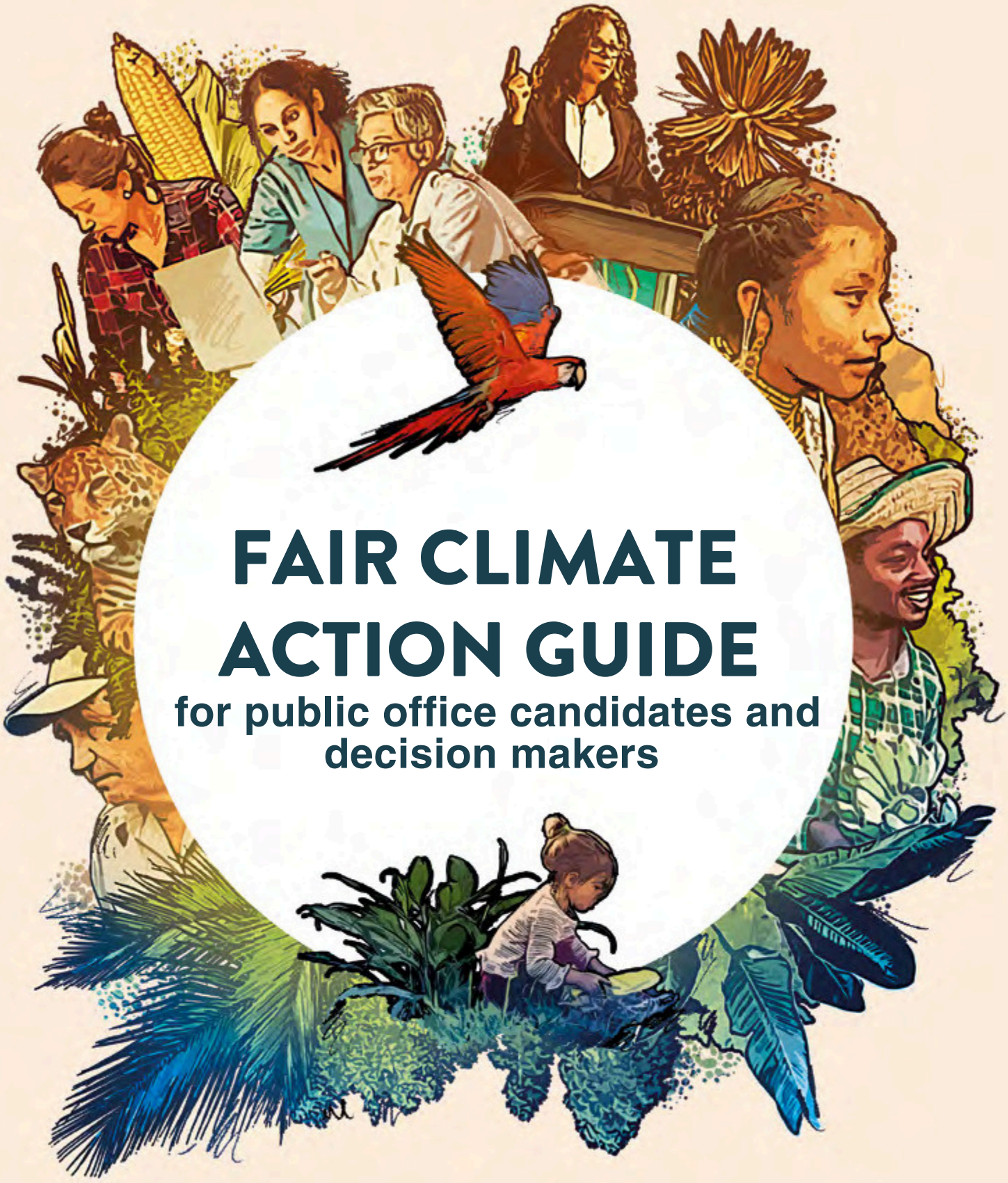

FAIR CLIMATE ACTION GUIDE

for public office candidates and decision makers

LowCarbonCity

HEINRICH BÖLL STIFTUNG
BOGOTÁ
Colombia

FAIR CLIMATE ACTION GUIDE
for Public Office Candidates and Decision-Makers (2023). Medellín: Low Carbon City.

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Design and illustrations
Puntoaparte Editores

INTRODUCTION

Dear elected public official,

The climate crisis we currently face demands that we, as a society, act swiftly and decisively to respond to the effects of the climate crisis and protect people's lives, recognizing that there are populations highly vulnerable due to their age, gender identity, ethnic identity, or socioeconomic status. Furthermore, there is an intersectionality that causes the impacts to be disproportionate and to affect those populations that have had the least responsibility for this crisis we face. This does not imply ignoring common responsibilities, but it does require us to act to carry out the necessary transitions in a just manner towards a model that respects the limits of nature and prevents the exacerbation of existing social and economic gaps.

In recent years, the climate crisis has increased the uncertainty of our society. Despite the certainty of knowing that the crisis is our fault, decision-makers have still not acted decisively, captured by economic interests despite the need to provide fair responses and consolidating "business as usual" and the "status quo," further deepening existing inequalities, along with the creation of false solutions to avoid the systemic changes we need. In this way, the environmental, cultural, and economic connections of different territories in the world and especially in our country have changed, making us increasingly vulnerable and leaving response opportunities to political and ethical decisions that will determine our future.opportunities to political and ethical decisions that will determine our future.

This is a decisive year due to your intention to assume an office of popular election. The power you will hold will be key to reorienting the planning and trajectory of our societies to face uncertainty and respond justly to existing socio-environmental and climate debts. It is a great task, and fortunately, civil society has been building alternatives for decades in the hope of not exceeding the tipping points (not exceeding the 1.5°C temperature increase above pre-industrial levels). Faced with the need to rethink new ways of relating to nature and to different actors, a reservoir of proposals, actions, and initiatives has been created that consolidate the opportunity to make the transformations we need.

In many cases, institutional frameworks are already in place, but legislation is not always enforced. Deep reforms are also required, which, driven by citizen participation and democratic institutions, will bring great benefits as long as they guarantee the effective participation of communities, as is the case with popular elections—a legitimacy mechanism that brings us together for the creation of this guide.


LCC

Thus, at Low Carbon City, with the support of the Heinrich Böll Foundation, Bogotá Office – Colombia, we believe that collective climate action is the answer. For this reason, we want to introduce you to the Just Climate Action Guide for Public Office Candidates and Decision-Makers. This guide is an invitation for elected officials to make the climate agenda, with a justice-focused approach, a cross-cutting and priority axis in development plans. The guide encourages addressing the climate crisis from a human rights and gender equity perspective, transforming climate action into an opportunity to work towards closing social and economic gaps. It also presents various initiatives demonstrating that these response approaches are feasible.

We invite you to use this guide as a tool for you and your team to consolidate fair decisions throughout your term as a popularly elected official.

This guide is the result of research and literature review, as well as a consultation process involving nine civil society organizations, five private companies, and two public organizations dedicated to providing solutions to address climate change. Additionally, it presents case studies featuring initiatives from across Colombia and other countries that respond to the climate crisis in a just manner. These initiatives are grounded in human rights and gender approaches, seek to reduce existing inequalities, facilitate civil society participation in climate solutions, and address the needs of the national territory—while also advancing the achievement of the Sustainable Development Goals (SDGs).

The organizations proposing this guide and those supporting us believe in community-based organizations, cooperativism, and public-popular alliances as opportunities to generate energy, food, and economic sovereignty. These are essential responses to existing needs, capable of achieving socio-ecological transformations that prevent the ongoing power imbalances in our relationships with each other and with nature.

Therefore, we invite decision-makers to support measures that contribute to the decentralization and democratization of climate crisis solutions through a bottom-up approach—one that considers the specific characteristics and needs of territories and the communities that inhabit them. At the same time, systemic changes must be driven across the public sector, private sector, academia, and society at large to ensure that no one is left behind, guaranteeing justice and dignity.

Luisa Grajales **Low Carbon City Team**

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GLOSSARY

Power Purchase Agreement (PPA): A long-term contract under which a company commits to purchasing electricity directly from a renewable energy generator.[1]

Escazú Agreement: The Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean. This treaty is a pioneering legal instrument in environmental protection and human rights. Its objective is to guarantee the right of all persons to have timely and adequate access to information on environmental matters, to participate meaningfully in decisions affecting their lives and environment, to access environmental justice, and to promote the protection of human rights defenders in environmental matters.[2]

Agroecology: From a practical perspective, agroecology proposes new forms of relationships between human beings and common goods, addressing productive, environmental, economic, cultural, and social variables. It aims to strengthen fair and sustainable food systems by enhancing socio-environmental resilience, dialogue, and the recovery of traditional/ancestral knowledge of indigenous peoples and peasant communities. At the same time, it promotes food sovereignty and local economies. Additionally, it can be understood as a social movement for strengthening grassroots processes that nurture identity and culture and advance social justice.[3]

Bioeconomy: Based on the production, utilization, and conservation of biological resources—including knowledge, science, technology, and innovation—as an alternative for productive diversification and value addition to the rural sector, particularly in agricultural and agro-industrial sectors.[4]

Climate Change: "A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods."[5]

Biological Connectivity: The ability of animals on land or in water to move freely from one place to another. Movement allows them to find food, reproduce, and establish new territories.[6]

Convention on Biological Diversity: A legally binding international treaty with three main objectives: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the utilization of genetic resources. Its overall goal is to promote measures leading to a sustainable future.[7]

Environmental Degradation: Deterioration of forest surface in terms of soil function, and loss of flora and fauna species. The main causes are mining, illegal logging, and timber harvesting.[8]

Urban Heat Island Effect: Occurs when an urban center has a higher temperature than its surroundings due to the absence of vegetation and the presence of dark materials such as asphalt and cement on streets and house roofs that retain more heat.[9]

Net Zero Emissions: "Net zero" means cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions reabsorbed from the atmosphere, for example by oceans and forests. To keep global warming below 1.5°C, as required by the Paris Agreement, emissions need to be reduced by around 45% by 2030 and reach net zero by 2050.[10]

Community Energy: "The set of knowledge, practices, and socio-environmental transformation processes in the production and consumption of energy and food, which favor the creation of dignified living conditions for the most vulnerable communities, respect all forms of life present on the planet, and contribute to mitigating the climate crisis, building peace, and reconstructing the social fabric."[11]

Promising Plant Species: All those animal or plant species with high potential for use...[4]

Promising Plant/Animal Species: All those animal or plant species with high potential for agro-industrial use that have not yet undergone large-scale commercial development.[12]

Gini Index: Used to measure the degree of inequality in the distribution of income within a country.[13]

Climate Justice: Although there is no global definition, it is understood as a vision that recognizes the differentiated and disproportionate effects of climate change, especially on low-income communities or those primarily composed of minorities such as people of color or ethnic groups, who have historically been the least responsible for climate change but are the most affected.[14]

Human Mobility Associated with Climate Change: Encompasses migration, displacement, planned relocation, and other flows of human movement, whether temporary or permanent, internal or cross-border, and voluntary or forced, induced by the effects of climate change on a person or community.[15], [16]

Generational Renewal: A process referring to the transfer of knowledge, skills, and responsibilities from one generation to the next. In agriculture, this process is fundamental to ensuring the continuity of the activity and the sustainability of the sector.[17]

Resilience: The ability of an individual, community, society, or system exposed to a hazard to resist, absorb, adapt to, and recover from its effects in a timely and efficient manner.[18]

Food Security: The availability of sufficient food to meet the consumption needs of a country's population at all times, considering the physical and economic access to sufficient, safe, and nutritious food, even during periods of low national production or adverse economic conditions.[19]

Ecosystem Services: The benefits that human beings obtain from ecosystems, whether economic or cultural, including supporting, provisioning, regulating, and cultural services. Biodiversity underpins a wide variety of these services.[20]

Early Warning Systems: A mechanism to identify and communicate an alert situation. Its function is to provide notice regarding water levels and warn the community in areas at high risk of torrential floods upon the potential manifestation of a natural phenomenon.[21]

Food Sovereignty: The right of peoples to define their own sustainable policies and strategies for the production, distribution, and consumption of food that guarantee the right to food for the entire population, respecting their own cultures and the diversity of peasant, fishing, and indigenous modes of agricultural production, marketing, and rural space management, in which women play a fundamental role.[19]

Nature-based Solutions (NbS): Actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously benefiting people and nature.[22]

Green Taxonomy: A tool that defines a classification system for economic activities and assets with substantial contributions to achieving environmental objectives; that is, it defines what constitutes a green investment in Colombia.[23]

Just Green Transition: A just transition means greening the economy in the fairest and most inclusive way possible for all involved, creating decent work opportunities and leaving no one behind.[24]

Vulnerability: The physical, economic, social, environmental, or institutional susceptibility or fragility of a community to be affected or suffer adverse effects in the event of a hazardous physical event. It corresponds to the predisposition to suffer losses or damage to human beings and their means of livelihood, as well as their physical, social, economic, and support systems that may be affected by hazardous physical events.[25]

ABBREVIATIONS

GHG: Greenhouse Gases

NZI: Non-Interconnected Zones

NbS: Nature-based Solutions

SDG: Sustainable Development Goals

NGO: Non-Governmental Organization

PES: Payment for Environmental Services

FAO: Food and Agriculture Organization of the United Nations

SFP: School Feeding Program

AFOLU: Agriculture, Forestry and Other Land Use

CAR: Regional Autonomous Corporation

PCFC: Peasant, Family and Community Farming

NNP: Natural National Parks

COP: Conference of the Parties

EbA: Ecosystem-based Adaptation

IPCC: Intergovernmental Panel on Climate Change

ELSA: Essential Life Support Areas

IDEAM: Institute of Hydrology, Meteorology and Environmental Studies

UNDP: United Nations Development Programme

EWS: Early Warning System

CEWS: Community Early Warning System

GIS: Geographic Information Systems

SNGRD: National Disaster Risk Management System

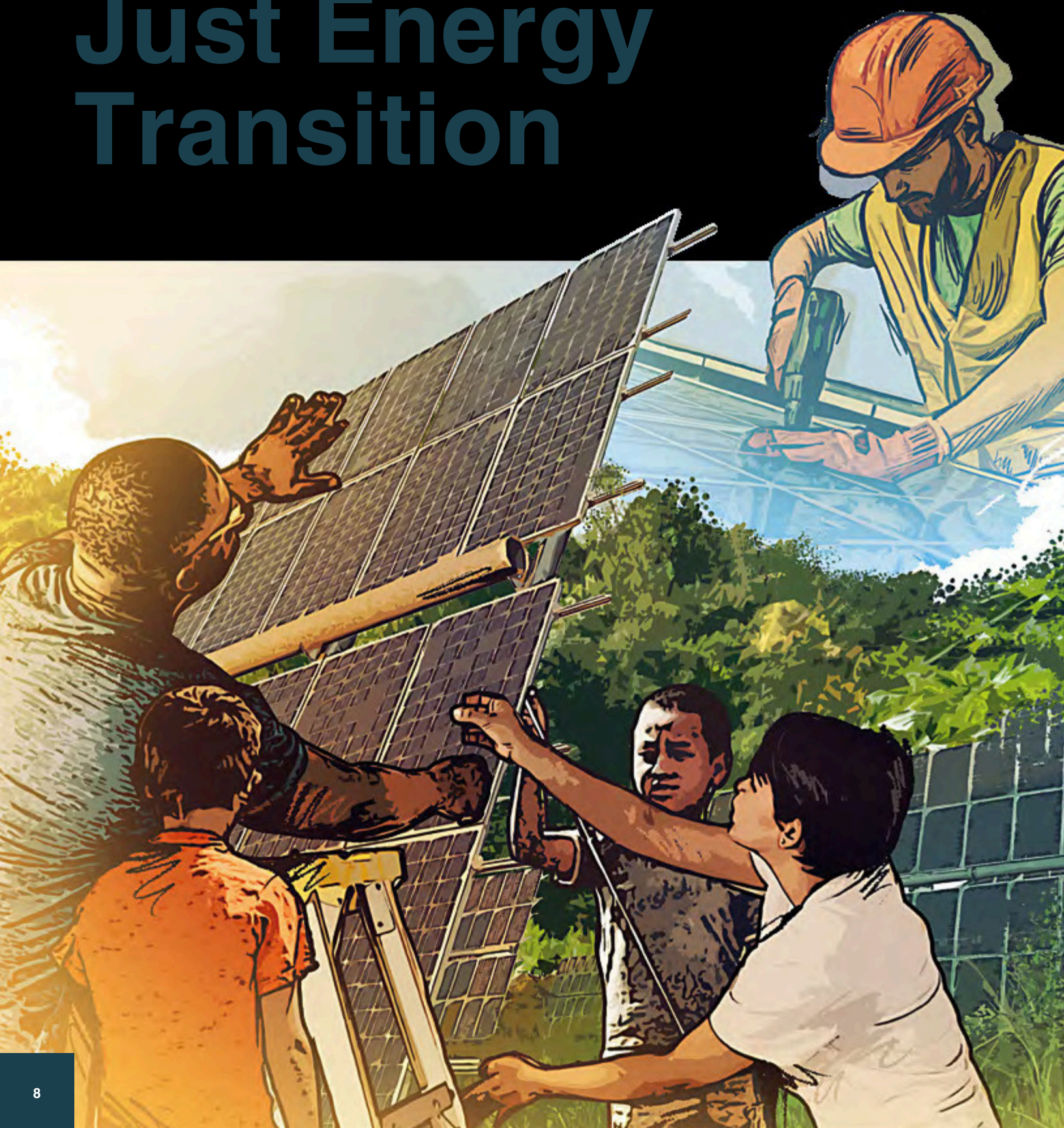
GDP: Gross Domestic Product

OECD: Organisation for Economic Co-operation and Development

WWTP: Wastewater Treatment Plant

CONTENTS

Energy and Just Energy Transition

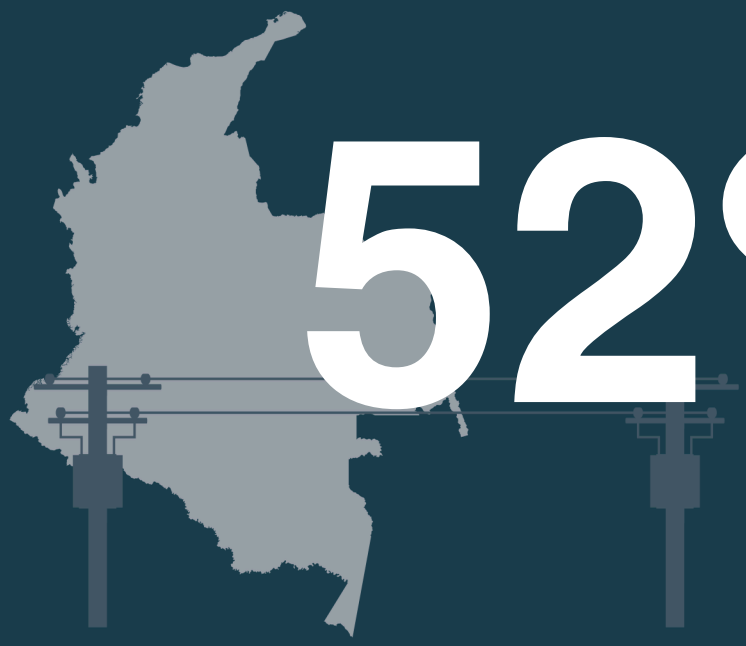


CONTEXT

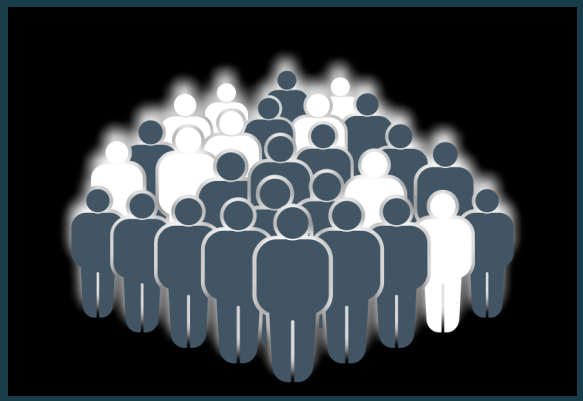
One of the major global challenges for reducing greenhouse gas emissions is related to energy generation. Colombia is no stranger to this problem, as the production of fossil fuels is not only important for the country's energy matrix but also for the national economy: over 40% of Colombia's exports in 2020 were related to fossil fuels, representing 32% of the country's revenue from this sector. However, there are encouraging facts: in the last 10 years, solar energy has become the cheapest in history, with an 85% cost reduction according to the IPCC (Intergovernmental Panel on Climate Change), confirming that increasingly, the environmentally sound decision is also economically favorable. This chapter aims to provide an overview of the challenges posed by the just energy transition for the country, the opportunities arising from this critical moment, and examples of public, private, and community projects already underway in this area.

