fao.org/documents/card/en/c/ca9229en> Retrieved 1 Nov 2020
- FAO and UNEP. 2020. The state of the world's forests 2020. Rome, Italy. <http://www.fao.org/documents/card/en/c/ca8642en> Retrieved 1 Nov 2020
- FAO & WRI. 2019. The road to restoration: A Guide to identifying priorities and indicators for monitoring forest and landscape restoration. Rome, Italy & Washington D.C. USA. <http://www.fao.org/documents/card/en/c/ca6927en/> Retrieved 27 Nov 2020
- Gann, G. D., T. McDonald, B. Walder, J. Aronson, C. R. Nelson, J. Jonson, J. G. Hallett, C. Eisenberg, M. R. Guariguata, and J. Liu. 2019. International principles and standards for the practice of ecological restoration. *Restoration Ecology* 27:S1-S46. DOI:10.1111/rec.13035
- Gligo, N., G. Alonso, D. Barkin, A. Brailovsky, F. Brzovic, J. Carrizosa, H. Durán, P. Fernández, G. Gallopín, J. Leal, M. Marino de Botero, C. Morales, F. Ortiz Monasterio, D. Panario, W. Pengue, M. Rodríguez Becerra, A. Rofman, R. Saa, H. Sejenovich, O. Sunkel, and J. Villamil. 2020. La tragedia ambiental de América Latina y el Caribe. Libros de la CEPAL, N° 161 (LC/PUB.2020/11-P). Comisión Económica para América Latina y el Caribe (CEPAL), Santiago, Chile.
- Greiner, J. T., K. J. McGlathery, J. Gunnell, and B. A. McKee. 2013. Seagrass restoration enhances "blue carbon" sequestration in coastal waters. *PLoS ONE* 8:e72469. DOI:0.1371/journal.pone.0072469
- Holl, K. D. and R. B. Howarth. 2000. Paying for Restoration. *Restoration Ecology* 8:260-267. DOI:10.1046/j.1526-100x.2000.80037.x
- Holl, K. D., M. E. Loik, E. H. Lin, and I. A. Samuels. 2000. Tropical montane forest restoration in Costa Rica: overcoming barriers to dispersal and establishment. *Restoration Ecology* 8:339-349.
- Huxham, M., A. Dencer-Brown, K. Diele, K. Kathiresan, I. Nagelkerken, and C. Wanjiru. 2017. Mangroves and people: Local ecosystem services in a changing climate. Pages 245-274 in V. H. Rivera-Monroy, S. Y. Lee, E. Kristensen, and R. R. Twilley, editors. *Mangrove ecosystems: A global biogeographic perspective*. Springer, Cham, Switzerland.
- International Resource Panel (IRP). 2019. *Global Resources Outlook 2019: Natural resources for the future we want*. United Nations Environment Programme. B. Oberle, Bringezu, S., Hatfield-Dodds, S., Hellweg, S., Schandl, H., Clement, J., and Cabernard, L., Che, N., Chen, D., Droz-Georget, H., Ekins, P., Fischer-Kowalski, M., Flörke, M., Frank, S., Froemelt, A., Geschke, A., Haupt, M., Havlik, P., Hübner, R., Lenzen, M., Lieber, M., Liu, and L. B., Y., Lutter, S., Mehr, J., Miatto, A., Newth, D., Oberschelp, C., Obersteiner, M., Pfister, S., Piccoli, E., Schaldach, R., Schüngel, J., Sonderegger, T., Sudheshwar, A., Tanikawa, H., van der Voet, E., Walker, C., West, J., Wang, Z., Zhu,, editors. Nairobi, Kenya. <https://www.resourcepanel.org/global-resources-outlook-2019> Retrieved 1 Nov 2020
- IPBES. 2018a. The IPBES regional assessment report on biodiversity and ecosystem services for the Americas. Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany. <https://doi.org/10.5281/zenodo.3236252> Retrieved 1 Nov 2020
- IPBES. 2018b. The IPBES assessment report on land degradation and restoration. Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany. <https://doi.org/10.5281/zenodo.3236252> Retrieved 1 Nov 2020
- IPBES. 2019a. Global Assessment Report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, DRAFT 31 May 2019. IPBES secretariat. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo, editors. Bonn, Germany. <https://ipbes.net/global-assessment> Retrieved 1 Nov 2020
- IPBES. 2019b. Summary for policymakers of the Global Assessment Report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. IPBES secretariat. J. S. S. Díaz, E. S. Brondizio E.S., H. T. Ngo, M. Guèze,, A. A. J. Agard, P. Balvanera, K. A. Brauman, S. H. M. Butchart, K. M. A. Chan, L. A. Garibaldi, K. Ichii, J. Liu, S. M. Subramanian,, P. M. G. F. Midgley, Z. Molnár, D. Obura, A. Pfaff, S. Polasky, A. Purvis, J. Razaque, B. Reyers, R. Roy Chowdhury, Y. J. Shin,, and K. J. W. I. J. Visseren-Hamakers, and C. N. Zayas, editors. Bonn, Germany. <https://ipbes.net/global-assessment> Retrieved 1 Nov 2020
- Jacobs, D. F., J. A. Oliet, J. Aronson, A. Bolte, J. M. Bullock, P. J. Donoso, S. M. Landhäusser, P. Madsen, S. Peng, and J. M. Rey-Benayas. 2015. Restoring forests: What constitutes success in the twenty-first century? *New Forests* 46:601-614. DOI:10.1007/s11056-015-9513-5
- Levy, J. 2017. Ecological restoration, critical for poverty reduction. *World Bank Blogs*. <https://blogs.worldbank.org/voices/ecological-restoration-critical-for-poverty-reduction>.

