AN ACTIONABLE RESEARCH AGENDA FOR INCLUSIVE LOW-CARBON TRANSITIONS FOR SUSTAINABLE DEVELOPMENT IN THE GLOBAL SOUTH

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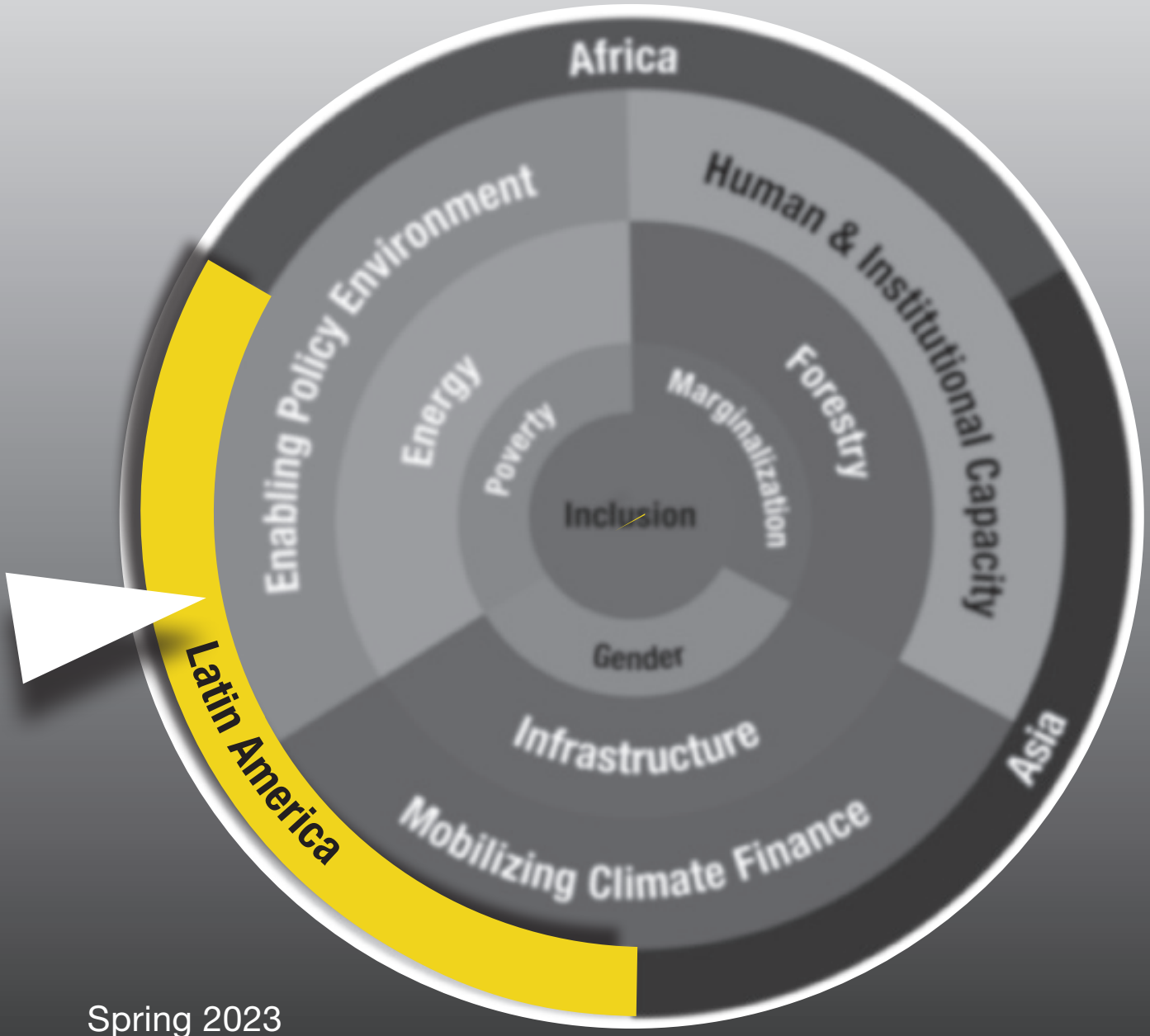

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Preface

All countries now face enormous challenges posed by climate change. The consequences of continued greenhouse gas emissions are dire, particularly for countries in the Global South that are both more affected and more vulnerable to climate change at the same time as they have less capacity to adapt (AfDB, 2022). The realization that a low-carbon transition needs to be implemented also in countries in the Global South is well established and is also reflected in most countries' ratification of the Paris Agreement and in their Nationally Determined Contributions. In effect, most countries in the Global South are now confronted with the fastest and most dramatic transformation of their economies that they have ever experienced – or at least they would need to be.