32.9% of the energy produced in Colombia comes from fossil fuels.[1]

Over 40% of Colombia's exports in 2020 were fossil fuels,[2] and 32% of the country's revenue depends on these exports.[3]



52%



4%

52% of Colombia's territory, and 4% of the population, are not connected to the electricity grid; these are known as non-interconnected zones (NIZ).4.

ISSUES AND CHALLENGES

Need for the energy transition: The Colombian economy depends largely on the extraction, use, and export of fossil fuels. In 2020, more than 40% of Colombian exports were fossil fuels 2 and 32% of the energy produced in Colombia comes from fossil fuels 1. At the same time, the Colombian coal market is expected to decline significantly over the next decade, as the main buyers of Colombian coal, such as European countries and the United States, plan to reduce coal-based power generation and shift their investments to renewable energy 5. To achieve a just transition, more than 100,000 workers employed in the fossil fuel industry will need to find new jobs 2; these communities that economically depend on the extraction and exploitation of fossil fuels will require State support to find new productive alternatives for their territories.

Commitments to address climate change: Colombia is committed to reaching net-zero greenhouse gas (GHG) emissions by 2050, in line with international commitments; this means that it will be necessary to reduce emissions by 90% compared to 2015 6 and that the GHG emissions that cannot be reduced must be reabsorbed from the atmosphere.

Social and environmental issues surrounding large renewable energy projects: Large renewable energy projects have a significant impact on surrounding communities and ecosystems. Rural and Indigenous communities in particular have been affected by the construction of large hydroelectric plants and wind farms. These projects greatly alter the natural environment in which they live and provide few benefits to the communities. For example: The Hidroituango hydroelectric project: a landslide caused a mechanical failure of the dam, which generated flooding that displaced thousands of people from neighboring communities (Bedoya & Cuellar, 2018). The dam has impacted more than 26,000 hectares and the biological chains in the basin 8, thus repeating some of the unjust impacts of the fossil fuel extractivist model.

The Sogamoso River hydroelectric project in Santander: this project negatively affected 900

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families engaged in agricultural, livestock, and fishing activities. The affected communities consider that this figure is outdated, as the number of those affected would be much higher 9 10. The 16 wind projects in La Guajira (including Guajira I and Jepírachi) 11, despite all the investment in these projects, communities continue to live in precarious conditions. Child malnutrition in La Guajira is six times higher than the national average and 77% of Indigenous families suffer from food insecurity 12. Furthermore, it has been reported that these projects have violated their right to prior consultation and to their autonomy.

A just transition. The legitimacy of a just transition depends on citizen participation; they must be informed and consulted about the social, economic, and environmental trade-offs of the transition, in addition to being included in decision-making. Communities that are most vulnerable to the effects of climate change and/or with limited access to energy must be prioritized in the development of alternative energy sources; among these are 52% of Colombia's territory and 4% of the population who are not connected to the electricity grid (Non-Interconnected Zones - NIZ) 4.

A just transition toward renewable energy sources requires that the benefits of this transition be distributed equitably across society, especially among communities whose livelihoods currently depend on fossil fuel industries, ensuring that they receive the training and tools necessary to secure their well-being 3.

Energy transition with a gender perspective: historically, climate change has disproportionately impacted women, who are usually responsible for care work and face greater difficulty in finding quality employment, especially in industries such as those related to fossil fuels. For the transition to be just, progress must be made in the recognition, reduction, and redistribution of unpaid care work 13 so that women also have the freedom and autonomy to fully participate in the transition process, making it an opportunity to reduce gaps, ensuring that women's needs and roles are included in the design, implementation, monitoring, and evaluation of policies, plans, strategies, and projects 14.

OPPORTUNITIES AND RECOMMENDATIONS

SOLAR ENERGY

Throughout Colombia there are high levels of solar radiation necessary to generate solar energy. In addition, the technology to produce, install, and maintain solar panels is widely available and increasingly affordable. This energy resource should also be oriented toward energy democratization and sovereignty, in the sense that it diversifies forms of connection, contributing to overcoming historical access barriers in regions that are not connected to the national electricity grid.

- ***Offer economic incentives for households and businesses to install solar panels, as well as to reuse and recycle solar panel components.***

Case study 1.1. - Solar City Program, Mexico City. The mayor grants subsidies of up to 30% of the initial costs of solar panel installations for residential and commercial buildings. At the Central de Abasto, the largest photovoltaic power plant in the world located within a city is being built, which will generate energy for 440 thousand users per day 15 16.

Case study 1.2. - Solarcycle: this company partners with other commercial and industrial (C&I) organizations and utilities to recycle solar systems at scale, helping to build a circular solar economy 17.

- ***Governments should promote the installation of solar panels in public buildings: schools, universities, and local government offices.***

Case study 1.3. - Ramón Jimeno School (Cundinamarca). It has 148 installed modules with a capacity of 35.5 kWp. It operates with energy from solar panels located on several of its roofs and in the parking area and was the first district school in Bogotá to receive the "green seal" for energy efficiency by returning surplus solar energy to the grid on weekends and during school holidays 18.

- ***Support the installation of solar panels in communities, especially those without access to the national electricity grid and for the urban population living in strata 1, 2, and 3. Providing these populations with their own source of energy will reduce their household expenses, as well as the amount of energy subsidies that the government must pay to the lowest strata. This will be even more important as the El Niño phenomenon increases electricity use and possibly the cost of energy. Previously, it is important to understand how these technologies are adopted by the community and to plan strategies that ensure their governance, in order to prevent risks and guarantee their sustainability; likewise, support must be provided for the proper maintenance of the project, for example, by training women and young people in skills to carry out proper maintenance of the panels and the system in general.***

Case study 1.4. - Microgrid installed on Isla Fuerte, Cartagena. In 2012, the community sought an alternative energy source different from the use of liquefied petroleum gas. A solar plant with 709 panels was then installed to provide 19 hours of energy as part of an exercise in social appropriation of knowledge, enabling dialogue to understand territorial capacities and needs.

needs and the solutions that the community considered relevant for its development. However, four years later the project became unsustainable due to maintenance and high consumption; in addition, 50% of the batteries were not functioning and those that were functioning only stored 30% of the energy received, highlighting challenges regarding the long-term sustainability of projects and opportunities to develop local capacities within the community 19.

Case study 1.5. - Project in Bangladesh to train women as solar panel technicians

This project promotes green employment in Bangladesh by training women in the installation and maintenance of solar panels. In doing so, it addresses the problem of women's limited access to electricity and to economic and employment opportunities 20.

- *Carry out awareness-raising and outreach campaigns aimed at the general public, explaining the environmental and economic benefits of solar energy and how households can install their own solar panels.*

HYDROELECTRIC ENERGY

Currently, Colombia generates more than 63% of its electricity from hydroelectric energy. This important source has helped Colombia move closer to its emission reduction targets 21. The country already has the technology and natural resources to produce more hydroelectric energy and has the potential to further expand hydropower production, but the development of these projects must be carried out without violating human rights, promoting community energy sovereignty, and decentralizing the energy market.

• Promote the development of small-scale hydroelectric projects led by local communities and that benefit them directly.

- *Conduct prior consultations in communities where hydroelectric projects are planned and respect community decisions regarding whether to move forward with these projects, which will largely depend on whether they can also benefit from them.*
- *Before carrying out a hydroelectric project, conduct studies on the impact the project will have on local biodiversity and on ecosystems that depend on rivers, as well as assess the impacts on the quality of life of people affected by the project and implement initiatives with the communities to minimize risks.*

WIND ENERGY

The geographical conditions allow certain regions such as La Guajira, Norte de Santander, and Risaralda to have high wind potential.

• Develop proposals jointly with local communities in areas with potential for wind energy projects. Municipalities must develop energy projects in which supply to these communities is prioritized, guaranteeing t

their right to prior consultation and recognizing their forms of self-governance.

- *Recognize the empirical knowledge of the communities involved in energy generation projects and bear in mind that "Indigenous communities are an environmental authority and must be considered as such in the preparation of inputs for Environmental Impact Studies."*

Environmental"; as they are familiar with their environment and territory, they provide relevant information for decision-making and for establishing mitigation plans 22.

- *Work to reduce the negative impacts of wind farms on fauna and flora. It is necessary to take into account the protection of migratory birds, the impact of noise pollution, soil contamination, among others.*

Case study 1.6. - Jepírachi wind farm: Learning from mistakes. The Jepírachi wind farm of Empresas Públicas de Medellín was inaugurated in 2004 and was a pioneer of wind energy in the country; however, today its turbines are already nearing the end of their useful life. When consulting EPM, they

explained that the development of this park was a pilot project "whose purpose was to understand the technology, evaluate the benefits of the available resource, and venture into the field of engagement with the Wayuú community." The shortcomings of this project demonstrate the importance of involving communities and monitoring the ecological impact of wind projects 11.

- *In conjunction with the previously mentioned environmental impact study, it is necessary to mediate so that companies present social impact studies and that conditions for a just transition are guaranteed 22.*

- *Include in projects a roadmap that incorporates the collection and utilization of infrastructure waste after the end of its useful life.*

D

ENERGY CONSUMPTION

- *Promote projects aimed at increasing energy efficiency and reducing consumption, seeking to break the link between economic growth and energy consumption.*

- *Invest in research and technology and work closely with academia to increase the efficiency of renewable energy production and storage.*

- *Promote more efficient energy use in large companies and in sectors that consume the most energy—industry, commerce, energy, transport—as well as in the domestic sector through educational campaigns and the use of energy-saving technologies.*

Case study 1.7. - Emergency text messages to prevent electricity outages. Emergency text messages helped prevent possible blackouts in the state of California in September 2022. The message asked residents to limit energy use for three hours to reduce the risk of power cuts being implemented. The California Independent System Operator (Cal-ISO) said it "saw an immediate and significant drop" in energy use after the text was sent. The alert was issued after record temperatures put pressure on the state's power grid 23.

COMMUNITY ENERGY AND A JUST ENERGY TRANSITION

Throughout Colombia, communities and organizations are developing their own means of sustainable energy production and consumption. These community projects are fundamental to a just energy transition, as well as to contributing to the achievement of the SDGs, generating conditions for a dignified life.

Community energy initiatives stand out for generating energy from sources other than fossil fuels, river damming, or nuclear energy. Likewise, they involve a lower cultural and environmental impact, while being participatory processes that engage the community. This implies supplying families and communities with fewer negative impacts, while also enabling the involvement of young people and strengthening grassroots organizations that lead these efforts 24.

In order to promote these initiatives and guarantee justice, the following recommendations are proposed.

• Consult and jointly build with citizens the process of transition toward renewable energy sources.

Resource: Just Energy Transition Roadmap, Ministry of Energy. https://www.minenergia.gov.co/es/servicio-al-ciudadano/foros/documentos-de-la-hoja-de-ruta-de-la-transici%C3%B3n-energ%C3%A9tica-justa/

• In regions where there is coal mining, invest the royalties obtained from high mineral prices to support the economic reorientation of the territory and the labor reconversion of communities that depend on the hydrocarbons sector 25. Invest in the training and employment of communities with a coal mining vocation, not only those who worked directly in the mining industry or those who own the land, as this excludes the majority of the female population; instead, forms of community organization could be promoted and the creation of community-based economies that do not depend on fossil fuels could be supported. For example, technicians could be trained or upskilled in trades such as solar panel maintenance.

or in Retrofit (the conversion of internal combustion vehicles into electric vehicles) and other trades necessary for the energy transition.

Case study 1.8. – Bottom-up approach to the transition. The Ruhr district is a region of Germany that developed economically through coal mining and other activities, an industry that experienced a significant decline after the war. Subsequently, the Government implemented a planned transition with a bottom-up approach, that is, from the communities, where governments focused on long-term planning but implementation was carried out with regional and local institutions and actors. Ultimately, "the local economy achieved significant diversification focused on clusters and productive linkages," which triggered a reduction in out-migration from the region, modest but stable economic growth, and the creation of sufficient jobs to replace those lost in coal-related industries." The development of clusters and productive linkages must be accompanied by the necessary investments to ensure the infrastructure, connectivity, and institutional capacity required to achieve an effective transition toward new economic activities in the regions 26.

• Provide administrative support to communities and small civil society organizations so that they have the capacity to bid for public resources derived from royalties for projects that contribute to developing new local economies and environmental recovery with conservation.

• Promote the training of local technical personnel in renewable energies through technical training programs. In this way, educational spaces are facilitated that bring together academics with technical knowledge and communities with experience in renewable energy production to share information and best practices.

Case study 1.9. – Small Grants Program and Guakía Ambiente. Part of the Small Grants Program (SGP-Small Grants Program) – an initiative of the Global Environment Facility (GEF) aimed at supporting civil society organizations with non-reimbursable funds and technical-administrative support in the development of community actions for the global environment and to generate local well-being 27.

- ***Promote the recognition of community energy production as a type of non-conventional energy source (Law 1715 of 2014) 28, which requires specific government regulation and funding. It is necessary for local administrations to promote public-popular associations, understanding the energy sovereignties that can be configured. For example: financing programs for family and community biodigesters, photovoltaic solar energy, and pedal-powered machines. See recommendations in 24.***

- ***Enable royalty funds to finance community energies, and provide guidance on meeting legal and administrative requirements. Furthermore, in the interest of a just transition, it is necessary not to burden popular producers with excessive tax and administrative obligations.***

- ***In addition to including women in decision-making participation, it is recommended to first understand "spaces, schedules, training, and assumption of responsibilities, in order to increase participation in all areas of management and leadership, with the same guarantee and quality of participation as men" 29. Considering the role of many women as household caregivers, it is essential to take this occupation into account and provide opportunities for engagement and participation.***

Resource: Community Energies: Opportunities and Challenges in Colombia – ISBN: 978-958-53114-5-9 ***(link: https://tran- sicione s.info/wp - conte nt /uploads /2021/0 6/ LIBRO - ENER- GIAS-COMUNITARIAS-compressed.pdf)***

F

BIOFUEL

More than 65% of the waste produced in Colombia is organic waste, which has the potential to be converted into biofuel. An example is the use of vegetable oil to create biofuel 30. Biofuel is expected to account for up to 27% of the total fuel used for transportation by 2050 31.

- ***Develop the production capacity of biofuels in the industrial sector as a transitional measure, using less polluting fuels as an intermediate step toward full electrification. Biofuels can be a viable alternative for companies that have recently invested in technologies that require fuel while moving toward zero-emission technologies.***

- ***Continue research and development of technologies that allow the production of fertilizers and biogas for energy generation from organic waste as part of the energy transition 32.***

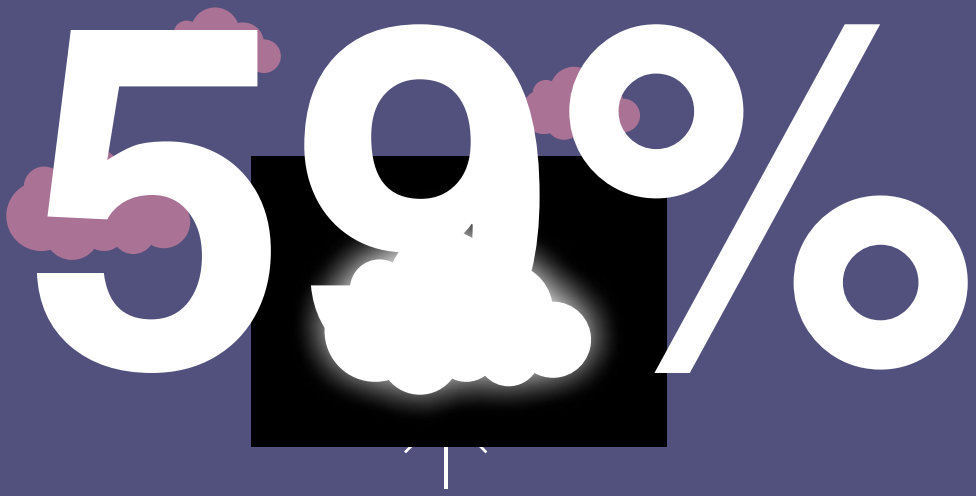
Case study 1.10 – Biovalor Initiative for Waste Transformation. This project by the Uruguayan government aims to transform waste generated from agricultural, agro-industrial, and small populated centers into energy and/or by-products, in order to develop a low-emission model through the development and transfer of appropriate technologies 33.

Agriculture and Land Use

CONTEXT

Historically, land use and land distribution have been critical issues in Colombia. The country has approximately 6.8 million internally displaced persons. Conflicts over land distribution and use raise several questions, particularly in the context of land restitution and the updating of the rural cadastre. How can a just land restitution be achieved? Who has the right to the land? How should it be used?

How can areas of environmental interest be protected in the face of an expanding agricultural frontier? This section proposes addressing this issue from an intersectional approach in order not only to contribute to resolving historically related social injustices but also to find a solution to deforestation, reducing the carbon footprint, and protecting areas of environmental interest.



The agricultural sector is responsible for 59% of Colombia's greenhouse gas (GHG) emissions, making it the highest-emitting sector 1.

Thirty percent of the Colombian population is in a situation of food insecurity, with 2.1 million Colombians experiencing severe food insecurity 2.

2.3%

In 2020, the agricultural sector contributed to a 2.3% growth of the national GDP. This sector generates more than 20% of national employment.[3][4]

6,800,000

There are more than 6.8 million victims of forced displacement, which between 1995 and 2004 resulted in the abandonment and/or dispossession of eight million hectares of land 5.

78%

Regarding land distribution in Colombia, 78% of plots smaller than 10 hectares account for 6% of agricultural production, while plots larger than 1,000 hectares account for only 0.19% of production and concentrate 53% of the land. This highlights the extreme concentration of agricultural land in the country, as a person with a large landholding is often unable to utilize it optimally 6.

PROBLEMS AND CHALLENGES

Lack of rural extension services: Agricultural extension supports farmers in improving the productivity and sustainability of their practices. Currently, Colombia does not yet have an articulated system of agricultural innovation, which hinders productivity, farmers' economic security, and the country's food security 7.

Outdated rural extension services: Current rural extension services are focused on conventional agriculture, which prevents the implementation of ecological production practices such as alternative agriculture, agroecology, and regenerative agriculture.

Dependence on imported food: Although in 2022 the gap between imports and exports in the agricultural sector was reduced, with percentages of 14.7% and 20.6% respectively 8, the country still has a deficit in the production of foods such as maize, wheat, and sugarcane 9, which are fundamental to the Colombian diet. To meet domestic demand, approximately 30% of food is imported, and rising prices threaten food security 10.

Low productivity and rural poverty: The country's productivity grows at an average of 2.3% annually, compared to a 4.1% annual average for the overall economy. The value produced per hectare of arable land in Colombia does not reach one-third of what is produced in OECD countries. This low productivity translates into high levels of rural poverty, which in 2017 was 38% for the rural population 7. Additionally, of 15 million hectares suitable for livestock, 35 are exploited, while of 22 million hectares suitable for agriculture, only 7.1 million are used, that is, 30%. This explains low agricultural productivity, as livestock generates a value 12 times lower than crops such as banana and coffee and produces very little employment 6.

Food waste: Thirty-four percent of all food produced in the country, equivalent to 9.8 million tons, is lost or wasted each year. Most food losses occur during the agricultural production stage 7.

Low value-added: The value added by the agricultural sector in Colombia increased by only 1.9% between 1990 and 2014, reflecting low agricultural productivity 7.

Lack of investment in innovation, science, and technology: There is a historical lack of financing and investment mechanisms for sustainable agriculture. This includes the absence of investment in agricultural infrastructure, which is essential to increase the country's competitiveness and reduce crop losses 7.