- Logar, I., R. Brouwer, and A. Paillex. 2019. Do the societal benefits of river restoration outweigh their costs? A cost-benefit analysis. *Journal of environmental management* 232:1075-1085. DOI:10.1016/j.jenvman.2018.11.098
- López-Barrera, F., C. Martínez-Garza, and E. Ceccon. 2017. Ecología de la restauración en México: estado actual y perspectivas. *Revista mexicana de biodiversidad* 88:97-112. DOI:10.1016/j.rmb.2017.10.001
- Meli, P. 2003. Restauración ecológica de bosques tropicales. Veinte años de investigación académica. *Interciencia* 28:581-589.
- Moura, E. A. F., A. C. d. S. Nascimento, M. D. Valente, D. S. S. Correa, T. L. de Farias, D. R. S. da Silva, and G. d. S. Miranda. 2012. Social Development Index of localities of Mamirauá Sustainable Development Reserve, MSDR, Amazonas, Brazil. *Uakari* 8:19-34. DOI:10.31420/uakari.v8i1.126
- Murcia, C. and G. H. Kattan. 2009. Application of science to protected area management: Overcoming the barriers. *Annals of the Missouri Botanical Garden* 96:508-520.
- Murcia, C. and M. R. Guariguata. 2014. La restauración ecológica en Colombia: Estado actual, tendencias, necesidades y oportunidades. Documentos ocasionales 107. CIFOR, Bogor, Indonesia. [www.cifor.org/library/4519/la-restauracion-ecologica-en-colombia-tendencias-necesidades-y-oportunidades/](http://www.cifor.org/library/4519/la-restauracion-ecologica-en-colombia-tendencias-necesidades-y-oportunidades/) Retrieved 28 Feb 2018.
- Murcia, C., M. R. Guariguata, and E. Montes. 2015. Estado del monitoreo de la restauración ecológica en Colombia. Pages 18-26 in M. Aguilar-Garavito and W. Ramirez, editors. *Monitoreo a procesos de restauración ecológica-Aplicado a sistemas terrestres*. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt (IAvH), Bogotá D.C., Colombia.
- Murcia, C., M. R. Guariguata, Á. Andrade, G. I. Andrade, J. Aronson, E. M. Escobar, A. Etter, F. H. Moreno, W. Ramírez, and E. Montes. 2016. Challenges and prospects for scaling-up ecological restoration to meet international commitments: Colombia as a case study. *Conservation Letters* 9:213-220. DOI:10.1111/conl.12199
- Murcia, C., M. R. Guariguata, M. Peralvo, and V. Galmez. 2017a. La restauración de los bosques andinos tropicales: avances, desafíos y perspectivas a futuro. Documentos Ocasionales No. 170. CIFOR, Bogor, Indonesia.
- Murcia, C., M. R. Guariguata, E. M. Quintero Vélez, and W. Ramírez. 2017b. Análisis crítico sobre la restauración ecológica en el marco de las compensaciones por pérdida de biodiversidad en Colombia. documentos OCasiones No. 176,. CIFOR, Bogor, Indonesia.