The low-carbon transition in the Global South needs to be guided by research since such a transition is an inherently very knowledge-intensive process. This is why the Sustainable Inclusive Economies (SIE) Division of the International Development Research Centre (IDRC) has identified this area as particularly interesting to support. This report is commissioned by SIE as part of a larger initiative to develop an actionable research agenda that the IDRC can support to achieve a low-carbon transition with gender equity in the Global South.

This Regional Policy Review for Latin America and the Caribbean is part of the Research Agenda for Low Carbon Transition and Gender Equity in the Global South series of papers. The consortium that is working on this series of papers is global and consists of 60 researchers from a multitude of universities and institutions. This particular paper has been written by Mateo Herrón and Jorge García from Los Andes University, and Santiago Arango and Clara Villegas from National University of Colombia. The EfD Global Hub staff supporting the authors were Daniel Slunge and Daniel Hernandez.

This Regional Policy Review for Latin America and the Caribbean is one of the three regional papers covering the experiences and political ambitions with respect to low-carbon transition in Africa, Asia and Latin America. The focus is on the opportunities and challenges that the regions will face in the years to come to achieve a low-carbon transition (LCT). Although the chapters present a regional perspective, they are supported by in-depth analyses of a sample of countries in each region. We hope to receive constructive comments on this draft paper from IDRC, our networks, and external scholars and practitioners. We will then revise the paper for validation by policymakers and senior civil servants in the Global South. Based on the reviews and validations, we plan to prepare final versions of both the paper and the accompanying High-Level Research Agenda by March 2023. The ambition is that these papers will be useful both for donors and research institutions in supporting an even greater contribution by research to a much-needed low-carbon transition with gender equity in the Global South in this crucial Decade of Action.

The focus is on the opportunities and challenges that the regions will face in the years to come to achieve a low-carbon transition (LCT).

Gunnar Köhlin
Director, Environment for Development

Regional Policy Review - Latin America and the Caribbean

1.1 Executive Summary

The following regional report provides a general overview of the environmental and social challenges that the Latin America and the Caribbean (LAC) region will face in the years to come in order to achieve a Low-Carbon Transition (LCT). In the first section, the report puts special emphasis on the relationship that LCT has with Gender Equity (GE) in the region, and how it is key to address gender inequality while developing climate action policies. Specifically, women are more negatively affected by climate change than men, and social norms tend to increase gender-based violence when confronted with climate impacts (ONU, 2020). The report first looks at the impact climate change is having in the region, and how several natural phenomena are scaling up. Although the region has made a historically and comparatively small contribution to climate change, it is one of the most vulnerable regions in the world. In addition to this, the pandemic has negatively affected most socioeconomic indicators in the region, and with this, women have suffered the most in the crisis.

In the second section, the report takes a deeper look into the region`s perspectives on inclusive Low-Carbon Transition, and takes a closer view of Brazil, Chile, Colombia, Costa Rica, and Honduras, as these countries are very diverse in size, population, economic development, and environmental indicators. The main policy document to understand each country's vision is the National Determined Contribution (NDC). This report makes an analysis of the NDCs, their conditional and unconditional emissions reduction targets, their level of detail, and their inclusiveness. The report looks at the negotiations made in the 26th and 27th UN Climate Change Conferences (COP26-27), and the various international and environmental commitments, alliances, statements, pledges, and declarations made by the countries from the LAC region. It then looks at the national laws and policies that set the legal framework for the LCT and GE in the region.

The third section focuses on policy instruments used in LAC for the LCT and GE. The report found that almost all common policy instruments can be found in the region, from carbon taxation to Emissions Trading Systems (ETS), fossil fuel taxes, and subsidies. Some of the complex challenges these instruments face are political will and political feasibility, lack of knowledge and technical support, and the need for regional and global cooperation. These challenges have limited the development of national policy instruments for LCT and GE. So far, only four countries— Argentina, Chile, Colombia, and Mexico— have carbon taxes, while Mexico is the only country that has implemented an ETS. Regarding fuel taxes and subsidies, there is a wide variety of scenarios in the region. The average subsidization rates vary from 3% in Colombia, Ecuador, and Mexico to 33% in Trinidad and Tobago and 54% in Venezuela; nevertheless, all countries have had large reductions in fossil fuels subsidies since 2013. Other policy instruments include things such as renewable energy subsidies, technology standards, payment for ecosystem services, forestry, and land use. The report concludes that promoting and implementing renewable energy sources is critical to meet the requirements of the Paris Agreement and the NDCs. This third section looks into the inclusiveness of these instruments, taking a deeper look at the role of women and indigenous and poor communities in each policy instrument. Although the region has made substantial progress in terms of access to clean cooking fuels and electricity, there is still a great deal of progress to be made.

