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Manuel Ruiz Muller



Climate Change and Biodiversity in Latin America: eleven views from Policy and Economy



To Nicolas Lucas, a friend and colleague, close to this work and who succumbed to Covid-19.

Climate change and biodiversity conservation: a synthesis of the situation

Manuel Ruiz Muller, Nicole Stopfer, Giovanni Burga
Editors

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The Konrad-Adenauer-Stiftung (KAS) is a political foundation linked to the Christian Democratic Union of Germany (CDU) political party. For KAS, energy security and climate change became an important part of the structure and maintenance of a democratic social order. In response, The Regional Program for Energy Security and Climate Change in Latin America (EKLA) from the KAS was designed as a platform for dialogue, in order to give impetus to political decision-making processes on these issues. In line with this, we believe that climate change and the loss of biodiversity are inseparable and must be addressed with an economic approach for the proper use of energy, food and water resources and thus achieve the sustainable development of Latin American societies.

Therefore, this publication is positioned as a tool to better understand the environmental, social and economic links and, with this, to foster the search to establish reflections and bridges between the political narratives of climate change, biodiversity conservation and economic development in Latin America, in order to achieve points of convergence for the promotion of public policies that harmonize these three elements.

To this goal, we invite specialists from different sectors and countries to write essays from the point of view of their knowledge that address topics ranging from the synthesis of the climate change situation and the conservation of biodiversity, the economic challenges post-COVID 19 and the declarations for a better return to the importance of the circular economy, technological innovations and nature based solutions for sustainable development.

From the EKLA KAS we would like to thank Jorge Caillaux from the SPDA and our colleague from the KAS Johannes HÜgel for writing the prologues; Manuel Ruiz for the editorial co-ordination; and the specialists who have shaped this publication with their essays that we hope will be to your liking.

The views expressed in this publication are those of the authors and do not represent the views or positions of KAS.

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Prologue

Jorge Caillaux

There is no doubt that the world is going through an eventful stage in its history due to the multiplicity of risks humanity is facing. In terms of climate change and biodiversity loss, the planet is altering and losing its life systems, possibly forcing us to face the most serious existential challenges in recent centuries. The tremendous social progress since the Enlightenment and Industrial Revolution and onwards paradoxically contrasts with the disturbing environmental conditions that currently exist and are suffered by citizens.

Between the enthusiasm and skepticism, globalization and nationalism, the developed societies and extreme poverty, the world is undergoing a process of change and transition towards something as yet unknown, where there is only certainty on the role to be played and the impacts of technology in all its variations. In this context, it is important to rescue, value and support truly important efforts and leadership by some governments and civil society organizations in order to contribute in mitigating climate change effects and reversing the trends of continental and marine biodiversity loss, applying not only the knowledge from ancestral peoples, but also available scientific knowledge.

In the face of activism and political incidence, efforts from the academia and different professions to understand these environmental challenges and problems also have a role and space to comply with a dynamic function of processes and adequate decisions. Understanding the phenomena of climate change and biodiversity loss from its roots and contributing through law and economics with ideas and proposals, also contributes to a complex task and sometimes to a mission that might seem impossible at this stage: to improve the planet's environmental -and social- conditions in general.

The presentation of a set of essays and reflections from Latin America proposing a critical approach based on economics, law and institutional analysis could not be more timely, due to the need to have its own regional perspectives adding to the international efforts to change the course of what we could call the "environmental history of the planet".

We live in an environment marked by a growing resistance from power spheres to scientific evidence and by the difficulties offered by the world of information to mul-

tiple actors and citizens, preventing truly critical reflections, duly supported by others that are not as detailed and much less sustained in their foundations, from prospering and allowing us to build consensus to adopt joint solutions. However, little by little, humanity is warning that there is no time to waste and demands greater awareness and concrete actions to stop a seemingly involutive process we have reached "unknowingly".

The authors of this collection of essays are breath and a breeze of fresh air. With a realistic but also positive and enthusiastic approach to what can be realistically achieved through the application of wisdom, common sense and appropriate ideas and proposals, supported by disciplines such as law and economics, the authors describe what could be generally called a form of "law and economics of climate change and biodiversity", thereby encapsulating part of a necessary multidisciplinary perspective required by the complexity of climate change and biodiversity loss problems.

In this regard, it provides a contribution from Latin America towards the world in the reflection and debate for a new economy placing nature and humanity at the center of production and trade of goods and services strategies. This work of synthesis and reflection has never been timelier and more necessary.

Jorge Caillaux Zazzali

President of the Peruvian Society for Environmental Law

Lima, December 11, 2021

Prologue

Johannes Hügel

During the International Climate Conference, known as Conference of the Parties 2015 (COP21), the "historic" Paris Agreement was established whereby all State Parties committed to transforming the global economy in order to become environmentally friendly. Since then, a lot has happened. Initially, there was a sense of joy and enthusiasm to work together against climate change, which is affecting the entire world in very different manners, especially in Latin America. However, we are now facing disappointing realities with major impacts.

A major accomplishment of the Agreement was that the largest greenhouse gas producers, the United States of America and China, ratified the Agreement. It is therefore also disappointing to realize that the Agreement depends to a large extent only on the will and concrete commitment of two major powers.

Under the administration of President Donald Trump, the U.S. withdrew from the agreement and returned under the administration of Joe Biden. In the case of China, very significant differences persist between climate policy commitments and reality. On one hand, they announce with great visibility that they want to achieve climate neutrality by 2060 yet, on the other hand, they still get 60% of their electricity from coal-fired plants. They are currently building 200 new coal-fired plants and reopening 150 coal mines, which intensifies their reputation as the largest producers of CO₂. It is also not surprising that Chinese President Xi Jinping did not even participate in this year's climate conference in Glasgow.

In addition to these unfortunate signs concerning climate and biodiversity conservation, there is the coronavirus (COVID-19) global pandemic. The latter represents an enormous challenge for Latin America and the Caribbean with its economic and social effects. It is comprehensible that in many countries of the region, other issues seem to be high on the agenda, displacing climate and biodiversity conservation.

Even more important, in my indispensable view, is sending a signal and seeking opportunities to work on sustainable economic and political measures. These will help to address today's structural challenges in a different and innovative manner. At the same time, climate change mitigation, adaptation and care for the environment can be promoted. Latin America seems to be bound for this, on one hand, due to the Amazon rainforest as the green lung of the planet and, on the other hand, for its unique flora and fauna biodiversity which is present throughout the continent.

This publication and set of essays is aimed at providing the reader with a general overview of the current situation in Latin America with respect to climate and development challenges, in the context of the COVID-19 pandemic recovery phase, and to present instruments, explanations and statements of different regional and intercontinental strategies regarding the care of the environment and biodiversity.

In a series of concrete proposals on how to counter biodiversity loss in the region and combat climate change, creativity based on reason is evidenced, which raises optimism towards the future. Among these are technological approaches to halt or slow climate change, a further reflection on the opportunities and costs of implementing the Paris Agreement, as well as the circular economy model for Latin America. Concrete projects from the region are also presented, such as the Peruvian proposal for a CO2 market in Latin America, or the Chilean proposal for a sustainable fishing concept to recover ecosystems and marine species.

With a realistic and scientific perspective on the local circumstances in Latin America, the Authors present future-oriented ideas and projects that provide the opportunity for a true fresh start.

The ambitious proposal is a climate change and biodiversity economy and policy, which is worth considering in detail. I hope the book as well as the ideas it contains can reach many readers and be effectively disseminated, leading to concrete policy actions.

Johannes Hügel

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Berlin, November 10th. 2021

Introduction

Humanity faces unprecedented environmental problems. The social and economic effects of biodiversity loss and climate change present challenges that seem increasingly complicated to address and particularly solve, even with the most advanced technologies and express international and national efforts and commitments.

The most recent United Nations report on climate change raises a "code red" in the sense that environmental, social and economic impacts from climate change are becoming exacerbated and are already being felt unequivocally, reflected in more intense and severe droughts with a consequent increase in severe forest fires on all continents, rising sea levels and impacts on small island states, and increases in global temperature averages that are generating dramatic problems for agriculture at all latitudes - to name just a few. Equally dramatic are the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) reports that describe an unabated pattern of sustained loss of marine and continental biodiversity with no signs of slowing down. All this is the irrefutable product of relentless human activity and intervention in nature.

For Latin America, given its extreme vulnerability, this situation is of doubly concerning. On one hand, the need to facilitate development and progress and balance this with costly national climate change mitigation measures (despite the regions relatively low but growing contribution to greenhouse gas emissions) and, on the other, the urgent need for public and private investment to adapt cities and rural communities to the effects of changing and more intense climate events. Likewise, despite being the region with possibly the greatest biodiversity on the planet, the demands for energy, infrastructure, renewable natural resources, the expansion of the agricultural frontier and a growing population impoverished by the systemic crisis unleashed by the Covid-19 pandemic, challenges even the most determined in their search for reasonable and efficient solutions that meet government commitments towards the environment and the imperative needs of the people.

The reasons for this dramatic and complex situation are known and have been extensively and thoroughly documented over the last decades in multiple documents, including several multilateral reports. The speed of changes and inability of States/governments to respond appropriately and in a timely manner, raises the need for both the region and the world to reflect on how Latin America can specifically address the challenges of climate change and biodiversity loss through the lens of economy and public policies. This can help meet at least three objectives. First, it allows to clearly distinguish and make visible the problems under consideration; second, it gives Latin America a voice to draw the attention of other countries, particularly industrialized

countries, on what concerns and limits the possibilities of overcoming institutional, technological, social, cultural and political challenges; and finally, it contributes to a still limited literature and synthesis that brings together renowned authors and expert analysts on issues related to climate change and biodiversity loss. Without losing sight of the interdisciplinary nature of the analysis of complex events, this set of policy and economic essays offer a hopefully interesting and useful window to understand and justify mitigation, adaptation and incentive measures in order to avoid the loss of biodiversity or its recovery.

This group of eleven essays is inserted in a context where the Covid-19 pandemic and the quasi paralysis of the world for almost two years, offer an space and opportunity to help relaunch a positive global and national agenda aimed at slowing down biodiversity loss and decisively confronting climate change on its different fronts of mitigation and adaptation. One of the first calls in this regard was made from Latin America under the slogan of a "new renaissance" for the planet when, in mid 2020, a group of personalities and institutions from the region launched the "Principles for a Sustainable Future for Latin America in Times of Pandemic and Global Crisis", outlining guidelines and principles for the decisive social, economic and environmental reconstruction of the planet. This is one of many declarations and statements pointing to the idea of "building back better" post Covid-19 and seeking to put countries and societies back on the path towards effective and measurable sustainable development.

Towards this end, the publication "Climate Change and Biodiversity in Latin America: 11 Views from Policy and Economics" calls upon a group of renowned experts from Latin America to offer their reflections on the economics and policy of climate change and biodiversity conservation. This is not an academic type of publication, although it has demanded rigorousness of the data and information it presents. On the contrary, the essays are personal reflections on critical issues of special relevance for the region. It is important to recognize that, as with many of the major global problems afflicting the planet, climate change and biodiversity loss will not be solved by a single discipline or perspective. Both require multidisciplinary approaches. However, this publication attempts to focus on public policies, legal frameworks and economics, from a regional perspective, as tools for change and support for the ambition and action required to reverse the aforementioned trends. However, they are certainly not enough in themselves and this recognition is made a priori.

The book is divided into two main sections or parts. The first section offers data, information and some elements of the political and economic context that provide the basis and support for different approaches and practical tools to address climate change and biodiversity loss. Ana María Hernández presents a frank and crude synthesis or "photograph" of the critical situation of biodiversity and climate patterns in Latin America, from the perspective of the Intergovernmental Science and Policy Platform on Biodiversity and Ecosystem Services (IPBES) as quite possibly the most authorized intergovernmental body to make objective assessments of the state of the

environment and its components. In addition, Marcia Tambutti and Jeannette Sánchez describe the social and environmental challenges facing the region based on a review of the data and economic information in the context of the crisis generated by the Covid-19 pandemic and its variants. Grethel Aguilar and Manuel Ruiz Muller, use these factual references about Latin America to focus on regional and international instruments that define paths and paths to overcome these challenges as part of the post-Covid-19 “building back better” movement, echoing the opportunities and real possibilities that exist for sustainable development in highly volatile times on all fronts. In the final essay of this section Daniel Klein and Pia Carazo analyze the Paris Agreement as the great “umbrella” framework for public policies required to mitigate climate change, particularly by reducing the production of greenhouse gases. Both authors take a positive view of mitigation opportunities and instruments in the Paris Agreement and guide the reader into how they may be appropriately implemented by countries.

To initiate section two of the book with a positive and constructive tone, Manuel Ruiz Muller offers a reflection on how ingenuity, technology and human creativity can generate effective and efficient responses to counteract some of the problems and challenges of climate change and biodiversity loss. The author looks at examples related to local monitoring of weather patterns, determination of the characteristics of forest canopies, or improvement of crops by applying biotechnology to address growing food insecurity due to changes in microclimates in many areas. Henrique Pacini offers reflections on a relatively new “discipline” that is beginning to gain traction as an alternative to provide productive processes and the daily lives of individuals the tools to improve and make their processes and the disposition and reutilization of energy and waste more efficient. He centers his attention on the Circular Economy and how Latin America is beginning to incorporate its principles into their its own development and environmental agendas and efforts. To specifically see how the carbon market is operating in Latin America, Samín Vargas explains the set of changes that have taken place in several countries of the region in terms of taxation, mainly to encourage a carbon market that contributes -in some way- to mitigate global warming and generates an economy of scale sufficiently robust to attract investors and create virtuous circles among economic agents, with visible and measurable impacts both regionally and globally. Jaime Echevarría describes how Costa Rica, an emblematic country in terms of its environmental responsibility and commitment to sustainability, is finding solutions to the problems of climate change and biodiversity loss in the areas of taxation, protected areas, sustainable tourism and integration between sectors. But he also argues that preferred mitigation measures should go hand in hand with adaptation, particularly in the case of Costa Rica. Joseph H. Vogel, Manuel Ruiz Muller and Klaus Angerer develop a conceptual proposal, based on the economics of information, to “transform” biodiversity into an informational economic asset with great potential to contribute to the conservation of ecosystems and natural environments. Their proposal of “bounded openness over natural information” builds on this theoretical framework by inserting it into the international debate of the Post-2020 Biodiversity Agenda. To start closing the section, but not less important, Rodrigo Oyanedel addresses a topic regularly overlooked in the literature, but of critical importance

for the region: fisheries and marine ecosystems and the different options applied to recover the former and protect the latter at national levels and through regional collaboration. Finally, Manuel Ruiz Muller offers an analysis of Nature based Solutions and their potential as both a conceptual and practical tool to support conservation and climate change in the region.

To integrate each of the authors' analysis, an epilogue is included where Manuel Ruiz Muller outlines some of the essential assumptions required by countries to get on track in and "build back better" post Covid-19, centering the commentary on three sine qua non conditions: solid institutional framework and mainstreaming of environmental issues; improved and consolidated technical and scientific capacities contributing to the political decision-making process; and unifying leaderships that look to the future and long term. Around these conditions there are many variables that must be defined at the national level, including sustainable economies to enable these conditions. But most importantly, the Epilogue suggests that ethical action -the forgotten variable- is required to overcome the new and urgent challenges this part of the Century is throwing at the world.

The situation in Latin America: relevant **and interesting** information, data and initiatives



1.

Climate change and biodiversity conservation: a synthesis of the situation

Ana María Hernández Salgar



Acronyms

CDB: Convention on Biological Diversity

IPBES: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

IPCC: Intergovernmental Panel on Climate Change

SbN: Nature-based Solutions

Introduction

Biodiversity is intimately connected to climate and this relationship is not new. For anyone who lives in and depends on ecosystems, such as local communities and indigenous peoples, the interaction is felt daily and observed integrally. For researchers studying the state and trends of biodiversity, this is also clear. It is in the decision-making process that we often see a disconnect. However, messages emerging from science and other forms of knowledge have allowed this divide to gradually close. It is well known that climate change and biodiversity loss pose significant threats to human livelihoods, food security and public health. But whilst the negative impacts on human well-being and quality of life affect all, they are felt disproportionately by communities that are socially, politically, geographically and/or economically more vulnerable.

Advances of IPBES and the IPCC

In the development of its mission and work plan since it was established in 2012, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has produced 8 themed and methodological assessments, including one on pollination, pollinators and food security, another on land restoration and degradation, four regional assessments and a global assessment on biodiversity and ecosystem services approved in 2019¹. Experts have systematically identified climate change as a key factor in biodiversity loss processes. The global assessments listed climate change as one of the top five direct drivers of biodiversity loss, with a clear tendency to be more relevant if measures are not taken in the near future.

A challenge in studying the relationship between the two issues is to reach an integrated perspective, where climate and biodiversity experts can clearly speak about the situation the planet faces if joint actions are not taken. This exercise was finally undertaken for the first time at the global level, through a joint workshop between IPBES experts and the Intergovernmental Panel on Climate Change (IPCC), resulting in a specific report on the relationship between biodiversity and climate change².

¹ See, <https://ipbes.net>

² Portner, H.O et al. (2021). Biodiversity and Climate Change Workshop Report. IPCC, IPBES. Available at, https://www.ipcc.ch/site/assets/uploads/2021/07/IPBES_IPCC_WR_12_2020.pdf



Photography by Eutah Mizushima. Source: Unsplash

Where are we today?

According to IPBES, we are currently undergoing a process of biodiversity loss and increase in climate change intensity never seen before in human history. Global assessments report that 75% the earth's land surface has been significantly altered, 85% of wetlands have disappeared, and 66% of the ocean's surface is experiencing high impacts and about half of the coral reefs have been lost since 1870. Likewise, and referring to IPCC reports, experts estimate that humans have caused an observed warming of approximately 1.0°C in 2017 compared to pre-industrial levels, and that average temperatures have increased by 0.2°C per decade over the past 30 years. The frequency and intensity of extreme weather events have increased in the past 50 years, while average sea level globally has risen at a rate of more than 3 mm per year in the last two decades. From a biological and ecological point of view, ecosystems and species with restricted distributions, those close to their tolerance limits or with limited capacity to disperse and settle in new habitats, are especially vulnerable to climate change.

According to models analyzed, even with an increase of temperature between 1.5 °C and 2 °C, significant reductions are expected in most of the geographical distribution zones of terrestrial species. Likewise, some of the effects found by the experts in-

clude desertification and degradation processes, ocean acidification, alterations in the distribution, functioning and interactions of species and ecosystems. In addition, degraded ecosystems and loss of habitats and species reduce the capacity of our biodiversity to effectively contribute to the regulation of water and climate cycles.³. For example, it is reported that species at risk of extinction are increasing disproportionately as temperature rises, from 5% with a 2°C increase to 16% with a 4.3° increase. One of the most vulnerable ecosystems to change are coral reefs, where the slightest change in temperature conditions has an enormous impact. According to several studies, with a 1.5°C increase in temperature, between 10% and 30% of reefs could be lost, and with a 2°C increase, 1% of the previous coverage would be lost. The facts rigorously analyzed lead to a clear conclusion that inevitably becomes a matter of political decision making: all efforts must be made to limit global warming to an increase well below 2°C if the adverse effects on nature and its contribution to humanity are going to be mitigated.

However, it is important to understand that impacts vary from region to region, between countries and even at the local level, depending on various factors. It is therefore key to establish monitoring mechanisms that document the principal impacts and, on that basis, develop appropriate action programs for each case.

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Climate change and unsustainable agricultural practices are the principal drivers of biodiversity loss in this region.

3 IPBES (2018): The IPBES assessment report on land degradation and restoration. Montanarella, L., Scholes, R., and Brainich, A. (eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany. 744 Available at, <https://doi.org/10.5281/zenodo.3237392>

Impacts at the regional and continental scale: the Americas

In the case of the IPBES assessment for the Americas, authors found that the increase in temperatures in the region's ecosystems and the rise in average and extreme precipitation have generated changes in the distribution and interaction between species and changes in the boundaries of ecosystems (glaciers, tropical forests, mangroves, among others).⁴ They also highlighted that climate change and unsustainable agricultural practices are the principal drivers of biodiversity loss in this region. Therefore, both the global assessment and that of the Americas show us the impacts of direct factors on our biodiversity and how climate change puts direct pressures, with evidence already identified, on species populations, community composition, ecosystem structures, among others.

This symbiotic relationship between climate and biodiversity is clear. Therefore, not only must the problems be seen jointly, but also solutions and policy responses must be addressed in an integrated manner. To this end, it is worth remembering that the main direct drivers of biodiversity loss (changes in land and sea use, overexploitation, climate change, pollution and invasive alien species) are also anchored in causes that underlie the roots of all social dynamics and generate or mobilize all transformation processes. These are known as drivers or indirect drivers of loss. They are also shared as reasons for the acceleration of climate change and are related to economics, politics, governance, institutions, development models, among others.

As a result of this complex scenario, experts call for transdisciplinary perspectives and integrated solutions that treat climate, biodiversity and human society as linked systems. And it is very important not only to listen but absolutely necessary to bring this into practical decision-making processes in order to achieve real progress.

To the extent that we make progress in actions and policies allowing us to conserve biodiversity and generate climate change adaptation and mitigation processes in a coordinated manner, we will see concrete results in the medium and long term for humans and the planet's general well-being.

⁴ IPBES Regional Assessment Report on Biodiversity and Ecosystem Services for the Americas. Rice, J., Seixas, C. S., Zaccagnini, M. E., Bedoya-Gaitán, M., and Valderrama N. (eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany. 656 pages. Disponible en, <https://doi.org/10.5281/zenodo.3236252> Regional Assessment Report on

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Forestation, which involves the planting of trees in ecosystems that have not historically been forests and reforestation with monocultures, especially with exotic tree species, can contribute to climate change mitigation, but they are often detrimental to biodiversity.

Some examples of actions: interdisciplinary, territories, restoration

A good example on how to address joint solutions can be to strengthen effective measures in natural park areas and other special conservation areas outside protected areas. It is important to emphasize effectiveness and not so much the percentage of areas. The greater the conservation and management capacity, the greater the capacity for ecosystem functionality and climate regulation. And if this can be carried out in increasingly larger areas, according to the capacity of governance, human, legal, scientific and financial support, all the better.

On the other hand, underlining the point made by biodiversity and climate experts in the IPBES reports, appropriate restoration and rehabilitating actions of damaged ecosystems are crucial to reduce the climate crisis by improving the resilience of biodiversity in the face of climate change while providing multiple contributions of nature to people⁵. According to experts, restoration is among the cheapest and most rapidly implemented nature-based climate mitigation measures but can only be effective with ambitious reductions in all human-caused greenhouse gas emissions.⁶ However, it should be kept in mind that these processes are not as easy as they may seem and the time for ecosystem recovery after restoration can vary greatly and is very important to consider. Many ecosystems can recover from perturbations, but the time scale of such processes can range from decades to centuries. Nevertheless, benefits generally far outweigh the cost and go beyond monetary valuation. On average, under its framework for thematic assessments

⁵ It is no coincidence that the 2021 - 2030 decade has been declared by the United Nations General Assembly as the Decade of Ecosystem Restoration.

⁶ Nature-based Solutions (NbS), for example, are a growing trend allowing the integration of development options at different levels, where biodiversity conservation and climate change considerations converge. See, Cohen-Sachan, E., Walters, G., Janzen, C. and Maginnis, S. (eds.) (2016) Nature-based Solutions to Address Global Societal Challenges. IUCN, Gland. Available at, <https://portals.iucn.org/library/sites/library/files/documents/2016-036.pdf>

on ecosystem restoration and degradation and based on the analysis of nine different biomes, IPBES highlights that the benefits of restoration are 10 times higher than the costs but should be seen as a long-term investment process and not strictly focused on rapid carbon sequestration.

It is also important to note at this point that, if we do not look at the bigger picture, we may adopt measures that can be harmful. That is why experts indicate that measures strictly focused on climate mitigation and adaptation can have direct and indirect negative impacts on nature and nature's contributions to mankind. One of the examples permanently seen refers to inadequate sowing processes. Forestation, which involves the planting of trees in ecosystems that have not historically been forests and reforestation with monocultures, especially with exotic tree species, can contribute to climate change mitigation, but they are often detrimental to biodiversity and have no clear benefits for adaptation; on the contrary, they seriously affect the functionality of ecosystems, putting their adaptation capacity at risk.

In short, we must integrate adaptation, mitigation, conservation and sustainable use actions intelligently in all sectors, learning to observe the different settings in which future options can be developed.

And just as technical and scientific efforts must take into account common objectives and actions for climate change and biodiversity conservation, a great effort must also be made to integrate not only national but also international policies, the allocation of financial resources, and sectorial agendas. At IPBES we have retaken the concept of "transformative change" to make an urgent call from scientific knowledge for decision making that generates truly viable alternatives for a sustainable future. In a world that is increasingly affected by climate change, the maintenance of biodiversity depends on improved and well-targeted conservation efforts, coordinated and supported by strong adaptation and innovation efforts.

Final reflection

From a scientific standpoint, the relationship between biodiversity and climate change is clear; from a territorial perspective, the impact generated by imbalances in natural processes on human wellbeing and the environment is evident. There are solutions that are being put into practice to solve the climate crisis and stop the rapid processes of biodiversity loss. However, the fundamental challenge is to integrate these solutions in a positive way for both the planet and humans. And decision-making in the political, social, economic and financial areas is a challenge to be met.

We must be aware that with speeches nothing is solved. It is real actions that tell us whether we will effectively achieve goals of the Paris Agreement, the post-2020 biodiversity framework of the Convention on Biological Diversity (CBD) and the Sustainable Development Goals. Actions require a social concert, where everyone contributes. This is necessarily a matter of cooperation and dialogue. It is collective work with the productive sectors, with private enterprises, with the academia, with indigenous peoples and local actors, with governments, governmental and non-governmental organizations, with youths, and with the community. Let us avoid being reluctant to dialogue because we are all co-responsible for the change.

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Portner, H.O et al. (2021). Biodiversity and Climate Change Workshop Report. IPCC, IPBES. Disponible en, https://www.ipcc.ch/site/assets/uploads/2021/07/IPBES_IPCC_WR_12_2020.pdf

2. Post COVID-19 environmental and development challenges for Latin America and the Caribbean

Marcia Tambutti y Jeannette Sánchez

Special thanks to colleagues Paul Wander, Gabriela Franco, Pablo Chauvet and Jose Luis Samaniego for their contribution with data and graphs and to ECLAC colleagues who have contributed with publications regarding the pandemic.

Acronyms

LAC: Latin America and the Caribbean

ECLAC : Economic Commission for Latin America and the Caribbean

FAO: Food and Agriculture Organization of the United Nations

FILAC: Fund for the Development of the Indigenous Peoples in Latin America and the Caribbean

GHG. Greenhouse Gas

ICCA: Consortium for Indigenous Territories

MIPYMES: Micro and small-scale industries

GBF: Global Biodiversity Framework

ILO: International Labour Organization

GDP: Gross domestic product

IPLCs: Indigenous peoples and local communities

Pre-pandemic socioeconomic and environmental problems in Latin America

Latin America and the Caribbean (LAC), face the COVID 19 pandemic with serious structural problems: slow economic growth (0.3% from 2014 to 2019), low productivity and investment levels, very high internal inequality and increasing asymmetry between countries compared to developed countries, culture of the privileged, informality, corruption and illegality, technological divide, social dissatisfaction, loss of biodiversity and climate vulnerability. Many of these structural problems are generalized in humanity, such as the concentration of wealth and land, but in LAC they are more accentuated (e.g., LAC is, regrettably, the most unequal region in the world).¹

Before the pandemic, half the population did not have formal jobs (76.2% in rural areas and 45.1% in urban areas) and 99.5% of the companies were small enterprises which, despite their size, represent 74.1% of the employment². This vulnerability is accentuated in the private sector associated to biodiversity, linked primarily to subsistence, self-employment, micro, small and medium enterprises, which are not part of the labor sector and are not capable of carrying out a productive reorientation on their own, for example, towards a green reconstruction. However, in LAC, 20% of the employment (64 million) depends heavily on healthy ecosystem services.³ Furthermore, globally, the economic sectors most affected by the loss of biodiversity, climate change and pollution are, at the same time, those that contribute most to its loss through their productive processes, with the consequent de-capitalization and loss of the natural capital needed both to continue producing and to provide security and well-being⁴.

1 See, CEPAL. (2021b) La paradoja de la recuperación en América Latina y el Caribe. Crecimiento con persistentes problemas estructurales: desigualdad, pobreza, poca inversión y baja productividad. CEPAL, Santiago de Chile.

2 OIT (2021) Transición justa y empleo verde en el marco de la protección de la biodiversidad en ALC (April 2021, final report/publish).

3 For example, agriculture, forestry, fishing, food, beverages and tobacco, lumber and paper, bioenergy, textiles, chemical products and tourism. CEPAL, (2019) The role of natural resources in the face of the COVID-19 pandemic.

4 See for example the reports from IPBES. 2019 Global Assessment on Biodiversity and Ecosystem Services. Available at, <https://ipbes.net> and from UNEP. Emissions Gap Report 2021, available at <https://www.unep.org/resources/emissions-gap-report-2021>

The region has been increasing the use of resources – both as raw material for exports and domestic use- in particular "renewable" products in the biomass category (e.g., soybean, corn, sugar cane) and minerals (Graph 1), under an extraction based industrial model, used less efficiently with respect to the gross domestic product⁵. This has led to serious loss of ecosystems, species populations, land and ecosystem services, affecting the well-being and security of its population, a pattern that is being repeated worldwide, where resources extracted from the planet have tripled since 1970, while the world population has doubled, and that has accelerated particularly in medium income countries since the new millennium⁶.