Food poverty: The cost of an optimal diet per person in the country is approximately 643,390 Colombian pesos per month. The latest report by the Food and Agriculture Organization (FAO) found that in Colombia around 4.9% of households have incomes of approximately 350,000 Colombian pesos per month for food, meaning that a large part of the population does not earn enough to maintain a healthy diet 11.

Lack of economic opportunities for rural youth: Ninety-six point nine percent of farmers are over 29 years old 12, indicating that there is no generational renewal and that the rural labor force is declining. Due to difficulties in accessing higher education and the deficit of well-paid formal jobs, it is estimated that around 12% of rural youth migrate to urban centers seeking better opportunities 13.

Unequal land and soil distribution and lack of agrarian justice: Land ownership is highly unequal (0.86 on the Gini index) and land is poorly managed,

Poorly managed and regulated land: Land is managed and regulated by the State. This has prevented farmers from obtaining property titles, and many hectares are occupied without proper planning or environmental protections 14. Land tenure is distributed as follows: 43% belongs to companies and private individuals, 25% to indigenous reserves, Afro-descendant and religious communities; 10% belongs to the State, and 5% are protected areas 6. This unequal land distribution results in inefficient land use, lower agricultural production, and consequently lower economic income for the communities that produce food, which are also the most vulnerable 7.

Gender inequality in land ownership: Compared to men, who hold 63.7% of land plots, women hold only 36.3%. Although women make up the majority of the rural population, the plots they solely own are smaller than those of men, with 75.1% being microplots under 3 hectares. Additionally, the land they own is more often used for residential purposes compared to land owned by men, limiting the potential for agricultural production 16.

Outdated cadastres and lack of information for territorial planning: Colombia currently lacks sufficient and updated information on rural land use. Present data are inefficient as they do not consider land valuation, potentially leading to land dispossession and unfair payments to farmers 7. Furthermore, outdated cadastres result in Land Use Plans in most regions having issues with validity, quality, and relevance of information 17. The absence of an adequate and updated territorial management and monitoring system impedes conflict resolution, increasing the risk of environmental problems due to unsustainable land use and natural disasters 7.

Accelerate and strengthen the implementation of multipurpose cadastres: Colombia lacks sufficient and updated information on rural land use. Current data are inefficient and fail to consider land valuation, potentially leading to dispossession and unfair payments to farmers. It is vital to develop a national system to accurately identify and monitor land ownership, value, and use to prevent land dispossession and unfair payments.

Inefficient land use: 22 million hectares are suitable for agriculture, but only 5.3 million are used for that purpose. 48 million hectares are suitable for forestry, but only 0.4 million are planted with timber. In contrast, only 15 million hectares are suitable for livestock, although 34 million hectares are used for this purpose 7.

Deforestation: Colombia was the fourth most deforested country in the world in 2018, losing 176,977 hectares. In previous years, it had an average annual deforestation trend of 148,000 hectares. 60% of forest loss was due to livestock farming and 31% to illicit crops 7.

Soil erosion: Soil erosion affects 48% of Colombia's territory, salinization affects 5%, and lands susceptible to desertification occupy 24% 7. The main causes are deforestation, anthropogenic modification of watercourses, soil degradation from livestock, and urban expansion.

Loss of native species cultivation: The supply of native species is practically nonexistent in most regions, partly due to a lack of consistent demand for their products (fruits or timber) or low planting density (approximately 400 plants/ha). With high demand, farmers' production cannot meet market needs 18.

Nitrogen pollution: Excessive use of nitrogen-based agricultural fertilizers contaminates the environment, poisoning freshwater and marine habitats, as well as plants, animals, and humans. It also accelerates climate change through emissions of nitrous oxide, a potent greenhouse gas 19. This issue has gone largely unnoticed, but recent warnings highlight its dangerous consequences for the environment and living beings.

OPPORTUNITIES AND RECOMMENDATIONS

KNOWLEDGE AND TECHNICAL CAPACITIES IN SUSTAINABLE AGRICULTURE:

•-Promote sustainable agricultural practices and innovation through technical training programs and knowledge exchange in rural areas.

•Provide rural women and women's collectives with spaces for education, technical assistance, and tools for agricultural training, with a focus on sustainable use of biodiversity. This enables rural women to access knowledge that supports production and agroecological distribution, which also forms part of their family and community economy. Training can include workshops on diversifying crops in home gardens, raising small livestock, and processing the raw materials they cultivate. Furthermore, training should be accompanied by institutional instruments that facilitate entry into production chains, such as access to credit and technical assistance so that beneficiaries can efficiently use the resources provided.

•Encourage productive linkages. Although the supply and marketing chain for small and medium producers is improving, a gap remains that hinders direct connection between producers of fresh and organic products and consumers. The goal is to build and articulate a system that improves the production chain while strengthening the links between urban and rural populations.

Case Study 2.1 – Red CSA Colombia:
Communities that Sustain Agriculture (CSA) operate as a collaborative economy model where families become co-farmers, financing a farming family's *production in exchange for fair and consistent compensation, healthy food, and environmentally friendly production. Both producer families and co-farmer families create a community that shares the rewards and risks of ecological agriculture. These CSAs can be developed anywhere in the country and are self-managed.*

• Implement systems to measure food losses and waste to improve efficiency throughout the food chain, from production to consumption. Establish measurement and reporting systems to optimize national supply and demand and avoid overproduction.

• Train farmers in organic and agroecological production methods that generate chemical-free foods. Promote community and regional seed banks, which help conserve native seeds.

Case Study 2.2 – National Family Agriculture Network (RENAF), Colombia:
This network comprises more than 120 community organizations across eleven departments and fifty municipalities. They work together to promote family farming, strengthen rural community organization, and foster sustainable production systems. The network has a strategy for local, peasant, ethnic, and agroecological markets, commercialization of agricultural and agro-industrial products under market and fair-price criteria, improving the quality of life for the families involved. aiming to create spaces for the direct

- *Promote agricultural practices that drastically reduce nitrogen losses to the environment and provide financial incentives for transitioning agricultural systems toward agroecology and organic production. It is also recommended that nitrous oxide emissions be globally considered in greenhouse gas accounting to promote proper nitrogen management.*

- *Recognize and make visible the role of women as primary guardians of seeds and native species, which helps guarantee food security, consistent food production, and biodiversity conservation.*

Case Study 2.3 – Recovery of Traditional Inga Agricultural System Seeds:

During the implementation of the project "Recovery of Traditional Inga Agricultural System Seeds," financed by Visión Amazonía in its first call to the Tandachiridu – Inganokuna Indigenous Council Association, three cultural gatherings were held that identified more than 138 traditional seed species at risk of disappearing. A community chagra (garden) was established in five indigenous reserves in the Caquetá department. Each chagra functions as a seed bank, and the women, as seed guardians of the Inga people, are responsible for propagating, identifying, protecting, and maintaining them each harvest.

- *Implement and support regenerative agriculture programs. These productive systems increase crop yields while allowing the natural growth of ecosystems. This strategy is implemented through shade crops, soil cover with plant material, controlled grazing, allelopathy, among other techniques.*

Case Study 2.4 – 3 Million Hectares to Promote Regenerative Agriculture and Livestock:

The Nature Conservancy will launch a six-year agricultural project across five Latin American countries in partnership with the Helmholtz Center for Environmental Research (UFZ), the Economic Commission for Latin America and the Caribbean (ECLAC), and Nestlé.

- *The consortium plans to transform 3 million hectares of agricultural land into regenerative landscapes through ecosystem-based adaptation, projected to impact up to 22,000 people and reduce CO_2 emissions from agriculture and livestock by 25%.*

- *Create a technical and/or technological training system through agroecological schools, enabling the inclusion of an agroecological approach in productive practices, incorporating ecological, social, economic, political, and cultural components. This includes training teaching staff and structuring a curriculum aligned with national and territorial needs, for example, by strengthening programs already implemented by entities such as the National Learning Service (SENA).*

Case Study 2.5 – Field Schools Methodology for Farmers (ECAS):

In 2020, Colombia established an alliance between SENA and the FAO to train instructors and extensionists (people who support rural producers in updating their knowledge) on sustainable development, food security, agroecology, sustainable resource management, and strengthening rural communities. The project includes six training centers nationwide. In 2021, the National School of Rural Extension was created to strengthen SENA's pedagogical processes.

- *Establish rural entrepreneurship programs to promote sustainable businesses in ecotourism and sustainable agriculture, as well as the formation of networks for knowledge sharing and cooperation. This requires intersectoral participation, including Chambers of Commerce, Regional Autonomous Corporations (CAR), green business programs, and other public and private entities.*

Case Studies 2.6 – Experiences in Fishing and Agriculture

The Association of Fishermen, Peasants, Indigenous, and Afro-descendant Communities for the Development of the Ciénaga Grande of Bajo Sinú (ASPROCIG) has existed for over two decades and has focused on peasant organization, amphibious culture, and agroecology. The ciénaga territory is part of the family and community economy, which means that its productive activities must constantly adapt, not only due to environmental conditions but also due to pressures from hydroelectric projects, extensive fishing, and livestock activities. From this context, ASPROCIG formulated a development plan where the central focus is agroecology as a way of life, from which other social, cultural, and political aspects unfold, aiming to replicate the experience in all territories where the organization operates through its various grassroots groups.

Case Study 2.7 – Sustainable Coffee Farming through the National Federation of Coffee Growers

The National Federation of Coffee Growers (FNC), in partnership with the United Nations Development Program (UNDP) under the Green Investments for Peace project (INVERPAZ), carried out a pilot in Norte de Santander to transform the coffee sector toward systems more resilient to climate variability and free of deforestation, with additional impacts on the recovery, conservation, and protection of natural resources. The project benefits 300 small coffee growers across three municipalities by implementing actions that promote the reduction or capture of greenhouse gases, as well as the conservation of biodiversity and water sources.

B

ECONOMIC POTENTIAL

- ***Increase agricultural credit availability and create mechanisms for easy access to agricultural credit funds to enable the implementation of agroecological systems. Additionally, it is recommended to generate additional financial incentives, such as lower interest rates and flexible loans, while providing technical assistance and guidance on the most efficient ways to use funds to achieve higher profitability.***

- ***Encourage public institutions to purchase from local producers who meet sustainability, quality, and equity standards, prioritizing women and Afro-descendant populations to reduce gaps in access to opportunities. In particular, it is recommended to connect school cafeterias and programs like the School Feeding Program (PAE) with organizations in peasant, family, and community agriculture.***

Case Study 2.8 – Institutional Markets and Rural Development in Southern Brazil

Ten years ago, Brazil developed a strategy to improve food security with "institutional markets":

preferential purchase systems carried out by public administration (federal, state, or municipal government) aimed at promoting products from specific populations, such as crops from peasant or family farming. The products are intended to meet the demand of public facilities like schools, hospitals, daycares, and various sectors of the population experiencing food insecurity.

- ***Provide financial and technical support to micro and small enterprises that reuse materials and/or organic processes in their production and logistics chains. This should be integrated as part of the country's circular economy strategy (ENEC). Examples include bio-organic foods, biomaterials, bio-inputs, and bioenergy.***

Case Study 2.9 – Discovering the Potential of the Bioeconomy in the Marketplace

This project highlights the role of marketplaces in conserving native flora based on traditional knowledge while demonstrating the importance of the peasant economy for urban development.

C

POLITICAL AND SOCIAL OPPORTUNITIES

- *Encourage associations among small-scale farmers to ensure fair competitiveness in purchase and sale prices, enable more profitable negotiations, increase sales volumes, reduce transaction costs, and strengthen market demand for their products.*
- *Effectively implement Law 731 of 2002 to improve the quality of life of rural women. This law seeks to structurally strengthen the rural women's economy by guaranteeing fair access to land, economic and productive support, health services, dignified social security, the strengthening of farmers' markets, and a more equitable redistribution of responsibilities within and outside the household. The law also aims to promote public policies, programs, and rural projects with a gender-responsive approach led by territorial entities 20.*

D

LAND USE

- *Accelerate and strengthen the implementation of the multipurpose cadastre. It is essential to develop a national system capable of accurately identifying and monitoring land ownership, value, and land use in order to prevent dispossession and unfair payments to small farmers 7.*
- *Support and formally recognize the governance exercised by Indigenous resguardos, consolidating their role as territorial environmental authorities in accordance with the Political Constitution. Deforestation in National Natural Parks (PNN) has steadily increased since the signing of the peace agreement, while deforestation in territories protected by Indigenous and Afro-descendant communities has remained stable during the same period 25. This demonstrates the conservation efforts of these communities and their contribution to the country's anti-deforestation strategy.*
- *Promote and provide education on sustainable management practices that protect, conserve, and regenerate strategic ecosystems, while recognizing and strengthening ancestral knowledge held by communities regarding their territories. Working alongside communities makes it possible to implement sustainable and traditional resource-use practices, with territorial monitoring led by those who actively conserve it.*

Case Study 2.10 – Peasant Families in the Management of Chingaza National Natural Park. Through the work of peasant families, Sustainable Systems for Conservation (SSC) have been implemented within the park, ensuring both family livelihoods and food sovereignty for local inhabitants. The National Natural Park currently has 64 active conservation agreements covering a total of 552 hectares. Peasant families have played a fundamental role in safeguarding natural resources, flora, and fauna through their local knowledge. This knowledge has enabled the successful implementation of SSC, including participatory monitoring and the involvement of diverse stakeholders in the ecological restoration of prioritized water sources 32.

- *Promote Community Forest Management (CFM) by empowering and supporting community-led governance. CFM is a decentralized resource governance strategy managed by local community groups or associations, encompassing production, planning, and territorial conservation processes. This approach can generate positive impacts on biodiversity conservation and broader ecosystem stewardship.*

Improve the quality of life of communities. To achieve this, it is necessary for the State to have the political will to establish agreements between the local government and communities with potential to implement a Community-Based Market (MCB).

- *Increase economic incentives for small landowners to protect ecosystems of interest within municipalities and communities, showing that protecting their forests and restoring ecosystems is a profitable and sustainable long-term alternative. This could be done through financial credits, public-private partnerships to compensate for negative impacts via funding for incentive programs, among other mechanisms.*

- *Support the application of silvopastoral systems, which combine livestock activities with other productive tasks such as planting native trees for non-timber forest products, forage shrubs, and pastures, as well as implementing live fences and windbreak barriers. This approach increases agricultural productivity while simultaneously contributing to soil and ecosystem regeneration.*
- *Implement and strengthen agro-food territories to guarantee food sovereignty for peasants, ethnic communities, and Indigenous peoples; while also increasing and diversifying the availability of food for cities, which can help reduce prices and contribute to greater dietary variety.*

Case Study 2.11 – Agro-Food Territories in the Department of Arauca

The municipality of Saravena is made up of 18 rural districts ("veredas"), where peasants gather in large assemblies to define central themes for territorial governance. The main strategies aim to guarantee food sovereignty through caravans of carts carrying agricultural products and peasant markets in strategic locations.

- *Provide technical and economic support for regenerative livestock, aiming to expand coverage and generate more efficient production processes and access to financial resources, along with advisory and technical training mechanisms to facilitate the transition from traditional to regenerative models.*

Case Study 2.12 – Restructuring Land Management and Biodiversity through Productive Reconversion in the Cocorná River Basin

1,227 hectares influenced by livestock landscapes were incorporated into a territorial management proposal based on conservation, restoration, and productive reconversion strategies, establishing 15 conservation-production agreements (ACP). A total of 67 people were trained through workshops on climate change, basic finance, good agricultural practices, regenerative livestock, and beekeeping. This project highlights that conservation activities must also fulfill a socio-ecological purpose, providing food security and well-being to local communities.

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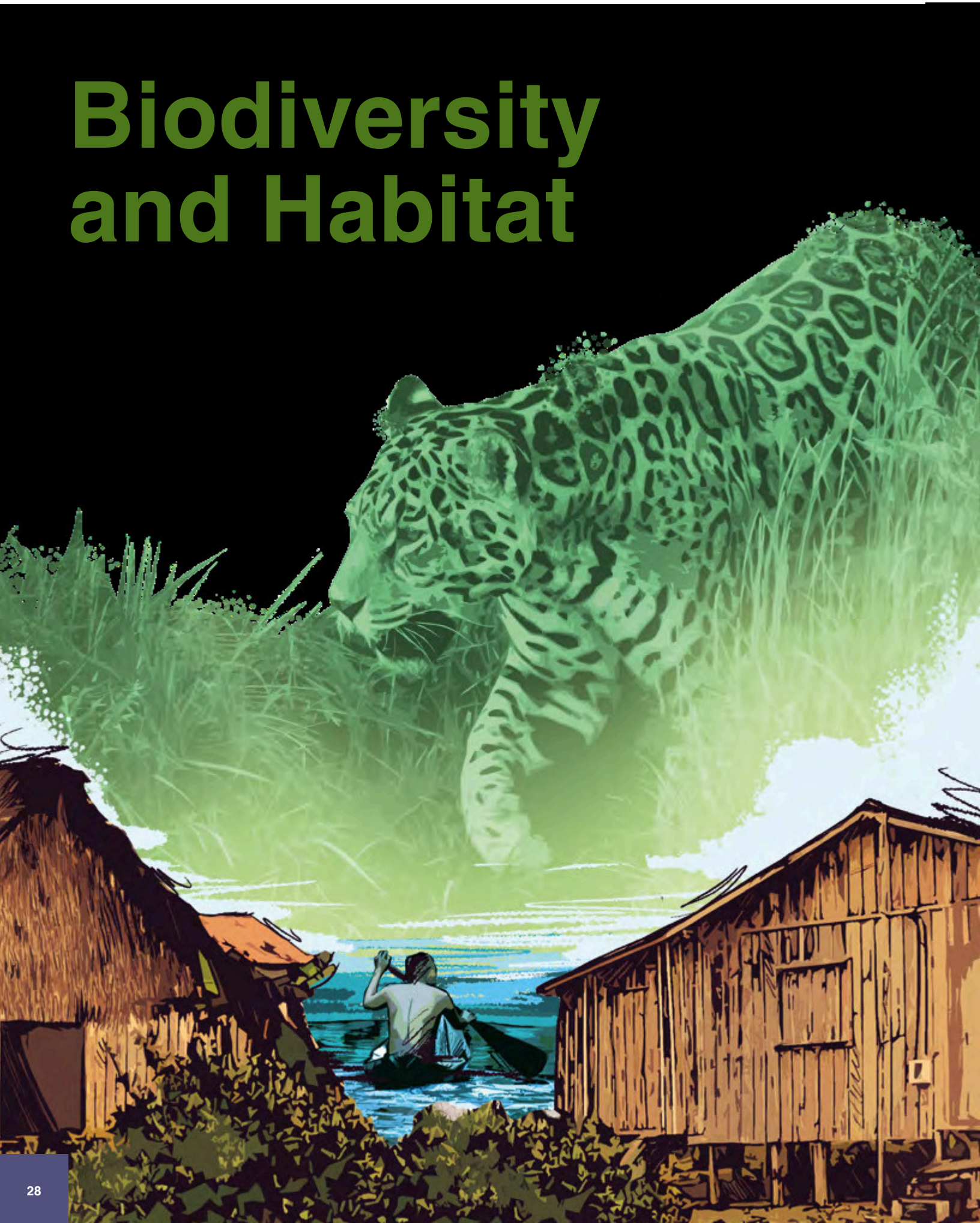
Biodiversity and Habitat

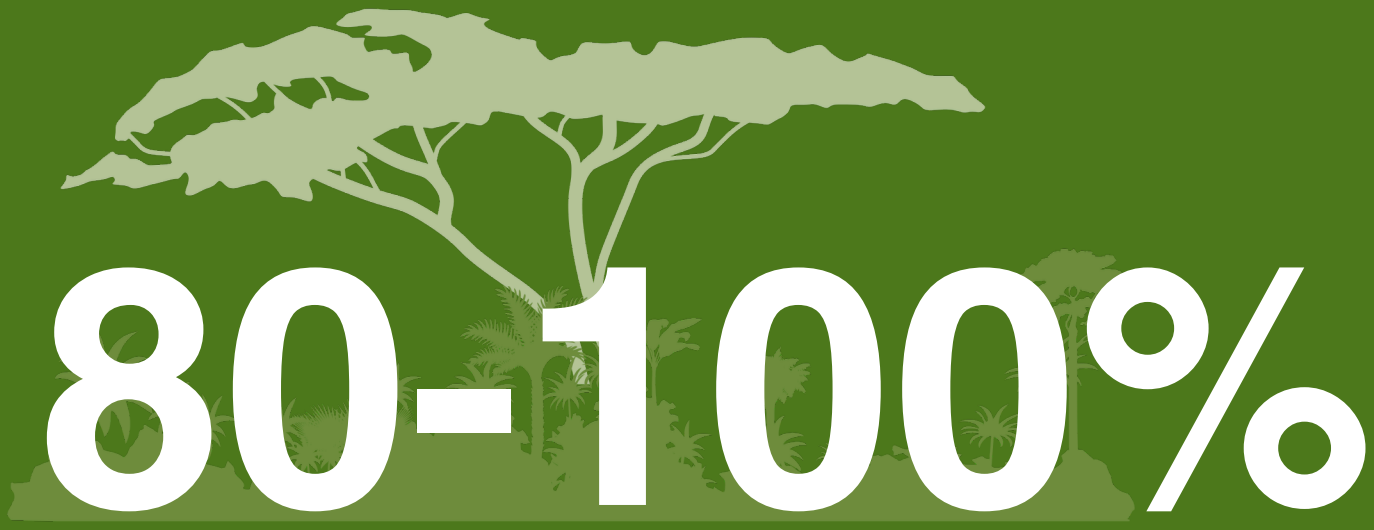


CONTEXT

In the face of the biodiversity crisis affecting the world, it is urgent to advance the protection of key ecosystems to guarantee rights such as access to water and food, which are threatened by ecosystem degradation.