The fourth section reviews the multiple sources of funding that LCT has, and could have, in LAC. It looks at the national and international sources of funding, as it takes a deeper look into green banking, green bonds, the private sector, and bilateral and multilateral commitments as powerful sources of funding. It is clear that there is not enough funding for the LCT, but there is an important potential that needs to be unleashed to reduce the gap between current funding for LCT and funding needed to achieve a real LCT. The report suggests that there is an important knowledge gap regarding sources of funding for the LCT in the Agriculture, Forestry and Other Land Use (AFOLU) sector.

Finally, the report mentions the main roadblocks and constraints for the LCT and GE. These include lack of investment, especially from the private sector, as well as lack of technical and institutional capacities, and formulating and implementing environmental policies, laws, and regulations. Moreover, there are also political and economic challenges that have historically limited the development of sustainable policies. Regarding GE, the low percentage of women in the

decision-making process, in ministerial positions, and in parliaments, combined with women's low level of political empowerment in general, has limited the role of women in the energy sector and the LCT overall.

To conclude, the report identifies the most relevant knowledge gaps in order to set an actionable agenda for LCT and GE. First, there is an important gap regarding the estimated cost of climate impact, the cost of natural disasters, and the potential savings made by investing in mitigation and adaptation. This is key to a better understanding of how economic resources should be invested in the LCT. Second, there are few policy instruments dedicated to the LCT and GE, and fewer impact evaluations that actually measure the impacts and benefits of those policies. Information regarding these policy instruments will allow regional cooperation and replication of successful instruments. Third, LCT is still in a very grey area of public opinion, therefore it is important to analyze and understand the importance of public promotion of LCT and GE. Fourth, there is an important knowledge gap based in the ALOFU sector. Given that it is the most representative emissions sector for LAC, it should be the sector where more policy instruments are developed and implemented in order to reduce emissions. But the region is following a northern tendency of focusing the LCT on the energy and transport sectors. Fifth, there is no clear methodology with an approach that integrates gender issues and priorities and the empowerment of women in the analysis of risks and vulnerabilities of climate change, or in the framework of financing to face climate change. Sixth and last, there is a potential knowledge and research gap regarding the relationship between politics and LCT, and regarding the different factors that might affect political will in relation to LCT. It is also important to research the role lobbying, especially the anti-climate lobby, has played in climate legislation in Latin America and the Caribbean.

1.2 Regional Overview

The Latin America and the Caribbean (LAC) region is composed of 42 countries. It had about 654 million people as of 2021, representing around 8.2% of global population (Data Bank - World Bank, 2021). It has a surface area of 20,424,848 square kilometers, representing 15.1% of the world surface. In 2021 the LAC region had a GDP of 5.45 trillion current US$ representing about 5.6% of world GDP (World Bank – Data Bank, 2021). The LAC region´s share of global GHG emissions is estimated to be 7%. Additionally, it has a different emissions composition than other regions: the energy sector represents 43% of total emissions while the global average is around 74%, and the AFOLU sector represents 40% of total regional emissions, which is about double the global average. The principal contributors of the AFOLU emissions are deforestation and land-use change (Cárdenas and Orozco-Sanchez, 2022).

The Latin American and Caribbean region is in an asymmetrical position in relation to climate change. The region has made a historically small contribution to climate change, but it is one of the most vulnerable regions to climate change impact. Moreover, the LAC region has one of the cleanest energy matrixes in the world, where nearly 60% of total electricity generation comes from renewable sources, compared to a global average below 40% (Cárdenas and Orozco-Sanchez, 2022). LAC was also one of the developing regions most affected by the pandemic regarding health standards. Nevertheless, this region has shown a clear commitment to LCT and GE, and it is implementing more policy instruments to fight climate change than ever before.