The region is home to 23% of the world's forests, yet it is among the regions with the highest rates of deforestation, mainly due to land-use changes for agroforestry and cattle raising purposes and the overexploitation of wild species and populations.⁷ Between 1990 and 2020, LAC lost 7% of its forest cover, 138 million hectares, equivalent to half the surface of Argentina, the eighth largest country in the world.⁸ Overexploitation is related to around 60% of the decline in fish stocks⁹ (and sea pollution) has resulted in 31 areas with eutrophication and 19 so-called "dead zones", which can cover hundreds or thousands of km² and large marine ecosystems heavily contaminated by micro and macro plastics (see Tambutti and Gómez, 2020). This strongly extraction-based model and the high regional inequality and illegality generates acute violence: despite the fact that LAC has 8.4% of the world's population and high provisions of natural resources, it leads world records in murders of natural resource defenders, according to Global Witness¹⁰

5 According to León, Lewinsohn and Sánchez (2020), LAC, particularly South America, has increased its material intensity per GDP unit since the 1980s, which implies greater inefficiency in the use of materials. León, M., Lewinsohn, J. and Sánchez, J. (2020) Physical trade balance and exchange, use and efficiency of materials in Latin America and the Caribbean, Natural Resources Series, ECLAC, Santiago de Chile.

6 PIR, (2019) Panorama de los Recursos Globales 2019: Recursos naturales para el futuro que queremos. Oberle et al. Informe del Panel Internacional de Recursos. Programa de las Naciones Unidas para el Medio Ambiente. Nairobi, Kenia.

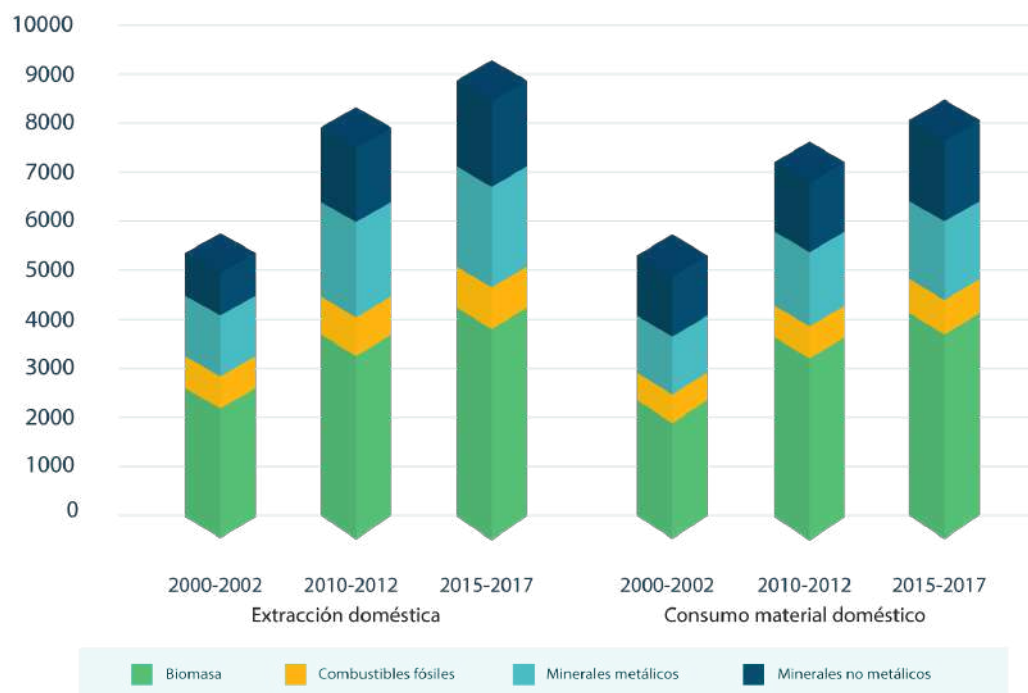
7 See reports, CEPAL (2021c) La pérdida de los bosques de América Latina y el Caribe 1990–2020: evidencia estadística. Temas estadísticos No.2 (julio) y WWF (2021) Frentes de deforestación: causas y respuestas en un mundo cambiante. Summary. Available at, https://wwflac.awsassets.panda.org/downloads/deforestation_fronts_spanish_summary_1_.pdf

8 CEPAL (2021c) Ob cit.

9 WWF (2021) Ob cit.

10 See report: Last Line of Defense (2020), Global Witness, available at, <https://www.globalwitness.org/es/last-line-defense-es/>

Graph 1. Latin America and the Caribbean (30 countries); domestic extraction and domestic material consumption, 2000-2002, 2010-2012 and 2015-2017 (in millions of tons)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the statistical basis of the UN Environment International Resource Panel Global Material Flows Database. Note: Domestic material consumption = Domestic extraction + Imports - Exports.

On the other hand, environmental institutions are relatively recent, still incomplete (for example, only 27% of the countries have environmental justice courts), with limited financial resources and political power and weak articulation with productive sectors. Although there have been advances and setbacks, the trend is towards strengthening environmental institutions including through the creation of ministries or similar level institutions, often stand-alone and independent from other sectors. Over the past decade, 61% of countries have in some way modified their environmental authorities.

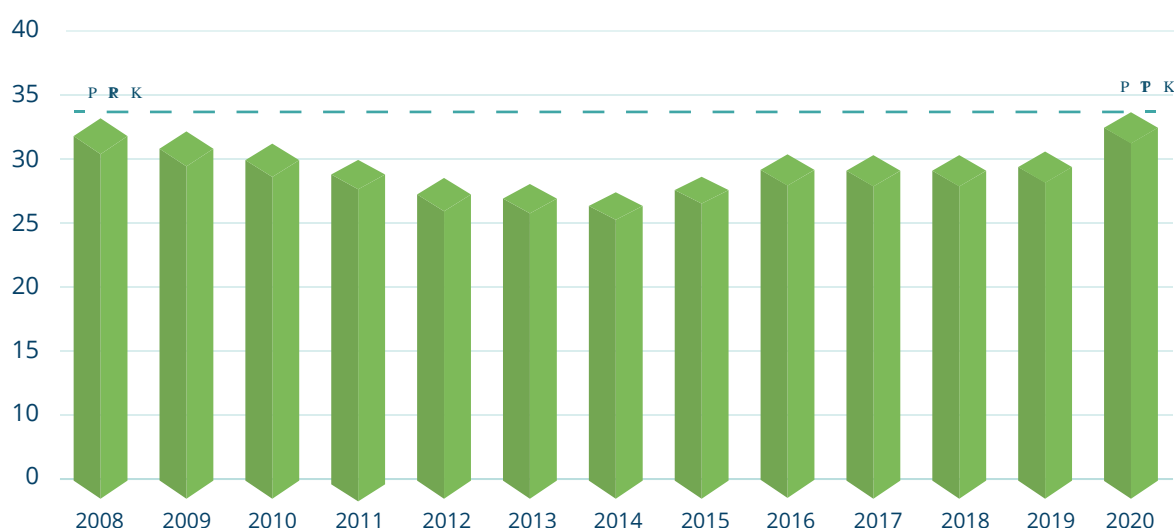
Likewise, concerning management and governance of natural resources, at a more local and in situ, a series of studies have shown that indigenous peoples and local communities (IPLCs), intimately linked to biodiversity conservation and who are a form of “custodians” of the best preserved lands, have not been sufficiently recognized and supported by governments in general.¹¹

¹¹ See, for example, the work from ICCA Consortium, at: <https://www.iccaconsortium.org> Also see, Fund for the Development of Indigenous Peoples of Latin America, <https://www.filac.org>

The socioeconomic and environmental impact from COVID in Latin America and the Caribbean

Latin America and the Caribbean are the region most seriously affected health wise, economically and socially by the pandemic. It's environmental impacts are still being assessed. With its relatively low proportion of the world population, it accounts for 32% of deaths due to COVID-19.¹² In economic and employment terms, it was also the region that declined the most in 2020, with a rate of decline of -6.8% and -9%, respectively.¹³ Employment declined by nearly 25 million between 2019 and 2020 as a consequence of the pandemic, particularly informal, female and youth employment.¹⁴ In the dramatic year of 2020, the region lost twelve years of progress towards reducing poverty levels (today at 33.7%) (Graph 2), about two decades in extreme poverty levels (today at 12.5%) and inequality grew by 2.9% (Gini index points) between 2019 and 2020.¹⁵

Graph 2. Latin America: tendencies of poverty, 2008-2020
(In percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), based on Demographic and Social Indicators: CEPAL Databases and Statistical Publications; and CEPAL (2021), "Social Panorama of Latin America, 2020". (LC/PUB.2021/2-P/Rev.1), Santiago de Chile. Notes: Latin American population experiencing poverty in percentages of the total population. The forecast for 2020 of the poverty level assumes a growth rate of 10.5%.

12 CEPAL (2021b) Ob cit.

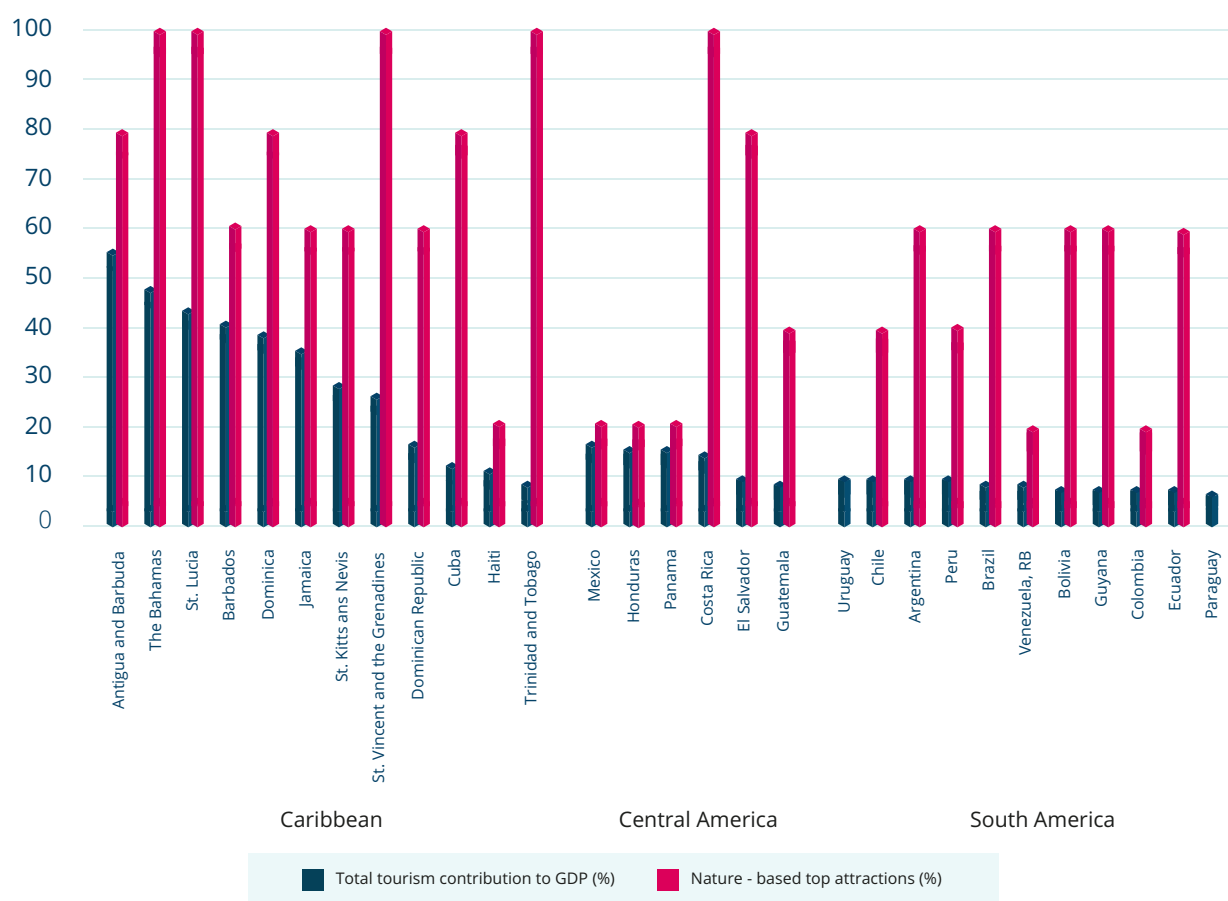
13 See, CEPAL (2021a) Estudio Económico de América Latina y el Caribe 2021: dinámica laboral y políticas de empleo para una recuperación sostenible e inclusiva más allá de la crisis del COVID-19. CEPAL, Santiago de Chile.

14 CEPAL (2021b) Ob cit.

15 Ibid.

The sector hardest hit by the pandemic has been the tourist industry, which in pre-pandemic times (2019) represented 42% of exports of goods and services in the Caribbean and 10% in Latin America, generating six million direct jobs and 15 million indirect jobs. Tourism in LAC is highly dependent on its natural heritage and the ability to travel to sites of interest (Graph 3). The Caribbean, which is home to 13 of the 20 smallest economies dependent on tourism in the world, was heavily affected and was also hit hard by severe storms, hurricanes and major hurricanes in 2019-2021 (particularly during a record year 2020), which undoubtedly makes their recovery even more difficult. Additionally, most Caribbean tourism is managed through foreign-owned companies and therefore a significant portion of the profits do not remain in the sub-region.¹⁶

Graph 3. Contribution of tourism to the GDP in LAC and the proportion of the top five nature and park-based attractions/country, according to TripAdvisor



Source: Own elaboration based on WTTC data (via the World Bank) (accessed June 29th, 2020) and TripAdvisor's top destinations guide for each country.

16 CEPAL (2021) Evaluación de los efectos e impactos de la pandemia de COVID-19 sobre el turismo en América Latina y el Caribe: aplicación de la metodología para la evaluación de desastres. CEPAL, Santiago de Chile. Available at, <https://www.cepal.org/es/publicaciones/46551-evaluacion-efectos-impactos-la-pandemia-covid-19-turismo-america-latina-caribe>

An apparent effect of the pandemic has been the increase of illegal activities, in particular illicit crop cultivation, illegal mining, timber theft, land trafficking and illegal roads by generally armed groups, who have taken advantage of this critical moment to deforest areas in indigenous territories and protected areas, as reported for five South American countries.¹⁷ An example, in another scope, is the increase by almost 74% of the illegal sale of seaweed in Chile during 2020 (against the 2017-2019 average), 69% confiscated in processing plants, despite the existence of a traceability mechanism that is clearly being violated along the entire chain¹⁸.

In contrast, the Escazú Agreement, the first treaty in the region on access to information, public participation and access to justice for environmental matters and the first in the world to guarantee the rights of environmental defenders, entered into force in April 2021, which represents a decisive commitment to address this problem, making ECLAC, who promoted the treaty together with the governments of the region, very proud.

On the other hand, another negative effect of the pandemic is the worrisome decrease of the environmental budget for central governments. In Graph 4 we see the total sum of the budgets for Argentina, Brazil, Chile, Colombia, Costa Rica, El Salvador, Honduras, Mexico, Peru, Uruguay and Dominican Republic which between 2019 and 2020 showed a reduction of 35%.¹⁹ Given the almost permanent restrictions in the environmental sector, this scenario was expected.²⁰ In addition, it is important to consider the critical cumulative effect of consecutive budget reductions that prevent proper execution of all functions and program implementation, mainly of surveillance and monitoring, which are very expensive.

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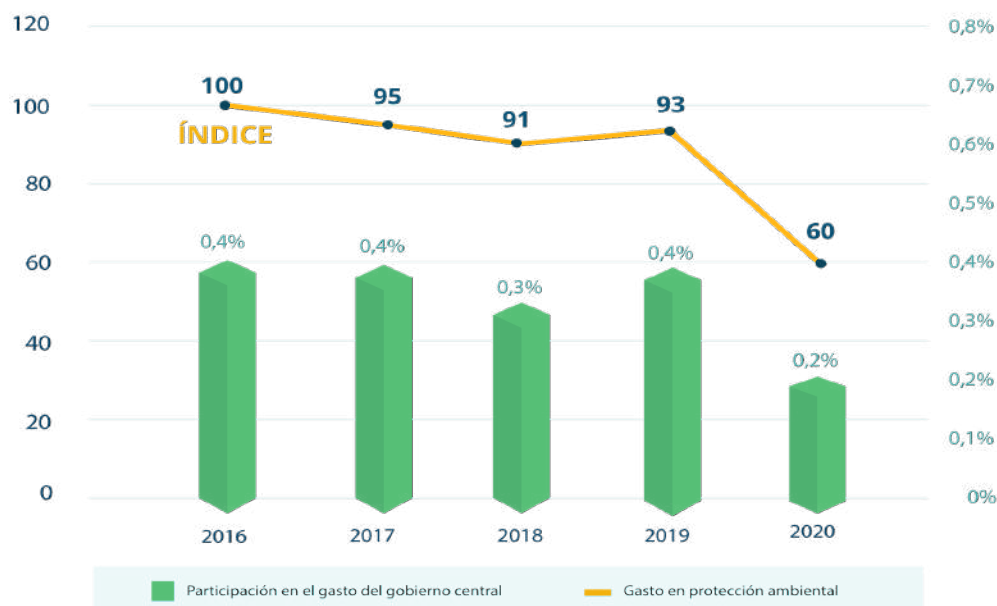
17 Ver, Mongabay LATAM, Rutas del Conflicto, La Barra Espaciadora y El Deber (2021), Mapas del delito: vigilancia satelital revela el violento impacto de la deforestación en tierras indígenas Disponible en, <https://es.mongabay.com/2021/07/mapas-del-delito-de-forestacion-pandemia-pueblos-indigenas-bosques/>

18 See, Mongabay, 24 de febrero, 2021. Chile: la cadena de infracciones detrás de la pesca ilegal de algas, por Michelle Carrere. https://es.mongabay.com/2021/02/chile-la-cadena-de-infracciones-detras-de-la-pesca-ilegal-de-algas/?mc_cid=f3c8953a6c&mc_eid=12b0ea1a5c

19 CEPAL (2021b) Ob cit.

20 CEPAL (2019) Ob cit.

Graph 4. Evolution of central government spending on environmental protection in eleven LAC countries) (Index 2016 = 100 and in percentages)



Source: CEPAL 2021b, based on national budget statistics.

The post COVID-19 rebound and the challenges for recovery

After 2019 with a strong fall in GDP, all the economies around the world recovered during 2021 as a result of a rebound from the crisis and demand incentives. However, for the year 2022, a new slowdown is expected: the projections for the world GDP growth rate are 5.9% for 2021 and 4.5% for 2022, 9% for 2021 and 4.5% for 2022; in the case of LAC, GDP had a decline of -6.8% in 2019, a rebound of 5.9% is projected for 2021 and would return to a slow growth of 2.9% for 2022 ²¹. Social problems such as informality, inequality and poverty are expected to be prolonged in time, unless measures are taken for a reactivation to transform structural imbalances.

²¹ CEPAL (2021a) Ob cit.

The different governments in the region supported their populations and economies differently, some with fiscal measures (direct transfers) and counter-cyclical monetary measures, which cushioned the impact of the crisis and saved an estimated 20 million people from extreme poverty and 21 million from poverty.²² ECLAC predicts that without continued transfers there would be 15 million more people in extreme poverty²³. There is currently greater indebtedness and a lower fiscal margin, therefore, strengthening the revenue collection capacity is a critical point for fiscal sustainability. Investment (dropping more than the GDP) and productivity are another challenge that conditions the recovery affecting employment.

There is increased pressure on natural resources or "commodities", whether renewable or non-renewable, in an attempt to alleviate the great external restriction, with concomitant environmental pressure. To this end, the aim is to reduce environmental regulations or breach them, a negative palliative that will deepen the crises. It should be noted that the agricultural sector in general maintained a resilient dynamic when compared to the GDP; in particular, rural communities have deployed better adaptation strategies to the COVID-19 crisis. On the one hand this is good news since many jobs in the region depend on this sector and, in addition, the majority of agricultural farms are small in size with an essential role in food security for the population.²⁴ However, in several countries, large-scale agroforestry and grazing activities do not require environmental impact studies, and this is highly questionable as their negative impact on biodiversity can be very high. Although the pandemic had strong reduction effects on greenhouse gases (GHG), which fell practically to levels prior to the present decade, the reactivation of the economy and an increase in the movement of people (transportation) are causing a rapid rebound in emissions (Graph 6)²⁵.

The challenge to prevent a 1.5oC increase in temperature by 2030 is of great magnitude, at a global level it implies reducing GHGs at an average rate of 7.6% each year during this decade,²⁶ It is worth mentioning that the region's GHG contributions are less than 9% of world contributions; however, the region is extraordinarily vulnerable to their negative effects,²⁷ and therefore it is in LAC's interest to push for more ambitious

22 CEPAL (2021b) Ob cit.

23 CEPAL (2021a) Ob cit.

24 See, Ibarra J.T., Caviedes, J., Barreauy, A., y Pessa, N. (2019) (Eds) Huertas familiares y comunitarias: cultivando soberanía alimentaria. Ediciones Universidad Católica de Chile. Santiago. Chile.

25 See, Samaniego, J. (2021) Panorama de las actualizaciones de las Contribuciones Nacionalmente Determinadas de cara a la COP26 (in press).

26 CEPAL (2021b) Ob cit.

27 Bárcena, A. et al. (2020) La emergencia del cambio climático en América Latina y el Caribe. ¿Seguimos esperando la catástrofe o pasamos a la acción? Libros de la CEPAL No. 160, Santiago, Comisión Económica para América Latina y el Caribe.

multilateral agreements and implementation of measures than those adopted so far in order to keep us within safer parameters. Of course, it is not only necessary to strengthen the region in climate change negotiations, but also to do the same with regional decarbonization in order to achieve the goal of not exceeding 1.5°C.

The pandemic initially also brought us out of the inertia related to views of the world we wish to live in and ambitious announcements of "building back better" or "green reconstruction" mainly by the countries with the strongest economies. However, in reality, the world is far behind these good intentions. Of the \$14.6 trillion (trillion) announced in fiscal measures in 2020 by the world's 50 largest economies, only 2.5% is for green recovery classified under five categories: green energy and transportation, green and efficient buildings, natural capital, and R&D.²⁸ Resources allocated to natural capital amounted to 56.3 billion dollars. In the case of countries in the region, the percentage is even lower: Argentina, Brazil, Chile, Colombia, Mexico and Peru total US\$ 278 billion announced for green recovery, of which US\$ 1.2 billion (0.43%) are consistent with environmental and climate goals.²⁹

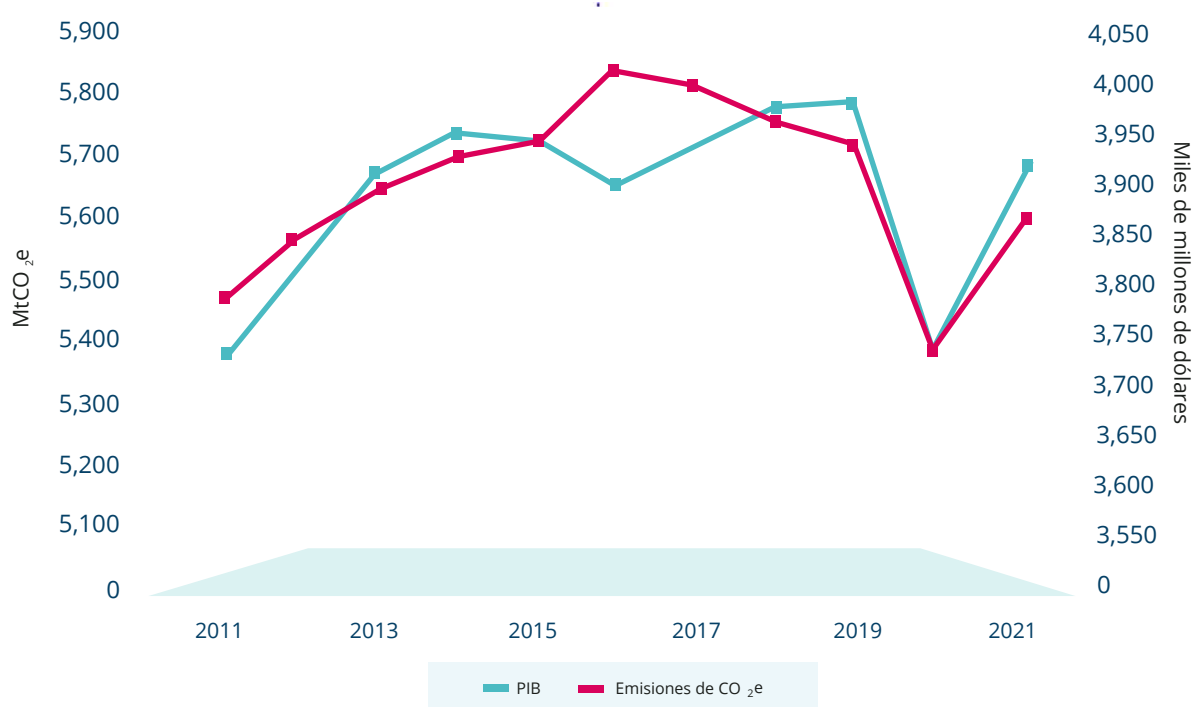
However, it should be noted that with crises come opportunities; the challenges for a green recovery could (re)take the key points of the Aichi Targets and the new post-2020 Global Biodiversity Framework (GBF) under construction in terms of their financing and implementation. Among the mechanisms identified by a group of high-level biodiversity experts from LAC during a regional dialogue,³⁰ to achieve a congruent budget with the targets of the draft post-2020 Global Biodiversity Framework, the top three priorities (52% of all options) point to reforms to harmful subsidies, the integration of biodiversity into productive sectors, national budgets and fiscal policies. The integration of biodiversity into different sectors has been the motto of the CBD COP13 and COP14 and is an essential process, as it implies integrating, harmonizing (making coherent policies and programs) and coordinating transversely across government and society as a whole and is therefore indispensable for a green recovery and a transition to sustainable development.

28 O'Callaghan B. y E. Murdock, 2021. Are we building back better? Evidence from 2020 and Pathways to Inclusive Green Recovery Spending. Summary for Policymakers. UNEP. Available at, <https://recovery.smithschool.ox.ac.uk/are-we-building-back-better-evidence-from-2020-and-pathways-for-inclusive-green-recovery-spending/>

29 CEPAL (2021b) Ob cit. based on O'Callaghan B. y E. Murdock (2021)

30 Diálogos Informales Multi-actor organizados por CEPAL y la Asociación Post 2020, con apoyo del Programa Post-2020 de la UE en agosto de 2021.

Graph 5. Latin America and the Caribbean: tendencies of Greenhouse Gas Emissions
(Period 2011-2021)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), based on the World Resources Institute, CAIT Climate Data Explorer [online] <http://cait2.wri.org>; CEPALSTAT [online database] <https://estadisticas.cepal.org/cepalstat/Portada.html>. and Samaniego, J. (2021), "Panorama de las actualizaciones de las Contribuciones Nacionalmente Determinadas de cara a la COP26". Unpublished (in press). Notes: MtCO₂e: Millions of tons of carbon dioxide equivalent. Projections for CO₂e emissions assume growth rates of -0.6, -5.2 and 3.4 for 2019, 2020 and 2021, respectively. GDP assumes a growth rate of 5.9% for 2021.

Strategic keys to meet post-COVID-19 environmental and development challenges

The pandemic has been devastating in many ways, but it has given us the opportunity to understand and reflect more on essential aspects that should be supported by society as a whole to sustain a structural change in development models: the interdependence of the world we live in, the need for everyone to be part of the solution, the fallacious and unacceptable argument of seeking solutions that do not contemplate society as a whole, especially the most vulnerable, and the essential role of the State in planning and public-private coordination. We are at a crucial point to disengage from the inertia and turn the crises into a turning point towards a more environmentally friendly and fairer lifestyle that will guarantee us all, from now on, a better quality of life, progressively recovering environmental, social and economic resilience.



Photography by Dmitry Dreyer. Source: Unsplash

Although our region faces multiple economic, social and environmental challenges, the best approach to true, inclusive and secure development in the broader context is to simultaneously, coherently and coordinately consider the social, environmental and economic dimensions, that is, by aligning the objectives of economic recovery and job creation with those of sustainability and equality. This implies a change in the paradigm of development with structural changes. Given the tax limitations of the countries in the region, it is essential to strengthen the revenue-raising capacity to ensure fiscal sustainability, for example, by targeting harmful economic incentives which are five or six times higher than those in favor of biodiversity . At ECLAC, we call this progressive structural change a Great Boost for Sustainability and it proposes to advance in policy consistency and strongly support those sectors in which an articulated set of macroeconomic, fiscal and sectoral policies, with substantial changes in public investment, industrial, technological, social and environmental policies, seek to reactivate the economy in order to narrow the social and environmental divide. Some examples are agroecology, ecosystem restoration, sustainable tourism, non-conventional renewable energies, sustainable transportation, and the circular and care economy.

31 See, <https://www.europapress.es/sociedad/medio-ambiente-00647/noticia-ocde-pide-g7-esfuerzos-medibles-frenar-perdida-biodiversidad-mayores-riesgos-presentes-20190507153812.html>

The 2030 Agenda, human well-being and the planet's health depend on us being able, from this point forward, to build a bridge between the short and the long term when facing the convergence of multiple crises. It is essential to address the crises and their solutions in a comprehensive manner, by deepening our understanding of the close interrelationships among them, including the costs and benefits for all actors, avoiding sacrificial zones and opting for a synergistic response that seriously addresses the underlying causes that trigger or exacerbate the crises. We reiterate that changing root or underlying causes requires changing society as a whole in terms of consumption patterns, understanding the connection between overconsumption and threats to the health of ecosystems, people, peaceful societies, etc

Although the region has depletion and degradation figures for natural resources, it is also a repository of traditional and innovative experiences in sustainable development, with strong potential for expansion and improvement, and the defenders under the Escazú Agreement have taken the lead in committing to the environment. Considering that social protection measures allowed the partial containment of poverty increase during the pandemic, it is advisable that the design of social transfer and employment programs that multidimensionally cover vulnerable groups that strongly depend on natural resources, virtuously strengthening the construction of a well-being State and the processes of sustainable productive transformation that are inclusive, participatory and transparent. For example, through the reciprocal integration between biodiversity and different productive sectors, the sustainable public-private co-management of natural heritage, productive diversification, support for joint monitoring with the integration of knowledge and opening of new markets. At the same time, the marked tendency of the central government to reduce the environmental budget is very disturbing and we hope the trend will be reversed.

Biodiversity can be conserved and used sustainably, while at the same, time increasing the productivity, stability and resilience of economic and productive systems, provided we change development models and production, distribution and consumption modes. Finally, we list some catalytic measures for these transformative changes:

- Strengthen institutional capacities, information and participation systems, follow-up and financing for implementation with a principle of non-regression.
- Provide sustained support to FPIC by jointly recognizing and monitoring their work, providing them with tools and resources to scale up sustainable development.
- Advance in the cross-sectoral integration of biodiversity, the harmonization and coordination of policies and instruments, emphasizing the promotion of collective and multi-stakeholder models for sustainable local production.