During COP 15 (Conference of the Parties to the United Nations Convention on Biological Diversity), 187 nations committed to halting and reversing nature loss by 2030 by at least 30%. Below, we outline some of the challenges the country faces in this regard.

Colombia is the third most biodiverse country in the world; it is estimated that for every 10 species that exist on the planet, one inhabits our territory 1.



Deforestation and habitat degradation are the main direct drivers of transformation and biodiversity loss, affecting between 80% and 100% of vulnerable ecosystems that are endangered or in critical condition 2

30%

More than half of Colombia's ecoregions require areas complementary conservation and management measures are required to achieve an internal protection area of 30% 3.

34%

In the case of Colombia, it is estimated that 34% of the land surface consists of collective territories of Indigenous and Afro-descendant communities, which conserve nearly 50% of the natural forests that provide goods and services on which both local communities and society at large depend 4.

PROBLEMS AND CHALLENGES

A

ECOSYSTEM DEGRADATION AND BIODIVERSITY LOSS

Deforestation: this poor land and vegetation cover management practice is the country's main source of GHG emissions. In addition, deforestation eliminates the habitat of thousands of species, directly affecting the quality, quantity, and availability of resources and plant and animal species.

Ecosystem homogenization: monocultures, as large areas where only a single species is cultivated, generate a loss of biodiversity and ecosystem services and contribute to climate change 5

This agricultural practice can also create social conflicts by putting community water resources at risk, either by depleting or contaminating them due to increased use of herbicides, fungicides, and insecticides 6.

Poor agricultural practices: the indiscriminate use of chemical agricultural pesticides affects the life cycles of insects and pollinators, contributing to the decline and extinction of species 7.

B

PROLIFERATION OF INVASIVE SPECIES

Invasive species: it is currently estimated that in Colombia there are at least 508 exotic species of fauna and flora, of which 22 species are invasive 8. Invasive species develop special characteristics that allow them to adapt to new environments; therefore, they are very difficult to eradicate and spread rapidly, directly competing for resources with native and endemic species 9.

Invasive species and climate change: some species currently found in our country may also have arrived due to the changes the planet is undergoing. One example is hurricanes, which are capable of transporting species from one area to another. Without a way to return to their original habitat, these species proliferate in new environments, becoming a large-scale problem.

LAND-USE PLANNING

Land-use planning: outdated cadastres make it difficult to identify and resolve land management conflicts and to delimit strategic protection areas, which means that ***conservation processes and the creation of protected areas often do not achieve the expected results for either the environment or communities 7.***

LACK OF INFORMATION FOR DECISION-MAKING

Outdated species lists or inventories: progress must continue in the assessment of species and the updating of red list records (a tool that classifies species and ecosystems by categories of extinction risk), and these should be updated periodically in order to determine the geographic area in which a species can be found and recognize its biological importance for the ecosystem 5.

Gaps in spatial data: an assessment of user needs in 60 countries that are members of the Convention on Biological Diversity (CBD), including Colombia, identified four major obstacles ***to integrating spatial data into national policies: data are inaccessible, unusable, not validated at the national level, and governments lack the capacity to use spatial data 10.***

Lack of updates to key biodiversity protection policies: Colombia does not have clear legislation that properly guides biodiversity protection strategies toward future scenarios. Biodiversity gain targets still need to be defined, along with indicators and methodologies to measure them, in order to clearly demonstrate progress toward a nature-positive outcome 2.

WEAK GOVERNANCE

Low inclusion of communities: the limited inclusion and recognition of the traditional knowledge of ethnic and rural communities in decision-making regarding the particularities of each territory has hindered the strengthening of the role of their inhabitants in environmental ***conservation and in the implementation of ecosystem protection mechanisms, which often fail to consider biological connectivity and sustainable spatial arrangements, practices that ancestral communities do apply as key to ensuring biodiversity 2.***

OPPORTUNITIES AND RECOMMENDATIONS

A

PRACTICES FOR THE CARE OF ECOSYSTEMS AND BIODIVERSITY

- *Promote natural regeneration as a nature-based solution (NbS) that provides valuable tools for the management and recovery of the country's degraded ecosystems. It is estimated that "NbS could provide around 30% of the cost-effective mitigation needed by 2030 to stabilize global warming below 2 ºC" 2.*

- *Promote and lead intersectoral partnerships among the public sector, academia, and other private and public institutions to efficiently implement and coordinate planting initiatives in the territories and thereby foster the recovery of degraded ecosystems 5.*

Case Study 3.1. – Regeneration in Action Platform. This is a platform that brings together individuals and organizations interested in regeneration. Its objective is to generate and facilitate the exchange of knowledge and practices, as well as to showcase inspiring examples that help scale up and strengthen the impact of regeneration 11.

- *Efficiently implement the program for the eradication of illicit crops and prohibit the use of glyphosate as an eradication agent, transitioning to other forms of eradication such as manual removal, including producers, affected communities, and other stakeholders in the strategy. It is also necessary to investigate and design processes to regenerate soils contaminated with glyphosate through agrobiotechnology, for example, through bioremediation, phytoremediation, and rhizoremediation 12.*

- *Promote the breeding of both native bees and introduced species (meliponiculture), which, together with sustainable management practices, contributes to the knowledge, conservation, and use of biodiversity in urban and rural areas, supporting the country's sustainable transition and the generation of livelihoods for communities 5.*

Case Study 3.2. – Madre Monte Natural Reserve: this is a sanctuary of flora and honey, where beekeeping continues to be developed and promoted by the government as a productive development alternative in institutional programs such as the eradication of illicit crops and illegal mining, or as part of productive adaptation strategies to the impacts of climate change in high mountain areas 13.

Case Study 3.3. – Sweet Cities Program: this took place in Costa Rica, in response to the challenges of urbanization in the city of Curridabat. The city has reinvented itself around its non-human inhabitants and incorporates pollinator species as a central axis. Green spaces are treated as infrastructure with ecosystem services that can be utilized and offered to residents 14.

- *Recognize ancestral knowledge and the contributions of communities, social organizations, and grassroots groups in the protection of biodiversity, in addition to promoting community-based biodiversity monitoring. Greater support and accompaniment from governments must contribute to enabling communities to improve their living conditions and continue protecting ecosystems 4.*

Governments must contribute to enabling communities to improve their living conditions and continue protecting ecosystems 4.

Case Study 3.4. – The Chocó-Darién Conservation Corridor is a project designed by the Community Council COCOMASUR, located in Acandí, Chocó, with financial and technical support from Anthrotect S.A. and Fondo Acción. The process began in 2010 and in 2012 was validated by the Verified Carbon Standard (VCS). A total of 104 thousand carbon credits were verified for the voluntary market, which prevented the deforestation of approximately 250 hectares of tropical forest and the emission of around 104,000 tons of carbon into the atmosphere 15.

NOTE: It is important to highlight that although REDD projects are a mechanism for reducing GHG emissions and protecting ecosystems, they sometimes have both positive and negative impacts, mainly for the communities receiving the projects. Therefore, it is the duty of local authorities to regulate monitoring and grievance mechanisms in order to guarantee the rights of communities. In the climate finance section, some recommendations are provided to continue strengthening these instruments.

Case Study 3.5. – Conflict in the territory of Pirá Paraná. The authorities of the Indigenous Territory of Pirá Paraná, in southern Vaupés, are requesting the annulment of a REDD+ project, claiming that those responsible for the project did not respect the authority or the mechanisms for participation and timely information to reach agreements with the communities in the area. This case has reached the Constitutional Court, which will now review the tutela to determine the next steps. Based on cases such as this, DeJusticia has denounced that the State has not developed effective response mechanisms to address calls from ethnic communities and civil society organizations regarding potential violations of community rights associated with REDD+ projects. This will set a precedent, as it will be the first time that the Constitutional Court rules on these projects 16.

- *Implement and promote urban green infrastructure by integrating nature inside and outside buildings through the use of vegetation, natural lighting and ventilation, and the attraction of fauna, in order to improve the provision of goods and services offered by biodiversity in urban environments. At the same time, the effects of ecosystem fragmentation and isolation can be reversed through the implementation of preservation and restoration strategies before and after projects 5.*

Case Study 3.6. – The revitalization of public spaces in Mompox through water. Through a landscape, urban, and architectural project spanning 2.7 km and covering an area of 18 hectares, the aim is to revitalize the urban axis of "La Albarrada de Mompox," integrating the various environmental, heritage, social, and cultural variables that characterize the site 17.

- *Promote other ecosystem-based adaptation (EbA) techniques that have been recognized by the IPCC as an effective measure to reduce climate risks associated with flooding and rising heat in urban areas. These systems include, but are not limited to: urban greening, wetland restoration, silvopastoral systems, organic agriculture, the declaration of protected areas, water harvesting, among others. These contribute to population well-being by combining biodiversity and ecosystem protection methods with sustainable socioeconomic development 5.*

- *Promote BiodiverCities, a strategy that seeks to ensure that biodiversity conservation becomes a central part of urban planning, land-use management, and the socioeconomic development of cities. BiodiverCities can restore the balance between urban management and nature, promoting new positive links between rural and urban areas 18.*

Case Study 3.7. – Educational institution for restoration. Since 1967, the Gimnasio Femenino school has been located on a 74-hectare property, currently known as the Mano de Oso Natural Reserve. The school community and its network of allies have participated in the restoration of the reserve with native species, transforming this natural space into an educational, research, cultural, sports, and recreational setting 19.

Case Study 3.8. – The value of the urban forest: with the objective of strengthening the management of green infrastructure, specifically by assessing its benefits, the environmental authority of Medellín developed a methodology that had its first pilot application in La Hueso stream, located in the Atanasio Girardot football stadium area. The experience can be replicated in different municipal regions, establishing payment for ecosystem services (PES) schemes. In addition, through this methodology, measures have been identified to address the problems affecting the city, such as heat islands and air quality 20.

• Manage urban biodiversity in a comprehensive manner at different scales (region, metropolis, locality, communes, and neighborhoods) through metropolitan governance schemes, which serve as input for designing landscapes that provide multiple functions. For example: managing urban-rural edges as a containment strategy, managing urban protected areas for research and citizens' enjoyment, and protecting watersheds 5.

Case Study 3.9. – Rivers of change. In 2002, Montería proposed an innovative public licensing model for one hundred parks, including a section of the Sinú River riverbank. This model required license holders to design, build, and maintain the designated public spaces for twenty years and would initiate a significant transformation for Montería. Since then, the recovery of the Sinú River riverbank has been guided by a structuring vision of the city, as it not only seeks to intervene in the riverbank but also to connect the urban fabric with the river, establish a design based on principles of respect and enhancement of its biodiversity, and promote new scenarios for the growth and well-being of the citizens of Montería 21.

Case Study 3.10. – Win-win scenarios for wetlands in Villavicencio. Decrees 304 of 2020 and 152 of 2021 seek to promote the protection of the municipality's wetlands. The first created a broad interinstitutional committee that has conducted various assessments of six wetlands in Villavicencio to recognize the potential of these areas and manage them in the best possible way.

The problems identified in this initial work led to the second decree, which allows landowners and developers to transfer protected land, such as wetlands, to the municipality, in exchange for the latter granting additional building rights on their properties suitable for construction. It is a win-win scenario, as it allowed the municipality to secure protected areas for public use, while enabling landowners to change their perception of a property that they previously viewed as a burden and that can now generate an additional benefit 22.

• Ensure the existence of biological corridors through the recognition and delimitation of areas of special environmental interest throughout the territory, allowing the safe movement of different species, for example, by expanding the coverage of National Natural Parks (PNN). Additionally, through the regeneration of degraded areas, the natural conditions of the site can be restored to allow the repopulation of native fauna and flora species 23.

• Transition to forms of agriculture that do not depend on chemicals and urgently regulate and implement the elimination of the most harmful pesticides and agrochemicals for the soil, as is expected to be defined in the new National Biodiversity Plan, through the generation of collective commitments from all sectors to make the transition toward agroecological practices that promote regeneration 24.

• Promote the creation of civil society reserves; these reserves should fundamentally include ethnic communities, peasant territories, local networks, among others, as a governance strategy that could strengthen existing protection mechanisms for protected areas. It is also necessary to generate economic incentives to cover the costs associated with these areas, in order to guarantee their permanence over time and improve the quality of life of the communities that depend on them 3.

Case Study 3.11. – Colombian Network Association of Natural Reserves of Civil Society. RESNATUR is a national network of individuals and civil society organizations that decided to manage their properties as natural reserves, contribu-

thereby contributing to the conservation of biodiversity and its ecosystem services, sustainable production, and the strengthening of the social fabric 25.

Case Study 3.12 – Community and Peasant Reserve Collective of Santander: As an alternative to state institutions, various peasant and community associations part of the Santander School of Agroecological Peasant Promoters created a space dedicated to forest protection and conservation.

Through family and community work, strengthening agroecology, beekeeping, local markets, and alternative energy, farmers foster a sustainable future for families, the land, and future generations. The collective has successfully restored high-Andean forests, engaged youth in conservation and nature stewardship, and promoted rural-urban dialogue26.

B

SEED MANAGEMENT

- *Strengthen community seed centers for the propagation and circulation of native and creole seeds adapted to local conditions, aiming to recover species at risk of extinction. This also helps guarantee food security for communities using these seeds and for those consuming their derivatives25.*

Case Study 3.13 – Espora Seed Guardians Network: This collective runs a community seed center in Medellín, with guardians cultivating and producing seeds across 7 departments of Colombia, 23 municipalities in Antioquia, and 2 Medellín districts. Key participation comes from peasant, indigenous, and Afro-Colombian communities throughout sowing, commercialization, and use, while also ensuring the transfer of intergenerational knowledge related to the protection of native seeds27.

- *Encourage research to advance knowledge of "promising species" such as chachafruto, chontaduro, breadfruit, achiote, among others, used mainly by indigenous and peasant communities. Research should assess their economic, environmental, and social benefits, preserve their cultural roles, dietary and therapeutic uses, expand market opportunities, and conserve the associated empirical knowledge28.*

Case Study 3.14 – Research on the Potential Use of Promising Species in Antioquia: A bibliographic study determined the potential uses of each species (medicinal, food, colorants, etc.) and identified those with the greatest number of applications by local communities28.

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C

LAND-USE PLANNING

- ***Timely implement temporary natural resource reserves, a legal instrument that allows for the temporary delimitation of areas of environmental and mining interest in order to avoid granting new titles in those areas while the environmental authority determines the protection strategy to be applied,***

which may or may not imply a definitive exclusion of mining activities. This instrument can help reduce land tenure conflicts and prevent the violation of the rights of local communities, and could even be replicated in other sectors such as hydrocarbons or infrastructure5.

D

LACK OF INFORMATION FOR DECISION-MAKING

- ***Include diverse social actors in data collection efforts that help reduce information gaps in under-sampled areas within cities. This will make it possible to analyze and make decisions regarding changes in biodiversity at different spatial and temporal scales, contributing to understanding biodiversity's response to global changes such as climate change or pandemics5.***

Case Study 3.15 – eBird Platform: it is the citizen science platform that contributes

the most biodiversity data in Colombia. With nearly 2.5 million records, its users have provided data on 95% of the country's bird species, making it the citizen science initiative that contributes the most biodiversity data nationwide29.

- ***Include information on the valuation of ecosystem services in the process of formulating land-use planning instruments, to guide decision-makers in the conservation and sustainable management of the territory5.***

E

GOVERNANCE

- ***Promote the use of technology to contribute to biodiversity protection and conservation policies, so that the use of spatial data and collected information allows for the prioritization of areas and protection and restoration actions for each territory, and that, together with collaboration between scientists and public policy experts, sufficient information is generated to support decision-making5.***

Case Study 3.16 – Mapping Essential Life Support Areas (ELSA) in Costa Rica: Through this initiative, scientifically based maps are developed for the implementation of policies aligned with national priorities. Thirty national and twenty international institutions participated in the mapping process. Together, these partners are transforming spatial data and policy priorities into applicable maps to safeguard Costa Rica's Essential Life Support Areas30.

to safeguard Costa Rica's Essential Life Support Areas30.

Case Study 3.17 – Systematic Conservation Planning Web Tool in Colombia. The Mapping Nature for People and Planet partnership brings together scientists and policy experts to leverage Earth observations in order to meet national priorities. To this end, the partnership works closely with countries to identify their Essential Life Support Areas (ELSAs), defined as areas where nature-based actions can safeguard biodiversity and key ecosystem services10.

• Generate multi-sectoral coordination to promote multilevel governance of urban nature, in which schools, universities, companies, and community-based organizations contribute through their areas and action plans to sustainability goals aimed at biodiverse cities5. Likewise, the participation of peasant groups, women, and ethnic communities must be ensured so that they contribute to the development perspective through an approach aligned with natural processes and respect for the governance of these peoples, from rural to urban contexts.

F

INVESTMENT AND INCENTIVES FOR THE PROTECTION OF BIODIVERSITY

• Promote the implementation of the country's green taxonomy as a tool to foster climate finance and the development of high positive-impact environmental projects that are national priorities, by leveraging investments from companies, local and foreign investors, public and private entities, financial regulators, and consumers, contributing to the country's competitiveness and to climate finance instruments31.