1.3 Country Profiles

The following Regional Policy Review makes an analysis of the carbon emissions from Latin America and the Caribbean, and the policies supporting the carbon transitions. Specifically, it emphasizes the following countries: Brazil, Chile, Colombia, Costa Rica, and Honduras. Nevertheless, there will be an analysis of other countries in the region.

Table 1 Country profiles- data[1]

[1] Recovered from: https://gunet.sharepoint.com/:x:/r/sites/sy-grp-idrc-research-agenda/_layouts/15/Doc.aspx?action=edit&sourcedoc=%7Bfb88b92e-4829-4e62-9025-da0f2294f65f%7D&wdOrigin=TEAMS-WEB.teamsSdk.openFilePreview&wdExp=TEAMS-CONTROL&web=1

Indicator \ Country	Brazil	Chile	Colombia	Costa Rica	Honduras
Population (2020)	212.559.409	19.116.209	50.882.884	5.094.114	9.904.608
GDP (current US$) (2020)	1.444.733.258.972	252.940.023.046	271.346.896.626	61.520.669.890	23.827.840.810
Human Development Index (2019)	0,765	0,851	0,767	0,81	0,634
Multi-dimensional Poverty Index (2020)	0,016	---	0,020	0,002	0,093
Gini coefficient (2019)	53,4	---	51,3	48,2	48,2
Total emissions (Total greenhouse gas emissions - kt of CO2 equivalent) (2018)	1.032.640	109.590	184.100	15.810	22.400
Emissions per capita (CO2 emissions - metric tons per capita) (2018)	2,04	4,62	1,60	1,65	1,02
Forest coverage (Forest area - % of land area) (2020)	59	24	53	59	57
Climate Action Rating (2021)	Highly insufficient	Insufficient	Highly insufficient	Almost sufficient	No information
Proportion of seats held by women in national parliaments (% of total number of seats) (2021)	15,2	22,58	18,82	45,61	21,09
Proportion of elected seats held by women in deliberative bodies of local government (%) (2018)	13,5073	23,29724	17,60744	45,64356	---
Proportion of women in managerial positions (%) (2018)	39,59	27,26		33,91	51,35
Ratio of female to male labor force participation rate (%) (modeled ILO estimate) (2019)	74,09549428	70,59144181	70,1147991	67,22797927	60,72507553

1.4 Environmental and social challenges ahead (situation at the regional and national level)

1.4.1 Climate change and Low-Carbon Transition

According to the OECD (2020), climate change is an existential threat that poses extreme risk to individuals and societies. The economic losses the world has faced due to climate-related disasters have reached an estimated of USD 337 billion in 2017 (Giuzio et al., 2019). Latin America's climate is suffering changes. The precipitation patterns are volatile, heavy rains and tropical storms are more frequent and severe, temperatures are constantly rising, and glaciers are melting, leading to floods and droughts in different parts of the region (Reyer, 2015). Droughts in the Amazon forest could push the region to a "tipping point", making large-scale destruction of the Amazon more likely (WWF-BRAZIL, n.d). For instance, 2020 was in the top three of the warmest years in Latin America and the Caribbean, where the mean temperature was between 0.6°C and 1.0°C above the long-term average of 1981-2010 (World Meteorological Organization, 2021). Moreover, according the IPCC (2022) the main climate risks for Central and South America are water security, severe health effects (vector-borne), coral bleaching, food security, and damage to life and infrastructure.

According to Cárdenas and Orozco-Sanchez (2022) countries in the LAC region have experienced at least one extreme weather-related event every 3 years over the past two decades. Furthermore, hurricanes in the Caribbean have affected millions of lives. Some of the most severe hurricanes are: Elsa (2021), Iota (2020), Eta (2020), Dorian (2019), María (2017), Irma (2017), Harvey (2017), José (2017), Erika (2015), Manuel and Ingrid (2013), Sandy (2012), Irene and Issac (2011 and 2012), Hanna (2008), Félix (2007), Stan (2005), Jeanne (2004), etc. According to the World Meteorological Organization (2021), in 2020 a record-breaking 30 named storms were detected in the Atlantic basin. Central America and the Caribbean are particularly vulnerable to extreme weather-related events. According to the Global Climate Risk Index, 10 out of the top 25 most vulnerable (climate risk) countries in the world are from this region: Puerto Rico, Honduras, Haiti, Nicaragua, Dominica, Dominican Republic, Guatemala, El Salvador, Bahamas, and Grenada (Cárdenas and Orozco-Sanchez, 2022). This exemplifies how Latin America and the Caribbean ranks second in regions of the world most susceptible to natural disasters. Between 2000-2019, 152 million people were affected by one of 1205 natural disasters (United Nations Office for the Coordination of Humanitarian Affairs (OCHA), 2020). Studies made by Juan Jose Miranda and Oscar Ishizawa (2017) found that a variation of one standard deviation in the intensity and strength of a hurricane generates a decline in total GDP per capita growth of 0.9% - 1.6%, and a decline in total income and salary income of 3%, which then increases poverty by 1.5 percentage points. Another study found a negative impact on GDP of 2.6% - 3.9% for the 12 months following a natural disaster (Miranda and Ishizawa, 2017). Other devastating effects of climate change are the fires in the Amazon region in 2019, lakes disappearing in Bolivia, melting glaciers in Patagonia, and water scarcity in São Paulo (The Climate Reality Project, 2021). The following figures show the increasing trend of temperature anomalies in South America and the Caribbean Islands.