- Prioritize, within the central government, the containment of biodiversity loss due to direct and indirect causes, from now on through different sectors, and particularly reorient incentives that are harmful to biodiversity.
- Request authorization (prior presentation of environmental impact studies by watershed) for large-scale agroforestry and cattle grazing activities.
- Develop active multilateralism: Implement the Escazú Agreement, strengthen alternative development indices other than GDP, promote debt swaps, strengthen the approach between biodiversity, human rights and equity, the principle of common responsibilities with differentiated obligations, advance synergies and a common language between multilateral agreements to continue progressing in articulated implementation (for example, between nationally determined contributions and national biodiversity strategies).

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3.

Instruments, declarations and manifestos: conciliating diversity and profiling robust and converging regional environmental and development agendas

Manuel Ruiz Muller y Grethel Aguilar

Abbreviations

CCAD: Central American Commission for Environment and Development

CDB: Convention for Biological Diversity

ECLAC: Economic Commission for Latin America and the Andean Community

Covid-19: Virus SARS-CoV-2

EKLA: Regional Programme Energy Security and Climate Change in Latin America

IPBES: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

IPCC: Intergovernmental Panel on Climate Change

ODS: Sustainable Development Goals

ACTO: Amazon Cooperation Treaty Organization

GDP: Gross Domestic Product

UNEP: United Nations Environment Programme

REDD: Reducing Emissions from Deforestation

NbS: Nature-based Solutions

SICA: Central American Integration System

IUCN: International Union for Conservation of Nature

UNCTAD: United Nations Conference on Trade and Development

WWF: World Wildlife Fund

Introduction

In addition to the growing and justified calls to use the COVID-19 crisis to "build back better" in terms of the path to sustainable development and the multiple expressions around this by important institutions and individuals, it is equally essential to propose a dose of pragmatism and preparedness to push this ambition and not to generate unreasonable expectations.

The enormous social and economic difficulties that countries in Latin America currently face to prioritize this path towards sustainability require an understanding of some of the minimum conditions and enabling factors - institutional, social, economic - necessary for them to have a better chance of success in this critical endeavor for their future and that of the planet as a whole.

This essay addresses some issues that can contribute to the regional dialogue and conversation on how to "build back better" in practical terms. It is divided into four sections. The first presents a synthesis of the environmental and policy context in Latin America; the second section offers a summary of the different manifestations, declarations and other instruments that advocate a positive and sustainable exit from the crisis and its meaning for countries; the third section proposes some elements for the regional environmental and sustainability discussion agenda; and the essay closes with some reflections and recommendations.

The present context

Latin America is going through an extremely difficult time socially, economically and environmentally. On the latter, the Intergovernmental Panel on Climate Change (IPCC)¹ and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) have described a very grim outlook that countries of the region will not be able to face in isolation and looking inwards.²

A convoluted political context, increasingly negationist and populist, dissociated from science and hard data to inform decisions, as well as systemic corruption that cuts across the region do not necessarily contribute to generate enthusiasm and hope. The somewhat disconnected and often poorly coordinated international agendas do not contribute either. This is particularly the case of the biodiversity agenda and the agenda for climate action promoted by the Convention on Biological Diversity (CBD) and the Climate Change Convention/Paris Agreement respectively, which have only recently started to find more coherent points of contact and integration. In addition, the COVID-19 pandemic refuses to disappear or dissipate.³ This complex scenario demands decisive leadership and commitments from the young, civil society and actors convinced about the urgency of the times and to infect the lethargic political body, especially at the national level. By way of example, as a result of the social effects of the pandemic, the relaxation of environmental frameworks to accelerate economic growth at all costs is to be expected and is already palpable.⁴

In this difficult context, it is worth asking what vision of sustainable development does Latin America have for the immediate future? As countries face uncertain political and economic junctures, there appears to be no clear vision of the future or even how to envision it. However, despite all this, there is also among sectors of society, especially young people as mentioned above, a sense of the inevitability of transformative change, especially concerning the conservation and climate action agendas and their principles. These social actors – which organize in multiple ways- distance themselves

1 CDKN. (2019) The IPCC Special report on Climate Change and Land: Whats in it for Latin America? Available at, https://reliefweb.int/sites/reliefweb.int/files/resources/IPCC-Land_Latin-America_WEB_20Nov2019.pdf

2 See for example, IPBES. The Global Assessment Report on Biodiversity and Ecosystem Services. Summary for Policy Makers. (2019). Available at, https://ipbes.net/sites/default/files/inline/files/ipbes_global_assessment_report_summary_for_policymakers.pdf

3 The growing informality of the economies and a reversed migratory process (from city to countryside) are two very obvious effects of Covid-19 in Latin America that are already being felt and will exacerbate economic problems and pressures on the ecosystems. ECLAC estimates that, on the economic front, and as a direct result of Covid-19 and the forced quarantines and slowdown of national and international economies, the regional gross domestic product will fall by 1.8% and at least 30 million people will become poor in Latin America and the Caribbean. ECLAC. Press Release. The COVID-19 Pandemic urges us to Build a New Development Model and Strengthen Regional Integration to Face the Crisis. April 7th, 2020. Available at, <https://www.cepal.org/es/comunicados/pandemia-covid-19-llama-construir-un-nuevo-modelo-desarrollo-reforzar-la-integracion>

4 The case of Peru is an example: the refusal to ratify the Escazu Agreement or recent initiatives to formalize informal alluvial mining in the Amazon are two examples of these efforts of relaxation with the excuse of accelerating economic recovery and safeguarding social sectors.

from merely bucolic environmentalism and swing towards activism which is also based on economic and more realistic pillars that are gradually being built and strengthened. This includes, for example, the creation of "type B" companies, small sustainable enterprises associated with ecotourism, responsible consumerism, Nature-based Solutions (NbS), the application of Circular Economy concepts, environmental activism, among others.

Declarations, manifestos and other instruments

Over the past two years or so, articles, editorials and opinion texts related to the effects and impacts that the pandemic caused by COVID-19 will have and is having on health and the social and economic spheres have multiplied. Additionally, there are countless declarations, manifestos, strategies and position papers (see Box 1) that propose and envision a better future based on a deeper conservation and climate action agenda at all levels. In the face of a scenario that is undoubtedly serious, a powerful movement and dynamic has also emerged that aims to take advantage of the COVID-19 crisis to "build back better" and ensure a more intensive, consolidated and robust sustainable development path.

Box 1. Declarations, manifestos and other instruments to "build back better"

Declarations, manifestos and other instruments to "build back better"
Principles for the Sustainable Future of Latin America in the Time of a Pandemic and Planetary Crisis (2020)
Declaration from the Council of Ministers of the Central American Commission for Environment and Development in light of the C-19 Pandemic (2020)
European Green Deal Must be Central to a Resilient Recovery after Covid-19 (2020)
A Global Call to Action on Covid 19 and Wildlife Trade (2020)
Green New Deal - UK Green Party (2020)
Broadband Co mission for Sustainable Development- Global Goal of Universal Connectivity (2020)
Draft of the Post 2020 Biodiversity Agenda (2021)

This movement comes from several fronts, from civil society organizations to some nation States (e.g. Germany, France, currently the United States of America) that understand and perceive a very serious but (hopefully) temporary situation as a promo-

ter for change. A kind of unprecedented global standstill of economic activities has created a context for an unavoidable reflective attitude among thinkers, leaders and institutions that contemplate the future. While the political exploitation of the situation in many places is undeniable, it is also true that, in many countries, this conversation on "what's next" is emerging. From the population itself and civil society, there is a more pronounced recognition of human vulnerability and fragility, coupled with uncertainty about what tomorrow will bring.

While structural deficiencies have been revealed in both developed and developing countries - from health systems to social and economic safeguards - in Latin America the impacts of COVID-19 are brutally instructive, to the extent that development and "progress" in the region seem a thing of the past and almost a mirage that everyone is questioning. The Economic Commission for Latin America and the Caribbean (ECLAC) itself has begun to question or put in question marks the development model implemented and experimented over the last 40 years. In general terms and with few exceptions, countries in the region have been visibly unable to deal with the health crisis first, and all its subsequent social, labor and economic consequences. Although the reasons for this vary, it can be affirmed that institutional weaknesses, informality and inequality, coupled with weak and inconsistent leadership, are somehow at the root of this failure. One word can perhaps bring it all together: "deficiencies", in its broadest sense.

But like any sudden and crushing event, the COVID-19 health crisis will be overcome - sooner or later - and the task of rebuilding the countries will remain. It is in this context that this essay looks at this current crisis process in Latin America and the efforts made by people and institutions to turn the narrative towards a message of hope and dynamics to overcome the impacts of the crisis. It is in the social, economic, labor, environmental and sustainable development scope in particular, that the current situation and future perspectives will be analyzed. Biodiversity conservation and climate action are two particularly critical dimensions to channel enthusiasms and build a better path to sustainable development. The emphasis of the essay is not only the "photograph" of the existing or situational state, but the reflection on factors or conditions that can lead to a "better return" or, alternatively, to undesired and worse situations. The hope is to contribute to the debate, reflecting on how to operationalize and ground the positive enthusiasm and current dynamics in concrete results.

The path to transformative change: transitions

Several transitions have been encouraged by the work of the IPCC and should help Latin America build a vision of future and return to the path of sustainable development. These refer to transitions to reach the goal of stabilizing global temperatures at + 1.5 degrees C or less, to substantive changes in the energy matrix, to improvements in land use and transformation of cities, and to the creation and promotion of an environmentally friendly infrastructure. Some of these transitions are already being integrated into development plans and actions in countries such as Costa Rica, Chile and Colombia, among others.

But the urgency of the referred systemic problem of biodiversity loss and environmental deterioration, including the effects of climate change, demands, in turn, almost immediate responses. Drastic changes are needed in the region in terms of outlook and public policies and, at the international level, taking seriously the differentiated responsibilities that correspond to industrialized and developed countries. Nature based Solutions for example, offer concrete and interesting opportunities as a starting point to promote the above-mentioned transitions and transformations.⁵

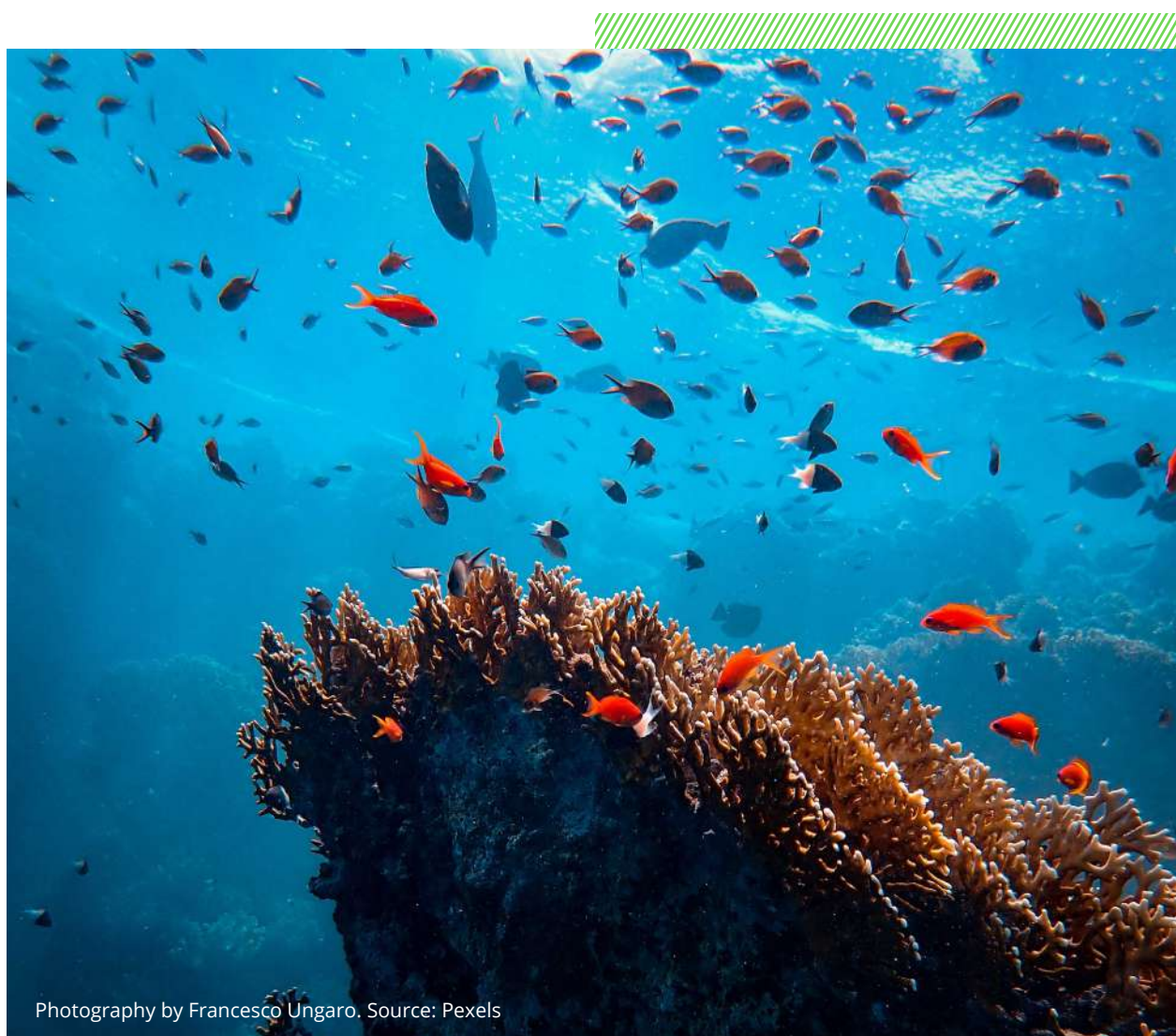
Nature based solutions are a utilitarian, pragmatic and anthropocentric approach, which should be acknowledged as positive: but they do not replace conservation measures as such. This is an indisputable starting point. However, it is about solutions to what? Nature based solutions do not play a particularly important role in the

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Nature based Solutions for example, offer concrete and interesting opportunities as a starting point to promote the above-mentioned transitions and transformations.

⁵ Frequently, concepts such as "NbS" are mingled or converged with alternatives such as the "ecosystem approach" or "nature positive" solutions, distracting the conversation on defining issues and leading to unnecessary hesitations in international negotiations, for example, in the Convention on Biological Diversity (CBD).

IPCC Land Report or IPBES, nor in international negotiation processes. In this respect, they contribute very little compared to other conservation strategies. To begin with, NbS are not associated, for example, with agriculture or agro-exports. It is important to recognize that NbS are very different in the USA and Europe from those in Latin America. These approaches in the region will probably require special consideration for land and territorial rights of indigenous communities. On the other hand, NbS compete with a number of technocentric solutions that, at first sight, appear to be much "easier" to implement. These include, for example, geoengineering, reflective mirrors, environmentally intelligent crops, artificial trees, cloud/rain creation, genetic engineering, etc.⁶



Photography by Francesco Ungaro. Source: Pexels

⁶ World Economic Forum. Harnessing the Fourth Industrial Revolution for Life and Land. Towards an Inclusive Bioeconomy. January, 2018, Geneva. Available at, http://www3.weforum.org/docs/WEF_Harnessing_4IR_Life_on_Land.pdf

There is also an inherent tension between NbS that are more complex but offer more extensive welfare and the technical solutions with high environmental risks, including with regards to the role of the "precautionary principle". A dilemma thus arises between the two. Finally, the recognition and implementation of NbS poses major challenges, both political and institutional.

This description of a concrete situation and a possible alternative to mark a path for development requires important changes, including simple modifications to the way people live. The changes do not come only from major transformations but from daily attitudes (e.g. waste disposal, energy use, use of shared public or private transportation, etc.) This is essential to rescue and promote as part of this new approach to development in Latin America. Sometimes, by focusing on the forest, the contribution of each element is lost sight of.

Some elements for a positive agenda in Latin America

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[...] there is a very evident questioning of all political models and an inherent instability that makes a collective action and a long-term vision of country

There is a certain coincidence in the sense that many governments reject an environmental agenda that is viewed as "accessory" and not essential in the current times of economic recovery. This is explained by factors that include negationism, populism and the fragmentation of environmental governance at multiple levels. In addition, there is a very evident questioning of all political models and an inherent instability that makes a collective action and a long-term vision of country sustainability complicated. However, there is also a powerful social movement and of international institutions, and in some countries, determined to promote a post-Covid-19 recovery that guarantees and

deepens the environmental changes needed to achieve the various proposals of the Paris Agreement, the Sustainable Development Goals (SDGs) and the future Post-2020 Agenda on Biodiversity.

Paradoxically, the economy itself offers mechanisms to enhance not only the recovery but also sustainable development. For example, Latin America has a very marginal participation in the Blue Economy, estimated at almost 2.5 trillion dollars worldwide. With some attention and the implementation of measures such as the elimination of fishing subsidies, the planning of the ocean economy and the development of new sectors - bioprospecting, marine sports activities, biotechnology, etc. - Latin America could find viable options for sustainability in this sector.

On the other hand, while NbS is one of several tools in the arsenal of conservation and sustainable development, it is legitimate to consider whether it is simply an ephemeral trend or fashion that will be appropriated by large corporations and transnationals. There is some evidence of this in, for example, the markets for carbon credits captured by big corporations. At the same time, there is considerable evidence of substantial changes in large corporations and their commitment to sustainability (e.g. DANONE, TESLA, etc.).

Conceptual and policy debate is important to understand the final beneficiaries and the effects on local well-being in particular and conservation in general. NbS offer an additional opportunity that has to do with the shared nature of many vulnerable and fragile ecosystems in Latin America (e.g. in the Amazon or shared watersheds).

Finally, an important aspect that must be overcome is the status quo forces that resist change and, in that regard, models that are viable for the health of a unique planet. It is also necessary to preach among the non-converts.

Considerations towards the future and final thoughts

1. The existence of multiple autonomous spaces and forums (e.g., Paris Agreement, CBD, Andean Community, Amazon Cooperation Treaty Organization, etc.) partly explains the disarticulation in international and regional agendas. It is necessary to seek mechanisms to efficiently integrate and articulate them for environmental governance and the promotion of sustainable development in Latin America.
2. Despite the political circumstances, negationism, systemic corruption and many resistances in Latin America, we need to take advantage of circumstances such as the climate agenda and its vision to understand the inevitability of the coming changes in terms of decarbonization/"zero emissions"), the growing presence and influence of the "positive environment" corporation and economic/business spaces (e.g. World Economic Forum) that, despite such resistances, exemplify almost a parallel world of changes and transformations with major implications in societies, even in Latin America.
3. Latin America in the early nineties (post Rio 92) advanced enthusiastically and to a certain extent effectively with the environmental agenda but became overwhelmed by the multiple problems already mentioned. This left it somewhat aimless and in need to boost enthusiasm again with this agenda. With all its limitations, there are some institutions, resilient economies, spaces and political leaderships that, properly channeled, can quickly guide and fulfill ambitious long-term commitments such as zero deforestation and decarbonization by 2050 or beyond
4. In addition, there are growing actions in relation to reforestation efforts, the search for NbS and new concerns for the sea and oceans as essential in the fight against climate change.
5. It is essential and a pending matter to find ways to penetrate political spaces with unavoidable and robust messages that are impossible to ignore and address sensibly by the political parties in the region, regardless of the ideologies, trends, regimes and sectors of the political spectrum in question.
6. It is also important to acknowledge and understand the progress made by the private/business sector to promote sustainability in a concrete and visible manner. The debate is not "environmental" (only) but also economic and linked to inclusive and equitable development (in other words: social)
7. It is clear that NbS cannot be seen or understood as a magic bullet that will solve many of the challenges associated with conservation and climate change. In fact, it is a tool marginally incorporated in the arsenal of options and underutilized in international debates, and even in the options for important reports on the state of the environment, such as IPBES and IPCC. In this regard, it is important to emphasize that NbS should be promoted not as an alternative to other measures but as a complement and support to strategies and actions already underway in order to provide a dose of realism to the possibilities they really have to mitigate biodiversity loss and conservation in general.

8. NbS must also be adapted to regional and national realities and not be understood as a uniform "standard" that can serve all contexts at all times. It is particularly important to pay attention to shared ecosystems and also to look at the possibility of shared regional solutions. It is particularly important to pay attention to shared ecosystems and see the possibility of shared regional solutions as well. Spaces such as the Integration System for Central America (SICA), the Andean Community (CAN) or the Amazon Cooperation Treaty Organization (ACTO) are in this sense particularly relevant for future decisive and urgent actions.
9. It is important to explore and document in more detail and precision the trade-offs between NbS and technocentric solutions, which also have an important space within the options promoted to mitigate the effects of climate change and promote more and better conservation, particularly in industrialized countries.
10. For Latin American countries, highly dependent on the sea, but with a minor participation in the global blue economy, there are very interesting options to explore and participate more prominently in this bioeconomy. To name three: biotechnology, bioprospecting, marine sports activities, artisanal fishing and aquaculture. Development plans, looking to the future should incorporate ideas from the Blue Economy for its strengthening and consolidation at the regional level.
11. Educating and sensitizing the political classes is an imperative need. There is still considerable gaps in knowledge on how to face these challenges and, to this effect, innovative educational programs and interventions with different methodologies and at different levels are a necessary first step to alleviate this deficiency.

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4.

The Paris Agreement: challenges and opportunities for its implementation

María Pía Carazo and Daniel Klein

Abbreviations

ACE: Action for Climate Empowerment

IDB: Inter-American Development Bank

WB: World Bank

CBD: Convention on Biological Diversity

UNFCCC: United Nations Framework Convention on Climate Change

GEF: Global Environment Facility

GCF: Green Climate Fund

GHG: Greenhouse Gases

INDC: Initial Nationally Determined Contributions

IPCC: Intergovernmental Panel on Climate Change

NDC: Nationally Determined Contributions

PCCB: Paris Committee on Capacity Building and Climate

UNEP: United Nations Environment Programme

UNDP: United Nations Development Programme

RCC: Regional Collaboration Centres

Introduction

The Paris Agreement was adopted unanimously by State Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in Paris, France, on December 21st, 2015,¹ The Agreement is considered one of the greatest achievements of recent diplomacy and international environmental law. On the one hand, the Agreement has almost universal membership. On the other, and more significantly, it exemplifies how all countries in the world can agree on highly complex and globally relevant issues. Rightfully, the Paris Agreement is described as the result of a new kind of collaborative diplomacy. Almost six years later, this essay examines where we are, what has happened so far, and what are the challenges and opportunities for us with its implementation.

Where and how are we?

The Agreement has three main objectives (Article 2.1), namely:

- a)** Maintain the increase of global average temperature well below 2°C with respect to pre-industrial levels, and continue efforts to limit this increase to 1.5°C;
- b)** Increase the capacity to adapt to the adverse impacts of climate change and promote climate resilience; and
- c)** Ensure that financial flows are compatible with a trajectory leading to climate-resilient development and low greenhouse gas (GHG) emissions.

It is important to remember that the Parties to the Agreement committed to bringing global emissions to peak levels as soon as possible and make further reductions until a balance between emissions and removals by sinks ("net zero") is reached by the second half of the century.

¹ To understand the UNFCCC, its process, content, functioning and institutionality, the Convention's Secretariat has developed an interactive portal at, <https://unfccc.int/resource/bigpicture/>.

Subsequent to signing the Agreement, the Intergovernmental Panel on Climate Change (IPCC) has prepared several helpful reports for a better implementation and contribute more efficiently to the solution of the global warming problem in general. One of these reports, requested by the Parties to the UNFCCC, concerns the impacts of a global warming by 1.5°C (2018)² and, most recently, the first chapter of the IPCC's Sixth Assessment Report (2021) is also enlightening albeit daunting.³

According to the IPCC, unless there are immediate, rapid and large-scale reductions in GHG emissions, the goal of not exceeding 1.5°C will be unachievable. Scientists are unanimous in saying that the global average temperature has already risen by about 1.1°C since pre-industrial times and the chances of maintaining or reversing this are becoming increasingly difficult. IPCC scientists also indicate that, to limit warming to 1.5°C, total emissions in 2030 must be 45% lower than in 2010, which puts the challenge ahead into perspective.

Each fraction of a degree of temperature increase means greater and more severe environmental impacts, with devastating social and economic consequences. These impacts include extreme heat, frequent droughts, less predictable floods, more intense precipitations, among other events. As if this were not enough, we are also approaching planetary tipping points. These tipping points refer to changes in certain ecosystems that would further accelerate global warming and once started, are irreversible. Among the most alarming are the collapse of the ice sheet (in the Arctic, Greenland and Antarctica), the

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Each fraction of a degree of temperature increase means greater and more severe environmental impacts, with devastating social and economic consequences.

2 Informe Final sobre el Calentamiento Global de 1.5 G, IPCC, 2018. Available at, <https://www.ipcc.ch/sr15/>

3 Sexto Informe de Evaluación del IPCC, resumen de las conclusiones clave. Available at, <https://es.greenpeace.org/es/wp-content/uploads/sites/3/2021/08/IPCC-briefing-ES.pdf>

large-scale death of coral reefs and with them most of the marine biodiversity, and changes in the circulation of ocean currents.

In short: we are facing a gigantic challenge. In simple terms, due to climate change and the consequent/parallel alarming destruction of our biodiversity through human action, we are facing a planetary emergency of colossal proportions.

It is still possible to solve these enormous problems, but will require sustained global efforts over time, as well as a real transformation of our economies, societies and - above all - our way of thinking. Faced with this serious situation we can ask- quite legitimately - what is the Paris Agreement for and are we still in time to achieve its objectives?

The Paris Agreement and Nationally Determined Contributions

All countries that are Contracting Parties to the Paris Agreement are required to prepare and maintain Nationally Determined Contributions (NDC).⁴ In this document, countries must formally state their contribution to emission reductions and their overall contribution to mitigation efforts. In addition, Contracting Parties may include other elements, on adaptation and resilience, as well as on needs for support in the development and promotion of technological capabilities and financing to achieve these goals.

Governments must communicate their NDC to the UNFCCC Secretariat every 5 years. Each NDC should reflect the country's highest possible ambition (Article 4.3). In other words, they should reflect each country's greatest possible effort to combat climate change. Furthermore, each NDC must successively represent a progression, i.e., be better than the previous one, both in its form and in its substantive content.

⁴ The Paris Agreement's history and process is summarized on the official UNFCCC website. Available at, <https://www.un.org/en/climatechange/paris-agreement>

During the initial negotiations of the Paris Agreement in 2012-2015, countries were invited to submit an Intended Nationally Determined Contribution (INDC), an action that was completed by the majority of countries during 2015. This was an important step in building confidence in the new Agreement, generating a sort of baseline and preliminary standard, and it also helped to facilitate the Agreement's successful conclusion and adoption by the end of 2015. The moment countries ratified the Agreement and became State Parties (Contracting Parties) to the Agreement, their INDC automatically became their first NDC - unless the country explicitly decided otherwise. Most NDC indicated 2020 as the starting date for their implementation, although some countries in Latin America, for example, Bolivia, Guatemala and Paraguay, began implementation earlier.

It was also agreed in Paris that all Parties to the Agreement would submit a new or updated NDC by 2020. By the end of 2020, only 48 new or updated NDC had been submitted representing 75 countries, including the 27 EU Member States and 11 from Latin America. As of October 1, 2021, 125 countries have submitted a new or updated NDC. Of the Latin American countries, Guatemala, Bolivia, El Salvador and Venezuela have not yet submitted their updated NDC. All NDC are available in the UNFCCC NDC registry, including the latest submissions of updated NDC, as well as previously submitted versions.

In general, it is worth noting that the quality of most NDC has improved as a result of the upgrading process. Many NDC were subjected to a comprehensive review, based on improved data and sounder, more consistent decision-making processes. The improved data is reflected in the content of many updated NDC, often with more elaborate assumptions, accurate targets, or, regarding adaptation, greater inclusion of quantitative targets. Most NDC updates mention more inclusive participatory processes and key stakeholders in their development, a more coherent national policy coordination and mature institutional arrangements.

Unfortunately, and despite the progress, according to the UNFCCC Secretariat's synthesis report on NDC of September 2021, climate ambition levels of these NDC are far from setting us on a path to meet the Paris Agreement's objectives. In other words, the ambition is not in line with the efforts reflected in the NDC. The targets presented in updated NDC would take the planet to a temperature increase of 2.7°C above pre-industrial levels, this following the best-case scenario.

The United Nations Secretary General has stated that this trajectory would be catastrophic, causing not only environmental devastation, but above all, loss of human life, social unrest and huge economic problems.

The need for countries to increase their ambition and act on it is evident and urgent. In this regard, it is worth asking ...

What is required to reach this greater ambition and the rapid transformation of our economies? What tools does the Paris Agreement give us? Are they useful? Will they be sufficient?

Firstly, it is important to clarify that although it was adopted in 2015 and entered into force in 2016, the Paris Agreement's implementation mechanisms became operational only in 2020. This was agreed by the Contracting Parties in their negotiations. In other words, contrary to what many people commonly believe, the Paris Agreement and its different implementation mechanisms have only just become operational.

It should also be noted that the Paris Agreement is conceived as a comprehensive package: with not only material rules, but also procedures and mechanisms to ensure its implementation. In addition to the material rules governing mitigation, adaptation and financing, the Agreement also establishes mechanisms to facilitate implementation and provide support to countries.

In this regard, the Agreement requires Contracting Parties to submit information on their operations and the support they receive. This information is processed as part of the Agreement's transparency regime. Parties are required to submit reports every two years and at the latest by 2024. Thus, the transparency framework system will enter its complete functional and operational phase. These reports for the transparency framework will be impor-

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What is required to reach this greater ambition and the rapid transformation of our economies? What tools does the Paris Agreement give us? Are they useful? Will they be sufficient?

tant and useful as countries must consolidate robust methodologies and solid databases reporting their objectives, measures and policies. This information is useful not only for NDC, but also to improve public policies in many other related areas such as access to water, health services, changes in energy matrices, etc.).