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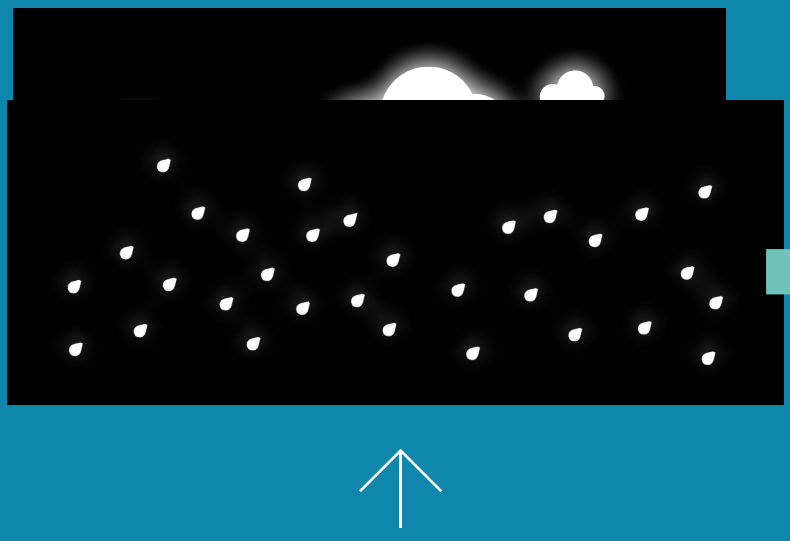
Water Management

CONTEXT

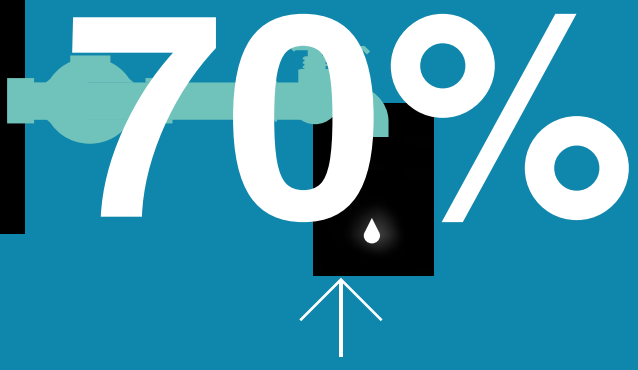
According to the World Bank, climate change manifests primarily through water1, disproportionately affecting the most vulnerable. Although in our collective imagination Colombia is, due to its geography, a water-rich country, water insecurity is a reality. Between 1990 and 2017, Colombia went from being the 5th most water-rich country in the world to 24th2. It is important to remember that our rivers and waterfalls not only guarantee our water supply but are also crucial for the energy matrix and for ensuring food security.

Although water is a fundamental right and progress has been made in the country to guarantee it through legal decisions such as the minimum vital amount of water, gaps and unequal relationships in access to this service persist. On several occasions, industrial and agricultural uses have been prioritized, denying this same right to entire communities.

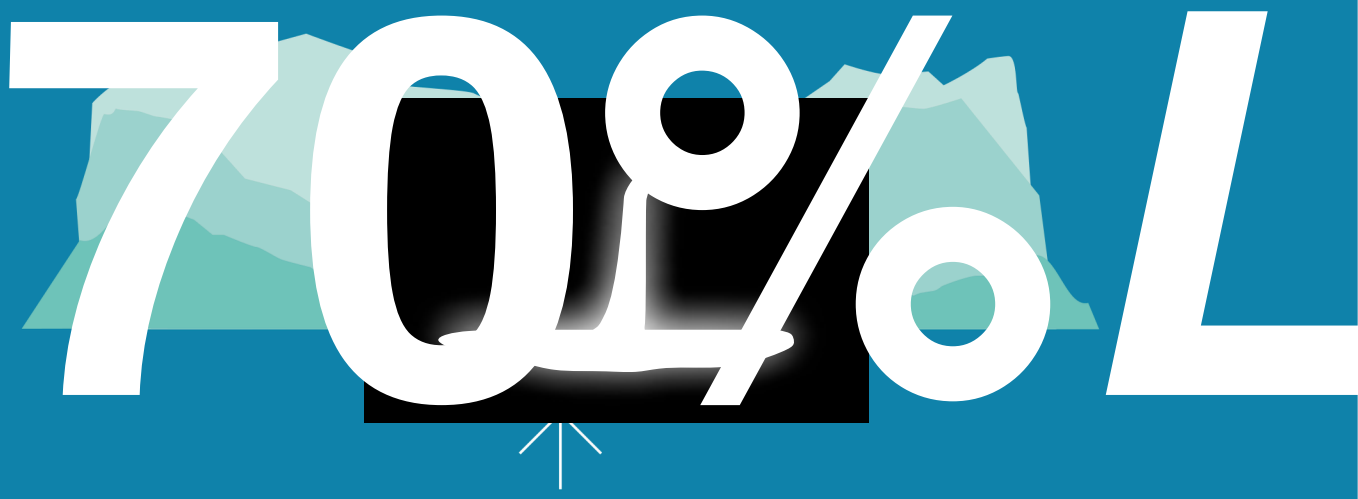
On the other hand, extreme weather events impact regions of the country differently, some experiencing more intense rainfall and others prolonged droughts, with consequences such as 391 municipalities being at risk of water shortages in 2018. Furthermore, impacts vary according to age, gender[3], racial identity, or socioeconomic status; therefore, these effects must also be analyzed through an intersectional lens in order to define better prevention and response strategies.



Climate change is altering rainfall patterns. In Colombia, rising global temperatures are likely to make the central Andean regions wetter and the northern and southeastern lowlands drier4.



70% of the population has access to potable water supply and sanitation services.



More than half of the world's páramos are located in Colombia4.

17% of the national territory is susceptible to extreme flooding4

CHALLENGES AND ISSUES

WATER QUALITY

Deforestation and pollution: these factors are deteriorating water quality, affecting the natural environment (biodiversity) and public health. The water quality risk index for human consumption has identified 289 municipalities with high or very high health risk due to poor water quality.

Water supply and sanitation infrastructure: fewer than half of municipalities have water treatment systems for potable water. Around 50% of the water treatment systems currently in use in Colombia operate at maximum capacity4.

Mining pollution: in 2012, the mining industry contaminated land and water in 179 Colombian municipalities with 205 tons of mercury4. Gold extraction has caused high levels of mercury contamination in natural water sources, putting the health of hundreds of people at risk5.

Agriculture and land-use change: agriculture is one of the three main causes of deforestation in Colombia6. Deforestation leads to worsening water quality due to increased soil erosion and sedimentation in water sources. Pesticides used in agriculture also contribute to water contamination due to the use of chemical products. Notably, coffee cultivation is the third-largest water polluter, after the industrial and domestic sectors2.

Impact on public health: in Colombia, malnutrition, inadequate water supply, and lack of sanitation contributed to 905 deaths and 2.9 million cases of illness in 20154.

> Case Study 4.1 – Neurological Impacts in Children near Bogotá Exposed to Water Contaminated with Pesticides.
>
> This study confirmed the association between neuropsychiatric syndromes and exposure to certain pesticides used for agricultural purposes in the rural area of Bogotá, specifically in the regions of Sumapaz and Usme. The study population consisted of 231 boys and girls between the ages of 7 and 10, and all participants had traces of these toxic pesticides in their bodies7.

Economic impact: the effect on public health limits the productive capacity of the population, creating a secondary impact on the economy. Limited availability of potable water and basic sanitation costs the Colombian economy an estimated COP 2.2 trillion per year (US$800 million), equivalent to 0.27% of GDP in 20154. Women and girls are the most affected by this economic impact, as they are more vulnerable to water-related diseases and must also invest more time collecting water far from their homes8.

B

WATER AVAILABILITY

Deterioration of páramos: human activities, mainly mining and agriculture, have already damaged more than half of these ecosystems, limiting their capacity to capture, filter, and retain water4.

Inequality in access to potable water: "Water availability in Colombia is generally 7.6 times higher than the global average; however, certain areas of the country have only one-tenth of the global average"4. Populations along Colombia's northern coast, especially Indigenous communities in La Guajira, have the least access to potable water. Additionally, there is sometimes disproportionate use of the limited water resource, such as at Cerrejón—the largest coal mine in Latin America—where up to 45 million liters of water per day have been used9.

High dependence of the agricultural sector on water: the agricultural industry is the largest consumer of water, even putting access to this vital resource at risk for certain populations.

In Valle del Cauca, 73% of the groundwater used is allocated to sugarcane cultivation4. Without proper management and control, Colombia's water resources are being depleted.

Impact on population well-being, especially women and girls: there is a correlation between decreased rainfall and infant mortality, which increases by 3.3% during droughts4. Additionally, diseases related to lack of access to water significantly affect maternal and child health10. Women's freedom is also limited, as in low-income areas they are the ones who spend the most time fetching water11, restricting their ability to engage in other economic or well-being activities due to the need to secure water for basic needs. This issue also disproportionately affects women because lack of access to clean water reduces menstrual hygiene8. In this same context, water scarcity negatively impacts women's educational attainment and income levels4.

C

FLOOD RISKS

More frequent extreme weather events: these occur due to rising global temperatures. The Institute of Hydrology, Meteorology and Environmental Studies forecasts a 31% increase in precipitation in Colombia by the end of the century12. This has increased the risk of flooding in many vulnerable communities in Colombia, with both economic and social repercussions.

Almost half of the Colombian population is highly vulnerable to hydrometeorological events, according to the UNDP Unsatisfied Basic Needs Index4. Lower-income populations are the most exposed.

High flood-risk areas include the Atrato River Basin (Chocó), the Mojana Region (Sucre), the Orinoco Region (Santander), and the Cauca and Magdalena River Basins4.

The increase in flooding could have an economic impact of between 2.76% and 3.08% of annual GDP4. Floods and landslides significantly affect transportation routes, limiting economic activity. In 2017, 30% of the USD 6.2 billion in damages caused by La Niña occurred in the transportation sector.

OPPORTUNITIES AND RECOMMENDATIONS

WATER QUALITY

- *Increase monitoring and water quality standards using the criteria of the Integrated Water Analysis Index13. In addition to social benefits, there are significant economic advantages, as it is estimated that for every dollar invested in water and sanitation, there is a return of 4.30 dollars4.*

Case Study 4.2 – Water Indicators System.
To monitor water quantity and quality, the "Water Indicators System" was developed by IDEAM in order to provide clarity regarding concerns related to the availability and constraints of this resource and the factors that may affect its supply and quality. These indices are associated with the natural regime (Aridity Index - AI, Water Regulation Index - WRI) and anthropogenic intervention (Water Use Index - WUI, Vulnerability to Water Shortage Index - VHI, Potential Threat to Water Quality Index - IACAL, and Water Quality Index - WQI)13.

Improve and expand wastewater treatment.

Case Study 4.3 – Wastewater Treatment Plant.
The Government of Colombia, supported by the World Bank, redesigned the El Salitre Wastewater Treatment Plant to expand its capacity to treat 7 m³/s of wastewater and cover 30 percent of the wastewater generated by the City of Bogotá.

In addition, the new plant design included an energy recovery provision generating a significant portion of the plant's consumption, as well as an additional disinfection treatment process of up to 14 m³/s to enable the reuse of wastewater for agricultural purposes in the future. The project also incorporates processes that contribute to the circular economy, producing 132 tons/day of biosolids that can be used for agricultural purposes14.

NOTE: These processes must guarantee the well-being of nearby communities, which are often affected, for example, by odors from treatment plants that can cause physical and mental health issues such as loss of appetite, insomnia, and disruptions to daily life, as well as property devaluation.

- *Prioritize the health of women and vulnerable populations such as children and older adults in the provision of potable water.*

- *Redouble efforts to eradicate illegal mining, ensuring compliance with environmental regulations across the entire mining sector and promoting a just transition toward other economic activities.*

B

WATER AVAILABILITY

- *A tariff reform is suggested for water service charges. The Regional Autonomous Corporations (CAR) could increase charges for the use (or misuse) of water, specifically for users who exceed the minimum vital amount or for non-essential services: domestic sprinklers, swimming pools, inefficient irrigation techniques in the agricultural sector, among others. This creates the possibility of subsidizing water service tariffs for low-income households or using the additional funds to expand infrastructure and water service coverage to populations that still lack access to potable water.*

Case Study 4.4 – Water Pricing.

Variations in environmental conditions triggered by climate change cause water stress in many places around the world, including in areas with high levels of rainfall, since water extraction and treatment can entail high economic and environmental costs. In Europe, many regions are under such stress, which has prompted renewed efforts toward efficient water use. In response to this issue, a report presented by the European Environment Agency (EEA) states that water pricing should be set at a level that promotes efficient use, incorporating purification and transport costs. It also suggests that environmental and resource depletion costs should be internalized in the price, as natural systems such as wetlands provide "ecosystem services" such as water purification and flood prevention15.

- *Expand the use of irrigation systems in agriculture, prioritizing regenerative, agroecological, family, and community-based agriculture, and support the implementation of these systems, thereby improving water use efficiency.*

Case Study 4.5 – Farmer-to-Farmer Program, Nicaragua.

A program to conserve soil and water. In Nicaragua, the "Farmer-to-Farmer Program" aims to conserve water and soil. Regarding water protection, in the country's dry areas, cisterns are installed to collect rainwater in farmers' homes. Briefly describing the process, ponds are excavated in the ground and water is channeled into storage tanks, where it accumulates in cisterns. When it reaches a certain level, a properly adjusted pump is activated. The collected water can then flow by gravity to different locations and be reused for domestic purposes or to supply irrigation systems16.

Case Study 4.6 – Large Irrigation System, Mali – West Africa.

In central Mali, on land fed by the Niger River, an initial infrastructure built through forced labor served as farmland that, in 1932, when the Niger Authority was created, was intended to establish a gravity irrigation system for one million hectares along the river. Urbanization of land and other social issues prompted government intervention. Through the creation of small contracts involving the government, the Niger Authority, and organized farmers, a work plan was implemented that allows monitoring and evaluation of the contributions and performance of each of the three parties. This partnership framework combines farmer monitoring of water service fee usage with agency administration and government authority for enforcement. This experience illustrates that governments can adopt measures to broaden support for irrigation reforms and reduce resistance to their implementation. By engaging farmers, national management institutions, NGOs, other secondary stakeholders, and the irrigation department itself, it is possible to test solutions that incorporate modern management perspectives and practices17.

- *Increase payments for environmental services (PES): Increasing these payments incentivizes farmers and landowners to manage their land sustainably. It is also necessary to establish verification mechanisms to certify compliance with the service for the duration agreed upon in the contract. Furthermore, progress must be made in formally recognizing peasants who have received land as part of the peace process as legal landowners so they can access this benefit. Many peasants lack official documents certifying land ownership and are therefore unable to access these financial resources.*

- *Use circular economy principles by encouraging the reuse of treated wastewater so that it can be reintroduced into the production chain whenever possible.*

- *Expand the monitoring and protection of aquifers, as only one-third of the identified groundwater systems in the country are currently being monitored and managed.*

Case Study 4.7 – Westcountry CSI: Citizen Science Project for Measuring Water Quality

The charitable organization Westcountry Rivers Trust in England developed this citizen science project with the aim of building a network of volunteers who assist in collecting data on rivers and aquatic environments. Regular water quality sampling not only produces valuable data that can be used to identify priority areas, but also enables citizen scientists and the community to become familiar with their river. This helps identify positive and negative changes and take timely action when necessary to prevent more severe damage.

- *Provide financial and technical support to communities in community-based water management and governance. Support communities that are already implementing their own projects focused on protecting and managing water sources, as well as those that wish to carry out community-led initiatives to conserve their water resources.*

Case Study 4.8 – National Network of Community Aqueducts, Colombia

This network is composed of social and public water managers operating on a non-profit basis who, guided by the values and principles of the social and solidarity economy, defend the right to water as a common good through legal actions and the promotion of public policies and other legislative instruments to protect community-based water management.

- *Uphold the right to access water as a fundamental right for communities and vulnerable populations and as a common good. To this end, it is important to promote and support community governance of water sources.*

FLOOD RISKS

Risk reduction: Municipalities should better implement River Basin Management Plans under the Environmental Flow Regimes (EFR) and the River Basin Management and Planning Plans (POMCA) when carrying out any planning or construction near rivers, especially in the construction of electrical facilities and sanitation services. Risk reduction measures must be included in all territorial planning.

Case Study 4.9 – Use of Local Risk Maps in Europe

The information contained in these River Basin Management Plans, available in the common digital repository, supports improved risk management and territorial planning.

WISE1 includes maps with hydrographic demarcations and their sub-units, surface water bodies (category of water body, ecological status or potential, and chemical status), groundwater bodies (type of aquifer, quantitative status, and chemical status), and monitoring sites. Providing flood risk maps to exposed residents and businesses is a good practice to raise public awareness about water-related risks.

- *Increase monitoring of flood risks and improve alert systems, leveraging information and communication technologies (ICT) to communicate risks to residents.*

Case Study 4.10 – Community-Based Flood Early Warning System in India

To create and improve resilient workspaces in 45 communities vulnerable to flood hazards in the Indian Himalayan region, a community-based flood early warning system was established with the support of various institutions such as ICIMOD (an intergovernmental institution working toward a greener, more inclusive, and climate-resilient Himalaya). This ICT-enabled system uses flood sensors connected to transmitters to detect rising water levels, and when a critical threshold is reached, it disseminates alerts via mobile phones to relevant agencies and downstream at-risk communities. During the 2013 flood season, the early warning system installed on the Jiadhal River successfully informed community members about imminent flooding, helping to save lives and property.

Case Study 4.11 – SIATA

The Early Warning System of Medellín and the Aburrá Valley is a Science and Technology project of the Metropolitan Area of the Aburrá Valley and the Mayor's Office of Medellín, supported by EPM and Isagen. Since 2010, a regional strategy has been developed based on scientific knowledge, technological development, and innovation to identify and forecast the occurrence of natural and anthropogenic phenomena that may alter environmental conditions in the region or generate risks to the population. This is achieved through real-time monitoring and hydrological and meteorological modeling adapted to the territory. This information is freely accessible and serves as the basis for communication and awareness processes regarding the collected data to support risk management in the territories.

- *Include local communities, community leaders, and Local Administrative Boards in decision-making processes regarding water management, promoting water governance and risk management.*

Resource: OECD Water Governance Indicator Framework

This framework can be understood as a voluntary self-assessment tool to evaluate the state of water governance policy frameworks, institutions, and instruments, as well as necessary improvements over time. Its primary objective is to be applicable at all levels of governance. Additionally, it seeks to stimulate transparent, neutral, open, inclusive, and forward-looking dialogue among all stakeholders regarding what works, what does not, what should be improved, and who should carry out each action.*Link: https:// www.oecd.org/regional/OECD-Water-Governance-Indi- cator-Framework.pdf*

- *Provide financial and technical assistance to communities exposed to high flood risk. Training and subsidies are important at this stage, but it is also essential to ensure that citizens participate in ecosystem restoration processes, reducing flood risks, monitoring warning signs, and adapting housing and infrastructure to become more flood-resilient.*

Case Study 4.12 – Reducing Risk and Vulnerability to Climate Change in the Momposina Depression Region

The local association of farmers, producers, forest rangers, and ecologists (ASOPASFU), with the support of Colombia's Ministry of Environment and Territorial Development, UNDP, and the Adaptation Fund, undertook a project to restore 900 hectares of wetlands in Chinchorro, Cecilia, and Mata de Caña. A total of 3,901 women from 44 communities participated in the project, which restored 900 hectares of wetlands and rehabilitated 40.3 kilometers of channels, improving the lives of approximately 15,928 people.

Mobility, Public Space, and Public Health

CONTEXT

82%

The majority of Colombians, equivalent to 82% of the population, live in urban areas 1. In 2015, 64% of the population lived in cities, 25% in towns, and 11% in rural areas 2.

Colombia's geographic diversity limits interconnectivity between cities and towns, especially in the most mountainous regions 3.

97%

Ninety-seven percent of freight transport is carried out by trucks.

71%

The majority of public investment in transport (71%) is allocated to roads 4.

Public space and the way it is used represent a fundamental factor when taking climate action. This chapter outlines several issues related to public space, mobility, and their impacts on public health. Pollution, lack of measurement, polluting mass transport systems, insufficient conditions for alternative mobility, and disconnection from rural areas are among the main challenges affecting this dimension.

However, there are actions that decision-makers can implement through infrastructure, civic culture, and the systems that currently move cities.

CHALLENGES AND ISSUES

PUBLIC HEALTH AND AIR POLLUTION

Air pollution and climate change are often addressed separately 5, yet they should be tackled together, as their primary source is the same: the burning of fossil fuels. Both issues have significant consequences for public health and must be approached as public health priorities.

Eight percent of the country's annual mortality is attributable to environmental risk factors, and nearly 90% of those deaths are associated with poor air quality 6, representing approximately 8,000 deaths 7.

Exposure to fine particulate matter (PM2.5) was responsible for more than 34,800 premature deaths between 2014 and 2019 8.

In the country's main cities and urban centers, where most of the population is concentrated, the primary source of particulate matter is mobile sources, which generate nearly 80% of PM2.5 emissions. The remaining 20% comes from stationary sources such as energy industries, industrial processes, and waste treatment and incineration 9.