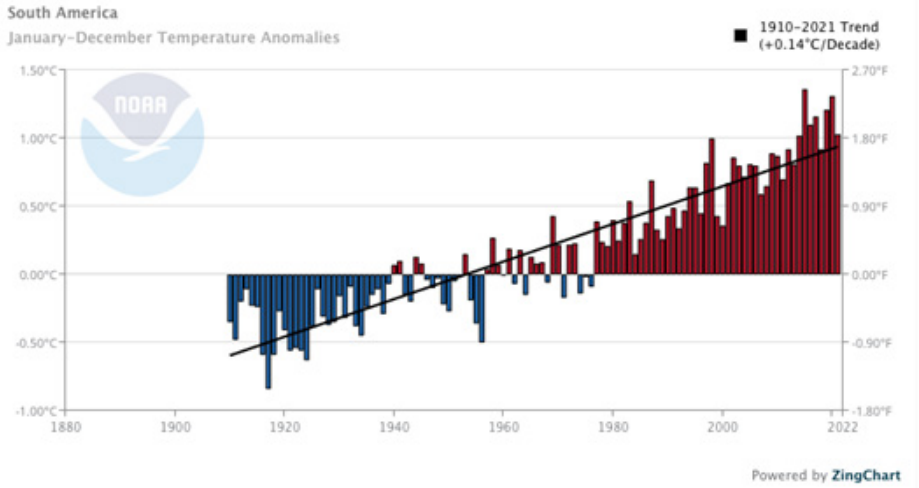

Figure 1 Annual Surface Level Temperature Anomalies in South America (1910 – 2022). Source: National Oceanic and Atmospheric Administration (NOAA)

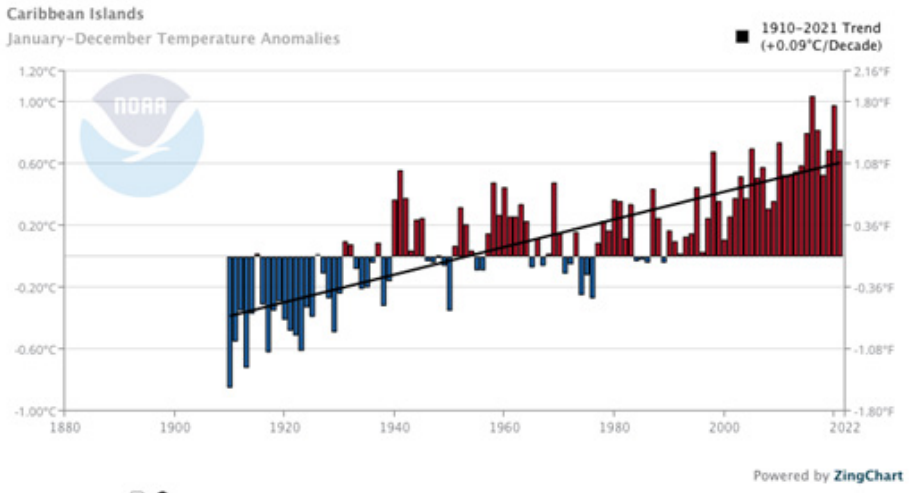

Figure 2 Annual Surface Level Temperature Anomalies in Caribbean Islands (1910 – 2022). Source: National Oceanic and Atmospheric Administration (NOAA)

Regarding some of the social impacts of climate change, Latin America and the Caribbean are among the regions most sensitive to climate-related migration and displacement, where droughts, tropical storms, and hurricanes are the most common climatic drivers. Together with warming temperatures, migration and displacements have affected the incidence of climate-sensitive infectious diseases, increasing the transmission of vector-borne diseases such as dengue fever, Zika, chikungunya, etc. All these climate phenomena have led millions of people to food and water insecurity, especially in Latin America and the Caribbean (IPCC, Impacts, Adaptation, and Vulnerability – Working Group II). The impact of climate-related events and disasters resulted in the loss of 312,000 lives and affected more than 277 million people between 1998 and 2020 (World Meteorological Organization, 2021).