The Agreement also created an Implementation and Compliance Committee to facilitate implementation and promote compliance with the Agreement's obligations and procedures.⁵ The Paris Agreement is also supported or served by the Warsaw International Mechanism on Loss and Damage, the Technology Mechanism, and the Paris Committee on Capacity Building and Climate Education (PCCB).

Perhaps the most important process to the success of the Paris Agreement is the Global Stocktake (GSA). The Global Stocktake, as a major assessment of progress, must be undertaken every five years on a global basis, reviewing mitigation, adaptation, and the means of implementation and support, all in the light of and within the framework of commitments to equity and application of the best scientific information available (Article 14.1).

Following the GSA cycle, all Parties to the Paris Agreement must also prepare and communicate their NDC every five years. The GSA outcome will advise countries to update and improve their actions and support and increase international cooperation for climate action (Article 14.3). Thereby, the GSA connects efforts at the national level with internationally agreed targets and assesses the collective progress of all Contracting Parties on an *aggregate* basis.

The GSA must also facilitate the understanding of latest scientific developments and climate policies and measures, in order to contribute to the preparation and improvement of the NDC at the national level for their subsequent communication to the UNFCCC Secretariat. It is important that this GSA guidance is not prescriptive in terms of the type of public policies countries can adopt. It is expected that this process will create an "ambition cycle" under the Paris Agreement. Thereby, GSA outcomes are also expected to summarize opportunities and challenges to improve actions and support in the light of equity and the best science available, as well as lessons learned and good practices from the different countries.

⁵ "The Paris Agreement Implementation and Compliance Committee held its first meeting from June 2-5, 2020. It deliberated on the work it would need to undertake prior to the third session of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (COP/RA) in order to develop draft rules of procedure on substantive issues for the committee. The meeting was ground-breaking as it is the first time ever that a first meeting of a constituted body of UN Climate Change was held entirely virtually." See the UNFCCC official portal, <https://unfccc.int/es/news/se-inicia-la-etapa-de-aplicacion-y-cumplimiento-del-acuerdo-de-paris>

The first GSA will be in 2023; the second in 2028 and so forth. This synchronizes the GSA cycle with the five-year communication cycle of successive NDC. The first round of communication on updated or new NDC was requested for 2020; the second is expected in 2025, and so forth.

The two years of the first GSA (2022-2023) offer great opportunities to call for regional initiatives and events that accompany and complement the process at a global level. For example, the UNFCCC has been organizing Regional Climate Weeks for several years now. The most recent was the Latin America and the Caribbean Climate Week held from May 11-14, 2021.⁶

The GSA process could also be a good entry point to promote public participation processes at national, sub-national and local levels and encourage further involvement of the academic world and the private sector, for example, through local, national and regional events, workshops, debates, etc.

A GSA approach to specific challenges and concrete solutions at the regional and local level has great potential for inspiration and motivation. The GSA will be a fundamental opportunity to build momentum towards greater ambition and accelerated climate action. Both during the two-year GSA process and in the regions, but also in the follow-up, after the 2023 Conference. As noted above, the outcome of the GSA will inform the Contracting Parties to update and improve their actions and different forms of support.

In this context, greater and improved regional cooperation is essential. The GSA process offers a rich space with opportunities to accomplish this cooperation and it should be fully taken advantage of by countries. With regard to Latin America, it is worth to note that countries and stakeholders in the region have a good understanding of how GSA works and its implications, work together to promote research and the identification of needs and opportunities, hold regional forums and discussions to identify best strategies to create green jobs, develop better metrics for adaptation, establish regional support groups, and identify institutional changes and other supportive needs in order to move the region towards a sustainable future with low GHG emissions and resilience to climate change.

⁶ El Acuerdo de Escazú (Costa Rica) entered into force on April 22nd. 2021.



Photography by Marcin Jozwiak. Source: Unsplash

Challenges and opportunities by implementing the Paris Agreement at the national level

Climate change is multifaceted and requires the involvement of multiple sectors. From a governance point of view, policy coordination and effective institutional arrangements are essential for the implementation of NDC. Coherence and complementarity of action is needed at the horizontal level, e.g., between ministries and agencies, as well as at the vertical level, i.e., between different government levels (national, sub-national, municipalities and local authorities).

Ensuring broad participation in the development of NDCs is also in line with the principle of public participation in environmental matters, one of the procedural dimensions of the right to a healthy environment and a part of most constitutional systems in Latin America. This has been embodied in international instruments such as Principle 10 of the 1992 Rio Declaration and treaties that build on it, in particular the 1992 Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, the United Nations Economic Commission for Europe and the recent 2018 Regional Agreement on Access to Information, Public Participation and

Justice in Environmental Matters in Latin America and the Caribbean (Escazú Agreement, Costa Rica). As any participatory process, the preparation of NDC also has other positive aspects, such as the strengthening of democracy and dialogue.

At the institutional level, a growing number of countries have decided to establish agencies or bodies to coordinate governmental activities and policies on climate change. Some examples in the region include the National Climate Change Cabinet in Argentina, the National Climate Change Commission of Paraguay and the National Climate Change Commission in Peru, among others. Recently, the United States of America created the position of White House National Climate Advisor, responsible for coordinating climate action among the different ministries. They are spaces and institutions where analyses, intersectorality, policy decisions, and other dimensions of governance converge. A coordinated policy that embraces all ministries and all economic areas is absolutely vital for the success of climate change measures and also helps to improve governance in relation to many other areas of national institutional architecture.

Ideally, short-term efforts should be guided by long-term goals. At the global level, long-term guidance for climate change is provided by the Paris Agreement targets and recent science. Similarly, at the national level, countries should formulate long-term low-emission development strategies by the mid-century (Paris Agreement, Article 4.19) and report on them by 2020. The strategies should also guide successive NDC, ideally in an ambitious but realistic manner, with progressive targets and milestones over time and based on implementation plans. At present, long-term strategies already reported to the UNFCCC include only two from Latin America: Costa Rica's National Decarbonization Plan (2019)⁷ and Mexico's Half Century Climate Change Strategy (2016).⁸ As the actions required to mitigate and adapt to climate change relate to many areas of the economy, a long-term strategy is also useful to "get the house in order." Effective and realistic planning will facilitate the implementation of public policies at a lower cost and with greater synergies and coherence.

While a whole-of-government approach that addresses climate change comprehensively is essential, assigning clear responsibilities for the implementation of specific activities is also key. As an example, Colombia's updated NDC⁹ enumerates the leading

7 Plan Nacional de Descarbonización 2018-2050 Available at, descarbonicemos.go.cr

8 Available at, https://unfccc.int/files/focus/long-term_strategies/application/pdf/mexico_mcs_final_cop22nov16_red.pdf

9 See, <https://cop26.minambiente.gov.co/sobre-la-ndc-contribucion-nacionalmente-determinada/>

responsible ministries and agencies along with specific mitigation and adaptation measures in two annexes.

Beyond this, it is also critical to ensure a good articulation of sectorial and territorial policies. Articulate climate change policies in tune with processes surrounding the Sustainable Development Goals and 2030 Agenda, as well as other key international agreements, such as the Convention on Biological Diversity (CBD) and its Post-2020 Biodiversity Agenda.¹⁰

Countries also have much to gain from coordinating and structuring processes that include state and non-state actors, creating public-private synergies. By identifying and promoting innovative approaches and dynamic actors, climate action would be accelerated while increasing the benefits. Constructive dialogue with and among different sectors in society is essential, particularly as the transformations required to implement the PA must rely on a high degree of social legitimacy. This social articulation must consider the geographical, cultural, social and political contexts of the country and its territories.

The effective implementation of the Paris Agreement also requires countries to formulate quantitative mitigation targets, taking into account the peak time and how the roadmap towards reaching neutrality will be. Capacity building is vital in this regard, as information and verification systems need to be consolidated in order to facilitate the design, implementation and monitoring of climate action plans.

What are the support opportunities for contracting State Parties to the Paris Agreement when preparing and implementing NDC?

Countries often identify in their NDCs the support needed for their implementation, even characterizing certain components as conditional on the availability of technology, capacity building and/or financial support.

In addition, the preparation of the NDC should consider the viability of the proposed measures, by conducting assessments on costs, benefits, financing options, and investment opportunities from NDC actions, both for domestic and international financing from public and private sources.

10 The detailed history of the CBD, its negotiation and progress, can be viewed at <https://www.cbd.int/history/>

Many United Nations agencies, international organizations, agreements and partnerships support countries in the preparation of NDC, their updates or implementation. We can name the NDC Partnership, UNDP's NDC Support Program and the World Bank NDC Support Facility, as well as support programs of the Inter-American Development Bank (IDB - also through the new NDC Invest IDB Invest Program), UNFCCC Regional Collaboration Centers (such as the Regional Collaboration Center - RCC Panama),¹¹ United Nations Environment Programme - UNEP-DTU and others. Many of the international institutions also facilitate access to financial support, including the Green Climate Fund (GCF) and Global Environment Facility (GEF), mainly to support the Agreement's transparency framework.

Climate financing strategies are required, as well as optimization in the use of public resources. Each country should map their budgetary and financial instruments, assessing their potential as a means for implementing climate policies. Climate action should be a transversal axis of fiscal policy, as the impacts and damages caused by climate change will affect public finances without any discrimination. An initial essential step is to reduce tax independence and eliminate fossil fuel subsidies. Having clarity of the needs, countries can take better advantage of the opportunities offered by the Agreement's implementation mechanisms, in addition to international and regional financial organizations.

Final considerations

The Paris Agreement offers different tools and procedures that can help member countries to better implement their climate policies and obtain support for different areas (e.g., technology, capacity building, financing). Likewise, the NDC preparation and updating process offers ample opportunities to ensure adequate climate action (both mitigation and adaptation).

However, the greatest challenge remains that of changing people's minds. Many decision-makers, both in the public and private sectors, continue to analyze the challenges we face with "the fossil chip". We consider switching from combustion cars to

¹¹ See, <https://unfccc.int/about-us/regional-collaboration-centres/rccpanama>

electric cars - when the real change is the comprehensive transformation of our cities to be car-free. We think of building natural gas power plants to supply the energy we require when we should rather skip that stage altogether, moderating our consumption and consolidating renewable energy systems. We must step out of the box or think outside of it, reaching a new holistic and innovative vision that will allow us to achieve the necessary transformation of our societies. This way we will win on all fronts: climate, environment, health, food security, etc. The future, particularly in the framework of the concept "going back or building better post-COVID 19" as almost all countries are advocating, is building forwards.

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Some answers and proposals to address **climate change and biodiversity loss**



5.

Technologies for biodiversity conservation and mitigation of climate change: some examples of interest

Manuel Ruiz Muller

Abbreviations

ABS: Access to Genetic Resources and Benefit Sharing

DNA: Deoxyribonucleic acid

CBD: Convention on Biological Diversity

NDCs: Nationally determined contributions

IPCC: Intergovernmental Panel on Climate Change

IPBES: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services}

Introduction

Climate change and its impacts have become the greatest threat to the future existence of humanity and the planet's biodiversity. This has been largely confirmed and even the most skeptical - and there are a few ! - find it difficult to refute the evidence. According to a recent report by the United Nations Framework Convention on Climate Change/ Paris Agreement, the world is moving uncontrollably towards the warming of its average temperatures with potentially catastrophic and devastating consequences.¹ The general consensus based on scientific evidence and very precise indicators related to global warming and biodiversity loss is that the scenario is very grim, despite the enthusiasm and potential for recovery proposed by some regarding the planet's environmental situation from a historical perspective.²

Recent reports by the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) corroborate this situation and, in particular, a trend that is moving the planet towards a point of no return.³ As already anticipated, the impacts of this are unpredictable, but clearly imaginable in relation to the economy, migration, increased inequality, conflicts over resources, food insecurity, etc. This has been extensively documented over time.⁴

Just consider: half of the coral reefs in Asia and the Caribbean have been lost due to the effects of marine contamination and ocean warming; global fisheries have also been reduced to less than half and some are about to disappear altogether; the native species of the different biomes have been reduced by at least 20%; millions of hectares of tropical forests, the most biodiverse on the planet, are lost annually; atmospheric temperature has increased by 1.1% on average with respect to the pre-industrial era, and 2019 was the warmest year on record since systematic data has been available.

1 The National Determined Contributions report under the Paris Agreement: a Synthesis Report dated September 17th., 2021 is the most recent of multiple and often dramatic reports that unanimously and scientifically document an almost irreversible process of change in global climate patterns resulting from continued global warming and human action. See, https://unfccc.int/sites/default/files/resource/cma2021_08_adv.pdf

2 Authors such as Steven Pinker highlight the progress humanity has made in the last 200 years by improving the living conditions of millions of people through enlightenment, creativity and almost endless ingenuity. This narrative, particularly on environmental issues, tends to ignore the growing evidence and hard data on the systemic environmental crisis the planet is going through. See, Pinker, S. (2018) *Enlightenment Now: the Case for Reason, Science, Humanism and Progress*. Viking, New York.

3 Recently, Alok Sharma, President of the upcoming Conference of the Parties to the United Nations Framework Convention on Climate Change/Paris Agreement (COP 26) indicated that we are one step away from no longer being able to reverse the catastrophic social, environmental and economic effects of global warming. See, <https://edition.cnn.com/2021/08/08/world/climate-warning-alok-sharma-cop26-ipcc-intl/index.html>

4 See, IPBES. The Global Assessment Report on Biodiversity and Ecosystem Services. Summary for Policy Makers. (2019). Available at, https://ipbes.net/sites/default/files/inline/files/ipbes_global_assessment_report_summary_for_policymakers.pdf

Public policies, norms and institutional aspects: advances and challenges

The last decade has seen, in general terms, significant progress both at the international and national levels in terms of generating enabling institutional and regulatory frameworks aimed at addressing and mitigating global warming and supporting biodiversity conservation.⁵ The international agenda, particularly within the United Nations system,⁶ has seen an increase in the number of policy and legal instruments and efforts to address the phenomena of climate change and biodiversity loss through agreements, instruments, financing, protocols, etc.

Nationally, progress is likewise notable and reflected through a multiplicity of laws, programs, plans, etc. regarding biodiversity and climate change. These are not specifically limited to environmental issues as such, but transcend sectors and include, for example, funding programs for biodiversity research, the creation of institutes on the loss of glaciers, promotion of the traditional knowledge of indigenous peoples as a concrete contribution to conservation and climate change adaptation, recognition of the "Rights of Nature", programs to implement Nationally Determined Contributions (NDCs), among others.

However, despite this progress, challenges persist and the real problems in the field are accentuated. The "progress on paper" does not match reality in situ, where biodiversity is lost and climate patterns, due to their intensity, complicate adaptation possibilities. This is not exclusively an environmental phenomenon - it is well documented that the main challenge Latin American countries face is the enforcement and compliance of general and specific regulatory frameworks. As is often said in different forms in different countries, "there are many laws and regulations, but they are not enforced". This is a common characteristic shared by most countries in the region. It is important and essential to understand or at least highlight why this is happening, even though it goes beyond the scope of this essay. In the midst of this complex scenario, technology and innovation, in many ways and, in the case of Latin America, more through private initiatives than support from the public sector,⁷ contribute discreetly to improve some indicators related to conservation and climate change.

5 Although it is true that denialism, nationalism and, in general, certain tendencies to minimize global environmental threats have increased, it is also true that there is a growing social movement (NGOs, activists, young people) and leadership in some countries (e.g. France, Germany, the Nordic countries) that firmly maintain the international agendas on biodiversity and climate change in an "urgent" mode.

6 This international agenda is quite broad: the World Economic Forum, the European Union, international cooperation and other spaces are also adapting their own actions and programs to generate the required changes.

7 This has nuances: countries such as Mexico, Brazil and Colombia have long-term commitments to invest public funds in research and technological development in general. Bolivia, Peru and Venezuela are far below the level of investment in research measured in relation to GDP. All of them, however, expressly highlight the importance of research and technology development in the political

Examples of innovation and technology for climate and biodiversity conservation

The relentless advance of science combined with human ingenuity and creativity make it almost impossible to monitor and "update" a list of the developments and application of technology and innovation related to climate change and/or biodiversity conservation.⁸ The number of examples alone will make the effort in vain. However, it is possible to attempt a kind of basic taxonomy of climate and conservation innovation and technology based on three major areas or categories: hard technologies, traditional knowledge/techniques, and social innovation.

In the case of hard technologies, all those centered on the use of equipment, infrastructure, gadgets, various inputs, information technologies combined with the intensive use of scientific knowledge, mainly from the natural sciences, can be included. This field includes, for example, small "kits" or field laboratories called GENE,⁹ which make it possible to extract, amplify and sequence portions of deoxyribonucleic acid (DNA) in the fields and generate bar codes that help the taxonomic identification processes and analysis of the distribution and conservation status of species in real time in specific areas. Solar panels in their different presentations and sizes would also qualify under this category as technical alternatives to gradually reduce greenhouse gas emissions and diversify the energy matrix. Geoengineering, with its known risks and despite the declared moratoriums,¹⁰ could also be included in this category of hard technologies and innovation, in this case to artificially modify precipitation regimes through the use and dispersion of silver iodide into the atmosphere for the "creation" of clouds or the use of metallic microparticles to reflect solar radiation towards space.¹¹ Biotechnology, LIDAR sound sensors (applied to seabed's and forests), and a long etc. are part of this group.

⁸ It is clear that many technologies and innovation in promoting biodiversity conservation can have positive effects on, for example, climate change adaptation or mitigation, and vice versa: climate technologies and innovation can have positive effects on biodiversity conservation.

⁹ See, <https://news.mongabay.com/2017/05/rugged-innovation-meeting-the-challenges-of-bringing-high-tech-dna-analysis-to-the-field/>

¹⁰ The Conference of the Parties (COP) to the Convention on Biological Diversity approved an indefinite moratorium on geoengineering experimentation in 2010. Decision IX/16 C of the 10th COP, held in 2010 in Nagoya, Japan. Its practical effects have been marginal while experimentation with different geoengineering technologies continues around the world. Moreover, the USA, the main proponent of these technologies is not a contracting party to this international convention. See, https://www.etcgroup.org/sites/www.etcgroup.org/files/publication/pdf_file/ETCMoratorium_note101110.pdf

¹¹ See for example, Sikka, T. Geoengineering in a World Risk Society. The International Journal of Climate Change. Impacts & Responses, Vol. 3, 2001. Available at, https://www.academia.edu/5672333/Geoengineering_in_a_World_Risk_Society

Meanwhile, traditional knowledge and techniques are part of a set of increasingly recognized and validated methods that enable local populations and indigenous groups, mainly in rural areas, to face the challenges posed by, for example, an increasingly intense change in climate patterns. Although seemingly simple answers, these are observations and practices that for centuries in many cases have allowed these social groups to adapt to changing environmental conditions and constitute part of complex knowledge systems.¹² For example, in the case of small-scale farmers of the high Andean communities in the southern part of the Peruvian Andes, as a direct impact of higher temperatures in their agroecosystems, they have had to "move" the cultivation of potatoes and other tubers to higher altitudes and adapt to new terrain and geographical conditions.¹³ Likewise, small-scale farmers in the highlands of the Province of Chimborazo apply the so-called "water harvesting" to capture and maintain water sources that allow their small "chacras" to be regularly irrigated in a controlled manner. These are high-impact innovations that combine local knowledge on rainfall and precipitation regimes with technologies that have been introduced to these communities over the years with the support of international cooperation to guarantee the effectiveness and efficiency of the efforts. These same innovations and practices are also being applied in many other areas of the Andes in Peru and Bolivia.

Finally, as a kind of synthesis, so-called "social innovation" combines the organization of communities with the application of traditional knowledge, technology and local knowledge to organize themselves around

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12 Ibañez Blancas, N. El Cambio Climático y los Cocimientos Tradicionales, Miradas desde Sudamérica. Terra. Nueva Etapa, vol. XXXVI, núm. 59, 2020 <https://www.redalyc.org/journal/721/72166221005/72166221005.pdf>

13 For example, in the Potato Park in the Andes of Cusco, potatoes were traditionally planted at 3,900 meters above sea level; today they have had to be moved up to 4,100-4,200 meters above sea level. <https://forestsnews.cifor.org/26487/productores-de-papa-del-peru-enfrentan-el-cambio-climatico-con-innovacion?fnl=>

the objectives of conservation and climate action among others. The work of Sierra Productiva in Peru ¹⁴ is an example of social innovation, seeking to improve the living conditions of small-scale Andean farmers through changes in their production processes and technological and technical assistance, while taking advantage of the farmers' own capacities and knowledge. For example, by means of two types of technologies - productive and for improving family housing - practical solutions are integrated into the farmer's daily life, resulting in substantial improvements in their living conditions, often not necessarily directly associated with higher incomes. In Bolivia, for example, the organization PROSUCO has implemented a model of social innovation in the highlands through the "Yapuchiri", who are peasants, mostly young, with, among others, recognized skills in climate observation and recording, which allows them to validate the official/state climate information generated and direct it towards solving local problems in their communities. The "Yapuchiris" are contributing to the provision of climate information services tailored to the needs and understanding of local communities (scaling "outwards"): a network of climate observers is being developed; a "pachagrama" of climate information has been created, as well as indicators that allow the prediction of climate events and their intensity at the most local levels. There are many such examples of social innovation of different nature.



Fotografía de ThisisEngineering RAEng. Fuente: Unsplash

¹⁴ See, sierraproductiva.org.

Social innovation is usually generated as part of long-term partnerships between communities, civil society organizations and international cooperation and, on some occasions, with different types of state institutions. Social innovation also takes advantage of existing hard technology and knowledge and innovation relevant to its space of operation.

Enabling factors and final reflections

But equally or more interesting than an enumeration, taxonomy or closed categorization of innovation and technology as a conceptual exercise, certainly interesting, is to think about those enabling factors that positively or negatively affect its promotion, development, application and practical scaling.¹⁵

In this regard, for Latin American countries, for example, it is important to reflect on how to generate and improve the conditions and institutional, legal and educational/academic environment needed for biodiversity conservation and climate change mitigation/adaptation efforts to better integrate innovation and technology in all its forms and for these to be proactively promoted and encouraged.

Although, on the one hand, and as already indicated, seemingly favorable institutional and legal frameworks, strategies and innovation programs have been developed, the truth is that there are underlying conditions that considerably limit conservation, mitigation and adaptation efforts in the countries. On the other hand, these underlying conditions have only been marginally addressed and are rarely inserted into environmental debate and conversation, as if it were conducted along separate lines, isolated from the very strong limitations. The following is a brief account and description of these conditions and the challenges that will inevitably have to be addressed if innovation and technology are to be appropriately integrated into the task of reversing the process of global warming and continued biodiversity loss.

¹⁵ In this case, it could be argued that these examples are given in spite of possible obstacles, contradictions, lack of institutionalism, etc. However, the reflection is on how to multiply them, scale them up and generate an environment that releases, accompanies and positively reinforces the creative and innovative forces of societies at different levels.

1. Lack of prepared institutions and transversality: It is enough to review the exorbitant number of laws, regulations, programs, plans, high-level declarations, etc. that commit states to support, finance and comply with environmental commitments, to imagine a context in which the problems and challenges would seem to have solutions in the short term. However, the reality is that many of these instruments are enacted and adopted in national contexts where institutional capacities are very limited - both in terms of personnel and budget - and generally collide with national policies of greater significance or importance, such as public budgets, infrastructure investment plans or development strategies. There is a disconnection and little transversality and internalization of these environmental laws, regulations, programs, etc. by public institutions.

2. Excessively strict rules for biodiversity research: For almost two decades, the research community has been drawing attention to the excessively strict regulatory frameworks for bioprospecting in Latin America. The CBD principles on access to genetic resources (ABS) translated into national laws and regulations have become real challenges in the sense of complying with international commitments, but at the same time encourage and not unnecessarily limit research and development, especially at the domestic level in Latin America, which also draws attention to its biodiversity wealth and genetic resources. Prestigious journals such as *Science* and *Nature* have documented the concern in this regard.¹⁶ There is a need to adapt these frameworks to the realities of a new technological research paradigm, where "omic" sciences play a preponderant and decisive role in the context of what has become the Fourth Industrial Revolution.

¹⁶ See for example, Laird, S. et al. Rethinking the Expansion of Access and Benefit Sharing: Several UN Policy Processes are Embracing a Calcified Approach to Conservation and Equity in Science. *Sciencemag.org – Science*, March 13, 2020. Vol. 367, Issue 6483.

3. Intellectual property: In many cases, access to relevant technology imposes impassable barriers to countries due to the conditions posed by intellectual property rights and protection, especially invention patents.¹⁷ This is particularly so in relation to innovation and hard technologies, which are not accessible or in the public domain, making it necessary to sign licensing contracts and pay their owners royalties, usually from industrialized countries, thus generating disincentives for possible technical solutions to the problems of developing countries such as those in Latin America.¹⁸ The problems of intellectual property and its effects on the development and promotion of innovation in these countries have been studied extensively and the general conclusion is that it tends to impose barriers to innovation and access to technologies, when there are no extensive human capacities and applied knowledge in the countries and a culture of innovation and creation based on clear institutional contours and extended formality.¹⁹

4. Corruption: It is not necessary to excessively expand on this issue, but it is central in the region. Corruption distracts any serious attempt to plan and organize structured and transparent responses to environmental problems faced by the countries. The tendency to generate infrastructure and construction ("brick and mortar") is discouraging the authorities, especially in the search for sustainable options or green technology that contributes to national efforts on the one hand, and international efforts on the other. Also, this context does not contribute to a future outlook and projection in terms of development and, especially, the application of innovation and technologies to solve problems associated with the climate crisis and biodiversity loss.

17 It is no coincidence that almost all international environmental treaties or agreements include references to "technology transfer" as one way of contributing to the challenges faced by developing countries in solving environmental problems of different kinds, including climate action.

18 The problem is much more complex and has been simplified, as there are factors such as national R&D capabilities, public investment in R&D, internal market demands, climate change mitigation strategies or "green solutions", among others, that mark very different contexts depending on the countries in the region. For further details, see, Singh, A. Climate Change, Green Innovation and the Patent regime: a Roadmap for Developing Countries. *Asia Pacific Journal of Multidisciplinary Research*. Vol 7, No. 4, 36-43, Nov. 2019.

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5. Populism: Finally, populism of all type, closely associated to denialism, isolation and the absence of a critical vision on problems that require real environmental commitments, is an important factor although temporary in countries. The political and ideological context of a government can have a significant impact on the creation of enabling frameworks and promoters of innovation and creativity applied to address climate change and biodiversity conservation. Although it is also not an essential part of the discussion, it is a dimension that cannot be overlooked if the aim is to navigate a space for the development and application of innovation and appropriate technologies.

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6. The Circular Economy in Latin America: advances and challenges

Henrique Pacini

Acronyms

FTAs: Free Trade Agreements

EC: Circular Economy

ESG: Environmental and Social Governance

LATAM: Latin America

MERCOSUR: Southern Common Market

UE: European Union

Introduction

The search for a better balance between the economy and the environment, compatible with net-zero growth strategies and the promotion of competitiveness, are at the heart of the post-COVID-19 development agendas. The concept of "circular economy," being put in place in various regions of the world, offers a framework for the redesign of economic activities -at different levels- providing a route for development which is dissociated from resource depletion and environmental degradation. The circular economy includes several dimensions of material recovery, product and system redesign, as well as digitization.¹ However, the most recognizable among its various dimensions is the closing of material cycles through increased product durability, as well as reuse, recovery and recycling.

While most end-of-use materials are treated domestically within countries, at the continental level, end-of-life materials flow through international trade to regions with a higher demand and lower cost processing.² Framed under a lens of circular economy, the relationship between material flows and comparative advantages has grown to become a \$315 billion USD global market for secondary materials in 2019. This was comprised of waste from various materials such as plastics, paper, textiles and metals.³

This dynamic has been particularly visible between the Northern Hemisphere and Asia and is aggravated by the logistics of shipping, as the presence of persistent excess of exports in market goods from Asia to North America and Europe has resulted in a net transfer of materials from one region of the world to another (e.g., from Asia to North America and Europe). As there is a lower demand for freight transport on the opposite route, it becomes attractive to fill containers with waste materials on the return voyage.⁴

1 See, <https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>

2 See the work of Ragaert, K., Delva, L., Van Geem, K. (2017) Mechanical and chemical recycling of solid plastic waste. *Waste Management* 69, pp 24-58. Available at, <https://www.sciencedirect.com/science/article/pii/S0956053X17305354> y Schroeder, P., Anggraeni, K., y Weber, U. (2018) The relevance of circular economy practices to the sustainable development goals. *Journal of Industrial Ecology* 23, issue 1, pp 77-95. Available at: <https://onlinelibrary.wiley.com/doi/full/10.1111/jiec.12732>

3 Liu, Zhe., Adams, Michelle., Walker, Tony R. (2018) Resources, Conservation and Recycling. Vol 136 pp. 22-23. Available at: <https://www.sciencedirect.com/science/article/pii/S0921344918301368>

4 See, for example, the work of, Chatham House (2017) A Wider Circle? The Circular Economy in Developing Countries. Disponible en: <https://www.chathamhouse.org/publication/wider-circle-circular-economy-developing-countries>; Dell, J. (2019) 157.000 shipping containers of US plastic waste exported to countries with poor waste management in 2018. Available at: <https://www.plasticpollutioncoalition.org/blog/2019/3/6/157000-shipping-containers-of-us-plasticwaste-exported-to-countries-with-poor-waste-management-in-2018> y UNCTAD (2018) From Regional Economic Communities to a Continental Free Trade Area. Available at: <https://unctad.org/en/pages/PublicationWebflyer.aspx?publicationid=1995>

As a region predominantly of developing countries, Latin America (LATAM) faces challenges when organizing ways to manage material flows as a result of economic growth, which is expected to average 5.2% in 2021.⁵ Its projected growth—which is expected to accelerate following the post-COVID recovery and will likely result in an increased transboundary movement of waste materials, which already in 2019 accounted for trade within LATAM of about \$2.9 billion USD.

While more attention has been paid to macro perspectives on material “circularity” in Asia and OECD countries, very few studies have addressed this issue with a specific focus on LATAM. All the studies analyzed by authors focus on specific subnational contexts, for example, in municipalities in Brazil or other LATAM countries.⁶ Considering the integrated energy, pollution and other economic and environmental aspects related to such trade flows, a more comprehensive investigation into the flow of recycling materials in the region is worthy of further research.