There is a clear lack of access to air quality monitoring networks in cities. In 2021, Colombia had only 22 official Air Quality Monitoring Systems, according to IDEAM, a decrease from 27 systems in 2018. These systems cover only 77 of the country's 1,102 municipalities, representing just 7.3% of the total 10.

The transport system is dominated by combustion engines, primarily private vehicles such as cars and motorcycles. Between 2010 and 2017, the number of motorcycles more than doubled, while the number of cars increased by 58% 2.

The transport sector produces 12% of greenhouse gas (GHG) emissions, and 90% of these emissions come from road transport 2.

Most freight transport is carried out using aging trucks with poor emission standards 11, and freight transport is estimated to account for 50% of transport-related emissions 12.

B

INSUFFICIENT PUBLIC SPACE IN CITIES

Under national regulations, each citizen should have between 10 and 15 m² of public space. With the exception of Popayán, Santa Marta, and Soacha, most cities fall below this target in Colombia 2.

Among major cities, Medellín has less than 4 m² per inhabitant 13, while Cali and Barranquilla provide 4.3 m² 2.

C

LOW-QUALITY AND LIMITED ROAD INFRASTRUCTURE

Colombia's road quality ranks well below the average for Latin America and the Caribbean 14, despite the fact that 90% of goods are transported by road. This weak connectivity significantly impacts the economy. In agriculture, for example, 34% of food produced each year is lost or wasted 15. This can largely be explained by the fact that 75% of rural areas are located more than four hours away from one of the country's 18 main cities, and 5% of these areas are inaccessible by land 16.

More broadly, the most disadvantaged neighborhoods in cities are often located farthest from employment centers and are the least connected to public transport systems. Residents face longer commuting times and must allocate a larger share of their income to transportation 17. In the capital, low-income residents spend up to one quarter of their income on transport 18.

Traffic congestion in Colombia costs approximately 2% of GDP annually 19.

D

INSEGURIDAD Y POCAS GARANTÍAS PARA LA MOVILIDAD SOSTENIBLE

Cycling infrastructure remains unsafe in many cities. In Bogotá, one of the leading cities for bicycle mobility, 17% of traffic fatalities in 2020 were cyclists 20. In Medellín, 5.6% of traffic fatalities in 2023 were cyclists 21.

On average, women spend more time commuting than men, approximately 11% more in Bogotá, particularly those living in low-income neighborhoods. In Bogotá, around 85% of women report having experienced sexual harassment during their daily commutes 22.

OPPORTUNITIES AND RECOMMENDATIONS

IMPROVING AIR QUALITY

• Strengthen air quality monitoring in line with the recommendations of the Pan American Health Organization, bearing in mind that what is not measured cannot be managed or mitigated. Real-time, publicly accessible monitoring systems can be implemented to improve decision-making and to develop strategies that reduce exposure to pollution levels that are hazardous to health, especially for the most vulnerable populations.

Case Study 5.1 – Collaborative Microsensor Network, Bogotá. This project was launched in September 2022 with the installation of 20 microsensors across Bogotá to measure particulate matter concentrations in specific environments such as roadways, bike lanes, and areas near schools. The city government subsequently announced its plan to install 200 additional microsensors over the following three years 23.

• Include Black Carbon and Brown Carbon sensors in monitoring systems. These pollutants, originating from fires and biomass burning, can account for up to 15% of PM2.5 in large cities 24. Monitoring them provides more precise information about particulate matter sources, allowing for better prioritization and decision-making.

• Measure secondary pollutants, which are generated by the reaction of various substances in the atmosphere, such as ozone. Ozone forms from hydrocarbons produced by the burning of fossil fuels, which, when combined with nitrogen oxides and solar radiation, create ozone with harmful health effects. Advancing research and monitoring of atmospheric pollutants will ensure stronger measures to protect public health. Current measurements indicate that national levels exceed the maximum recommended by the WHO, although greater capacity is still needed to obtain more precise data 25.

• Adopt differentiated measures for urban and rural areas. In urban areas, both mobile and stationary emission sources require stricter control. In rural areas, measures should be strengthened to reduce forest fires, household firewood burning, and agricultural burning. Urban local administrations must also participate in developing strategies to prevent and manage emissions from rural areas, as these can significantly affect urban air quality.

• Adopt the new WHO limits, updated in 2021, within local air quality management regulations for major atmospheric pollutants (criteria pollutants), and more rigorously monitor polluting actors. Stronger regulation and the reduction of key sources of particulate matter, including fossil fuel combustion from motor vehicles and industrial activities, improve air quality and public health while advancing climate targets.

• Strengthen community-based air monitoring by creating and training networks of citizen scientists to obtain complementary data for decision-making and the democratization of information.

Obtain complementary data to support decision-making and the democratization of information.

Caso de estudio 5.2. - CanAirIO, monitoreo ciudadano del aire. *CanAIRIO es un sensor de bajo costo que mide el material particulado PM2.5 y es una de las herramientas con las que cuentan 20 personas gracias al proyCase Study 5.2 – CanAirIO, Citizen Air Monitoring. CanAirIO is a low-cost sensor that measures PM2.5 particulate matter and is one of the tools used by 20 individuals through a project funded by the Heinrich Böll Stiftung foundation. Through these kits, monitoring has made it possible to collect air quality data from 20 locations across the country and to generate new actions around air quality and climate justice. It is noteworthy that this project has relied on citizen efforts to disseminate and democratize knowledge on air quality, with the aim of advancing climate justice 26.*

- *Replace diesel vehicles, both public service and private, to ensure compliance with Euro VI regulations, as established by Law 1972 of 2019. For motorcycles, fleet renewal should also be planned to ensure at least compliance with Euro III standards.*
- *Expand electric bus fleets, including charging infrastructure in all cities and in partnership with international allies.*

Case Study 5.3 – Electric Buses for Bogotá. In 2022, Bogotá launched La Rolita, the first and only public transport operator in the city's history composed entirely of 100% electric buses, with a strong gender equity approach.

Fifty percent of its workforce are women working as drivers, technicians, and administrative staff 27.

- *Allocate a budget to implement Law 1811 of 2016, which promotes the bicycle as a primary mode of transport nationwide, and significantly expand safe cycling infrastructure in cities 28.*
- *Effectively and continuously include citizens in the review and development of policies related to bicycle use and low-emission transport modes, as indicated in Article 10 of Law 1811 29.*
- *Create shared bicycle systems, increase access to bicycles in cities, and offer cycling courses for children and adults to promote sustainable mobility. Likewise, ensure that these services are accessible to people with reduced mobility.*
- *Support cross-sector collaboration and air quality governance by creating spaces where the public sector, academia, the private sector, and civil society can meet to monitor and co-develop solutions to air pollution.*

Case Study 5.4 – Community Odor Monitoring. Some communities in Bello and Copacabana, north of Antioquia, have developed their own odor monitoring system. This initiative emerged in response to strong odors reported from the Aguas Claras wastewater treatment plant (WWTP). Through a WhatsApp-based communication system, residents report odors

According to the intensity (scale of 1 to 5) and type of odor (rotten egg, sewage, etc.), this enables the implementation of odor mitigation strategies largely driven by community participation, while also promoting educational actions on the issue 30.

- *Promoting partnerships in support of citizen science and environmental education with civil society organizations helps bridge social gaps between science and the public by creating connections that activate citizen engagement in actions for improving urban air quality.*

Case Study 5.5 – Citizen Technical Roundtable for Air Quality in Bogotá. This space is a technically oriented, citizen-led initiative aimed at promoting air quality governance. The objective of this citizen technical roundtable is to facilitate a better understanding of the problem, the various stakeholders involved, and to generate solutions for air pollution in Bogotá. This initiative focuses on three specific projects:

1. **Highlighting the importance of good air quality and its relationship to health and quality of life;**
2. **Aligning motivations and capacities within a shared technical space to achieve a governance framework capable of meeting the primary goal: improving air quality for Bogotá's residents;**
3. **Directly influencing city processes to foster participatory, solution-oriented, and transformative improvements in air quality, while encouraging citizen empowerment through knowledge and education 31.**

- *Actions during contingency events must follow immediate response protocols coordinated between the Ministries of Health and Environment to protect lives, especially those of the most vulnerable populations. For this, timely access to air quality data is essential.*

- *Restrict freight transport within cities and promote soft mobility (non-motorized transport) for last-mile deliveries, in accordance with the Sectoral Action Plan 32.*

Case Study 5.6 – The Last-Mile Revolution. In the city of Medellín, a micro-distribution system for goods has been implemented using cargo bicycles. Combined with shared warehouse spaces, this allows multiple companies to use collaborative storage facilities and carry out deliveries using non-motorized vehicles. Reported benefits, in addition to reduced air pollution, include optimized delivery processes and the ability to meet diverse customer time windows with greater flexibility than conventional delivery models 33.

- *Create external freight corridors to limit the entry of heavy cargo transport into cities and reduce population exposure to particulate matter.*

- *Encourage and promote the electrification of freight transport fleets and invest in the development of alternatives such as railways 34.*

- *Increase public space allocated to pedestrians in cities.*

- *Expand low-emission zones.*

Case Study 5.7 – Urban Protected Air Zones (ZUAP). These are designated areas or zones within the city of Medellín where a set of measures is applied to reduce emissions and improve residents' health. These measures aim to increase the use of sustainable mobility options, such as walking and cycling. In these zones, air quality and traffic are monitored, and public space is actively managed and regulated 35.

- *Pedestrianize more areas of the city as an incentive for low-emission mobility, such as walking and cycling.*

Case Study 5.8 – Children First. The "Children First" program in Bogotá includes various initiatives designed to provide safer and more efficient spaces for the daily mobility of Bogotá's children. These initiatives include the creation of supervised walking caravans for students, programs encouraging bicycle use, and the implementation of preferential lanes for school transport 36.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B

IMPROVEMENT OF MOBILITY

• Increase the availability and use of multimodal transport in cities in order to develop an integrated public transport infrastructure with greater interconnectivity between different modes of public and zero-emission transport. This must be aligned with the implementation of the national transport electrification strategy, together with budget allocations from municipalities.

- *Urban planning should prioritize ensuring that essential goods and services, including transport, are accessible to all residents, with special attention to the most disconnected neighborhoods and to persons with reduced mobility.*

Case Study 5.9. – Care Blocks (Manzanas del Cuidado). The Care Blocks are an urban planning strategy that provides various services, focused on making educational opportunities more accessible, from high school completion to complementary training. They also offer access to the "Bike School," where participants learn how to ride a bicycle, enabling them to use a sustainable mode of transport 37.

• Increase and improve the safety of pedestrian and cycling infrastructure, preventing vehicles such as motorcycles from invading low-emission mobility spaces.

• Improve the quality and safety of pavements and pedestrian crossings, and increase regulation of parking areas.

• Develop cycling infrastructure maps in cities to encourage bicycle mobility and incorporate damage reporting systems that allow infrastructure to be maintained in good condition.

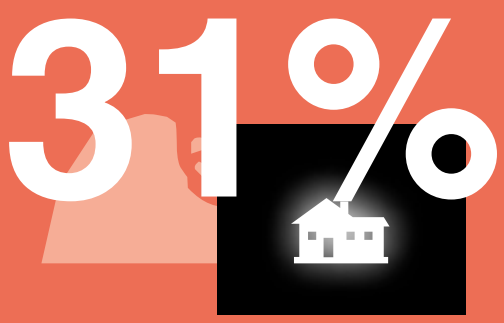
Case Study 5.10. – SIG en Bici. This collaborative mapping project on cycling infrastructure, carried out by the Siclas collective and the GeoLab Seedbed of the University of Antioquia, began in 2019. Based on open-source software, it generates information not only on existing infrastructure in cities but also on characteristics of the cycling population, such as gender and age, as well as cyclists' perceptions of safety and comfort regarding cycling infrastructure. The initiative has been built through the participation of the cycling community and encourages the public sector to use citizens' knowledge of the city so that policies and projects truly meet their needs through participatory methodologies and cross-sector coordination 38.

Ensure the proper functioning of reporting systems for inappropriate sexual conduct on public transport to enhance women's safety.

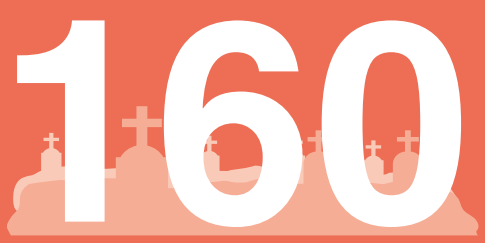
Conduct public campaigns against sexual harassment in streets and public transport, and promote the adoption of such campaigns within the private sector.

Disaster Risk Management and Human Mobility

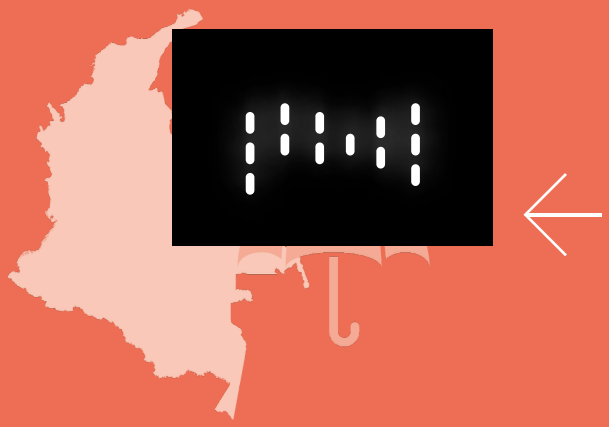
CONTEXT



The El Niño and La Niña phenomena have had significant impacts on the pace and intensity of floods, droughts, and landslides. It is estimated that 28% of the Colombian population is exposed to significant flood risk and 31% to high or medium landslide risk 1.



These events cause, on average, 160 deaths and the destruction of 2,800 homes per year, primarily affecting the poorest and most vulnerable sectors 1.



According to the National Disaster Risk Management Policy and the Sendai Framework for Disaster Risk Reduction 2015–2030, it is essential for candidates for Governorships and Mayoralties to recognize disaster risk management as a determinant and conditioning factor for safe and sustainable territorial development, and to include it in the formulation and adoption of Development Plans 2.

The effects generated by climate change will increasingly put us to the test, as we have already raised the planet's average temperature by 1.1 °C. If this increase is not limited, both the frequency and intensity of extreme climate events will continue to rise. Proper risk management seeks to prevent both human and material losses and damages; however, it must be carried out based on the specific conditions of each population and territory. Some areas are far more vulnerable to the effects of climate change despite having made little contribution to the problem.

As a country that is highly vulnerable, we must urgently promote territorial adaptation to build resilience, prioritizing the most vulnerable populations and coordinating across sectors and territories, as achieving this requires joint action. Likewise, a call must be made for those sectors and countries that bear greater responsibility for the climate crisis to provide a larger share of financing for territorial adaptation actions as a matter of justice.

ISSUES AND CHALLENGES

HIGH VULNERABILITY TO DISASTER RISK

Long-term climate change and short-term climate variability generate significant uncertainty regarding future disaster events 3. According to IDEAM, a 31% increase in precipitation in Colombia is projected by the end of the century 4, and it is estimated that nearly half of the Colombian population is highly vulnerable to hydrometeorological events.

MANAGEMENT AND PLANNING

Deficiencies in land-use planning: accelerated and unplanned urbanization in hazard-prone areas has contributed to increased disaster risk, with a significant impact on populations living in poverty. As a result of forced displacement and the migration influx of Venezuelan population, the tendency to build in hazard-prone areas has increased 3.

Deficiencies in public policy and planning: there is a lack of clear coordination and implementation of the national disaster management policy at the municipal level, particularly in planning processes, as there is no efficient local housing policy nor land-use planning structured around climate change considerations 5.

ECONOMIC EFFECTS

Loss of human lives and basic services: losses caused by natural hazards are estimated to generate an average of 160 deaths and the loss of 2,800 homes each year, disproportionately affecting low-income populations 1.

Economic expenditure for repair and reconstruction: estimates of average annual losses due *to natural hazards in Colombia range between USD 177 million and USD 381 million. The majority of post-disaster resources are provided by the Government. In 2011 and 2012, the Government invested 0.9% and 0.7% of gross domestic product (GDP), respectively, in response to flooding 3.*

HUMAN MOBILITY ASSOCIATED WITH CLIMATE FACTORS

Increase in human mobility: it is projected that by 2050 there will be 17 million migrants in Latin America associated with impacts on livelihoods such as reduced food production, water scarcity, sea level rise, and the uninhabitability of certain areas due to climate change effects, in addition to those displaced and migrants generated by internal conflicts 6.

Degree of vulnerability by gender: women, boys, girls, persons with disabilities, and older adults are the most ***vulnerable to experiencing the effects of climate change and feeling them more intensely. Specifically, women and girls are more vulnerable to forced displacement due to climate change impacts and their significant dependence on natural resources for their livelihoods, as they are the primary providers of prepared food, water, and energy. They are also more likely to experience violence 7.***

CLIMATE GOVERNANCE

Lack of collaboration with citizens and communities in risk management: many communities have developed their own strategies and processes to manage the environmental risks they face, as they often possess ***the most specific territorial knowledge. However, there is a lack of coordination with governmental entities and insufficient knowledge transfer between communities and public institutions to improve resilience to extreme climate events.***

CLIMATE JUSTICE

The most vulnerable are those who have contributed the least to climate change: communities most exposed to climate-related disasters are often the poorest and those who have contributed least to the generation of GHG emissions, the primary cause of climate change. The poorest and most vulnerable populations, who live in "low-rent but high-risk areas," are the most exposed to climate-related disasters 8.

Indigenous communities inhabit 28% of the country's territory 9 and have significantly contributed to the conservation of ecosystems in these areas 10. Given their close relationship with nature, they are also highly affected by pollution and climate change 11. Despite this, they are excluded from decision-making processes related to conservation and receive limited governmental support 12.

OPPORTUNITIES AND RECOMMENDATIONS

ADAPTATION AND MITIGATION

- *Integrate Disaster Risk Management into Territorial Development Plans. To do so, strategic lines must first be defined, taking into account existing disaster risk conditions in the territory, current capacities, and the capacities that need to be strengthened to ensure safe, sustainable, and resilient development. This should follow the guidelines established by the National Unit for Disaster Risk Management and Law 1523 of 2012, "National Disaster Risk Management Policy" 13.*

- *Articulate disaster risk management plans with climate change management plans in order to align strategies and programs under an approach that prioritizes risk prevention and mitigation.*

- *Strengthen disaster risk management capacities across all sectors and implement a management strategy that coordinates: housing, environment, health, education, road infrastructure, public services, the agricultural sector, industry, commerce, among others.*

- *Ensure that the Departmental and Municipal Disaster Risk Management Fund established in the Development Plan is sufficient to address territorial needs, not only to respond to emergencies but also to strengthen territorial capacities that increase resilience to extreme climate events.*

- *Identify disaster risk conditions at the departmental and municipal levels using the Departmental and Municipal Disaster Risk Management Plan and the Municipal Disaster Risk Management Index. This index identifies municipalities facing the highest levels of risk and measures their capacity to manage them 14.*

- *Strengthen hydrometeorological services and Early Warning Systems (EWS) through community programs that provide access to and training in the use of EWS. These systems play a fundamental role in the timely and appropriate communication of alerts so that individuals can take necessary protective actions and prevent loss of life and property.*

Case Study 6.1. – Community Early Warning System (CEWS). This is a strategy led by SIATA in the city of Medellín, which includes 27 community alarms, sensors, and monitors that detect emergencies and trigger an alarm that spreads throughout the neighborhood via WhatsApp messages and phone calls, coordinating a safe evacuation 15.

Case Study 6.2. – Inform@risk Project. This is the early warning system in the Bello Oriente neighborhood of Medellín designed to prevent landslides. With the participation of academia, the community, and international cooperation, it positively impacted the neighborhoods of Bello Oriente and Los Alpes Bávaros by installing 100 sensors that detect ground movement at 50 meters. When risk is detected, an alarm is triggered and disseminated through WhatsApp messages and phone calls to coordinate a safe evacuation 15.

- *Use technology as an ally in disaster risk management by employing Geographic Information Systems (GIS).*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Geographic Information Systems (GIS) together with Artificial Intelligence, for example, can be used to identify areas at highest risk of wildfires, thereby improving management and facilitating planning decisions that enable a timely response to prevent severe impacts 16.