- Paneque, R. R. and C. W. Finkl. 2020. Erosion of carbonate beaches on the northeastern coast of Cuba. *Journal of Coastal Research* 36:339-352. DOI:10.2112/JCOASTRES-D-18-00163.1
- Patiño, L. C. A. and J. L. Mirallesi Garcia. 2015. Design and management of the metropolitan green belt of Aburrá Valley, Colombia. *WIT Transactions on Ecology and The Environment* 194:193-203. DOI:10.2495/SC150181
- Peralta, N. and D. d. M. Lima. 2013. A comprehensive overview of the domestic economy in mamirauá and amanã in 2010. *Uakari* 9:33-62. DOI:10.31420/uakari.v9i2.155
- Quiroga, R., M. C. Perazza, D. Corderi, O. Banerjee, J. Cotta, G. Watkins, and 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. <https://publications.iadb.org/publications/english/document/Environment-and-Biodiversity-Priorities-for-Protecting-Natural-Capital-and-Competitiveness-in-Latin-America-and-the-Caribbean.pdf> Retrieved 1 Nov 2020
- Robillard, C. M., L. E. Cristine, R. N. Soares, and J. T. Kerr. 2015. Facilitating climate-change-induced range shifts across continental land-use barriers. *Conservation Biology* 29:1586-1595. DOI:10.1111/cobi.12556
- Rockström, J., W. Steffen, K. Noone, Å. Persson, F. S. Chapin III, E. Lambin, T. M. Lenton, M. Scheffer, C. Folke, and H. J. Schellnhuber. 2009. Planetary boundaries: exploring the safe operating space for humanity. *Ecology and Society* 14:32 [online].
- Rodrigues, R. R., R. A. Lima, S. Gandolfi, and A. G. Nave. 2009. On the restoration of high diversity forests: 30 years of experience in the Brazilian Atlantic Forest. *Biological Conservation* 142:1242-1251.
- Rodrigues, R. R., S. Gandolfi, A. G. Nave, J. Aronson, T. E. Barreto, C. Y. Vidal, and P. H. S. Brancalion. 2011. Large-scale ecological restoration of high-diversity tropical forests in SE Brazil. *Forest Ecology and Management* 261:1605-1613. DOI:10.1016/j.foreco.2010.07.005
- Rovere, A. E. 2015. Review of the science and practice of restoration in Argentina: increasing awareness of the discipline. *Restoration Ecology* 23:508-512. DOI:10.1111/rec.12240
- Ruiz-Jaén, M. C. and T. M. Aide. 2005. Restoration success: how is it being measured? *Restoration Ecology* 13:569-577.

- Sanderson, E. W., J. Walston, and J. G. Robinson. 2018. From bottleneck to breakthrough: Urbanization and the future of biodiversity conservation. *BioScience* 68:412-426. DOI:10.1093/biosci/biy039
- Schweizer, D., P. Meli, P. H. Brancalion, and M. R. Guariguata. 2019. Implementing forest landscape restoration in Latin America: stakeholder perceptions on legal frameworks. *Land Use Policy*:104244. DOI:10.1016/j.landusepol.2019.104244
- Secretariat of the Convention on Biological Diversity (CBD). 2020. Global Biodiversity Outlook 5. Montreal, Canada. <https://www.cbd.int/gbo5> Retrieved 1 Nov 2020
- Seixas, C. S., C. B. Anderson, S. Fennessy, B. Herrera-F., O. Barbosa, R. Cole, R. Juman, L. Lopez-Hoffman, R. Moraes, M., G. Overbeck, T. W. R. ownsend, and J. Díaz-José. 2018. Chapter 2: Nature's contributions to people and quality of life. Pages 53-169 in J. Rice, C. S. Seixas, M. E. Zaccagnini, M. Bedoya-Gaitán, and N. Valderrama, editors. The IPBES regional assessment report on biodiversity and ecosystem services for the Americas. Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany.