Circular economy (CE) in Latin America

Latin America countries have diverse economies, although most share significant exposure to primary extraction, especially in agriculture and basic products. Policies that promote aspects of the circular economy are likely to affect LATAM countries, either through national regulatory trends or through legislation adopted by the region's major trading partners.

In 2019, LATAM generated a net export value of \$17.5 billion USD, which indicates that the region produced more materials than what it received.⁷ According to 2019 trade statistics, primary materials represented the largest share of exports at 30.1%⁸; exports of primary and secondary goods combined accounted for 50% of exports.⁹

5 See, <https://www.cepal.org/en/pressreleases/growth-latin-america-and-caribbean-2021-will-not-manage-reverse-adverse-effects>

6 See the work of Campos, H., Tavares, K. (2014) Recycling in Brazil: Challenges and prospects. Resources, Conservation and Recycling 85, pp130-138. Available at: <https://www.sciencedirect.com/science/article/pii/S0921344913002243> y Medina, Martin (2015) Living off Trash in Latin America. Debunking the Myths. Harvard Review of Latin America. Available at: <https://revista.drclas.harvard.edu/book/living-trash-latin-america>

7 See, <https://wits.worldbank.org/CountryProfile/en/Country/LCN/Year/LTST/Summary>

8 Ibid

9 Ibid

Since the main industries in LATAM include sectors such as agriculture and mining,^{10 11} it is most likely that the region will be impacted by the global circular economy policies and initiatives of its trading partners. Attempts to introduce voluntary or binding global circular economy initiatives in the agricultural and mining sectors will have direct implications for these sectors in LATAM, particularly in relation to their exports.

In LATAM, the circular economy continues to be seen primarily as a model of alternative development focused on the environment and disconnected from dominant economic planning. This is exemplified by the fact that only 2.9% of post-COVID-19 economic incentives in the region were dedicated to green sectors, compared to 21% in other regions of the world.¹² In this regard, the ministries of environment - which are often among the least funded - tend to be the main players in the development of circular economy initiatives, rather than a multi-sectoral and multi-actor approach.¹³ This creates a risk of political myopia, with inadequate connections to the financial and business sectors in order to scale up circular operations.

Despite relatively timid policy measures, companies in the region are gradually improving their environmental and social governance (ESG) practices as a reaction to consumers' demands. Therefore, commitment by the private sector is crucial to promote the gradual adoption of policy measures aimed at promoting circular economy transitions, such as national circular eco-

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Since the main industries in LATAM include sectors such as agriculture and mining,^{10 11} it is most likely that the region will be impacted by the global circular economy policies and initiatives of its trading partners.

10 See, Latin America: Agricultural Perspectives, <https://economics.rabobank.com/publications/2015/september/latin-america-agricultural-perspectives/>

11 See, Extractives in Latin America and the Caribbean: The Basics. <https://publications.iadb.org/publications/english/document/Extractives-in-Latin-America-and-the-Caribbean-The-Basics.pdf>

12 ECLAC news: <https://www.cepal.org/en/news/greater-incorporation-circular-economy-will-enable-region-move-towards-more-sustainable>

13 See, The Circular Economy in Latin America and the Caribbean - Chatham House. <https://www.chathamhouse.org/2020/09/circular-economy-latin-america-and-caribbean>

onomy strategies, product policies, extended producer responsibility initiatives, and resource efficiency goals.¹⁴ Another hurdle that stakeholders must address is the development of approaches to raise awareness on the benefits of circular business models, as well as the implementation of strategies to disengage sectors that are likely to lose out from a circular transition.¹⁵

These impacts may include requirements to minimize external inputs for agricultural production and emissions that pose risks to human and environmental health.¹⁶ Likewise, targets may be introduced for marketed agricultural products related to precision farming techniques and the adoption of systems that promote the reuse and recycling of agricultural waste and materials in manufacturing sectors that use primary industries as inputs.^{17 18} Precedents for this are the implementation of sustainability approaches for biofuels, which were adopted by LATAM's main trading partners in the European Union and the United States starting in the late 2000s.¹⁹

The mining sector could also face increasing pressure to incorporate verifiable material recovery systems into the value chain of metals, even at the end of the products' life cycle.²⁰ As the exploration of the circular economy makes it easier to evaluate innovative ideas related to a shared economy,²¹ the mining sector in LATAM could also evaluate the possibilities of incorporating leasing services as part of efforts to strengthen the recovery of materials, something that would require the redesign of the business models currently adopted in the primary sector.

14 Ibid.

15 See, UNIDO. The circular economy: getting the best out of Latin America, <https://www.unido.org>

16 FAO (2021) Circular Economy: Waste-to-Resource & COVID-19. Available at, <https://www.fao.org/land-water/overview/covid19/circular/en/>

17 Ibid.

18 See, <https://unctad.org/webflyer/material-substitutes-address-marine-plastic-pollution-and-support-circular-economy>

19 See Pacini, H. et al. (2021) The Price for Biofuels Sustainability. Energy Policy. Volume 59, August 2013, pp. 898-903 Available at <https://www.sciencedirect.com/science/article/abs/pii/S0301421513002206?via%3Dihub>

20 See, International Council on Mining and Metals 2021. The 'circular economy' in mining and metals. <https://miningwithprinciples.com/es/>

21 See, <https://www.unido.org>

Chart 1. Types of policies related to the circular economy (CE) in LATAM countries²²

LATAM Country	National CE Policy	Waste Management and Recycling	EPR	Product Policy	Fiscal Policy
Antigua and Barbuda				✓	
Argentina		✓	✓	✓	
Bolivia		✓	✓		
Brazil		✓		✓	
Chile		✓	✓	✓	
Colombia	✓	✓	✓		
Costa Rica	✓	✓	✓	✓	
Cuba		✓			
Dominican Republic		✓			
Ecuador	✓	✓	✓		
El Salvador		✓			
Guatemala		✓			
Guyana		✓			
Honduras		✓	✓		
Mexico	✓	✓	✓	✓	
Nicaragua		✓			
Panama		✓			
Paraguay		✓			
Peru	✓	✓	✓	✓	
Puerto Rico		✓			
Uruguay	✓	✓	✓	✓	✓
Venezuela			✓		

22 Chatham House 2020. Policies. <https://circulareconomy.earth>

Chart 2. Number of policies related to the CE in LATAM countries²³

LATAM Country	National CE Policy	Waste Management and Recycling	EPR	Product Policy	Fiscal Policy
Antigua and Barbuda				✓	
Argentina		✓	✓	✓	
Bolivia		✓	✓		
Brazil		✓		✓	
Chile		✓	✓	✓	
Colombia	✓	✓	✓		
Costa Rica	✓	✓	✓	✓	
Cuba		✓			
Dominican Republic		✓			
Ecuador	✓	✓	✓		
El Salvador		✓			
Guatemala		✓			
Guyana		✓			
Honduras		✓	✓		
Mexico	✓	✓	✓	✓	
Nicaragua		✓			
Panama		✓			
Paraguay		✓			
Peru	✓	✓	✓	✓	
Puerto Rico		✓			
Uruguay	✓	✓	✓	✓	✓
Venezuela			✓		

²³ Ibid.



Photography by ThisisEngineering RAEng. Source: Unsplash.

The main challenges to advance with the circular economy in LATAM

The challenges of incorporating the circular economy in LATAM can be linked to its key industries - extraction and mining, as well as the challenges of municipal waste management and recycling, and the continental bioeconomy sector.²⁴

One of the main challenges within the extractive and mining industries is the significant negative environmental and social impact of traditional mining operations. Also, the proper structuring of resilient urban mining business models to absorb electronic waste is not well established across LATAM.²⁵ In addition, the transition to a circular economy in the extractive and mining industries poses a double effect on employment: risks of potential job losses for workers engaged in primary extraction; and potential employment gains (or formalization) for workers engaged in secondary material processing. With LATAM's exports and imports of secondary materials in 2019 reaching 86.6 mt and 12.5 mt respectively,^{xxvi} the region's extractive and mining industries will likely have to contend with these potential employment effects while increasing the rate of adoption of circular economy business models within the sector. This will also require investments for the partial requalification of the workforce, a trend already observed in the renewable energy transition in other parts of the world.²⁷

24 The Circular Economy in Latin America and the Caribbean: Opportunities for Building Resilience. Available at, <https://www.chathamhouse.org/2020/09/circular-economy-latin-america-and-caribbean>

25 Ibid.

26 See, Chatham House 2020. Policies. <https://circulareconomy.earth>

27 See, <https://www.xprize.org/prizes/rapidreskilling/articles/reskilling-workers-for-the-green-economy>

For the municipal waste treatment and recycling sectors, a notable challenge has been the low rates of municipal solid waste recovery or recycling across the region and the absence of associated markets for recycled materials, a problem that is due partially to the underdeveloped reverse logistics infrastructure.²⁸ In addition, the predominance of informality in waste recovery activities and difficulties in successfully integrating the informal sector into a modernized waste treatment and recycling process also hinders the development of the circular economy in LATAM. Furthermore, increasing per capita rates of waste generation, driven by changes in consumption patterns in LATAM, also poses a considerable risk for efforts to promote circulation in the region.

Regarding the bioeconomy in LATAM, the effective transition from large-scale conventional agriculture to sustainable food systems still faces major obstacles. Given that animal-based protein sources dominate the nutrition culture within the region,²⁹ food systems that promote veganism or alternative diets based on closed-loop organic cycles face a difficult task. Likewise, identifying an appropriate balance between sustainable use of biomass and biodiversity protection has been an ongoing challenge in the region, where land tenure disputes continue to be present.

Circular opportunities and the leaders in LATAM

The LATAM countries that lead in the adoption of the circular economy are Colombia and Uruguay,³⁰ as well as Argentina (Table 1-2). There are many opportunities for the circular economy in the region. For extractive and mining industries, for example, a primary benefit would be the enablement of new technologies and the automation of mining operations.³¹ In addition, the search for the circular economy influences the growing demand for key materials used in low-carbon technologies. Likewise, the circular economy can help position the extractive and mining industry in order to address the environmental and social risks associated to the industry's operations, as well as promote the value extraction from waste.

28 Schroder, P. et al. The Circular Economy in Latin America. Opportunities for Building Resilience. Research Paper. September, 2020. <https://www.chathamhouse.org/sites/default/files/2020-09-17-circular-economy-lac-Schröder-et-al.pdf>

29 Viana de Lima, M. The Rise of Plant Proteins in Latin America. Kerry Digest. November 12, 2018. <https://www.kerry.com/insights/kerrydigest/2018/the-rise-of-plant-proteins-in-latin-america>

30 Schroder, P. Ob cit.

31 Ibid.

Likewise, in the municipal waste management and recycling sectors, there are opportunities to develop cooperative resource management systems that effectively integrate the knowledge and capital assets of both formal and informal waste recovery operations. In addition, there is also an opportunity to incorporate circular economy principles for improved wastewater management,³² que en muchas ciudades constituyen una fuente de energía de biogás no aprovechada. which in many cities is an underutilized source of biogas energy. The adoption of "fourth industrial revolution" technologies to improve resource collection and recovery.

In terms of the bioeconomy sector in LATAM, the circular economy can promote the production of sustainable bio-based products while protecting the biodiversity. Pursuing the circular economy approach in bioeconomy can help reverse and control deforestation in LATAM. It can also help to establish the application of cascading principles to efficiently facilitate the use of biomass

In addition, Brazil's bioenergy sector serves as a useful case study for other LATAM states. By gradually developing a closed-loop system for its sugarcane sector, Brazil has had great success in deriving multiple value streams from its sugarcane production.^{33 34} Specifically, while the juice extracted from sugarcane has been used for the production of sugar and ethanol, sugarcane residues have also been used to generate electricity, heat, biomaterials and fertilizers.^{35 36 37}

The adoption of legislation inducing circularity in LATAM will have trade implications, particularly in relation to imports of consumer goods into the region. Given that free trade agreements (FTAs) between Latin American states and their trading partners do not usually contemplate the circularity of traded materials, there is an opportunity to incorporate SRP policies into present and future FTAs.³⁸ For example, a renegotiation of the trade agreement between the European Union (EU) and the Southern Common Market (MERCOSUR, in Spanish)³⁹ may incorporate SRP provisions and tariff reductions on secondary materials and remanufactured goods.

32 Ibid.

33 Oliveira, E.C. Brazilian sugarcane sector: an economic and environmental approach. Latin American J of Management for Sustainable Development. 3(1): 35 January 2016

34 Embracing circular economies, <https://www.dumbofeather.com/articles/embracing-circular-economies/>

35 Moreira, J.R. Bioenergy and Agriculture: Promises and Challenges. Brazil's Experience with Bioenergy. Focus 14, December 2016. Available at, www.globalbioenergy.org/uploads/media/0612_IFPRI_-

36 See, <https://statswiki.unece.org/display/SCFP/Organizational+culture+and+its+mission%2C+vision+and+values>

37 CGEE. (2017) Second Generation Sugarcane Bioenergy & Biochemicals. Advanced Low Carbon Fuels for Transport and Industry. Available at, https://www.cgee.org.br/documents/10182/734063/Ethanol2G_web.pdf

38 The Circular Economy in Latin America and the Caribbean, Ob cit.

39 This customs union is made up by, Argentina, Brazil, Paraguay and Uruguay.

The circular economy can also contribute to the implementation of the NDCs of LATAM countries through the institution of production systems, business models and consumption patterns that reduce carbon emissions.⁴⁰

The effort to promote the circular economy in LATAM has the added impact of facilitating higher incorporation rates of digital technology to improve resource management. Recent studies show that the region has relatively low levels of digitalization and rates of adoption of technology compared to industrialized countries.⁴¹ In particular, 53% of the region's population subscribes to mobile broadband services, while only 46% of households have a fixed broadband connection.⁴² Asimismo, el 68% de la población de LAC tiene acceso regular a Internet.⁴³ Likewise, 68% of the LAC population has regular Internet access.^{xliii} These challenges are in part due to the relatively high cost of digital services in the region - the average cost of 1GB of mobile data is \$2.74.⁴⁴ However, with the Internet playing an increasingly important role in the revolution in services in LATAM⁴⁵ and access to digital services is expected to increase - the entry of mobile telephones is predicted to rise to 73% by 2025⁴⁶ - small or informal businesses are likely to benefit from greater access to potential end-market stakeholders through e-commerce platforms. These developments would enable small or informal businesses to market secondary products, finding buyers more efficiently outside their local venues and giving circular marketplaces a much-needed scaling.

40 See, <https://www.ndcs.undp.org/content/dam/LECB/events/2019/20190625-circular-economy/undp-ndcsp-1.5Degree-circular-economy-l4C-2019-Workshop-Summary.pdf>

41 Bew, M. et al. How Latin America and the Caribbean can unlock its digital potential. March 12, 2018. World Economic Forum. <https://www.weforum.org/agenda/2018/03/how-latin-america-and-the-caribbean-can-unlock-its-digital-potential/>

42 Rosemberg, J, and Wellenstein, A. How to use digital infrastructure and technology for a sustainable, inclusive future. World Bank. December 16, 2020. <https://blogs.worldbank.org/latinamerica/how-use-digital-infrastructure-and-technology-sustainable-inclusive-future>

43 Latin America and the Caribbean: digital transformation key to recovery and building back better, says new report. Available at, <https://www.oecd.org/dev/latin-america-caribbean-digital-transformation-key-to-recovery-building-back-better.htm>

44 Celis, J.P and Mendes, M.P. Latin America and the Caribbean's digitization: Time to scale-up investments June 17, 2021. Available at, <https://blogs.worldbank.org/ppps/latin-america-and-caribbeans-digitization-time-scale-investments>

45 Bew, M. et al. Ob cit.

46 GSMA. (2019) Latin Americas Evolving Digital Landscape. GSM Association. Available at, <https://www.gsma.com/latinamerica/wp-content/uploads/2019/09/Latin-Americas-evolving-digital-landscape.pdf>

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Liu, Zhe., Adams, Michelle., Walker, Tony R. (2018) *Resources, Conservation and Recycling*. Vol 136 pp 22-23. Available at, <https://www.sciencedirect.com/science/article/pii/S0921344918301368>

Medina, Martin (2015) Living off Trash in Latin America. Debunking the Myths. *Harvard Review of Latin America*. Available at, <https://revista.drcas.harvard.edu/book/living-trash-latin-america>

Ragaert, Kim., Delva, Laurens. Van Geem, Kevin. (2017) Mechanical and chemical recycling of solid plastic waste. *Waste Management* 69, pp 24-58. Available at: <https://www.sciencedirect.com/science/article/pii/S0956053X17305354>

Schroeder, Patrick., Anggraeni, Kartika., Weber, Uwe. (2018) The relevance of circular economy practices to the sustainable development goals. *Journal of Industrial Ecology* 23, issue 1, pp 77-95. Available at, <https://onlinelibrary.wiley.com/doi/full/10.1111/jiec.12732>

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7. A carbon market in Latin America: prices, tax reforms and how to move forward

Samín Vargas

Abbreviations

CO2: América Latina y el Caribe
CER: Reducciones de Emisiones Certificadas
CMNUCC: Convención Marco de Naciones Unidas sobre Cambio Climático
CO2: Dióxido de Carbono
GEI: Gases de Efecto Invernadero
IC: Impuesto al Carbono
IPC: Índice de Precios al Consumidor
IVA: Impuesto al Valor Agregado
MDL: Mecanismo de Desarrollo Limpio
PBI: Producto Bruto Interno
REDD: Reducción de Emisiones por Deforestación Evitada
TCO2: Tonelada de Dióxido de Carbono
USCUSS: Sector Uso de Suelo, Cambio de Uso de Suelo y Silvicultura
UVT: Unidad de Valor Tributario

Introduction

Since 2016, Latin America and the Caribbean's (LAC) Gross Domestic Product (GDP) has recorded low levels of economic growth compared to other regions. In fact, LAC is characterized by its high degree of inequality among its population. Although countries have established expansive economic policies to face the pandemic health crisis, a higher level of openness of the regional economy is required to recover the level of investment and consumption that are essential elements to finance public spending through growth.

At the same time, LAC is facing, in addition to the pandemic effects, a climate crisis that is causing severe impacts, restricting the availability of natural resources to sustain growth and, more importantly, livelihoods for thousands of families.

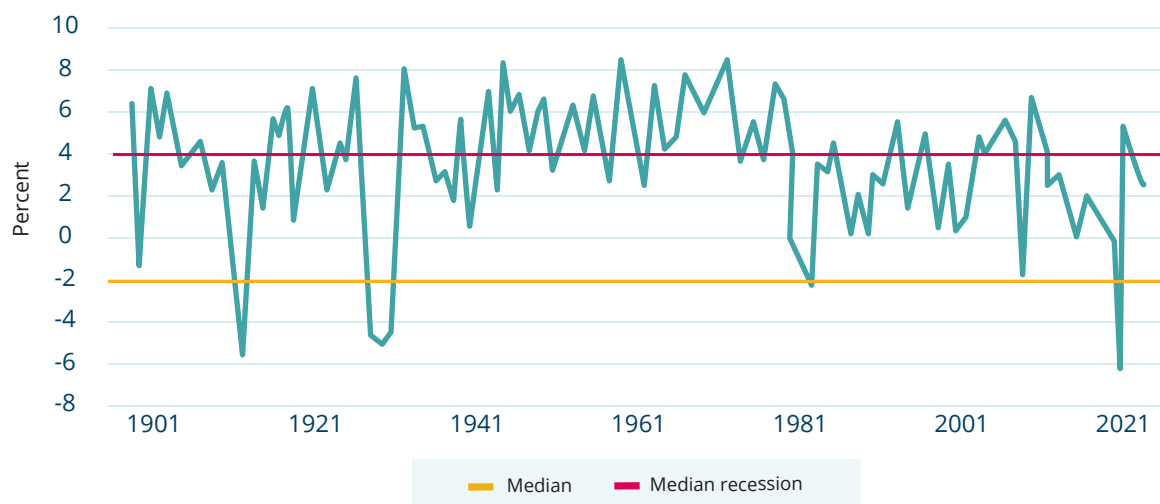
This essay offers information on some of the tools being deployed in LAC to meet climate objectives in a complex context. The first part offers data on the economic perspectives for the region for 2021; the second part presents the experiences of some countries in the application of market instruments, such as carbon pricing; and finally, some reflections on how to face economic recovery challenges and the climate crisis are offered.

Current economic context in Latin America and the Caribbean

Economic growth

In aggregate terms, projected economic growth in LAC for 2021 was estimated at 5.2%. Nevertheless, this level of recovery is still insufficient to recover from the -6.5% drop in the region in 2020, which was more profound than the recessions registered during the First World War and the Great Depression of 1929 (World Bank, 2021).

Graph 1: Growth in LAC

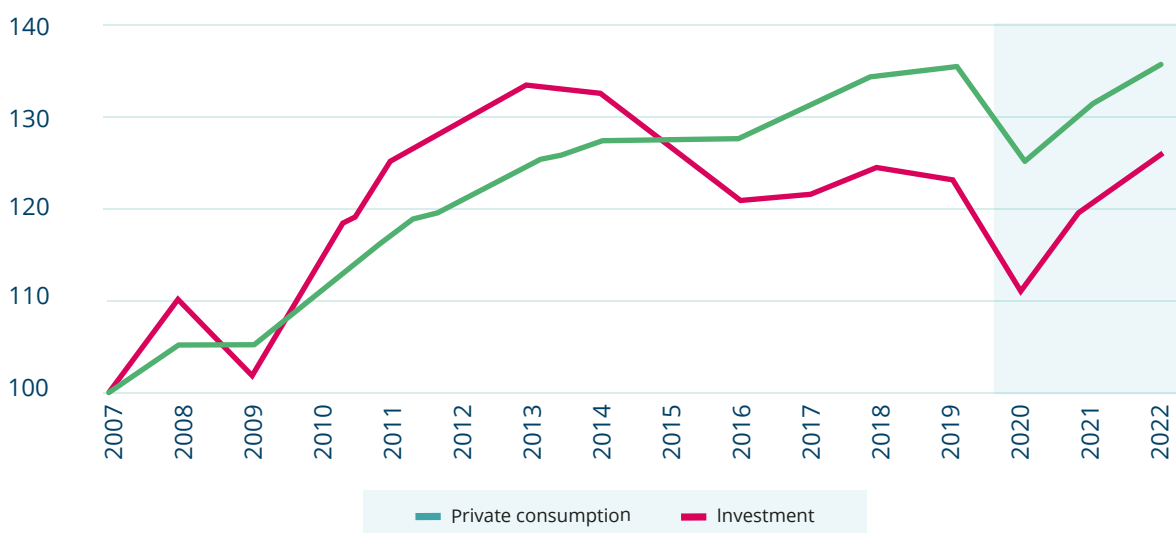


Source: Global Economic Prospects, June 2021-World Bank

The two main components of economic growth in LAC, private consumption and investment, are expected to recover by 2021. However, it is observed that growth levels even for 2022 will be lower than in years prior to the pandemic, such as 2013, which registered a high growth in investments.

Graph 2: LAC Principal growth components

Level 100 = 2007



Source: Global Economic Prospects, June 2021-World Bank

Argentina was the emerging country in the region with the highest drop in growth for 2020, registering a -9.9% GDP, followed by Mexico and Brazil with -8.3% and -4.1%,

respectively¹. Meanwhile, by subgroups, Central America recorded a -7.5% decline, the Caribbean -6.8% and South America -5.8%.

On the other hand, although all economic variables are projected to show positive figures for 2021, these levels would not be sufficient to compensate for the declines recorded in 2020.

Box 1: Projections of actual economic growth in LAC (%)

	2018	2019	2020e	2021f	2022f	2023f
EMDE LAC, GDP¹	1.8	0.9	-6.5	5.2	2.9	2.5
GDP per capita (U.S. dollars)	0.7	-0.2	-7.4	4.2	2.1	1.7
(Average including countries that report expenditure components in national accounts) ²						
EMDE LAC, GDP ²	1.80	.9	-6.5	5.22	.9	2.5
PPP GDP	1.80	.9	-6.8	5.2	2.92	.5
Private consumption	2.21	.1	-7.7	5.33	.2	2.7
Public consumption	1.70	.1	-1.9	0.7	0.5	0.5
Fixed investment	2.4	0.9	-10.7	8.8	5.34	.3
Exports, GNFS ³	4.30	.8	-8.3	7.3	4.9	3.9
Imports, GNFS ³	5.3	-0.8	-13.8	9.7	5.44	.9
Net exports, contribution to growth	-0.3	0.4	1.3	-0.5	-0.1	-0.2
Memo items: GDP						
South America ⁴	1.51	.0	-5.8	5.2	2.72	.5
Central America ⁵	2.7	2.6	7.54	.8	4.5	3.6
Caribbean	4.93	.2	-6.8	4.76	.1	5.7
Brazil	1.81	.4	-4.1	4.5	2.52	.3
Mexico	2.2	0.2	8.3	5.0	3.02	.0
Argentina	-2.6	-2.1	-9.9	6.41	.7	1.9

Source: Global Economic Prospects, June 2021 – World Bank

e = estimate f = projected

(1) GDP and expenditure components are measured at average prices and exchange rates 2010-2019.

(2) Includes countries in footnotes 4, 5 and 6 and Mexico, except Antigua and Barbuda, Barbados, Dominica, Grenada, Guyana, Haiti, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Suriname.

(3) Exports and imports of goods and services that do not include production factors.

(4) Includes Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru and Uruguay.

(5) Includes Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama.

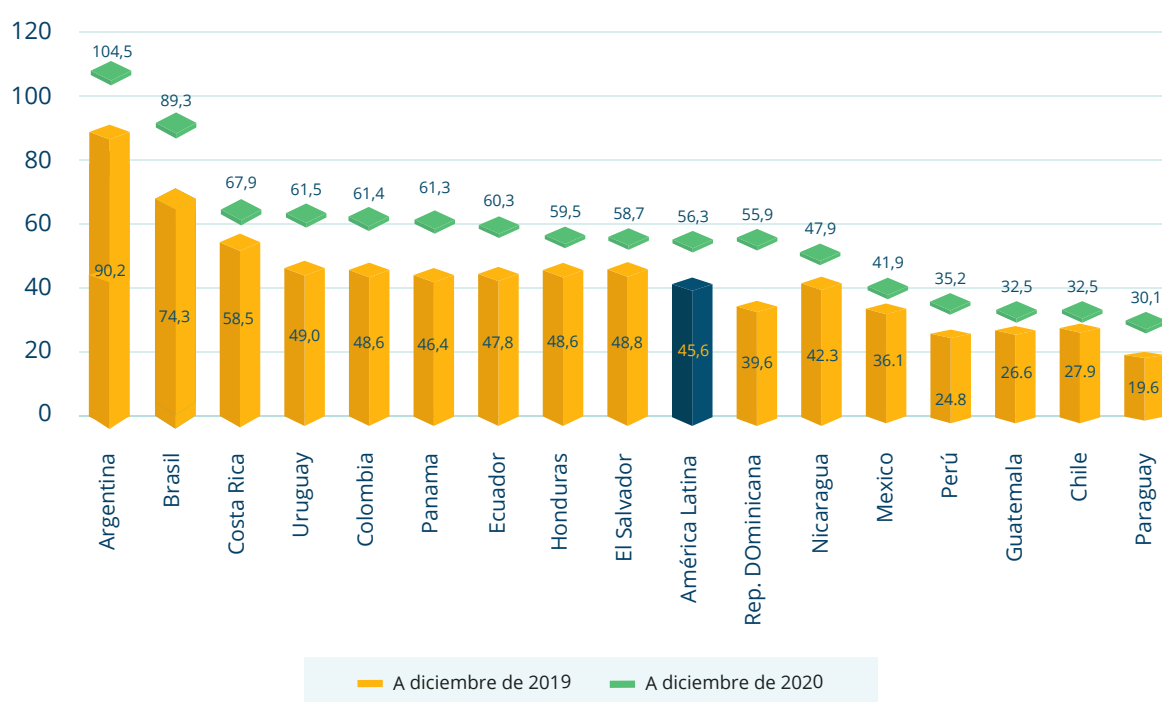
(6) Includes Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Dominican Republic, Grenada, Guyana, Haiti, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Suriname.

¹ There are countries in the region that registered greater declines in growth: Panamá (-17.9%), Bahamas (-16.2%), Surinam (-14.5%), Perú (-11.1%).

Fiscal situation

Prior to the pandemic, many countries in LAC were already recording high levels of debt in excess of 30% over their GDP. The 2020 global health crisis led to an increase of more than 10 percentage points in the level of public debt across all countries in the region. The continued pandemic during the period 2021-2022 could lead to higher levels of debt in the region over the coming years to finance public spending. Although some countries such as Mexico, Chile, Peru and Paraguay are in a better fiscal position to finance their economic recovery policies².