Case Study 6.3. – Artificial Intelligence for wildfire detection. The Spanish company Indra has developed its own system based on GIS technologies, which makes it possible to visualize the status of a fire and its evolution. It also enables more precise decision-making by improving the estimation of evacuation routes and helping to better identify populations that may be affected by the event 17. In addition, they use Artificial Intelligence to support the early detection of fire outbreaks across 100 thousand hectares from a distance of 20 km in less than three minutes, thereby accelerating the response to a potential emergency 18.

• Promote resilient infrastructure and establish minimum resilience and safety criteria for urban infrastructure. Based on these criteria, assess the vulnerability of existing infrastructure and systems to extreme climate events in order to strengthen those with weaknesses. Additionally, it is recommended to provide communities with financial and technical support to improve infrastructure and housing so that they become more resilient 19.

Case Study 6.4. – Investing in disaster risk reduction measures. Through a project carried out by the municipal government in collaboration with citizen groups, investments were made in disaster risk reduction measures in Pune, India. This included the implementation of structural and planning measures to restore natural drainage, widen streams, expand bridges, and apply infiltration methods

to reduce exposure to flood risks, an issue that has affected the city for decades 19.

- *Promote community-based disaster risk management schools and grassroots schools for autonomy throughout the national territory in each locality or neighborhood to coordinate organized community efforts in climate-focused risk management.*

Case Study 6.5. – Community Risk Management School. In the El Pacífico neighborhood of Medellín, this school has served as an example by developing its own community risk management plan through popular and community-based education. This enabled the community to identify local threats, as well as the factors contributing to its vulnerability and, at the same time, the strengths and resources that ultimately become capacities for community risk management 20.

• Implement the Community-Based Adaptation (CBA) approach, which is grounded in the needs, priorities, knowledge, and capacities of the community to increase resilience and adaptive capacity in response to the effects of climate change. Furthermore, it is important to design strategies that guide and influence the formulation of public policies and development plans in order to promote the creation of support networks and improve the relationship between local administrations and communities as a key factor for effective CBA 21.

- *Recognize the relevance of ecosystems in disaster risk management and advance in the valuation of ecosystem services, promoting an Ecosystem-based Disaster Risk Reduction (Eco-DRR) approach, which enables the generation of resource management opportunities based on the co-benefits obtained from applying this approach 22.*

B

HUMAN MOBILITY ASSOCIATED WITH CLIMATE FACTORS

• Include and make visible the climate factor as a cause of forced human mobility phenomena. Likewise, it is necessary to advance in defining and recognizing migration, displacement, and refugee status in climate contexts in order to assign responsibilities and obligations to States and cities.

• Establish shelter and assistance systems for climate migrants 7, and advance in the implementation of a mechanism to monitor individuals displaced due to climate-related effects. Progress must be made in systematizing cases as a step toward advancing climate justice and migration justice, enabling a fair and timely response to such situations.

Case Study 6.6. – National Strategy of the Colombian Red Cross for Assistance to Migrant Populations. Since 2018, this entity has provided nearly six million services in the sectors of comprehensive health care, protection, shelter, water, sanitation and hygiene, humanitarian assistance, and integration and development to more than three million beneficiaries across 23 departments of Colombian territory 23.

C

CLIMATE GOVERNANCE

• Implement citizen participation mechanisms in Disaster Risk Management projects and planning, in accordance with the Escazú Agreement 5, in order to generate a perspective of well-being and optimal quality of life for the entire population.

Case Study 6.7. – Local Agreement for Climate Action in Comuna 8 of Medellín. Local Agreement Project 008 was developed over two years with the participation of social and environmental organizations such as the Housing and Habitat Board of Comuna 8, as well as local council members. This document consolidates community strategies for inclusive climate action and outlines principles, objectives, approaches, and measures for risk mitigation and climate change adaptation 24.

- *Articulate the different public, private, and community entities that make up the National System for Disaster Risk Management (SNGRD) in the generation of essential knowledge and information, as well as in decision-making in order to promote leadership and capacity building in the territories, with institutional and community empowerment that strengthens regional and local governance processes 25.*

Case Study 6.8. – The Inter-Neighborhood Climate Change Panel. This project, led by the collective 'Movimiento de Laderas' in Comuna 8 of Medellín, aims to teach climate change science and contribute to understanding its impacts and adaptation strategies from different territorial perspectives. At the JAL headquarters, there are risk maps by sector, and they have identified the risks perceived by residents; additionally, they maintain information about inhabitants and the vulnerability conditions of individuals living in each house within the community 26.

- *Strengthen the risk management capacities of Indigenous peoples and ethnic communities, as well as the strategies they have implemented in disaster risk management.*

Disaster risk management should be strengthened through training, economic incentives, and technological tools, while respecting and incorporating ancestral knowledge of the territory.

Case Study 6.9. – The Nasa indigenous community has its own risk management plan. Through observation, interpretation, monitoring of territorial signals, risk perception, and field research, the resguardos develop what they call social cartography, which includes contingency reduction strategies such as early warning systems based on observing wildlife behavior in response to volcanic events, and resilience measures such as planting crops resistant to ash emissions 27.

- *Strengthen public–popular partnerships proposed in the 2022–2026 development plan as a mechanism for collaboration in the development of social infrastructure projects, tertiary roads and rural pathways, energy efficiency, community water management, basic sanitation, among others. These partnerships between public entities and grassroots and community-based associations encourage community autonomy in managing local public goods and strengthening environmental and community governance for development 28. This can be implemented through collective action agreements or conditional cash transfers 29.*

Case Study 6.10. – Public–popular partnerships for the implementation of 'Community Kitchens.' The National Unit for Disaster Risk Management (UNGRD) formalized the first 25 public–popular partnerships with Community Action Boards (JAC) and social associations for the implementation of the 'Community Kitchens' program in the La Mojana subregion. The program benefited communities affected by the rainy season through the 'Community Kitchens,' which aim to provide food to families in areas impacted by the events 30.

D

CLIMATE JUSTICE

- *Include the vision of climate justice as well as social justice in disaster risk management policies and actions, which must take into account social and economic disparities, as well as the specific vulnerabilities of the most affected communities. This means ensuring an equitable distribution of resources and promoting the inclusive participation of all stakeholders 19.*

- *Implement sustainable recovery strategies following an extreme climate event. After conducting damage and needs assessments, recovery and reconstruction programs should be developed based on the principle of "building back better," while continuing to strengthen disaster risk response and post-emergency recovery capacities through training, economic incentives, and technological tools, respecting and incorporating ancestral knowledge of the territory. The recovery process after a catastrophe must focus on affected communities and be led by them 19.*

Case Study 6.11. – Community-led housing reconstruction project. In Sri Lanka in 2004, following the tsunami, the State provided money directly to citizens whose homes were damaged to support reconstruction projects. This program leveraged local experience to ensure that new constructions were more resilient 19.

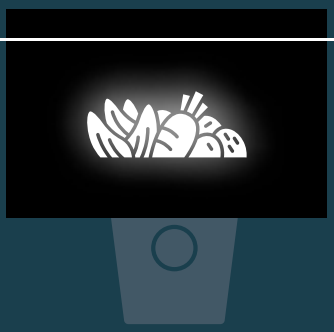
Circular Economy and Waste Management

CONTEXT

83%

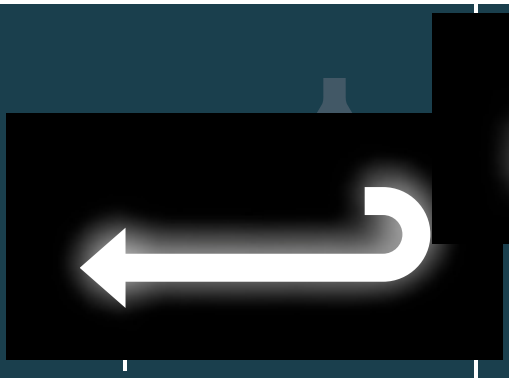
83% of municipal waste goes to sanitary landfills 1.

⅔



Nearly ⅔ of the waste produced in the country is organic 1.

11.1%



Of the total solid waste generated in Colombia in 2018, only 11.1% was recycled or reused 2.

50%

50% of landfills will reach their capacity in 2031 3.

60-100 mil

The recycling sector is dominated by informal workers. In Colombia there are between 60,000 and 100,000 informal waste pickers 3.

The circular economy and waste management represent significant potential for Colombia in advancing climate action. With a current strategy led by the government, it is essential to incentivize and integrate different sectors so they coordinate in favor of proper waste management. In addition to the benefits in combating climate change, this management approach and the recovery of different resources represent economic potential for the country and for each Colombian citizen. However, certain elements must be refined, particularly in relation to the population engaged in waste collection and the opportunities for waste reduction or reuse. The following sections outline the main challenges, as well as solutions related to this dimension.

ISSUES AND CHALLENGES

A

SECTOR MANAGEMENT

Absence of strong recycling standards in households: Fewer than half of households in Colombia separate their waste 4.

There is no separation at the source: One of the main challenges for implementing measures in the country continues to be separation at the source and differentiated waste collection. Without achieving this step, the development of alternative waste management solutions is not viable 5.

Lack of substantive governmental action at the local and national levels to implement the National Strategy for the Circular Economy: Apart from Resolution 1407 of 2018 6, which establishes that by 2030 all companies must reuse 30% of their waste, and Law 2232 of 2022 on the prohibition and gradual substitution of single-use plastic products 7, there are no public policies or a roadmap for the implementation of this strategy. Without substantive public actions and policies, sectors do not effectively implement circular economy strategies.

Inefficient policies: Public policies incentivize the final disposal of waste in sanitary landfills rather than recycling or reuse. 83% of municipal waste goes to sanitary landfills 1. This means that most of the money households and companies allocate to waste collection is directed toward landfill disposal instead of recycling processes. There are no resources or public policies to develop infrastructure for recycling and composting.

Lack of incentives: Financial incentives in Colombia do not support the development of recycling technologies and systems that facilitate the local implementation of the circular economy, ***despite the significant potential economic opportunities it presents 8. Without financial support or the necessary infrastructure, such as collection points, it is not profitable for small businesses to collect waste for reuse or recycling into certain products, for example, due to transportation costs.***

The recycling sector is highly fragmented and lacks coordination: In addition to public companies, there are private companies involved in recycling, along with a large informal sector of waste pickers. Of total household waste, 60% is organic and another 30% recyclable, yet 83% ends up in sanitary landfills 1 9. Waste pickers recover only 17% of recyclable material 3. This demonstrates the lack of coordination between public waste collection companies and waste pickers.

There is a high level of informality in the sector: A study on waste pickers in Colombia revealed that half are hired by recycling cooperatives only through "verbal" contracts, and fewer than 25% of organizations pay the public service fee to waste pickers 10. These waste pickers do not receive psychosocial support and live in highly precarious conditions.

Lack of regulation: There is no effective control over waste disposal and its subsequent environmental impact, particularly in vulnerable communities. Notably, 34% of sanitary landfills in Colombia are unauthorized, with Bolívar, Chocó, Magdalena, and Nariño being the departments with the highest number of landfills in this condition. It is important to recall that these are sources of "soil and water contamination and methane emissions" 9.

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B

LACK OF INFRASTRUCTURE AND INNOVATION

There is limited space and a rapid reduction in the capacity and useful life of current sanitary landfills: 50% of landfills will reach their capacity by 2031 3., and 96% of municipal waste is disposed of in them. Additionally, the areas where sanitary landfills are developed face problems such as odors, the presence of pests, and diseases within the population, as well as contamination of water sources and ecosystems; all of these externalities generate negative effects on public health and the environment.

There is insufficient public sector investment in both formal and informal recycling systems: Decree 2412 of 2018 and 802/2, which established an incentive for waste recovery that generates resources to invest in the operation and logistics of the sector, have not been implemented efficiently. For example, according to Enka, a leading circular economy company in Latin America, these resources amount to $19,000 million in Medellín; however, none of the projects submitted were approved between 2021 and 2022, which limits ***the growth of the recycling sector and the development of business structures that promote formalization.***

There is neither a circular culture nor circular infrastructure for organic waste: Public composting systems are lacking. Most household waste produced in Colombia is organic waste, approximately two thirds. When organic waste is processed in a landfill without oxygen, methane is produced, a gas with 21 times greater warming potential than carbon dioxide or CO11 2 ; in contrast, when organic waste is converted into compost in the presence of oxygen, only CO 2 is produced.

There is a lack of infrastructure to collect and recycle construction materials. Construction and demolition activities in Colombia generate 25 million tons of waste each year, but only 2% is recovered for reuse or recycling 1.

OPPORTUNITIES AND RECOMMENDATIONS

SOCIAL REGULATIONS

- ***Conduct educational campaigns on responsible consumption to prevent waste generation, informing citizens about the full life cycle of waste, the energy involved, and the pollution produced, and how unnecessary consumption could be reduced through circular economy models.***

Case Study 7.1. – Mayapo Pilot Community Economy Center, La Guajira. This pilot project, led by the company Plastieco, is being planned with the communities of Mayapo in La Guajira and is focused on waste management and recycling. Through this initiative, it is expected that a community center for the circular economy will be built by 2024. The project will begin with the collection of plastic waste in areas near the rancherías and seeks to prevent plastic from reaching the seas, rivers, and forests 12.

- ***Encourage companies and households to increase recycling through a progressive fee for the use of sanitary landfills, so that beyond a certain amount of waste, the fee per ton of waste deposited in the landfill increases. Additionally, a differentiated tariff system should be created based on material type, charging higher rates for those that cause greater pollution. Currently, the final disposal of solid waste in sanitary landfills is one of the lowest-cost alternatives. Including the cost of the externalities caused by this final disposal model on public health and the environment would enable a faster transition toward alternatives that promote the circular economy.***

Implement a differentiated waste collection system, with separate collection days for recyclable waste, organic waste, and non-recyclable waste, encouraging separation at the source. This must be accompanied by regulations that ensure proper waste management in the domestic, commercial, and industrial sectors.

IMPROVE SECTOR MANAGEMENT

- *Allocate public resources to update the Regional Integrated Solid Waste Management Plan (PGIRS) with a defined roadmap and a regulatory framework that includes verification and monitoring mechanisms to ensure compliance.*

Case Study 7.2. – Roadmap for a Circular Chile 2040: To accelerate the transition toward a circular economy, in 2019 the Ministry of Environment designed this roadmap with a *Strategic Committee composed of 33 representatives from the public sector, the private sector, civil society, and academia. It also included citizen participation spaces and a public consultation process of the previous version of the document. To achieve the goals related to the circular economy, Chile proposes a series of 28 initiatives, each containing different actions. These are grouped around four major axes of action: circular innovation, circular culture, circular regulation, and circular territories 13.*

IMPROVE INFRASTRUCTURE

- *Implement more underground containers for recycling and waste, including the formalization and employment of waste pickers. With this system, waste is deposited in a type of underground vault, avoiding exposure to sunlight, pests, and the generation of unpleasant odors in large cities. They can store up to 60% more than current containers 14. This infrastructure must be accompanied by continuous maintenance work, as in several cases it operates hydraulically. The use of these containers can be encouraged through a bonus system, where users receive discounts for depositing recyclables such as PET bottles.*

Case Study 7.3. – Underground containers to improve waste disposal. In Bogotá, the new underground containers have a greater capacity, increasing from 3,200 to 6,400 liters. Additionally, due to their technology, they help ensure better use of public space by occupying much less space than a traditional container and using operational tools that facilitate not only waste disposal by users but also a more agile and automated collection process 15.

- *Implement and/or expand the fleet of electric vehicles for waste collection.*
- *Create composting points in each neighborhood and in green spaces, where compost can be used to fertilize plants. In these same spaces, the construction and maintenance of community gardens can be supported and promoted.*

Case Study 7.4. – Green Plastic Containers (GPC) Composting Project. This is a strategy aimed at instilling good waste management habits at the household level through source separation of organic waste, collection, and composting. The program began in 2008 in some neighborhoods, and by 2019, more than 400 tons of organic waste were being collected and converted into compost monthly. At IBICOL, a composting plant located 20 minutes from Cajicá, compost is produced by stacking organic material in long windrows through mechanical turning, where inoculants are added to accelerate the composting process. To ensure a high-quality product, standard control measures are taken, such as the

continuous temperature and humidity monitoring, among other things; additionally, some commercial vegetable farms use the compost produced, closing the loop.[16]

• Create more centralized points for depositing waste, where small businesses can collect waste more easily.

Case Study 7.5. - Reuse of construction waste in Bogotá. The Special Administrative Unit of Public Services (UAESP) works to utilize approximately 600 tons of waste daily through strategies such as 'Juntos Limpiamos Bogotá' (Together We Clean Bogotá),

which involves locating 'eco-points' near critical sites. These are locations where citizens can, according to established schedules, drop off their construction waste at no cost, aiming to address the problem of critical waste sites that annually cost citizens approximately 30 billion pesos in taxes. This waste is then utilized at 'Punto Limpio' (Clean Point), located in Doña Juana; a separation plant was built there where construction and demolition waste is prepared, manual separation is carried out, and then the waste is converted into gravel and mixed with sand to be turned back into concrete, which is used for road compaction and restoration.[17]

D

INCENTIVIZING INNOVATION FOR THE CIRCULAR ECONOMY AND BIOECONOMY

Develop more incentives for circular economy innovation for small and medium-sized enterprises (SMEs). In Colombia, SMEs represent 99.5% of the national business landscape, and they also have a simpler internal organization that allows them to adapt more easily to change.[18] *Due to the size and diversity of many SMEs, the transition to circular economy models is in an early stage, requiring various innovations and more environmentally friendly practices. Incentives can be provided in the form of tax benefits and/or soft loans for investment in circular economy technologies. It is also important to ensure that the SME sector introduces changes that go beyond strategies applied by individual actors, aiming for systemic corporate changes within different production and distribution clusters.*[19]

Create an information exchange platform, where different actors in the ecosystem can see the supply and demand for different types of waste in different municipalities. Through this system, it could, for example, help consolidate loads of recyclable material among different cooperatives for transport to processing plants, contributing to the reduction of logistics costs in the sector.

Case Study 7.6. - Rescycle: It is an online platform that creates a conscious community helping companies and industries sell, buy, and donate their waste, connecting supply and demand to reduce their environmental impact. Focused on the circular economy, it creates opportunities for optimal waste recycling based on the correct connection of responsible agents: generators, waste managers, and processors.[20]

**Resource - Circular Economy Information System (*https://www.dane.gov.co/index.php/estadisticas-por-tema/ambientales/economia-circular/sistema-de-consulta-de-informacion*): *The SIEC is an articulated set of elements (public and private entities that produce or use information, policies, standards, technical processes, and infrastructure involved in managing information related to the circular economy) that interact to collect, consolidate, and disseminate statistical information related to the circular economy. Its purpose is to facilitate decision-making in public policy and demonstrate the country's transition towards this circular production and consumption model.*[21]

...circular; its purpose is to facilitate decision-making in public policy and demonstrate the country's transition towards this model of circular production and consumption.[21]

- *Incorporate the principles of the circular economy and bioeconomy into public procurement and contracting practices and public works construction.*

Case Study 7.7. - Integration and mainstreaming of circular procurement at the municipal level, Lisbon, Portugal. Lisbon has taken steps to implement circular economy principles in a structured way throughout the municipality in the areas of goods and infrastructure procurement. They are doing this by developing a Procurement Planning Platform (PPP) and implementing the ISO 20400 standard. The PPP allows departments to register their annual needs for goods, works, and services and identifies social, environmental, and economic measures to be considered in future tenders.[22]

- *In places with few alternatives, technologies for using waste for energy production can be implemented, seeking opportunities to implement this technology in a way that minimizes emissions.*

Case Study 7.8. - Waste-to-energy plant in San Andrés. Since 2012, a plant has been installed that incinerates solid waste to generate electricity from combustion and the gases produced, helping to provide final disposal for the approximately 80 tons/day that reach the 26 km² island. Furthermore, with the help of academia, possible uses for the waste remaining from incineration are being studied to contribute to the circular economy in the territory.[23]

- *Implement biogas capture and utilization systems in landfills, which even after closure continue to emit GHGs, such as methane, as a result of the anaerobic decomposition of organic waste.*[5]

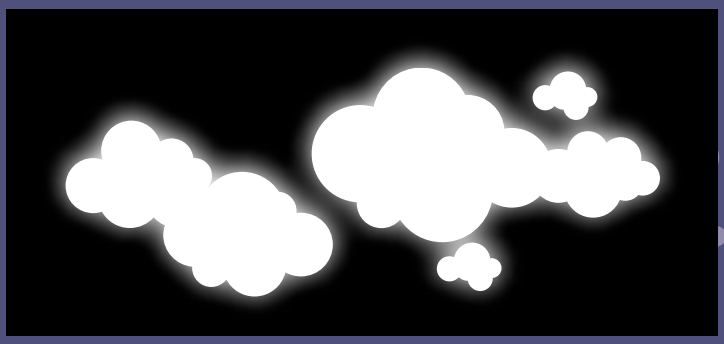
Climate Finance

CONTEXT

In general terms, climate finance refers to the resources allocated to finance mitigation and adaptation actions. Ultimately, the United Nations Framework Convention on Climate Change (UNFCCC) states that this finance aims to "reduce emissions and enhance greenhouse gas sinks while also seeking to reduce vulnerability and maintain and increase the resilience of human and ecological systems to the negative effects of climate change."[1]

According to the National Climate Finance Strategy, achieving emission reduction targets requires an investment between $8.76 and $14.19 trillion Colombian pesos annually until 2030, and between $5.8 and $10.5 trillion to manage climate change adaptation.[2]

In pursuit of climate justice, the following section will outline some reasons why it is necessary to commit to climate finance.