- Sizer, N., S. DeWitt, and J. Messinger. 2015. Bonn Challenge 2.0: Forest and landscape restoration emerges as a key climate solution. *Insights: WRI's Blog*. <http://www.wri.org/blog/2015/04/bonn-challenge-20-forest-and-landscape-restoration-emerges-key-climate-solution-1>. Retrieved 17 Dec 2017
- Suich, J. C. Howe and G. Mace. 2015. Ecosystem services and poverty alleviation: A review of the empirical links. *Ecosystem Services* 12: 137-147. <https://doi.org/10.1016/j.ecoser.2015.02.005>
- Steffen, W., K. Richardson, J. Rockström, S. E. Cornell, I. Fetzer, E. M. Bennett, R. Biggs, S. R. Carpenter, W. De Vries, and C. A. De Wit. 2015. Planetary boundaries: Guiding human development on a changing planet. *Science* 347. DOI:10.1126/science.1259855
- Strassburg, B. B., A. Iribarrem, H. L. Beyer, C. L. Cordeiro, R. Crouzeilles, C. C. Jakovac, A. B. Junqueira, E. Lacerda, A. E. Latawiec, and A. Balmford. 2020. Global priority areas for ecosystem restoration. *Nature*:1-6. DOI:10.1038/s41586-020-2784-9
- Tomblin, D. C. 2009. The ecological restoration movement: diverse cultures of practice and place. *Organization & Environment* 22:185-207. DOI:10.1177/1086026609338165
- UNEP-WCMC. 2016. The State of Biodiversity in Latin America and the Caribbean: A mid-term review of progress towards the Aichi Biodiversity Targets. UNEP-WCMC. Cambridge, UK. <https://naturalcapitalcoalition.org/the-state-of-biodiversity-in-latin-america-and-the-caribbean/> Retrieved 1 Nov 2020
- UNEP. 2015. Ecosystem Management: Supporting human well-being through healthy ecosystems. UNEP 2015 Annual Report. <https://www.unenvironment.org/resources/annual-report/ecosystem-management-supporting-human-well-being-through-healthy-ecosystems> Retrieved 1 Nov 2020
- UNEP. 2016. GEO-6 Regional Assessment for Latin America and the Caribbean. United Nations Environment Programme. Nairobi, Kenya. <http://www.unep.org/publications> Retrieved 1 Nov 2020
- UNEP and FAO. 2020. The United Nations Decade on Restoration Strategy. <https://www.decadeonrestoration.org/strategy> Retrieved 1 Nov 2020
- UNEP/GPA. 2003. Diagnosis of the erosion processes in the caribbean sandy beaches. Report prepared by the Environmental Agency, Ministry of Science, Technology and Environment, Government of Cuba. The Hague, Netherlands. [https://tamug-ir.tdl.org/bitstream/handle/1969.3/29241/diagnosis\\_of\\_the\\_erosion-17.pdf?sequence=1](https://tamug-ir.tdl.org/bitstream/handle/1969.3/29241/diagnosis_of_the_erosion-17.pdf?sequence=1) Retrieved 27 Nov 2020
- United Nations Convention to Combat Desertification (UNCCD). 2019. The Global Land Outlook, Latin America and the Caribbean Thematic Report. UNCCD, Bonn, Germany. <https://knowledge.unccd.int/glo/global-land-outlook-regional-reports> Retrieved 1 Nov 2020
- United Nations General Assembly (UNGA). 2019. United Nations Decade on Ecosystem Restoration (2021–2030). Resolution A/RES/73/284, 1 March 2019 <https://digitallibrary.un.org/record/3794317?ln=en> Retrieved 1 Nov 2020
- Valiela, I., J. L. Bowen, and J. K. York. 2001. Mangrove Forests: One of the World's Threatened Major Tropical Environments. *BioScience* 51:807-815.
- World Economic Forum. 2020. New Nature Economy Report II: The future of nature and business. World Economic Forum & AlphaBeta. Geneva, Switzerland. <https://www.weforum.org/reports/new-nature-economy-report-ii-the-future-of-nature-and-business> Retrieved 1 Nov 2020
- WWF. 2020. Living Planet Report 2020 - Bending the curve of biodiversity loss. Almond, R.E.A., Grooten M. and T. Petersen (Eds). WWF. Gland, Switzerland. <https://www.worldwildlife.org/publications/living-planet-report-2020>
- Zuleta, G., A. E. Rovere, D. Pérez, P. I. Campanello, B. Guida Johnson, C. Escartín, A. Dalmasso, D. Renison, N. Ciano, and J. Aronson. 2015. Establishing the ecological restoration network in Argentina: from Rio1992 to SIACRE2015. *Restoration Ecology* 23:95-103. DOI:10.1111/rec.12198

# Forum of Ministers of Environment of Latin America and the Caribbean

February 2021



Food and Agriculture  
Organization of the  
United Nations