Graph 3: LAC Gross Public Debt (% GDP)



Source: Panorama Fiscal América Latina y el Caribe. CEPAL 2021

Inflation

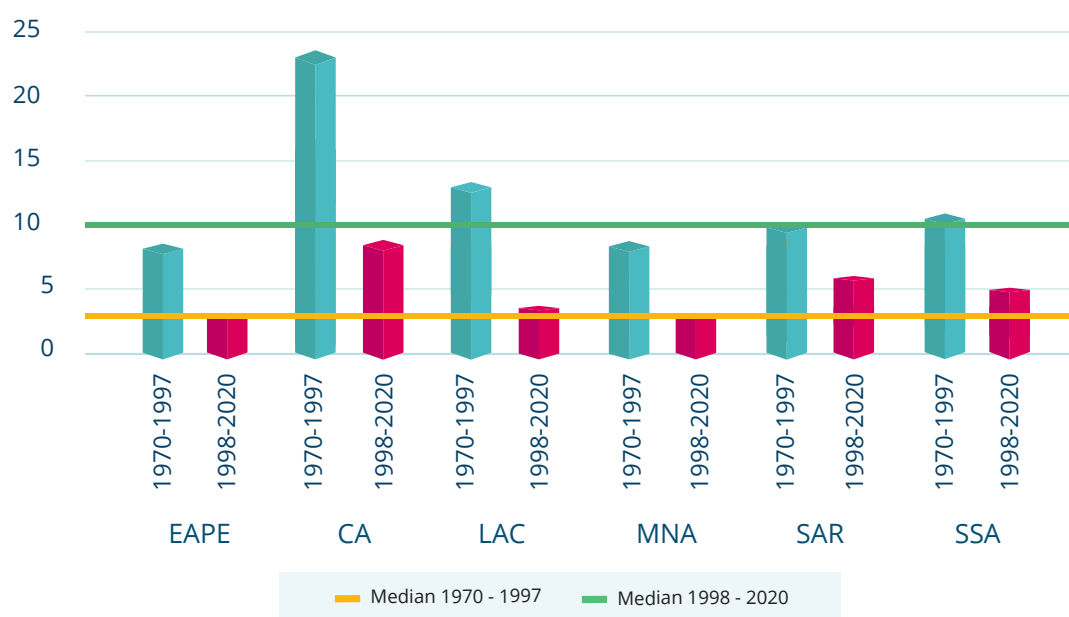
The CPI did not reach 5% annually in the period 1998-2020 (Asian and Russian Crisis,

² In 2020, the overall fiscal deficit exceeded 5% in several countries of the region: Brasil (-13.8%); Panamá (-9.2%); El Salvador (-9.2%); Perú (-8.4%); Costa Rica (-8.1%); Colombia (-7.8%); Panamá (-9.2%); El Salvador (-9.2%); Perú (-8.4%); Costa Rica (-8.1%); Colombia (-7.8%); República Dominicana (-7.7%); Ecuador (-7.7%); Chile (-7.3%); Honduras (-7%); Paraguay (-6.2%).

Financial Crisis 2009 and Pandemic Crisis 2020) compared to 15% annually in the period 1970-1997 (Oil Crisis in the 70s, Debt Crisis in the 80s, and low levels of economic growth at the end of the 90s). It is important to distinguish the specific characteristics that were produced by the global crises: in the 1970s, the CPI increased as a result of rising oil prices; in the 1980s, several countries in the region had high levels of fiscal deficits and public debt; the 1998 crisis was produced by the depreciation of Asian currencies, increased debt levels and recessions in these countries affecting world growth.

While the 2009 financial crisis was caused by the excess valuation of financial assets in the USA and increase in the price of raw materials (food and oil), the 2020 crisis produced by the pandemic caused a decrease in the GDP growth rate on the demand and offer side, which affected the economy on a global scale.

Graph 4: Nivel de inflación por región



Source: Global Economic Prospects, June 2021-World Bank: EAP: East Asia Pacific; ECA: European and Central Asia; LAC: Latin America and Caribbean; MNA: Middle East and North Africa; SAR: South Asia; SSA: Sub Saharian Africa.

A carbon market in Latin America, prices and tax reforms

Basic definitions

Most of the world's corporations have not yet incorporated into their production processes the pollution costs of fossil fuels in the manufacture of goods and the provision of services to the necessary extent. As a result, high levels of carbon dioxide emissions are being generated in the atmosphere, altering the natural cycles of resources such as water and clean air, which are of vital importance for life on the planet.

In recent years, a global trend has been generated to reach the climate objectives established in the Paris Agreement. Many countries have been applying several instruments to solve the negative externalities caused by greenhouse gas emissions. Among the instruments that are generating great acceptance in international markets, the carbon price stands out.

Carbon pricing is a market-based instrument that aims to internalize in corporations, the costs of greenhouse gas emissions generated by the production of goods and services using raw materials and polluting materials and inputs derived from fossil fuels.

The most popular carbon pricing modalities are carbon taxes (establishes a tax rate for each ton of CO₂ emitted); an emissions trading system (purchase price is established for the trade of emission units, through this system a carbon market is created); and compensation mechanisms (based on an emissions reduction program or project that has been certified by an accredited national entity, credits derived from the reduction of emissions can be traded in markets)³.

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High levels of carbon dioxide emissions are being generated in the atmosphere, altering the natural cycles of resources such as water and clean air, which are of vital importance for life on the planet.

³ The World Bank's Carbon Pricing Dashboard indicates other types of carbon pricing: RBCF-finance projects and/or programs linked to adaptation and/or mitigation with the condition of providing resources once the products and results of the project are produced, which requires verification of the compliance with the achievements attained (Results Based Climate Finance). Internal Carbon Pricing (is a tool used by some companies to measure their environmental performance with respect to the effects of climate change it generates).

Tax reforms in the region

El establecimiento de un precio al carbono ha sido parte de un conjunto de reformas fiscales en algunos países de América Latina y el Caribe, entre las más importantes destacan las siguientes:

Chile: Through Law 20,780 enacted in September 2014, a tax reform was established for the purpose of modifying the income tax system and introducing various adjustments to the tax system in Chile. Specifically, Article 8 of the law established an imposed carbon price that taxes particulate matter (PM); nitrogen oxide (NOX); sulfur dioxide (SO₂); and carbon dioxide (CO₂).

With regard to tax rates, the norm established that for the first three pollutants, payments would be associated to the social cost generated by each one; while for carbon, the tax was set at USD 5 per ton of emissions⁴. As for taxpayers, it was established that they would be the owners of fixed source establishments such as boilers and/or turbines that equal or exceed 50 MWt of nominal thermal power (thermal megawatts)⁵.



Photography by Patrick Hendry. Source: Unsplash.

3 The World Bank's Carbon Pricing Dashboard indicates other types of carbon pricing: RBCF-finance projects and/or programs linked to adaptation and/or mitigation with the condition of providing resources once the products and results of the project are produced, which requires verification of the compliance with the achievements attained (Results Based Climate Finance). Internal Carbon Pricing (is a tool used by some companies to measure their environmental performance with respect to the effects of climate change it generates).

The tax entered into effect in 2017 and during its first two years of implementation just over 90 establishments have been taxed, and about USD 190 million has been raised annually covering about 42% of total CO₂ emissions (Pacific Alliance; 2020). Additionally, in February 2020, a new reform was approved to modernize tax legislation (Law 21.210). Article 16 proposes to establish a tax on any establishment that individually or as a whole emits 100 or more tonnes of particulate matter (PM) per year, or 25,000 or more tonnes of CO₂ per year⁶.

Another element of the regulation is the inclusion of a new type of carbon compensation price, whereby taxpayers subject to the carbon tax can compensate all or part of their taxable emissions with emission reduction projects of the same polluting agent. It is important to mention that one of the key conditions to apply this mechanism is that reductions must be additional to the affected subjects' own obligations, such as prevention or decontamination plans, emission norms, environmental qualification resolutions or any other legal obligation⁷.

Colombia: Approved a tax reform in 2016 to strengthen mechanisms to combat tax evasion, tax elusion and other provisions, including the establishment of a carbon tax (Law 1,819). According to the norm, the tax applies to the carbon content of all fossil fuels, including all petroleum by-products and all types of fossil gas used for energy purposes, provided they are used for combustion⁸. "The generating factor of this carbon tax is the sale within national territory, withdrawal, imports for self-consumption or imports for the sale of fossil fuels and is caused in a single phase with respect to the generating factor that occurs first".

4 According to the regulation, the tax on other pollutants will be equivalent to 0.1 per each ton emitted or the corresponding proportion multiplied by the per capita social cost of the pollutant by the population of the specific commune. Furthermore, if the emission is produced in a saturated commune or in a commune with a high concentration of any of these pollutants, an additional coefficient for air quality (latent or saturated zone) will be adjusted to the tax.

5 Those establishments that use biomass as an energy source for the production of goods or services are excluded from paying the tax.

6 Excluded from the tax payment are emissions associated with hot water boilers used in services linked to personnel and generator generators with a power of less than 500 kwt.

7 The new regulatory framework of February 2020 will become effective as of 2023.

8 For liquefied petroleum gas, the tax will only be imposed on sales to industrial users; for natural gas, the tax will only be imposed on sales to hydrocarbon refining and the petrochemical industry. While the tax is not imposed on taxpayers that certify to be carbon neutral, in accordance with the regulations issued by the Ministry of Environment and Sustainable Development.

The tax was established at a rate of 15,000 pesos/tCO₂, equivalent to USD 5/tCO₂. Furthermore, this rate will be adjusted each year with the internal inflation rate plus one percentage point, scaling up to 1 UVT per TCO₂, equivalent to approximately USD 10/tCO₂.

On the other hand, it is important to highlight that with Decree 296 of 2017, the system of compensations was also established as a mechanism that allows taxpayers to opt for the partial or total exemption from the CT payment, provided that they can certify to be carbon neutral, in other words, the emissions generated by the use of fossil fuels are neutralized. The introduction of this mechanism is aimed at promoting the implementation of mitigation projects that generate emission reductions to help the country meet its national mitigation objectives and at the same time exempt taxpayers from paying the tax if they can demonstrate these reductions⁹.

To implement the condition of neutral carbons, taxpayers must submit a Voluntary Cancellation Certificate with a Verification Statement of the GHG mitigation results to be used for compensation¹⁰.

Mexico: In 2013, a tax reform was approved that included among its main lines, modifications of the VAT, modifications to the income tax for both individuals and companies, measures to reduce informality, environmental and public health improvements (Arenas; 2016). In the environmental thematic area, the introduction of the CT that taxes the emissions of several economic sectors, including energy, transportation, construction, agriculture, sanitation, among others, stands out

All fossil fuels are subject to this tax, except for natural gas. Unlike Chile, whose tax is imposed on emissions generated by pollutants (downstream), Mexico applies an upstream type CT, i.e. based on the carbon content of fuels used in the production process (Ministry of Environment and Energy, Chile; 2021)¹¹.

9 Within the procedures for the non-causation of carbon taxes, the use of certification programs or carbon standards from the voluntary market that would have implemented UNFCCC CDM methodologies, both national and international were allowed; methodologies issued by the National Government through the National Standardization Agency or compliance with REDD+ methodologies.

10 The first is issued by a carbon program or standard, and the second by a Validation and Verification Body (VVB) with the necessary accreditations to provide such services.

11 "An upstream tax establishes the regulation, monitoring and collection on the first entities that commercialize fuels, such as natural gas processing facilities or oil refineries." García Bernal; 2018: Implementation of a green tax in Chile.

According to the World Bank's Carbon Pricing Dashboard, the tax rate is in a range between USD 0.4/tco₂ and USD 3/tco₂. In addition, the normative allows taxpayers to use compensations to reduce the tax payment through the purchase of carbon credits in the framework of the CDM in Mexico as well as CERs in international markets¹². The tax collection level reached USD 230 million.

Final reflection

- The transition of LAC countries towards a low-carbon economy is a highly complex challenge at present and in a post-pandemic scenario. Many countries in the region have public debt levels well above the regional average (45.6%), and economic growth projections for the medium term (2021-2023) will not be sufficient to reach levels similar to those of pre-pandemic years. The economic effects of the pandemic coupled with high inflation in 2021 are affecting the actual incomes of families, businesses and governments, and therefore regional financing opportunities will be limited to promote investments in carbon substitutes.
- The CT implemented in the region have been a part of national policies that seek on one hand, to increase the level of tax collection and, on the other, to reduce carbon emissions levels. The use of the resources raised is not the same in each country. While in Chile and Mexico, the revenues generated are destined to the fiscal treasury, Colombia is the only country where the revenues are used to finance environmental projects. Another difference lies in the type of CT established: while Chile applies a tax on emissions (downstream), Colombia and Mexico apply a tax on the carbon content of fossil fuels (upstream).

12 In January 2020, Mexico initiated an ETS Pilot as part of a 2-phase program to establish an Emissions System that will help promote carbon emission reductions in a more cost-effective manner without affecting the competitiveness of economic sectors. This pilot covers the energy, hydrocarbons and industry sectors that account for about 40% of the country's GHG emissions. Establishments with annual emissions from direct sources exceeding 100 ktCO₂ in the period 2016-2018, or in some of the years since the launch of the pilot will be covered under this scheme.

- Another element regarding the modalities of carbon pricing, specifically the compensations, is the benefit that it grants to the affected parties. This mechanism allows companies as legal entities to reduce tax payments to the Treasury through the purchase of carbon credits from regulated mitigation projects. In this regard, questions arise as to what mechanisms can be used by individuals as final consumers to also reduce the payment of the CT.
- The level of carbon prices established in the region is well below the price range determined at USD 40-USD 80 t/CO₂ for 2020 by the World Bank's High-Level Commission to contribute to the climate objectives of the Paris Agreement. However, it is important to note that the countries in the region are unlikely to be able to establish this level of carbon pricing. Specifically in the modality of an imposed price, it would cause significant losses in the competitiveness of these countries. It should be noted that if there are countries in the world that have reached this recommended price level, these correspond to more advanced economies located mainly in Western Europe, including nations with a higher level of economic growth and income, as well as a greater flow of investments for the development of alternative energies as substitutes for fossil fuels¹³.
- In LAC, the cause of emissions and the characteristics of the economies must be taken into account for the implementation of carbon pricing. While the drivers of GHG emissions in Chile, Mexico and Colombia are concentrated in the energy, transportation and industrial sectors. In countries that do not yet apply carbon pricing, such as Brazil and Peru, the main drivers of GHG emissions come from Land Use, Land Use Change and Forestry (LULUCF); therefore, it is necessary to evaluate the most suitable measures to reduce emissions levels in these countries. For example, the establishment of a CT in Peru could not only affect the national and sectoral competitiveness of its economy, but also lead to a decrease in consumption levels and the real income of consumers due to higher fuel prices. As a result of the pandemic, around 80% of its population works in the informal sector, therefore the application of this mechanism could end up reducing the only employment and income options they have in the current context.

¹³ Carbon pricing levels of countries around the world can be seen in the Document: State and Trends of Carbon Pricing 2021 (World Bank).

- The region requires other measures to make the transition to a low-carbon economy effective. These include: a promotional framework for the development of carbon substitute products; the establishment of economic incentives in the region to encourage a higher level of investment in alternative energies, and strategic global alliances between governments, corporations and research centers. Specifically, one of the measures which would have a great impact in LAC is the development and implementation of a Regional Low Carbon Economy Investment Program. This program could include a first component to generate productive, economic and supporting infrastructure for low-carbon services in the energy, transportation, industrial and agricultural sectors; a second component for the development and commercialization of low-carbon products for global markets; and a third component for the commercialization of carbon emission reductions using fewer polluting means of production

The second component of the program would also involve regional strategic actors such as local populations (non-indigenous and indigenous) who, in an associative and collaborative manner with the accompaniment of thematic experts, could form a Regional Cluster for the commercialization of low-carbon products from the agricultural sector, thereby generating economic incentives to reduce land use changes. Likewise, experts from the academic sector, business leaders, high-level management of non-governmental organizations, civil society and government entities would participate in the program to ensure its operational and financial sustainability once the program is completed.

For its application, an innovative financing scheme could be proposed that includes private capital mechanisms (investment funds, institutional investors, venture capital, investment trusts, among others); public financing (national and/or subnational government budgets). Also adding innovative mechanisms such as "carbon debt" (which would be similar to the debt-for-nature swaps used in the 80s and early 90s) that could be used in those countries in the region that have a high level of public debt and that through this instrument could convert a percentage of their external debt into financing for the program.

The impact would be of great significance in the region given that enormous capital resources would be provided to finance the transition to a low-carbon economy on a larger scale. This would help Amazon countries such as Brazil and Peru, where the LULUCF sector is the main driver of GHGs, and thus reduce the negative effects in the Amazon generated by this sector. In addition, the new green businesses would generate employment and income in the short, medium and long term for local populations and would help to overcome the impoverishment caused by the social effects of the pandemic.

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8. Advances in Costa Rica to face Climate Change: **a look at the effort from the South**

Jaime Echeverría

Abbreviations

CO₂: Carbon Dioxide

COP: Conference of the Parties

FONAFIFO: National Forestry Financing Fund

GW: Gigawatts

OPEP: Organization of the Petroleum Exporting Countries

PIB: Gross Domestic Product

Introduction

Climate change efforts in Costa Rica are centered primarily around mitigation through emissions reduction. Adaptation, however, does not seem to get as much attention or resources and is seen more as complementary. The national decarbonization plan, the electric train, the use of ethanol in gasoline and the electrification of the transport sector through subsidies are the most important projects that the government has promoted over the years, mostly related to mitigation. These kinds of proposals have received a great deal of attention by authorities and the media. The implicit reasoning is that emissions need to be reduced as a means to mitigate the occurrence of events such as the Turrialba floods in September 2021.

At the same time, adaptation rarely takes center stage. It is perceived as something that we should do, interest by institutions is marginal when compared to emission reductions. Media campaigns such as TV/radio commercials and ads from public and private banks, municipalities and others always focus on emissions reduction through "decarbonization". The same occurs with international agencies in general terms.

Over the next 10 years, Costa Rica will face a complicated environmental protection and nature conservation scenario. The economic effects of the pandemic will be felt in the country for several years to come, while the fiscal situation does not have a good outlook at this time. This generates competition for limited public resources that should be invested to maximize benefits and requires public policies that carefully consider the country's conditions and contributions.

This essay argues that adaptation can become a much better investment for Costa Rica than emissions reduction (mitigation) and that the focus and priorities should shift towards the former. Costa Rica should, at least, pay equal

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Adaptation rarely takes center stage. It is perceived as something that we should do, interest by institutions is marginal when compared to emission reductions.

or more attention to climate change adaptation. The essay presents information about Costa Rican greenhouse gas (GHG) emissions, the national economy, existing incentive schemes, and the expected results from these policies.

A new approach to climate change is necessary in Costa Rica. As with all countries in Latin America, Costa Rica is not historically responsible for the accumulation of GHG in the atmosphere, neither does it have a significant participation in global emissions. The current evidence indicates that emissions will continue to increase globally. Therefore, if the forecasts materialize, the country will need to be prepared for rainfall and temperature pattern changes.

Decarbonization in this context is designed for other contexts, for economies which are intensive in the use of hydrocarbons. In any case, Costa Rica is already decarbonized and must devote most of its energy and resources to climate change adaptation

Costa Rica's emissions to the world

Total annual global emissions can be estimated at about 50 billion tons of CO₂-equivalents. Costa Rica's emissions are 8.25 million tons per year, or 0.0165% of the total, or less than one-fiftieth of 1% of global emissions. No matter how much Costa Rica reduces its emissions, the global effect will be marginal.

According to WorldOdometers.info in Costa Rica, in 2019, 1.70 ton CO₂ equivalent per person per year was generated, while in the world the average was 4.72 ton per person, almost three times more.¹ As a comparison, in the United States the average is 16.06 ton/p and in China 7.10 ton/p. This means that a Costa Rican generates 9 times less tons of CO₂ than an American, and 4 times less than a Chinese. In Mexico the number is 4.2 ton/p, Venezuela 6.6 ton/p and Puerto Rico 16.0 ton/p. This means a Costa Rican generates 9 times less CO₂ than an American, 4 times less than a Chinese, 3 times less than a Mexican, 5 times less than a Venezuelan. On average, Costa Rica has done its homework and continues to do so.

¹ Website that compiles climate change data.

We are already decarbonized

Costa Rica represents a very small percentage of global emissions, and its economy is not very intensive in the use of CO₂. This is mainly due to the fact that about 90% of the electricity is produced by hydroelectric power. In other countries, electricity production is one of the biggest emission generators.

As observed in Figure 1, to produce one dollar of gross domestic product (GDP)² the Costa Rican economy produces 80 grams of CO₂ emissions, nearly four times less than the global average of 260 grams. The United States is close to the global average, while Germany generates 160 grams. China generates almost half a kilo (or 470 g) or more than six times that of Costa Rica. Switzerland is one of the few economies with the lowest CO₂ footprint in the world, generating only 6 g per dollar of its GDP.

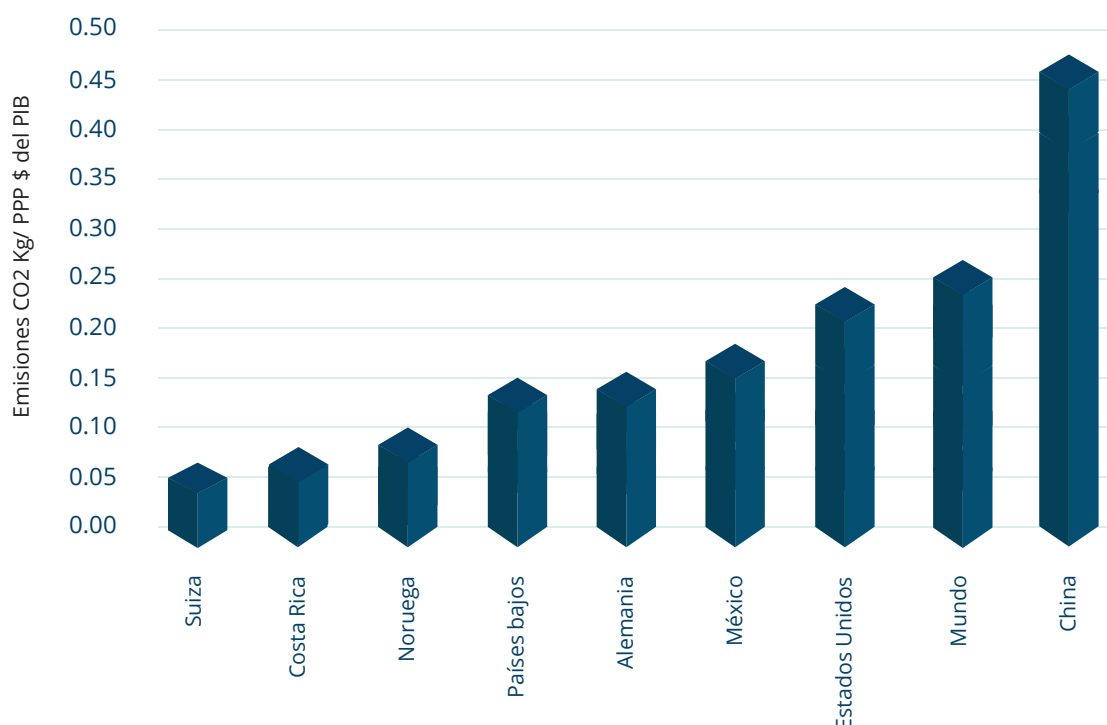
This comparison between countries is indicative that further reductions in CO₂ emissions will be costly for the Costa Rican economy. According to the law of decreasing yields, additional units of reduction will be increasingly more expensive than the previous ones. This is because the "easy" solutions have already been implemented. For example, opportunities to build hydroelectric projects have shrunk compared to several decades ago, when the country invested in hydroelectric power in order to take advantage of its topography and precipitation. The low-lying fruits have already been harvested.

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Costa Rica represents a very small percentage of global emissions, and its economy is not very intensive in the use of CO₂. This is mainly due to the fact that about 90% of the electricity is produced by hydroelectric power

2 Measured in terms of purchasing power parity.

Figure 1. Emissions per dollar produced in the economy (2018)



Source: Own elaboration with data from the World Bank Group (2021). “CO₂ emissions (kg per PPP \$ of GDP)”. Recovered from: <https://data.worldbank.org/indicator/EN.ATM.CO2E.PP.GD>

Economy

Personal income in Costa Rica and CO₂ emissions are very correlated (see Figure 2). It is difficult to imagine a drastic change in this trend, since it has been increasing at an accelerated rate since 1950, as has production. A reduction in emissions could very well result in a decrease in production, as long as there are no proven technological options that provide low-cost energy.

It is still unclear how production and individual income would be maintained in a decarbonization scenario. The trend would have to be completely reversed and it is not yet clear as to how this would be done. Nor how the country would generate job opportunities to compensate for the sacrifice. There are many potential options, but currently most still require significant subsidies for people to adopt them.



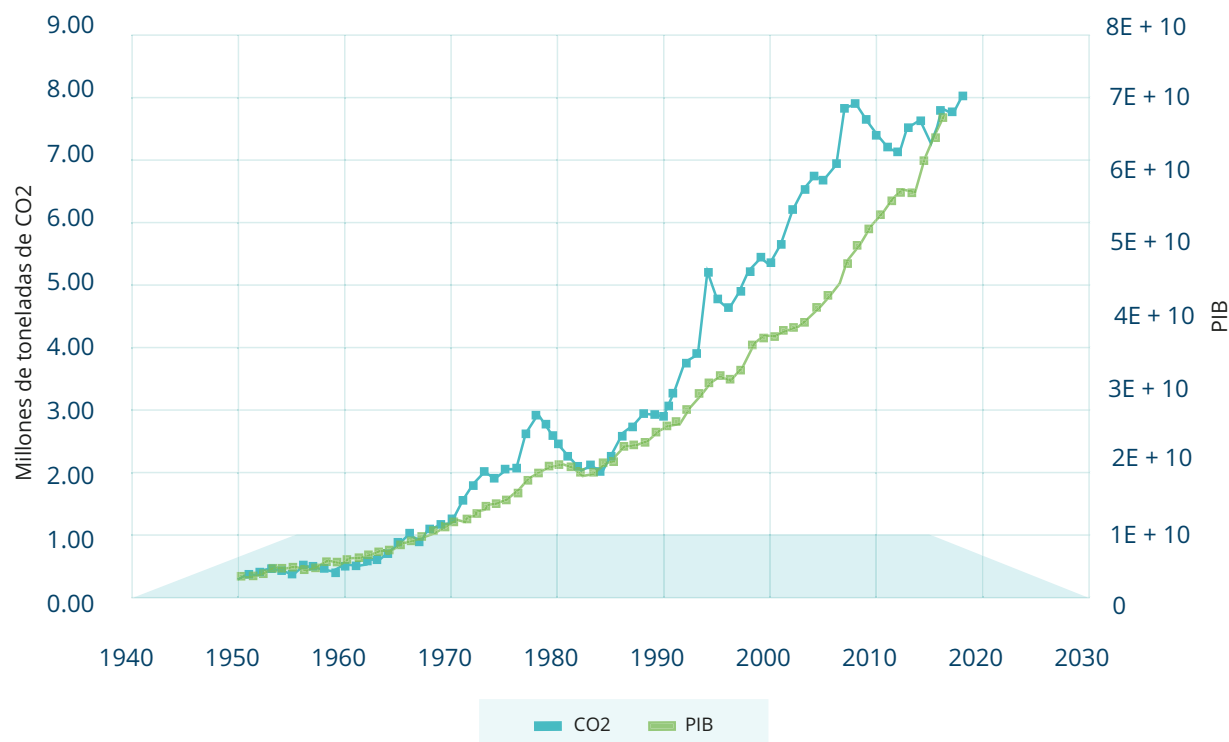
Photography by Juan Mt. Source: Pexels.

In Costa Rica, the cost of energy has increased significantly in recent years and there are also signs of inflation, which is equivalent to a tax for the lower income classes. Both gasoline and electricity are among the most expensive in the region. Options that involve driving up energy prices are going to be politically unacceptable in the coming years. Countries such as France have faced difficulties in implementing hydrocarbon taxes and this year even the United States has asked the Organization of Petroleum Exporting Countries (OPEC) to increase production. These examples show the difficulty associated to emissions reduction and its high cost.

Another important consideration is the fuel tax, which is a major collector and generates about 20% of government revenues.³ It also finances the National Forestry Financing Fund (FONAFIFO, in Spanish) which is responsible for implementing the national program of payment for environmental services, a global example that pays landowners who maintain their forests. It is not yet clear how all these revenues would be replaced.

³ See, Salazar, D. (2018). Más de un quinto de los ingresos del Gobierno dependen del combustible. Recovered from: <https://semanariouniversidad.com/pais/mas-quinto-los-ingresos-del-gobierno-dependen-del-combustible/>

Figure 2. Gross Domestic Product and CO₂ emissions



Source: Own elaboration with data from Ritchie, H. Roser, M. (2020). "CO₂ and Greenhouse Gas Emissions". Available at, <https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions>

At present, countries continue to invest in fossil fuel-based projects. China, for example, is currently building new capacity of 88.1 GW, and has 178.7 GW proposed for construction in the short and medium term.⁴ By comparison, Costa Rica has a total installed capacity of 3.5 GW. In 2020 China emitted 10.67 billion metric tons of CO₂, the only country whose CO₂ emissions did not decrease due to COVID19. One of the major reasons why China is the country that produces the most CO₂ emissions is due to its dependence on fossil fuels. Coal- plants generate around 70% of China's electricity.

⁴ See, Tiseo, I. (2021) CO2 emissions in China 1960-2020 Available at, <https://www.statista.com/statistics/239093/co2-emissions-in-china/>

Policy response in Costa Rica

In this global and national context, the "National Decarbonization Plan" is the official flagship in terms of climate change. As its name suggests, the main objective is to further reduce the country's emissions. It marks a decisive move towards mitigation in public policy while relegating adaptation to second place. In the name of decarbonization, projects such as the metropolitan electric train and the electrification of vehicle fleets are justified. In this plan, mitigation through a change towards electric transportation is a fundamental pillar. By 2050, the plan estimates that CO₂ emissions from public and private transport and freight transport will practically disappear.

At the same time emissions reductions are being promoted nationally and internationally, climate change adaptation receives very little attention from the Government and bilateral and multilateral cooperation agencies. This is despite the fact that there is plenty of information indicating that adaptation can be far more cost-effective. For example, the incentive for an electric car would allow the payment of ecosystem services to the private sector over 20 hectares for 10 years!

Final comments and conclusions

- The emissions reductions made by Costa Rica will not have a noticeable impact on the amount of global emissions, and therefore will not have an observable effect on climate. The margin of error of the models is larger than the total contribution by the country. This should be clear for decision makers and must be taken into account in the development of public policy.
- The country could eliminate 100% of its emissions and its impacts on climate change would be imperceptible.
- Furthermore, Costa Rica is already decarbonized as a country. In total emissions, emissions per person and emissions per unit of gross domestic product, the country has one of the cleanest CO₂ economies in the world. Because of this, additional reductions will be increasingly expensive.
- National income is highly correlated with CO₂ emissions. Although there are examples and experiences of successful reductions, most of them are only pilots that are unlikely to be scalable to the necessary magnitude.