Between $8.76 and $14.19 trillion

To achieve emission reduction targets, an investment between $8.76 and $14.19 trillion Colombian pesos annually is required until 2030.

Between $5.8 and $10.5 trillion

To manage climate change adaptation.

OPPORTUNITIES AND CHALLENGES

WHY IS IT IMPORTANT TO MOBILIZE RESOURCES FOR CLIMATE CHANGE AT THE TERRITORIAL LEVEL?

• The aggregate impact of climate change on the country's economy would be negative, especially for the transportation, forestry, fishing, livestock, and agriculture sectors. On average, there would be annual GDP losses of 0.49% (from 2011 to 2100), meaning that each year GDP would be 0.49% lower than in a macroeconomic scenario without climate change. The estimated losses from climate change are equivalent to the country suffering, every four years, losses similar to those of La Niña 2010-2011.[3]

• Extreme weather events generate a significant economic impact on the country, manifesting through climate disasters and their negative consequences for long-term economic growth. An analysis of the period between 1980 and 2010 highlighted that a 20% increase in the number of fatalities, injuries, and people affected by weather events was linked to a 1.5% decrease in GDP during that period. Furthermore, investment in disaster risk management is clearly cost-effective, suggesting that increasing public investment to 1% of current spending could reduce the disaster rate by 60%.[3]

• Climate change directly impacts households by reducing their well-being and generating a decrease of approximately 2.9% in consumption compared to scenarios without climate change. This impact is differentiated: the departments of Chocó, Amazonas, and much of the Caribbean region will be particularly affected, facing welfare losses close to 4.5%. Conversely, the central region of the country would see the lowest losses, with an approximate 2.2% decrease in average annual consumption during the 2011-2100 period.[3]

To mobilize resources in projects that contribute to climate change mitigation and adaptation, it is important to: i) Properly structure projects; ii) identify the financial instruments available to your territorial entity to leverage resources; and iii) identify the national and international institutions that support climate financing.

PROPER PROJECT STRUCTURING

Prior to presenting projects, it is necessary to structure them in such a way that they are viable and have a concrete impact. It is proposed to carry out this framing considering five stages: ideation, profile, pre-feasibility, feasibility, and evaluation.

Likewise, it is important that these projects implement an effective monitoring system that promotes community participation to strengthen it and guarantee its sustainable impact.

To access financing for projects aimed at addressing climate change needs, it is essential to align with the guidelines required by funders. This can be done independently or with the support of funds such as:

Readiness Programme

Inter-American Development Bank

Fondo Colombia en Paz

Fund for Non-Conventional Energy and Efficient Energy Management (FENOGE)

German Cooperation Colombia (GIZ)

United States Agency for International Development (USAID)

Export-Import Bank of Korea (KEXIM)

FINANCIAL AND ECONOMIC INSTRUMENTS TO LEVERAGE RESOURCES FROM TERRITORIAL ENTITIES FOR CLIMATE PROJECTS

Among the existing financial instruments to address climate change are those that allow territorial entities to generate revenue to leverage projects managing this issue. Some of these are:

- **Sustainability-Linked Bonds (SLB): Financing instruments where payment conditions are established based on achieving specific Environmental, Social, and Governance (ESG) targets. Their uniqueness lies in the fact that payments are linked to the achievement of specific goals.**
- **Green Loans: Financing instruments that provide borrowers with resources to leverage opportunities contributing to an environmental objective**
- **Carbon Markets: In Colombia, there are two types of markets: the voluntary market, where any public or private entity, government institutions, or companies can contribute to GHG emission reductions and voluntarily offset their emissions; on the other hand, the compliance market, known as the emissions trading system, was created by Law 1931 of 2018 but is not yet regulated or operational.**
- **Land-based financing instruments: Fiscal instruments aimed at obtaining compensation from the private sector for the economic benefits they receive when the value of their properties increases. This can result from actions exogenous to them, such as investments or administrative decisions by local governments. The unified property tax, urban delineation tax, betterment levy, Tax Increment Financing (TIF), and equitable distribution of burdens and benefits are some types of these instruments.**
- **Environmental Fees: Fiscal instruments required as consideration for the use of a biological resource or for the pressure exerted on natural resources. They are a source of financing that environmental authorities use to invest in ecosystems.**
- **Stormwater Credits: Financing instruments focused on managing stormwater and pollution caused by stormwater discharges.**
- **Green Bonds: Fixed-income debt instruments that allow national governments, subnational governments, or companies to raise capital to invest in gray-green or exclusively green infrastructure projects.**

• **Endowment funds: These are instruments that can be used to diversify the sources of resources that finance water fund objectives. They work to guarantee water security for cities through the implementation of territorial initiatives that improve water supply and resource governance.**

• **Development funds: Financing mechanism to manage and promote public investments. They allow pooling *diverse sources of financing for biodiversity conservation and NbS projects, optimizing resource utilization and operating costs.***

• **Blended finance: A mechanism that seeks to strategically combine resources from different sources—public, private, and international cooperation—to advance the achievement of the SDGs in developing countries.**

INSTITUTIONS THAT SUPPORT CLIMATE FINANCE

This subsection focuses on examining various institutions involved in climate finance. It explores international climate and financial funds, bilateral approaches, and development agencies from countries such as Germany, Japan, and the United States. Additionally, regional and national funds are mentioned, along with the role of private foundations.

Climate funds and international financial institutions

- ***United Nations Adaptation Fund (AF)***
- ***Least Developed Countries Fund (LDCF)***
- ***Special Climate Change Fund (SCCF)***
- ***Green Climate Fund (GCF)***
- ***World Bank***

Bilateral climate financing

- ***Global Climate Change Alliance + (GCCA+)***
- ***German Federal Ministry for Economic Cooperation and Development (BMZ)***
- ***German Agency for International Cooperation (GIZ)***
- ***Kreditanstalt für Wiederaufbau (KfW)***
- ***International Climate Initiative (IKI)***
- ***Japan International Cooperation Agency (JICA)***
- ***Danish International Development Agency (Danida)***
- ***Nordic Climate Facility (NCF)***
- ***Norwegian Agency for Development Cooperation (NORAD)***
- ***Swedish International Development Cooperation Agency (Sida)***
- ***Agencia Suiza para el Desarrollo y la Cooperación (COSUDE)***
- ***Departamento para el Desarrollo Internacional (DFID) del Reino Unido***
- ***Fondo Internacional para el Clima (ICF)***
- ***Agencia de los Estados Unidos para el Desarrollo Internacional (USAID)***

Fondos regionales e instituciones financieras internacionales

- ***Inter-American Development Bank (IDB)***
- ***Development Bank of Latin America (CAF)***
- ***Amazon Fund***

National funds

- ***Fund for Non-Conventional Energy and Efficient Energy***
- ***Management (FENOGE)***
- ***Fonenergía***
- ***Colombia Sostenible Fund***
  Fund for Sustainability and Climate Resilience (FONSUREC)
- ***Technology Advancement Fund***
- ***Royalties***

Private foundations and donor agencies

- ***Bloomberg Philanthropies***
- ***Fundación ClimateWorks***
- ***Fundación Ford***

- *Hewlett Foundation*
- *KR Foundation*
- *MacArthur Foundation*
- *Oak Foundation*
- *Packard Foundation*
- *Carvajal Foundation*
- *ANDI Foundation*
- *Bill and Melinda Gates Foundation*
- *Natura Foundation*

RECOMENDATIONS AND OPPORTUNITIES

Considering the importance of climate finance and knowing the key actors and sources, it is essential to keep the following recommendations in mind for decision-making:

- **To guide informed decision-making, it is essential to access accurate information on region-specific climate scenarios. This understanding will enrich planning and allow for effective anticipation of climate impacts, which is crucial for creating robust mitigation and adaptation strategies.**

- **Aligning climate projects with national and territorial guidelines and regulations is a fundamental pillar. Evaluating and considering these regulations not only guarantees the viability and legitimacy of projects but also provides a solid framework for effective and sustainable long-term implementation.**

- **It is not simply about seeking financing, but about designing solid and strategic projects to address climate challenges. Seeking expert guidance in project structuring ensures that proposals are coherent, robust, and aligned with climate and development objectives. An efficient strategy is to integrate climate actions into already ongoing projects. This integration not only optimizes already committed resources but also maximizes results and impact. By addressing climate change within pre-existing projects, duplication of efforts is avoided and more efficient resource management is ensured.**

- **Recognizing the cross-sectoral nature of climate change is essential. Establishing alliances with the national government, the private sector, and international partners expands available perspectives, resources, and capacities. This collaboration not only increases financial viability but also enriches vision and expertise. From the conception stage through monitoring and evaluation, incorporating climate considerations into each phase of the project is crucial; this integration guarantees long-term resilience and allows for continuous adaptation to changing conditions, ensuring lasting and effective results.**

- **Climate change can be a catalyst for innovation. Seeking solutions that generate economic and social benefits while addressing climate challenges turns obstacles into opportunities. This transformative perspective can lead to creative solutions and lasting benefits. Investing in the training and awareness-raising of local actors strengthens successful implementation and project ownership. Empowering stakeholders with the necessary knowledge and skills is an essential pillar for achieving lasting and sustainable results.**

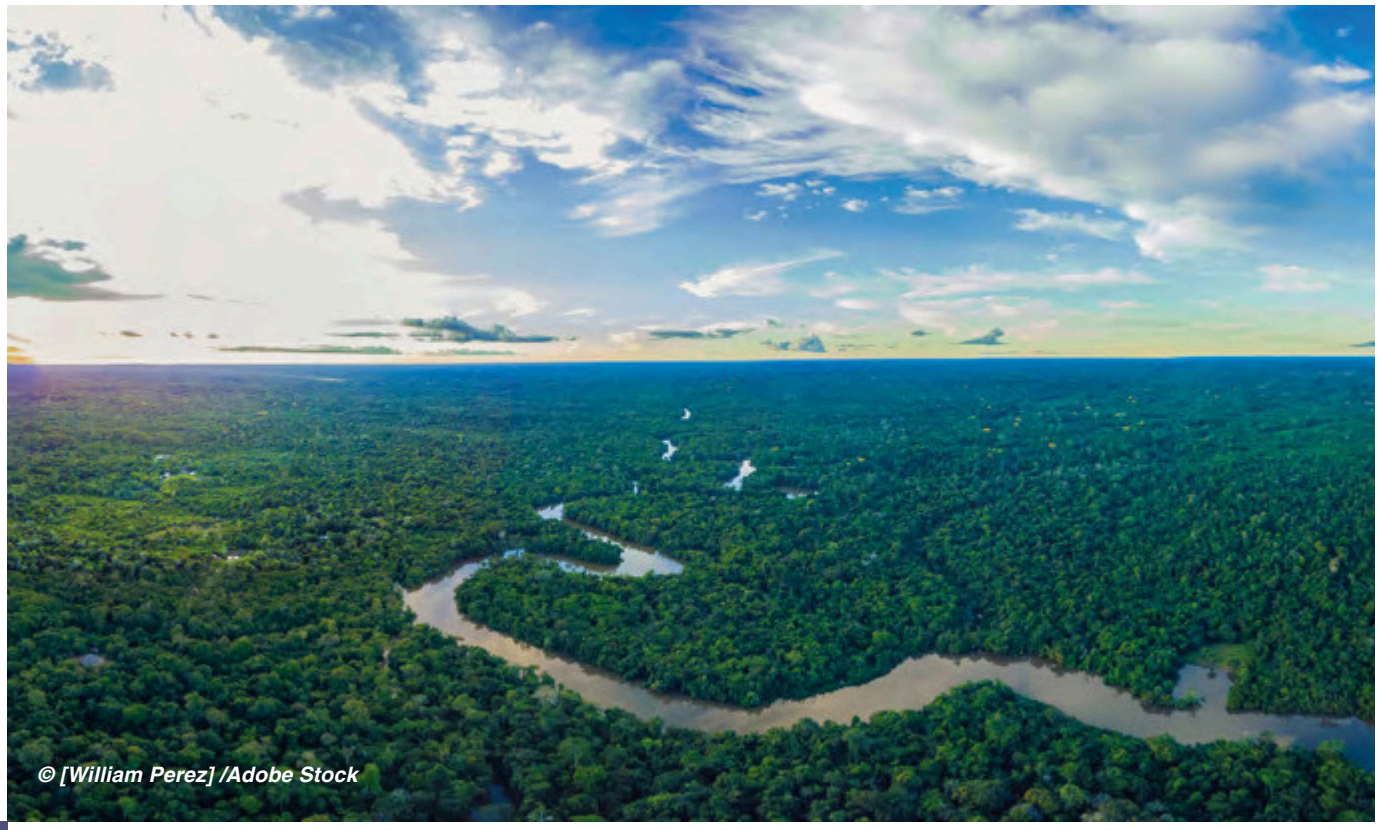
- ***Aligned with the Study Commission for the Promotion and Development of Carbon Markets in Colombia (CEMCO²), it is recommended to establish a robust and binding National Safeguards System that precisely sets forth the regulations that mitigation projects, programs, and initiatives must follow in environmental and social terms in Colombia. Among the fundamental aspects to promote...***

...the equitable distribution of benefits is found as an essential component of social safeguards.

- **These benefits must be directed not only to ethnic communities but also to local communities across the country. The environmental and social measures arising from the interpretation of the Cancun Safeguards (measures to anticipate, minimize, mitigate, or manage potential environmental and social risks)[4] should not be limited solely to projects and programs under REDD+. They must be applied to all mitigation initiatives carried out in the country. This will ensure that safeguards do not become an arbitrary criterion among different market mechanisms.**

Case Study 8.1. - Amazon Vision Program. This illustrates how climate finance can not only restore vital ecosystems but also empower local communities, providing a sustainable model for environmental and social development in Colombia. The program's objective is to contribute to the conservation and sustainable development of the Colombian Amazon, preserving biodiversity, mitigating climate change, and fostering the participation ***of indigenous and local communities in the sustainable management of their territories. The project is financed through a combination of international resources, private investments, and government funds and is implemented by non-governmental organizations in collaboration with local communities. Strong partnerships have been established with scientific institutions and conservation organizations to ensure restoration practices are evidence-based and respectful of local biodiversity. Furthermore, the program adheres to principles of climate justice by generating jobs and sustainable economic opportunities for local communities. By empowering indigenous and local communities in the sustainable management of their territories, it fosters active participation and inclusive decision-making, advancing towards a more equitable approach in the fight against climate change in Colombia.[5]***

- ***To foster robust and socially equitable climate management, strict compliance with safeguards is urged as a fundamental requirement for including projects in the country's climate agenda.***



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CONCLUSIONS

- *The current climate crisis requires joint action from all sectors of society, especially public leadership capable of mobilizing efforts. Failing to address it represents a threat to the quality of life of individuals, communities, and other species with whom we share our habitat and who sustain the ecosystem services and common goods on which we depend, including water, air, and soil.*
- *Land-use planning must be carried out considering the natural limits of the territory rather than being primarily based on economic interests. In this regard, the country's disorganized territorial growth demands the integration of adaptation measures and resilience-building strategies to face the imminent impacts of climate change. It also requires updating territorial planning instruments around water management, as proposed in the National Development Plan 2022–2026, in order to reduce risks and prevent their exacerbation. Advancing the definition of an adaptation agenda with regenerative approaches and centered on community empowerment is imperative, as it will reduce both human and material losses and damages.*
- *Certain human activities and the impacts generated by climate change put access to basic services at risk, including access to water and sanitation, access to healthy, quality, and sufficient food, the right to clean air and environment, and access to education in cases of disasters and extreme climate events, among other rights of present and future generations. Therefore, climate action must be a central and cross-cutting axis in development plans and in the public agenda of all municipalities and departments, contributing to social and economic objectives in addition to environmental ones, with the aim of reducing existing gaps and preventing them from intensifying, as is currently occurring.*
- *The definition of measures and strategies to address the climate crisis must be carried out with citizen participation and with recognition of intersectionality, which results in historically underrepresented populations and those least responsible for climate change being the most affected by its impacts. Ensuring effective governance and citizen participation of these groups represents an opportunity for climate action to reduce social gaps rather than perpetuate the historical causes that generate them. Adopting an intersectoral, gender-responsive, and intergenerational perspective is necessary to achieve climate justice.*
- *A bottom-up approach must be integrated into the development of public policies and projects that directly affect communities and the environment or territory on which they depend. This approach proposes a diagnosis and design process based on recognizing that communities possess valuable and relevant information about the needs and potential of their territories, thereby contributing to a just transition.*
- *It is important to recognize communities as drivers of local development and to provide technical and financial support for consolidating community governance of territory and natural resources, as well as for managing community projects that seek sovereignty and autonomy. These represent an opportunity to address challenges such as poverty, hunger, and lack of access to basic services. Such projects and processes not only contribute to climate justice and the achievement of the SDGs, but also empower communities to manage their territories and improve their quality of life, and with adequate support, can generate environmental and economic co-benefits.*

• Financial flows must be increased to meet climate objectives, and efforts must especially focus on closing the existing financing gap for climate change adaptation, where resources for protecting and supporting communities and territories facing the impacts of the climate crisis are minimal compared to the needs. Mechanisms and strategies must also be implemented to ensure that these resources effectively reach the communities that need them most. Likewise, progress must be made in recognizing and supporting people affected by climate change and in developing strategies to prevent these impacts from generating new territorial conflicts over access to land, water, food, and other resources threatened by climate factors.

- *Progress must be made toward a just energy transition and recognition of the need for transition not only to meet GHG emission reduction targets but also to diversify the economy, which is currently highly dependent on the fossil fuel industry. With global carbon neutrality commitments, this sector is expected to decline significantly, putting hundreds of thousands of families who directly and indirectly depend on it at risk. To achieve this, economic reorientation and labor reconversion led by municipal and departmental administrations must be considered, accompanied by broad social dialogue that takes into account the needs and potential of each territory.*
- *Commitments derived from the Convention on Biological Diversity (CBD), the biodiversity agreement equivalent in importance to the Paris Agreement on climate change, although far less publicized, must be included in the public agenda. Development plans should align with the commitments assumed at the national level in order to advance the care and conservation of biodiversity as a fundamental pillar of planetary health that sustains life.*

Alejandro Cortés Claro

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Aknowledgments

We extend our gratitude to all the social, private, and public organizations that contributed to this publication and that work tirelessly to provide solutions to address the climate crisis. We also thank the decision-makers who, from the public sphere, promote collective construction, as well as the other entities from all sectors that strive to advance climate action.

We invite you to join us and work together to co-create the solutions and strategies needed to ensure that no one is left behind. We trust that this effort will add value to your work and that, together, we can achieve in a timely manner the transformations we need to build resilient, just, and regenerative societies.