- At present, the national budget and the national payment program for environmental services depend to a large extent on fossil fuel consumption; their substitution will require the search for new financing sources. However, at present these sources are theoretical and would imply major legal and institutional changes.
- The cost of energy in Costa Rica is high and it is unlikely that initiatives resulting in higher electricity or fuel prices will have political viability. The country should learn from the European experience where efforts to reduce emissions have resulted in higher energy prices.
- For all the above reasons, Costa Rica should place far more or at least equal importance on adaptation compared to emissions reductions. It should take advantage of its green infrastructure, including national parks, and private properties to reduce the risks associated to climate change. It must also increase the use of technological tools, improve land-use planning and early warning systems.
- Cooperation resources are limited and therefore, in those cases where it is feasible, should the country opt for the adaptation to climate change. The only country that has estimated the economic cost of decarbonizing its economy is New Zealand and it is not cheap (5% of GDP!)
- The intention to achieve decarbonization by electrifying the transport sector is unrealistic and raises too many questions at present: how far will emissions actually be reduced when the entire life cycle of an electric car is taken into account? what will be the final destination of batteries, whose useful life is estimated to be 5-8 years?⁵
- In contrast, adaptation to climate change, taking into account the entire national territory, will possibly be much more cost-effective, more equitable and more effective for the country. Which is better: giving \$10,000 to a high-income individual to buy an electric car, or paying farmers and other people in rural areas to maintain the forests? Which option is less regressive.

⁵ See, Duran, A. (2021) Transporte público eficiente: el principal reto de Costa Rica para reducir emisiones contaminantes. Available at, <https://radios.ucr.ac.cr/2021/08/interferencia/transporte-publico-eficiente-el-principal-reto-de-costa-rica-para-reducir-emisiones-contaminantes/>

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9.

Access to Genetic Resources and Economics of Information: a comment in the context of the post-2020 global biodiversity framework*

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Klaus Angerer and Nicolás Pauchard*

Abbreviations

ABS: Access to Genetic Resources and the Fair and Equitable Sharing of the Benefits

TRIPS: Trade-Related Aspects of Intellectual Property Rights

CBD: Convention on Biological Diversity

COP: Conference of the Parties

DSI: Digital sequence information

GMBSM: Global Multilateral Benefit-Sharing Mechanism

IPBES: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

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Introduction

The conclusion of the 2019 Global Assessment Report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is alarming: human activities threaten the global extinction of species now more than ever and on a scale never before witnessed or imaginable. Recent reports maintain the somber tone.¹ For example, "Our Future on Earth 2020,"² compiles the perceptions of leading researchers and scientists and acknowledges the alarming and uncontrollable loss of biodiversity and the soon-to-be irreversible effects of climate change at all levels. The list of reports and appeals for action is long and recurring. They are both a warning and an accusation at the same time.

Something has gone wrong with the 1992 Convention on Biological Diversity (CBD) and the 2010 Nagoya Protocol on Access to Genetic Resources the Fair and Equitable Sharing of Benefits Arising from their Utilization.³ That "something" is the policy/regulatory approach on "access to genetic resources" and the "fair and equitable sharing or participation of the benefits arising from their utilization" (ABS), which is the third objective of the Convention and the purpose of the Protocol. Ultimately, ABS should align incentives between the users (e.g., corporations) and providers (e.g., countries) of genetic resources. However, this has not been done and the success of this alignment depends significantly on the ABS modality that is chosen, i.e., the conceptual, political and regulatory framework that is defined.

Despite the fact that this issue is essentially an economic one, the COP to the CBD has systematically ignored the relevant economic aspects of the issue. Ironically, and most unfortunately, is that applicable economics is neither difficult nor more advanced than what can be found in an introductory university textbook on economics. This essay out-

1 The Global Assessment Report on Biodiversity and Ecosystem Services. Summary for Policy Makers. 2019. Available at, https://ipbes.net/sites/default/files/inline/files/ipbes_global_assessment_report_summary_for_policymakers.pdf

2 Available at, <https://futureearth.org/publications/our-future-on-earth/>

3 Voices are mounting that "something is very wrong" with ABS. Prestigious academic journals have highlighted this. For example, see, Laird, S., Wynberg, R., Rourke, M., Lawson, C., Ruiz, M. Rethinking the Expansion of Access and Benefit Sharing. Policy Forum. Science. March 2020, Vol. 367, Issue 6483

lines the dimensions overlooked in the ABS debate and their relevance to conservation and climate change.

Fundamental deficiencies and common significances

According to the 1969 Vienna Convention on the Law of Treaties, an undefined word in a treaty should be interpreted by its "common sense" and in the light of its objective and purpose. In the CBD, "genetic material" was defined in terms of "material" and "material" was left undefined. The neglect of the negotiators in 1992 still has repercussions to this day, particularly in the context of the highly controversial international debate on ABS and "digital sequence information" or "DSI".⁴

In 2017 a formal exploratory study was mandated by the CBD on "DSI" and in 2018 an Ad Hoc Group of Technical Experts was convoked to start analyzing this notion and its implications. The major consensus of the Ad Hoc Group was that "DSI" "is not the most appropriate term and should be kept in place only momentarily until a better one is found - which does not yet seem to have happened, at least in the official narrative."⁵

Several Ad Hoc Group participants expressed the view that some or all such information, collectively, can be framed as what might be called "natural information".⁶ When the object of access for benefit sharing is interpreted as "natural information", economics becomes predominant in the analysis. The application of economics inevitably leads to multilateralism replacing bilateralism (ABS contracts or Material Transfer Agreements) as an ABS modality - a logical and critical shift, but politically resisted for many years.⁷

4 The concept of "digital sequence information" is highly problematic, only because it excludes everything that is "non-digital". For a review of the concept see, SPDA. "Unpacking 'Digital Sequence Information on Genetic Resources': Scaffolding of Errors to Preserve a Category Mistake" (2017). Available at, <https://www.cbd.int/abs/DSI-views/SPDA-DSI-EN.pdf>

5 See the report of the Ad Hoc Group at, <https://www.cbd.int/doc/c/4f53/a660/20273cadac313787b058a7b6/dsi-ahteg-2018-01-04-en.pdf>

6 "Natural information" can be defined as an "expression generated and extracted from living or once-living matter, where 'expression' refers to any distinction, non-uniformity or unintended difference." Proposed Legal Elements for a "Multilateral Global Benefit-Sharing Mechanism" as contemplated in Article 10 of the Nagoya Protocol on Access to Genetic Resources and Fair and Equitable Sharing of Benefits. Arising from their Utilization (2015). Available at, https://www.uni-giessen.de/fbz/fb11/institute/histor/mitarbeiter/mitarb_dwnl/GMBSMV.1.0RuizVogelAngererPDFSPANISH.pdf

7 Ruiz, M., Vogel, J., Zamudio, T. La Lógica debe Prevaler: un Nuevo Marco Teórico y Operativo para el Régimen Internacional de Acceso a los Recursos Genéticos. Research Document. Initiative against Biopiracy. SPDA, Year. V, No. 13, March 2010. Lima, Peru.

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[...] human activities threaten the global extinction of species now more than ever and on a scale never before witnessed or imaginable. Recent reports maintain the somber tone.

Global Multilateral Benefit-Sharing Mechanism

Since Adam Smith, economists have celebrated competition as a driver for efficiency and even equality in relation to the various type of goods. Information is the exception. When competition occurs around information or informational elements, many aspiring innovators simply wait to be able to copy what others have invented with their effort and investment. The strategy avoids the very high fixed costs associated to creation versus the facility of copying/replicating it. If a sufficient number of suppliers take advantage of this, the market price plummets and the innovators are unable to recover the fixed costs of such an innovation or invention. This is a fairly fundamental economic logic.

In this regard, recognizing the inefficiency and inequity of such results, governments have exceptionally institutionalized monopolies on man-made information, i.e., artificial information, through time-limited intellectual property rights.⁸ The same logic can be applied to genetic resources. Analogously or almost homologically, just as governments incentivize the creation of artificial information through intellectual property rights (e.g., monopolies to incentivize and protect innovations, creativity, etc.), governments can similarly encourage the conservation of natural information through the ABS system.⁹

8 Intellectual property rights have developed over centuries and, at present, the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS, 1996) is the umbrella multilateral agreement -part of various agreements covered by the World Trade Organization- that establishes international standards for their protection and the sanctions for non-compliance. See, https://www.wto.org/spanish/docs_s/legal_s/27-trips_01_s.htm

9 Ruiz, M (2015) Genetic Resources as Natural Information. Implications for the Convention on Biological Diversity. Earthscan from Routledge. London, New York.

To this effect, it is critical that given natural information (contained in biodiversity) is disseminated across jurisdictions, protection must be oligopolistic and not monopolistic, which implies an understandable nuance. Without this type of protection, the market price collapses due to a sort of "race to the bottom" as a result of the search for more favorable jurisdictions where, in general, the same natural resources/information can be found.¹⁰ In the face of this, opportunity costs for conservation would continue to be very high.

Examples of this are abundant. The best evidence of the "race to the bottom" comes from a country whose constitution mandates transparency. In 2015, Brazil passed a law allowing royalties for the use of "its" genetic resources to be as low as 0.1%. A balance would have to be made on how low this 0.1% really is. In a biotechnology (innovation) with one million dollars in sales, a scarce one thousand dollars in royalties would be earned! In the case of a highly successful innovation, usually defined as one that generates \$1 billion in sales, only \$1 million in royalties would be accumulated. This is clearly unfair and inequitable and is repeated over and over again when one reviews, for example, the various ABS contracts that have been made public and where derisory royalties have been negotiated.

10 Peruvian Society for Environmental Law. Lawful Avoidance of ABS: Jurisdiction Shopping and Selection of non-Genetic-Material Media for Transmission. Proposals for new and emerging issues for consideration received after COP-13, 2 May 2017. Available at, <https://www.cbd.int/emerging/>

Could the ABS system promote "resources mobilization" as an incentive for conservation?

Article 10 of the 2010 Nagoya Protocol calls on parties to "consider" modalities for a Global Multilateral Benefit-Sharing Mechanism (GMBSM) for "transboundary situations". The drafting may seem weak, but it is not. Since "something" (a genetic resource) cannot be in any two places at once (except in the quantum dimension!), in the concept of "transboundary" the information is implicit. Likewise, the concept of "global" modifying "mechanism" implies that royalties can be set multilaterally.

The fairest distribution of royalty revenues would be a distribution proportional to the geographical area of habitat where the natural information is or can be found. In the case of ubiquitous natural information, the revenues collected would finance the necessary infrastructure for the system to be implemented - basically a global public good, historically underfunded, such as taxonomy. Until the use becomes intellectual property (e.g., an invention patent), the natural information can flow freely for all types of applications. This modality is understood as "bounded openness over natural information".¹¹

Should the "consideration" of a GMBSM turn into its implementation, Article 10 would give an upturn to fourteen Conferences of the Parties. Strategically, those who oppose profound changes in ABS remain silent or dismissive.¹² When pushed, they solemnly invoke the legal precedent as if *stare decisis* had scientific merit.¹³ In 2013, there was a vibrant online debate on GMBSM with 143 experts convened. In 2015, the same issues were examined for written submissions. In 2019, the exercise was repeated once again.

¹¹ Ibid.

¹² Few users acknowledge the issue and even fewer develop a position. A quasi-exception comes from the International Chamber of Commerce Working Group, "Views on a Multilateral Global Benefit-Sharing Mechanism (Article 10, Nagoya Protocol)," Paper No. 450/1069 (2011). The exception is "quasi" in that the conclusion provides that "Having considered all of the above possible situations, we conclude that none of the situations identified indicate the need for a GMBSM and, consequently, any additional consideration to its modalities.

¹³ *Stare decisis* comes primarily from common law, where judicial precedents tend to remain firm over time, with few variations in their interpretation. It is what provides predictability to the judicial system. In the case of ABS, *stare decisis*, on the contrary, denotes indifference and policy considerations over and above technical and economic fundamentals.



Photography by Tima Miroshnichenko.Source: Pexels

Why do users continue to dismiss the GMBSM, and why do providers remain indifferent? The answer is prosaic. Not only are careers and reputations at stake, but also money.

Annual biotechnology sales worldwide amount to several hundred billion US dollars. Revenues from a royalty percentage of 1 to 10 percent - negotiated through the Conference of the Parties - could amount to tens of billions of US dollars per year. Opportunity costs from conservation and sustainable use, Article 1 of the CBD, would finally be compensated. The possibility of the long-desired "resource mobilization", Article 25 of the Nagoya Protocol, would finally become a reality.

ABS in the Aichi Biodiversity Targets and the Post-2020 Biodiversity Framework

In any long list, the most important element or component is often underestimated. The Nagoya Protocol, for example, consists of 36 Articles. Article 10 on the GMBSM is not just one among three dozen articles, but the core of both the Protocol and the CBD and ABS. Likewise, the Aichi Biodiversity Targets list twenty targets. Only Target 16 refers to the Nagoya Protocol. The scale matters in both economics and ecology.

Under bilateral ABS agreements, royalty percentages are so low that users do not voluntarily disclose them. Having said that, the criteria of fairness and equity do not require any specific percentage. It only requires equal treatment in the protection of artificial and natural information. A GMBSM levels the playing ground. Improvement in royalty percentages will depend on how well the providers, mostly developing countries where biodiversity/natural information is concentrated, negotiate as a group. Improvement could be as much as two orders of magnitude.

The scale actually matters. Through improved and more important royalty revenues on IP-protected biotechnological innovations, many of which will owe their existence to the "openness" suggested in the "bounded openness" approach, Article 10 of the Nagoya Protocol may become the core not only of the CBD and the Nagoya Protocol, but also of the post-2020 Global Biodiversity Framework by opening a possibility to mobilize resources and direct them to conservation, especially giving consistency and coherence to the three overarching objectives of the CBD: conservation, sustainable use and fair and equitable sharing of benefits derived from genetic resources, understood as natural information.

Final reflections

"Access to genetic resources" and "fair and equitable benefit sharing" under the CBD and the Nagoya Protocol can contribute to efficiently compensate the opportunity costs of conservation; resources that must be mobilized to implement the Post-2020 Global Biodiversity Framework, for example, are the revenues generated by biotechnological innovations protected by intellectual property rights that make use of genetic resources/natural information.

At present, competition - over assets widely distributed across countries and jurisdictions - reduces conservation incentives. However, interpreting the object of access as "natural information" would justify a GMBSM whereby royalties are set, and revenues distributed proportionally to the habitat where such information is or could be found in different "source countries".

The fair and equitable distribution of benefits requires equal treatment of artificial and natural information. This requires a change in the paradigm and thinking on ABS and overcoming the stare decisis that has stalled for almost 30 years any significant advances on ABS, in terms, for example, of monetary benefits generated.

All this, however, requires the integration of economics into the analysis and application of ABS. Economics has been completely overlooked in the theoretical construction of ABS as a foundation for consistent and efficient policy development. Change requires leadership and a certain daring in complex political contexts. This same post-Covid 19 context that demands "going back or building better" becomes an unsurpassable possibility to think "outside the box" and generate proposals that will allow CBD objectives to be achieved in an adequate manner.

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10. Sustainable fisheries in Latin America: **how to recover marine ecosystems and species?**

Rodrigo Oyanedel

Introduction

The sea that surrounds the coasts of Latin America is key to their development. For thousands of years, different communities have used their marine resources for food, materials, rituals, etc.¹ Several coastal settlements chose the coast to evolve as a result of its diversity and amount of resources. The situation is not very different today. Fisheries in Latin America continue to be a driving force in the local economies of several countries, with thousands of fishermen going out to sea every day.² For these fishers, and all who are involved in the transport,

1 Salas S, Chuenpagdee R, Seijo JC, Charles A. 2007. Challenges in the assessment and management of small scale fisheries in Latin America and the Caribbean. Fisheries Research 87:5–16. Elsevier.

2 Muller MR, Oyanedel R, Monteferri B. 2019. Marine and Fisheries Policies in Latin America : A Comparison of Selected Countries. Routledge, Abingdon. Available at, <https://www.routledge.com/Marine-and-Fisheries-Policies-in-Latin-America-A-Comparison-of-Selected/Muller-Oyanedel-Monteferri/p/book/9781138386921> (accessed October 11, 2019).

processing and sale of marine products, the sea is a source of employment. But the sea is also a source of food security for those who consume these products, both in Latin America and around the world.³

However, years of exploitation have reduced the sea's capacity to regenerate its fisheries resources.⁴ Both overfishing and illegal fishing have the inexorable capacity to reduce fish stocks and therefore reduce the amount of economic, social and nutritional benefits fisheries can provide. An overexploited or poorly managed fishery provides less employment, produces less food and can decrease biodiversity in the surrounding environment, bringing species to the point of extinction.⁵ Illegality, on the other hand, can have significant negative repercussions on land, creating social conflicts associated to illegal operations, violence and loss of belonging in communities.

There are various reasons to explain the overexploitation of fisheries and the increase in their illegality.⁶ However, it is generally difficult to identify the various factors explaining why different players work in the overexploited fisheries, as in the long term, this has a negative outcome for them.⁷ The market - understood as a series of processes, institutions and social connections where parties exchange products and services - is in many cases the driver of the overexploitation of natural resources.⁸ In a globalized world like today's, demand for a product on the other side of the planet can send an almost instantaneous signal that the product is in demand. This puts fishers in a two-edged position: they may find potential buyers for their products rapidly, but when demand is excessive, it can have negative repercussions for products with a limited regenerative capacity such

3 See, for example, work by: Costello C et al. 2020. The future of food from the sea. *Nature* 588:95–100; Short RE et al. 2021. Harnessing the diversity of small-scale actors is key to the future of aquatic food systems. *Nature Food*. Available at, <https://www.nature.com/articles/s43016-021-00363-0>.

4 Castilla JC, Gelcich S. 2007. Management of the loco (*Concholepas concholepas*) as a driver for self-governance of small-scale benthic fisheries in Chile 1989:441–452.

5 See, Worm B et al. 2009. Rebuilding Global Fisheries. *Science* 325:578–585; Costello C et al. 2020. The future of food from the sea. *Nature* 588:95–100.

6 Oyanedel R, Gelcich S, Milner-Gulland EJ. 2020a. A synthesis of (non-)compliance theories with applications to small-scale fisheries research and practice. *Fish and Fisheries*:1120–1134.

7 See, Ostrom E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press, Cambridge, UK. Available at, <http://ebooks.cambridge.org/ref/id/CBO9780511807763>

8 McNamara, Rowcliffe M, Cowlishaw G, Alexander JS, Ntiamoa-Baidu Y, Brenya A, Milner-Gulland EJ. 2016. Characterising wildlife trade market supply-demand dynamics. *PLoS ONE* 11:1–18.

as marine resources.⁹ Therefore, in recent years research has increased in an attempt to understand how and under what circumstances markets are a driver of unsustainable practices, and how they can be regulated in a way that the demand they generate is directed towards long-term sustainability.¹⁰

Within markets there is a key role that is often understudied: intermediation. Intermediaries connect fishers with local and international markets, and they mediate the demand response.¹¹ Therefore, in many cases they have considerable power in how fishing is conducted in a specific place, which is particularly relevant in artisanal fishing where there is greater dependence of intermediaries. This essay offers a brief reflection on the role of intermediation in fisheries and how public policy can help to encourage sustainability, focusing on the artisanal sector. The first part describes the operation of intermediation and value chain in the artisanal sector, and the receptive role commonly undertaken by artisanal fishers; the second part addresses a specific case in Latin America: the Chilean common hake fishery to illustrate both the role of intermediation and the possible negative consequences it may have; part three, explores different approaches used in science to understand intermediation and the impacts it may have on the sustainability of resources; part four looks at possible options for public policy and finally, come reflections and suggestions are presented.

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9 Espinoza-Tenorio A, Espejel I, Wolff M, Zepeda-Domínguez JA. 2011. Contextual factors influencing sustainable fisheries in Mexico. *Marine Policy* 35:343–350.

10 See work by Cinner JE, Barnes ML, Gurney GG, Lockie S, Rojas C. 2020. Markets and the crowding out of conservation-relevant behavior. *Conservation Biology* 0:1–8; Maire E, Stephanie D, Aliaume C, Mouillot D, Darling ES, Ramahery V, Randrianantsoa B, Tianarisoa TF, Santisy A, Cinner JE. 2020. Disentangling the complex roles of markets on coral reefs in northwest Madagascar. *Ecology and Society* 25.

11 Basurto X, Bennett A, Lindkvist E, Schlüter M. 2020. Governing the commons beyond harvesting: An empirical illustration from fishing. *PLoS ONE* 15:1–18.

Intermediation, value chains and the receptive role of artisanal fishers

The globalization processes seen over the last 50 years have created a situation whereby products and services tend to be traded globally, with more extensive value chains. This is no exception for natural resources value chains, where there has been a phenomenon of "commoditization", by which products tend to standardize in order to be a part of global markets.¹² Artisanal fishing, in particular, has witnessed this process. However, it has been affected in different ways, as the heterogeneity in the operations of this sector has repercussions in a number of value chains. Artisanal lobster fishers from the Juan Fernández Archipelago in Chile (a premium product that is exported alive, mainly to China) have a radically different relationship with their value chains compared, for example, to artisanal anchoveta fishers in Peru.¹³

Despite the heterogeneity found in artisanal fishing value chains in Latin America, common elements do exist. One of them is the verticality in the relations and imbalance of bargaining power that exists between intermediaries and artisanal fishermen.¹⁴ This imbalance of power generally results in a price-receptive role by artisanal fishers. This means that fishers have limited bargaining power to negotiate prices in the face of an intermediary who has a great capacity to reach markets, access to financing and economic resilience. This can have negative implications both for the fishers who receive few benefits from the resource exploited, and for the resource if incentives from intermediaries are in line with over-exploitation.

12 Pitcher TJ, Lam ME. 2014. Fish commoditization and the historical origins of catching fish for profit. *Maritime Studies* 14. Springer Verlag.

13 Ernst B, Chamorro J, Manríquez P, Orensanz JML, Parma AM, Porobic J, Román C. 2013. Sustainability of the Juan Fernández lobster fishery (Chile) and the perils of generic science-based prescriptions. *Global Environmental Change* 23:1381–1392.

14 Oyanedel R, Gelcich S, Milner-Gulland EJ. 2021b. A framework for assessing and intervening in markets driving unsustainable wildlife use. *Science of The Total Environment* 792:148328. Available at, <https://linkinghub.elsevier.com/retrieve/pii/S0048969721033994>.

Case study: common hake artisanal fishery in Chile

The common hake fishery is vital for Chile. The artisanal sector employs thousands of fishers directly, in addition to providing work for a greater number throughout the value chain.¹⁵ Perhaps more importantly, this fishery plays a key role in national food security, as the most highly traded marine product in the domestic market, and at a competitive price with other animal protein sources. Despite the significance of this fishery for Chile, its situation is critical. The stock has navigated between states of over-exploitation and collapse for the past ten years.¹⁶ This is due to a combination of factors, which in the artisanal sector are centered on over-quota fishing. Estimates show that in the country's VII region, which has the most artisanal landings of the resource, up to 77% are over the quota, which makes such fishing illegal.¹⁷ This is a longstanding problem determined by years of inadequate management, lack of legitimacy in the regulations, distribution of quotas leaving artisanal fishers little capacity to generate legal incomes, and a subsequent social acceptance of over-quota fishing.¹⁸

However, the role of intermediaries in the development, and collapse of this fishery is little known, but perhaps far more important. Intermediation in this fishery operates in a relatively simple manner: intermediaries buy

15 Plotnek E, Paredes F, Galvez M, Pérez-Ramírez M. 2016. From unsustainability to MSC certification: A case study of the Artisanal Chilean South Pacific Hake Fishery. *Reviews in Fisheries Science and Aquaculture* 24:230–243. Taylor & Francis. Available at, <http://dx.doi.org/10.1080/23308249.2016.1161003>.

16 SUBPESCA. 2016. Plan de Manejo de la Pesquería de la Merluza Común. Available at, <https://www.subpesca.cl/portal/616/w3-article-93150.html>.

17 Oyanedel R, Gelcich S, Mathieu E, Milner-Gulland EJ. 2021a. A dynamic simulation model to support reduction in illegal trade within legal wildlife markets. *Conservation Biology*. Wiley.

18 Oyanedel R, Gelcich S, Milner-Gulland EJ. 2020b. Motivations for (non-)compliance with conservation rules by small-scale resource users. *Conservation Letters* 13:1–9.

fish at the various harbors ("caletas") where common hake is landed and transport the product to the central fishing terminal in Santiago. This way, the chain is relatively short, with no processing or added value. However, this simplicity in the chain has been exploited by intermediaries in order to establish high levels of control over the operation, which concentrates power.¹⁹ Due to high levels of illegal landings, only intermediaries willing to undertake the risk of transporting illegal products from the coast to Santiago are capable of operating. This impacts on the limited number of intermediaries that operate, as they have a higher capacity to associate and control prices, which tends to put fishers at a disadvantage. This generates a vicious circle: as fishers receive artificially low prices for their catch, landings must increase to maintain their income levels, which increases supply, lowering the price even further.

The problem of a negative role played by intermediaries in artisanal fishery lies in the limited capacity of fishing authorities to control the activity of these actors. Although they can be controlled, a record on the number of actors involved, their characteristics or product flows is non-existent. This creates a void that makes it difficult to fully understand how to intervene in this group in order to modify incentives towards greater transparency and legality. Intermediation, unlike fisheries where the actors have a detailed record, it functions as a "black box", only tangentially understood.

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The problem of a negative role played by intermediaries in artisanal fishery lies in the limited capacity of fishing authorities to control the activity of these actors.

19 Oyanedel et al. Ibid

Approaches to unravel intermediation based on science

Conservation science has tended to focus more on the role of markets and intermediation on how natural resources are used.²⁰ This has generated a number of approaches towards understanding ways to intervene to increase sustainability in the use of resources. By using different approaches in an interdisciplinary manner, one can unravel the true role of intermediation, and from that point intervene and direct it towards sustainability. One of the approaches used in this area is the Theory of Access.²¹ This theory proposes that the various actors in a market (in this case fisheries) use different "mechanisms" to access the system's benefits. These mechanisms can be formal, for example, by having a legal fishing quota. But they can also be informal: by having connections with specific markets, or knowledge of the demand. The idea of identifying specific mechanisms used by different actors throughout the value chain is that the ability to recognize these mechanisms can help identify specific interventions that correct the systems. For example, if intermediaries in a particular fishery develop an access mechanism by which they can control prices (through an oligopoly), the potential for intervention lies in the increase of competition in order to decrease the ability of a group of actors to control the demand.

Another possible methodological approach is to mathematically model the incentives that intermediaries have to trade legal or illegal products, and thereby orient interventions aimed at changing those incentives.²² In purely economic terms, an individual's incentive to engage in illegal activities is determined by the benefit from carrying them out and their potential cost.²³ The cost, meanwhile, is determined by the probability of being detected and size of the fine. Although this economic model has limitations, and the evidence shows that human behavior is determined by more factors than a cost-benefit calculation alone, it is a useful approach for beginning to understand what determines the behaviors of intermediaries.²⁴ The problem with such approaches, however, is that when attempting to model systems where both legal and illegal products exist, information on the illegal market (such as prices,

20 Moyle B. 2017. Wildlife markets in the presence of laundering: a comment. *Biodiversity and Conservation* 26:2979–2985.

21 See work of Peluso NL, Ribot J. 2020. Postscript: A Theory of Access Revisited. *Society and Natural Resources* 33:300–306. Routledge. Available at, <https://doi.org/10.1080/08941920.2019.1709929>; Myers R, Hansen CP. 2020. Revisiting A Theory of Access: A review. *Society and Natural Resources* 33:146–166.

22 Oyanedel, Ob cit. 21

23 Becker GS. 1968. Crime and Punishment: An Economic Approach. *Journal of Political Economy* 76:169–217. The University of Chicago Press. Available at, <https://www.journals.uchicago.edu/doi/10.1086/259394> (accessed November 29, 2018).

24 Also see the work of Fulton EA. 2021. Opportunities to improve ecosystem-based fisheries management by recognizing and overcoming path dependency and cognitive bias:1–21; Bova CS, Halse SJ, Aswani S, Potts WM. 2017. Assessing a social norms approach for improving recreational fisheries compliance. *Fisheries Management and Ecology* 24:117–125.

amounts, etc.) is difficult (or almost impossible) to obtain directly. In these cases, it is necessary to use mathematical models adapted to deal with high levels of uncertainty (e.g. Bayesian models).²⁵ The use of these types of models can contribute to an understanding of the amount of illegal resources traded in a system, and how to change the incentives of intermediaries with a view to sustainability and legality.

Finally, it is important to highlight research that seeks to understand how the way fishery market actors interact to exchange information and products affects sustainability. Assessing the configurations of markets requires mapping on how products, information and resources travel through the supply chains.²⁶ This can be done by using different methodologies such as system mapping, interviewing key informants, analyzing social networks and reviewing literature.²⁷ Understanding these configurations can help identify interventions by targeting specific points in the supply chain that may be causing or maintaining unsustainable practices.²⁸

Options in fisheries policy

Fisheries policies that seek to change or intervene the role of intermediaries in determining how fishery resources are managed require, in the first place, a register of intermediaries. This would help to visualize the composition and characteristics of those who participate in this sector. Ideally, this could also open communication channels through which information can be exchanged in order to adapt policies and measures. A register of intermediaries would also be a clear sign that these actors are key in the fishing system and would require recognition for the role they play. However, this is more than a simple administrative process and requires a shift in the paradigm of how fisheries are managed.

25 Beaumont MA. 2010. Approximate Bayesian Computation in Evolution and Ecology. *Annual Review of Ecology, Evolution, and Systematics* 41:379–406.

26 Purcell SW, Crona BI, Lalavanua W, Eriksson H. 2017. Distribution of economic returns in small-scale fisheries for international markets: A value-chain analysis. *Marine Policy* 86:9–16. Available at, <https://doi.org/10.1016/j.marpol.2017.09.001>.

27 González-Mon B, Bodin Ö, Crona BI, Nenadovic M, Basurto X. 2019. Small-scale fish buyers' trade networks reveal diverse actor types and differential adaptive capacities. *Ecological Economics* 164:106338. Available at, <https://linkinghub.elsevier.com/retrieve/pii/S0921800918313247>.

28 Phelps J, Biggs D, Webb EL. 2016. Tools and terms for understanding illegal wildlife trade. *Frontiers in Ecology and the Environment* 14:479–489.

If in the last 20-30 years the shift in paradigm was from understanding the ecology of fish stocks and their bio-masses to understanding the management of fishers, the upcoming shift in paradigm requires the recognition that fishery management involves not only fishers but also those who participate in the value chains.²⁹ To meet this new challenge, new legislation and capacities within fisheries agencies will be required.

In the same way a paradigm shift in fisheries legislation is needed, the focus of control must be shifted from the fisher to the intermediaries and participants in the value chain. Because intermediaries act as aggregators of products from several producers, they are ultimately bottlenecks where there is a high probability of finding illegal activities. This makes the effectiveness of control activities higher, which has in turn a stronger dissuasive effect. Increasing the efficiency of control activities is key in countries and sectors where resources for control are limited. However, this change of approach will also require new capabilities. The way in which control is undertaken differs according to the actor under control, as each type of actor has different ways of evading the controls.³⁰ It is essential for the control activity to be adaptive and flexible in order to detect these differences and maintain its effectiveness over time. In the same way, focalizing control in the intermediation sector may help to reduce monopolies or oligopolies that are created to control prices and the quantities of traded products. Again, new and different capabilities will be needed to attack this sector, which differ from those techniques usually used by fisheries inspectors.

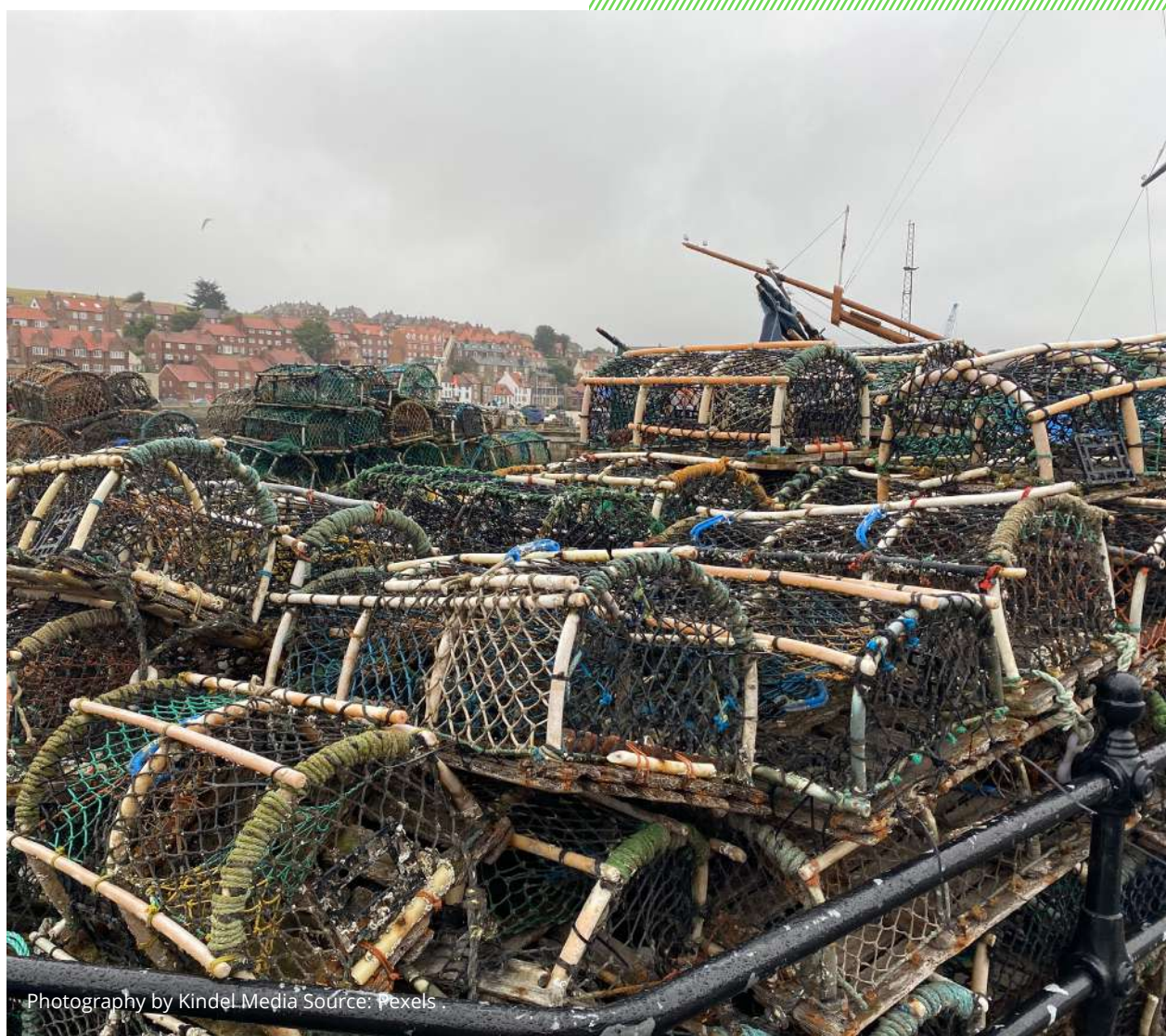
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the upcoming shift in paradigm requires the recognition that fishery management involves not only fishers but also those who participate in the value chains.

29 Fulton EA. Ob cit.

30 Arias A, Bergseth BJ, Weekers D, Wilcox C, Purcell SW. 2021. Countering Avoidance Strategies Used by Fishers to Avoid Detection During Illegal Fishing 8:1–7.

Another important challenge to incorporate public policies covering the fisheries intermediation sector is the need for a multi-institutional approach. Depending on the legislation of each country, intermediaries are under the administration of governmental tax collecting institutions, those responsible for sanitary regulations, as well as fisheries institutions. This tends to hamper and dilute the capacity to control and supervise this group when coordination between institutions is weak. This can generate inefficiencies, but also provides an opportunity to better understand, from a variety of capacities, the factors determining market dynamics in which the intermediaries operate. A proper characterization is key to intervene efficiently and reduce the possibility of non-intended consequences.



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Final reflections

- Fisheries in Latin America are a key source of employment and food security. However, years of overexploitation and illegal fishing threaten the benefits they generate in different areas at different levels.
- A sector that has been under-explored to reverse this negative trend is intermediation. Intermediation is a key sector in fisheries as it connects markets with fishers and it can be transcendental in determining how and how much is being caught.
- There are several scientific methodologies and approaches that can help to identify and understand the operation of intermediaries and their incentives. This can help to design effective interventions aimed at changing the way in which intermediaries operate in search of fisheries sustainability.
- However, a transformation in the institutions that manage fishery resources is needed to accommodate new practices, techniques and methods for legislating and controlling intermediation.
- While challenging, the important and incremental role of intermediation in fisheries must be considered and incorporated into fisheries management. This is the only way to move towards sustainability and maintain the diversity of social and economic benefits that fishing provides for Latin America.

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11.

Nature-based Solutions: a review of the concept and their significance*

Manuel Ruiz Muller

Acronyms

CBD: Convention on Biological Diversity

EbA: Ecosystem-based Approach

GBF: Global Biodiversity Framework

IUCN: World Conservation Union

MEAs: Multilateral Environmental Agreements

NbS : Nature based Solutions

* This essay is an adaptation of a non-published policy brief written in early 2021.

Introduction

Nature-based Solutions (NbS) is a relatively new concept which has, nevertheless become strongly anchored in international and national environmental and development discussions.¹ In simple terms, NbS are a way of using nature/biodiversity to solve and address societal problems and challenges. These may include, for example, improving access to water, mitigating climate change, enhancing local agricultural production, reducing health risks from diseases originated in tropical forests, reducing exposure to natural disasters, among others. In doing so, NbS also serve to connect development, climate change and biodiversity policy goals.² Clearly, not all nature interventions qualify as NbS. Furthermore, quite a few stakeholders have voiced their concerns regarding potential downsides to the use of the concept and application of the tool.³

Nature based Solutions have and continue to receive attention and broad support from many organizations, including the World Bank, IUCN, OECD and the European Commission and countries, including the United Kingdom, Norway and France, particularly in the

1 Nature-based Solutions are defined as “[A]ctions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.” Cohen-Sachan, E., Walters, G., Janzen, C. and Maginnis, S. (eds.) (2016) Nature-based Solutions to Address Global Societal Challenges. IUCN, Gland. Available at, <https://portals.iucn.org/library/sites/library/files/documents/2016-036.pdf> [highlights are ours] A Note by the Executive Secretary of the CBD suggests definitions for “NbS”, “Ecosystem-based Approach” and “Ecosystem Approach”, among other terms used in the updated Zero Draft of the 2020 Global Biodiversity Framework. The definition of NbS has not been formally endorsed by Parties. See, CBD/SBSTTA/24/INF/11. Annotation for Terms and Concepts Used in the Language of Interim Updated Post 2020 Goals and Targets. June 15, 2020. Available at, <https://www.cbd.int/doc/c/46bf/8fcc/4fc82767c058517caa96892d/sbstta-24-inf-11-en.pdf> The CBD Secretariat’s Note definition of NbS coincides with that of IUCN but includes an important addition [...] “Nature based solutions are broader than ecosystem-based approaches and include benefits for biodiversity, water quality/quantity, sustainable land management, etc.” [the highlights are ours]

2 Strong and recent high-level calls for better connection and integration of biodiversity and climate change have been made in manifestos and declarations including the Beijing Call for Biodiversity Conservation and Climate Change (2019), the High Ambition Coalition for Nature and People (2021), the UK COP 26 Presidency’s Nature Stream (2021), among others.

3 Some NGOs have voiced concerns about NbS regarding potential for “greenwashing”, corporate misuse, commodification of nature, delays in addressing the critical issues concerning phasing out fossil fuels and de-carbonization, etc. and so are weary about its inclusion in the text of the Post 2020 Global Biodiversity Framework. Off-setting is of particular concern. See, Nature Based Solutions: Civil Society Statement of Concern – Draft December 15, 2020. The Nature based Solutions Initiative from Oxford University also highlights potential pitfalls of not “getting the message right about NbS.” See, Oxford University. Getting the Message Right about Nature Based Solutions, February 1, 2021. See, <https://www.naturebasedsolutionsinitiative.org/news/new-paper-getting-the-message-right-on-nature-based-solutions/>

context of the mitigation and adaptation climate action agenda.^{4,5} The World Economic Forum (WEF) has also embarked in a mission to modify how business is done by endorsing the notion of Nature Positive and NbS and reassessing the role of nature and biodiversity as core to sustainable business and development models.⁶

In general, NbS are broadly accepted within the climate change community but are yet to be fully endorsed by the biodiversity community and the Convention on Biological Diversity (CBD) process.⁶ Within the CBD and the Post 2020 Global Biodiversity Framework (GBF), NbS can positively drive and strengthen biodiversity action and contribute to the realization of the three CBD objectives: conservation, sustainable use and benefit sharing.⁸

4 See for instance, The World Bank (2008) Biodiversity, Climate Change and Adaptation: Nature-based Solutions from the World Bank Portfolio. Available at, <https://openknowledge.worldbank.org/handle/10986/7785>

5 Nature-based Solutions have received widespread support within the climate action agenda as evidenced by the call by the UK and France for 30% of the climate action budget dedicated to NbS; or the call for inclusion of NbS in Natural Determined Contributions; or prioritization of the concept as part of COP 26 of the UNFCCC/Paris Agreement.

6 World Economic Forum. The Future of Nature and Business. New Nature Economy Report II. Switzerland, 2020. Available at, <https://www.weforum.org/reports/new-nature-economy-report-ii-the-future-of-nature-and-business>.

7 As an example of a respected and high profile multisectoral and diverse set of stakeholders actively involved in climate change negotiations – NGOs, business organizations, academic institutions, donor agencies, etc.- and supportive of NbS, the “Call to Action for an Equitable, Carbon Neutral, Nature Positive World” (2020) describes the urgent need for a transition towards a nature positive economy and investment in NbS. See, https://www.iied.org/sites/default/files/post-2020_pavilion_call_to_action.pdf

8 Launched at the Conference of the Parties 14 of the CBD, held in Sharm el Sheik in Egypt (2018), through COP Decision 14/34, the Post-2020 Global Biodiversity Framework sets out an ambitious process and plan to implement broad-based action to bring about a transformation in society's relationship with biodiversity and to ensure that, by 2050, a shared vision (“living in harmony with nature”) is fulfilled. The Post 2020 Biodiversity Framework is a guiding international framework which builds on and will replace the Strategic Plan for Biodiversity 2011-2020 (Aichi Targets). <https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-34-en.pdf>

Nature-based Solutions: the concept

The concept of “NbS” can be traced to the late 2000’s, as awareness rose among the conservation community about the critical role played by ecosystems in providing environmental services. At around the time the Millennium Ecosystem Assessment (2005) was released, it was recognized that humans could become not only passive beneficiaries of environmental services but could also engage proactively in utilizing and applying biodiversity and nature to address and solve a wider range of global problems beyond the realm of conservation per se (e.g. climate change, food and water insecurity, etc.).⁹

Nature-based Solutions are, by definition, a tool, a practical application to address, primarily, broad societal challenges. But they are also a useful way to connect with the CBD objectives and create positive synergies both conceptually and in practice. Nature-based Solutions differ and are often confused with the Ecosystem-based Approach (EbA), which is, in general, more about management and equitable integration of genetic diversity, species and ecosystems in conservation interventions.¹⁰ Nature-based Solutions on the other hand, place their main emphasis on societal challenges, where nature/biodiversity are instrumental to allow the generation of positive social, economic, cultural and environmental/biodiversity benefits. Nature-based solutions and the EbA should be supportive of one another.

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Nature-based Solutions on the other hand, place their main emphasis on societal challenges, where nature/biodiversity are instrumental to allow the generation of positive social, economic, cultural and environmental/biodiversity benefits.

⁹ Cohen-Sachan et. al. Ibid. at 1, p. 3

¹⁰ The EbA is defined as: “[...] a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Application of the ecosystem approach will help to reach a balance of the three objectives of the Convention. It is based on the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of ecosystems.” See, <https://www.cbd.int/ecosystem/>. The EBA was endorsed at COP 5 of the CBD. See, UNEP/CBD/COP/5/23. Decision V/6 (Ecosystem Approach). Adopted in May 2000 in Nairobi, Kenya. Available at, <https://www.cbd.int/decision/cop/?id=7148>

According to the World Conservation Union (IUCN), one of NbS core dimensions is biodiversity net gain,¹¹ which also creates a convergence with the biodiversity conservation community interests and a connection with ecosystem-based approaches through which conservation goals can be met.¹² Even though NbS are not primarily targeted towards conservation, synergies can be created between development, climate action and biodiversity conservation through institutions, policy goals, agendas, projects and in situ interventions and finance, including alignment with other Multilateral Environmental Agreements (MEAs).

The CBD objectives and ecosystem-based approaches

Article 1 of the CBD establishes that its objectives, to be pursued in accordance with its relevant provisions, are “... the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.” These objectives are in line with related core dimensions expressed by NbS, particularly with regards to biodiversity net gains and overall conservation benefits.

At the same time, early since its implementation phases, specific ecosystem-based strategies in the CBD (e.g. forest landscape restoration, climate adaptation services, green/natural capital) have been designed to enhance conservation of entire habitats

11 The other core dimensions highlighted by IUCN are social change, co-benefits, economic feasibility and balance of trade-offs. See, IUCN (2020), IUCN Global Standard for Nature based Solutions. A user-friendly framework for the verification, design and scaling up of NbS. First Edition. IUCN, Gland, Switzerland. See, <https://portals.iucn.org/library/sites/library/files/documents/2020-020-En.pdf>

12 Whilst considerable discussion is under way as to what exactly “net gains” mean, suffice to say it broadly refers to a reversal and positive recuperation of biodiversity at all levels as we move in the effort to change course and alter prevailing biodiversity loss trends. See brief explanation and graph on page 3 of CBD/SBSTTA/24/3/Add.2. Post 2020 Biodiversity Framework: Scientific and Technical Information to Support the Review of the Updated Goals and Targets and Related Indicators and Baselines. February 5, 2021. Available at, <https://www.cbd.int/doc/c/a00b/c37b/d8e83f95a469e837ff681d44/sbstta-24-03-add2-en.pdf>



Photography by Christian Heitz. Source: Pexels

and biodiversity therein. The idea of an “Ecosystem-based Approach” was adopted as the main framework for implementation of the CBD as early as 1995.¹³

Some of the key principles of the EbA include, for example, a recognition that the objectives of management of land, water and living resources are a matter of societal choice; management should be decentralized to the lowest appropriate level; ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems; there is usually the need to understand and manage ecosystem in an economic context and recognize potential for gains (including for biodiversity) from management; among others.¹⁴

Creative responses and approaches to new, intensified and highly complex challenges (e.g. effects of climate on marine and terrestrial biodiversity and livelihoods), are required. Nature-based Solutions come in timely and offer an opportunity to support biodiversity mainstreaming and cross-sectoral solutions to environmental and social challenges. Ecosystem-based approaches and NbS can be mutually supportive of and complement one another.

13 COP 2, Decision II/8, Preliminary Consideration of Components of Biodiversity Particularly under Threat and Actions which could be taken under the Convention. See, <https://www.cbd.int/decision/cop/?id=7081>

14 Secretariat of the Convention on Biological Diversity (2004) The Ecosystem Approach, (CBD Guidelines) Montreal: Secretariat of the Convention on Biological Diversity. Available at, <https://www.cbd.int/doc/publications/ea-text-en.pdf>

Nature-based solutions: an opportunity for the CBD/Post 2020 Global Biodiversity Framework

Although NbS are not part of the CBD text or process, the updated Zero Draft of the Post 2020 GBF does include direct references.¹⁵ This is a step in the right direction.¹⁶ The references to NbS are included in Targets 7 and 10 in conjunction with the Ecosystem-[based] Approach.^{17 18}

The challenges ahead for NbS

The manner in which NbS have been included in the text of the updated Zero Draft of the Post 2020 GBF creates room for improvement. First, under Targets 7 and 10 NbS and the Ecosystem [based] Approach¹⁹ are used in conjunction, leading to potential confusion about the role and objectives of two very distinct instruments.²⁰

Second, under Target 7, references are made to objectives of other conventions which are not necessarily directly related to the CBD scope nor the Post 2020 GBF. Likewise, under Target 10, references to air quality, hazards and extreme events,

15 CBD/POST2020/PREP/2/1. Update of the Zero Draft of the Post 2020 Global Biodiversity Framework. August 17, 2020. Available at, <https://www.cbd.int/doc/c/3064/749a/0f65ac7f9def86707f4eaeafa/post2020-prep-02-01-en.pdf>

16 Co-Chairs at the first Contact Group meeting of CBD SBSTTA 24, under Agenda Item 3 CG #1 on Add.2/Rev.1 expressed concerns that NbS were not clear to all Parties and indicated that it may be more suitable to further enhance references to the EbA instead (May 5, 2021).

17 The EbA is considered a set of different “approaches” which may include, for instance, ecosystem-based adaptation, climate adaptation services, forest landscape restoration, natural capital, etc. Cohen-Sachan, E. et al. Ibid, at 1, p. 23

18 Target 7 of the Zero Draft of the Post 2020 Global Biodiversity Framework: By 2030, increase contributions to climate change mitigation, adaptation and disaster risk reduction from nature-based solutions and ecosystem-based approaches, ensuring resilience and minimizing any negative impacts on biodiversity. Target 10: By 2030, ensure that, nature-based solutions and ecosystem approach contribute to regulation of air quality, hazards and extreme events and quality and quantity of water for at least [XXX million] peoples.

19 The EbA is defined as: “[...] a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Application of the ecosystem approach will help to reach a balance of the three objectives of the Convention. It is based on the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of ecosystems.” See, <https://www.cbd.int/ecosystem/>. The EbA was endorsed at COP 5 of the CBD. See, UNEP/CBD/COP/5/23. Decision V/6 (Ecosystem Approach). Adopted in May 2000 in Nairobi, Kenya. Available at, <https://www.cbd.int/decision/cop/?id=7148>

20 The EbA and NbS have different objectives and are distinct from one another in their essential features. Differences include their origin and consolidation (biodiversity and climate agendas), their objectives (conservation and dealing with social challenges/development), their “nature” (strategy and tool), their scope (NbS is an “umbrella” under which the EbA approaches can be deployed) and the spaces they more prominently occupy (CBD and the UNFCCC/Paris Agreement)

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[...] a net nature/biodiversity gain is a key dimension for conservation in terms of defining the quality of the intervention in/with nature [...]

are outside the scope of the CBD and only cover a portion of what may be considered societal challenges.

Finally, NbS seem to have been forcefully inserted as “add-on” targets in the text without fully reflecting alignment with the CBD nor the Post 2020 GBF vision, mission, tools for implementation and other sections of the updated Zero Draft ²¹

On another level, as a more general challenge, the separation and specialization of the biodiversity and climate change communities have unnecessarily hampered coordination, consistency and coherency in visions, language, decisions and overall actions pertaining to NbS.²²

When looking at the three core dimensions of NbS – societal challenges, biodiversity net gain and co-benefits – if an intervention or strategy is not designed to address these challenges concurrently, it will fall outside the scope of a NbS approach. Under the present text of Targets 7 and 10 of the Post 2020 GBF conceptual clarity is lost regarding NbS. Likewise, under NbS, a net nature/biodiversity gain is a key dimension for conservation in terms of defining the quality of the intervention in/with nature, including, for example, through projects and programs which are reliant on ecosystem-based and other approaches.

21 Deprez et al. discuss how, often, integration, coordination and coherency in international processes is limited to adding-on or lumping concepts, references, issues, etc. Rather than simply linking, they call for aligning broader ambitions. See, See, Deprez, A., Rankovic, A. and Landry, J. Aligning High Climate and Biodiversity Ambitions in 2021 and Beyond: Why? What? How? Background note for the February 9-10 informal workshop: “Aligning high climate and biodiversity ambitions in 2021 and beyond” IDDRI. Available at, <https://4post2020bd.net/workshop-aligning-high-climate-and-biodiversity-ambitions-in-2021-and-beyond/>

22 Deprez, A. et al. describe a process as a result of UNCED (1992) where the CBD, UNFCCC and the Convention to Combat Desertification are connected in spirit and as part of a global impulse to protect the environment but hardly refer to one another in their actual text. They have “drifted apart” and only recently are efforts underway to bring them together through collaboration among Secretariats, coordination in implementation and funding, looking at policy coherence in decisions, etc. The spillover effect of this situation is noticeable in discussions surrounding the Post 2020 GBF and the disconnect with other MEAs and processes. See, Deprez, Ibid.

The opportunities

The powerful trend setting motto “build or come back better” -post Covid 19- has captured the imagination of the development and environmental communities and is reflected in declarations, manifestos, etc. In addition, as noted above, the WEF, coalitions of NGOs and the academic sector, donors and various countries, are creating momentum and a forward looking dynamic. This must not be seen only as an “appropriate moment” for transformations but rather, as an ambitious and new long-lasting phase in the history of human and social development.

This scenario could offer a unique opportunity for an ambitious Post 2020 GBF,²³ which prominently and coherently reflects NbS. Given the critical urgency of our times, the world is marked by strong commitments to accelerate and drive a robust and transformative environmental and sustainable development agenda which takes advantage of a renewed animus for long-lasting change among wide sectors of society. The Post 2020 GBF must respond to an expectant world.

And so inserting NbS in the Post 2020 GBF but doing so coherently and not just as an add on, is of utmost importance. By creating an initial set of principles for NbS, they can contribute to the realization of the CBD objectives and the GBF ultimate vision and mission. Likewise, this allows for coherence with yet other international processes, including various MEAs and the SDGs

23 The degree and content of the ambition is still a matter of contention. Some Parties and stakeholders suggest that the Post 2020 GBF should remain a broad, biodiversity centered plan; others suggest the Strategic Plan for Biodiversity should explicitly link biodiversity to equity, human rights, gender, tenure rights, wellbeing, etc.; others feel the Post 2020 GBF should focus on addressing all direct and indirect drivers of biodiversity loss. Some have argued also that narrowing coverage of the Post 2020 GBF will limit possibilities of achieving the 2050 vision. See, CDB/POST2020/PREP/1/INF/1. Synthesis of Views of Parties and Observers on the Scope and Content of the Post 2020 Global Biodiversity Framework. January 24, 2019. Available at, <https://www.cbd.int/doc/c/de9c/8c12/7c0cb88a47f9084e5d0b82eb/post2020-prep-01-inf-01-en.pdf>

According to IUCN and the CBD Secretariats note on terms and concepts,²⁴ NbS can be seen as a general “umbrella” like concept under which a wide range of different strategic conservation approaches such as ecosystem- based mitigation, climate adaptation services and forest restoration services can fall and further serve to realize the objectives of the CBD. By doing so, alignment with the sustainable development discourse becomes apparent. Nature, through multiple ecosystem-based approaches, serves to reach different social/development goals including those under the SDGs and the Post 2020 GBF itself).²⁵

By becoming responsive to NbS, the Post 2020 GBF can create a virtuous circle which brings together different reasonings, science (e.g. IPCC and IPBES)²⁶ and “looks at the forest rather than at the trees.” Nature-based Solutions as a practical tool and a EbA as conservation strategy can follow parallel and distinct yet complementary and mutually supportive pathways. One striving to overcome a wide range of social challenges and the latter guided by the vision of “living in harmony with nature” in the context of the Post 2020 GBF.

24 See document, CBD/SBSTTA/24/INF/11, at 1

25 Nature-based Solutions cut across various SDGs including SDG 1 (Poverty), SDG 2 (Zero Hunger), SDG 3 (Good Health and Wellbeing), and various others. Current targets 7 through 12 in the updated Zero Draft also relate to and emphasize nature’s contribution to people (development). Nature-based Solutions can directly enhance human wellbeing by contributing to realization of policies pertaining to, for example, climate change adaptation and mitigation, food security, small-scale agriculture, natural resources management, etc. whilst at the same time support improvements in biodiversity and ecosystems conditions.

26 The mere existence of an IPCC and IPBES as independent entities is an indication of parallel science and research serving different communities, climate change and biodiversity, respectively. They often influence policy process in ways which could create risky trade-offs whereby climate policies could actually harm biodiversity conservation efforts. We must prevent setting climate goals without fully understanding biodiversity goals and vice versa. See, Deprez, A., et al. Ibid, at 21 and discussion on how carbon dioxide removal measures, for example, could have negative impacts on biodiversity or prove highly inefficient. A recent report reveals how California Air Resources Board’s methodology for the state’s forestry carbon crediting methodology is flawed and that there are US 410 million being overpaid to projects. See, Song L. and Temple, J. The Climate Solution Actually Adding Millions of Tons of CO2 into the Atmosphere. ProPublica and MIT Technology Review. April 29, 2021. Available at, <https://www.propublica.org/article/the-climate-solution-actually-adding-millions-of-tons-of-co2-into-the-atmosphere> A similar conclusion was reached in an article analyzing the Cash for Clunkers Program (scrappage of old vehicles for new ones to combat emissions and climate change), which spent US 3 billion dollars, grossly misplaced incentives and did not address consumer behavior. See, Linn, J. Cash for Clunkers 2.2: Targeting Scrappage Subsidies to Cut Costs. Common Resources, Dec. 22, 2020. Available at, <https://www.resources.org/common-resources/cash-clunkers-20-targeting-scrappage-subsidies-cut-costs/>

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Epilogue

The necessary premises for countries to embark on the route of sustainable development and ride the wave of “building back better” post COVID-19 usually entail at least three elements: solid institutional structures and a transversal approach to the environment; robust scientific capacities which positively inform decision making processes and leadership. Different variants of this are usually present in the sustainable development and conservation conversation. As most of the essays in this collection have shown and as a seeming common feature in Latin America, weak institutions are central to the challenges faced to overcome climate change and loss of biodiversity.

What I would like to propose in this epilogue to a set of essays addressing issues of great complexity is how, despite efforts, including from the economy and public policy, mankind is facing problems derived from climate change and biodiversity loss of such a magnitude that technological solutions and innovations seem largely insufficient or, at the very least, partial and limited in their impacts.

J. B. Weisner and H. F. York, quoted by Hardin in his seminal article *The Tragedy of the Commons*, concluded, with respect to the 1950s and 1960s nuclear arms race, that, in their thoughtful judgment, it was impossible to find a technical solution to this problem - the nuclear threat - that threatened/threatens the very existence of human beings and the planet as a whole. Analogously, perhaps climate change and biodiversity loss, because of their extreme complexity in their origins, actors and interests involved, are such a problem, technically unsolvable.

In this context I would also like to propose returning to our main topic that, with the advent of the new century marked by anthropocentrism and techno-centrism, an issue has been grossly overlooked and has little or no relevance in the international debate and conversation: moral and ethical action. It is in ethical action - in the sense of Kant's categorical and universal imperatives - that we may possibly find the seeds of a movement to mitigate and, who knows, reverse the climate and biodiversity loss crisis. Ethical action, probably translated into policy mandates, would guarantee the future of coming generations.

However, we must not be naïve or ingenuous either. As the Nobel Prize-winning economist Paul Krugman rightly points out, despite the overwhelming scientific evidence and social support, decision-makers will find some reason not to do the correct and sensi-

ble things over and over again. Political decisions, according to another award-winning economist Milton Friedmann, also very evidently respond to incentives: and the greatest incentive for decision-makers is political survival - at all costs. With growing nationalism, populism and negationism, the slope has become even steeper.

Human nature, carefully analyzed, is extremely predictable and the way in which political decision-making spheres are dissociated from the world of science and scientific evidence and popular outcries, allows one to easily infer the unwillingness that exists and will exist, in many countries, in order to face the climate crisis and its impacts in a forceful manner - until it is too late. In this regard, there are not many cards left to play on the table and options to avoid a true climate hecatomb - which is beginning to manifest itself in a very dramatic way in many parts of the world - are beginning to shrink and the deadlines and opportunities are beginning to disappear. The tendency posed by social psychology proposing that "somehow it will be solved later on" puts at real risk not only sustainable development as a goal/process, but the viability of the biosphere as a whole.

In view of this situation, we close this series of essays with a brief reflection on the role of ethics and morals which we hope will open the door to a broader debate. It is worth considering how ethical action can become a "nuclear" option (for the record!) that will change the way in which countries, particularly decision-makers, deal with the climate crisis. How to scale this ethical action to make it "efficient" in the context of the pressing global environmental challenges humanity is facing becomes an important and relevant exercise during these times.

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