Latin America and the Caribbean countries are some of the most vulnerable to climate disruption. As measured by the Notre Dame-Global Adaptation Index (ND-GAIN) Country Index, out of the selected countries, Chile is the least vulnerable, while Honduras is the most vulnerable, being ranked 117.

Table 2 Vulnerability index in the selected countries, top 3 and bottom 3. Source: Notre Dame-Global Adaptation Index (ND-GAIN) Country Index

World Ranking[2]	Country	Score
1	Norway	0.249
2	Switzerland	0.250
3	Austria	0.267
20	Chile	0.317
45	Costa Rica	0.360
62	Brazil	0.381
84	Colombia	0.409
117	Honduras	0.461
180	Guinea-Bissau	0.629
181	Somalia	0.676
182	Niger	0.677

Women are the most negatively affected by climate change, and social norms also tend to increase gender-based violence when confronted with climate impacts (ONU, 2020). In Latin America and the Caribbean, women are disproportionately affected by climate change´s effects, because they have less secure land tenure (only 25% of landowners are women) and less access to economic subsidies and other incentives (Erthal Abdenur, 2020). Climate actions then need to have a

[2] First place (1) being the least vulnerable.

clear gender-based approach, especially since women tend to disproportionately bear the costs of poor health conditions from pollution and climate change effects, for example through unclean cooking (Inter-American Development Bank (IDB), 2022). Additionally, indigenous women who have fought to defend the environment in Latin America and the Caribbean have suffered from gender-based violence. For instance, in Mesoamerica, between 2015 and 2016 there were 2,197 reported attacks on women environment defenders, 37% of which had a specific gender cause (UN Women, 2021).

Climate effects, especially natural disasters, affect women disproportionally. Women are more vulnerable to adverse economic effects of natural hazards. One reason for this is because they work mainly in the tourism and hospitality industries, which often are the most affected industries during natural disasters. Moreover, natural disasters are associated with high levels of sexual and gender-based violence (GBV) mainly in shelters and camps due to the lack of protection for women and girls. After Haiti's 2010 earthquake, cases of sexual assaults reached a record high of 10,813 cases within six weeks after the natural disaster. According to Sirker, (2021), gender-differentiated impacts from natural hazards are mainly a result of social and institutional gender inequalities and unequal access to resources and information, which means that understanding and solving those inequalities can be the difference between life and death for many women in the LAC region (Sirker, 2021).

To summarize, the Latin American and Caribbean region is highly vulnerable to climate change, mainly due to geography, climate, socioeconomic conditions, and demographic factors, and the great dependence on its natural resources such as forests and its biodiversity (Economic Commission for Latin America and the Caribbean (ECLAC), 2015). Climate effects are projected to have a stronger impact on poorer communities all over the region. Given local poverty, the homes in this region are less likely to resist extreme weather conditions and the people are more prone to economic instability in order to overcome disasters (The Climate Reality Project, 2021).

1.4.2 Carbon emissions and the LCT

According to the International Energy Agency (IEA), there was an increasing trajectory in CO2 emissions in Latin America and the Caribbean from 1990 to 2014, and a slightly decreasing trajectory since 2014. That year, the region reached an emissions record of 1,227.6 Mt CO2, and for 2019 it decreased by about 1,107.3 Mt CO2. LAC represented 3.29% of total global CO2 emissions, as the world emitted 33,621.5 Mt CO2 in 2019. That same year, CO2 emissions per capita reached 2.1 t CO2/capita for Latin America and the Caribbean, compared with the 8.3 t CO2/capita produced by the OECD, almost 4 times more. In 2019, oil was the energy source that produced the most emissions (705.0 Mt CO2), and the transport sector was the sector with the largest proportion of emissions (450.0 Mt CO2) (International Energy Agency, 2022).

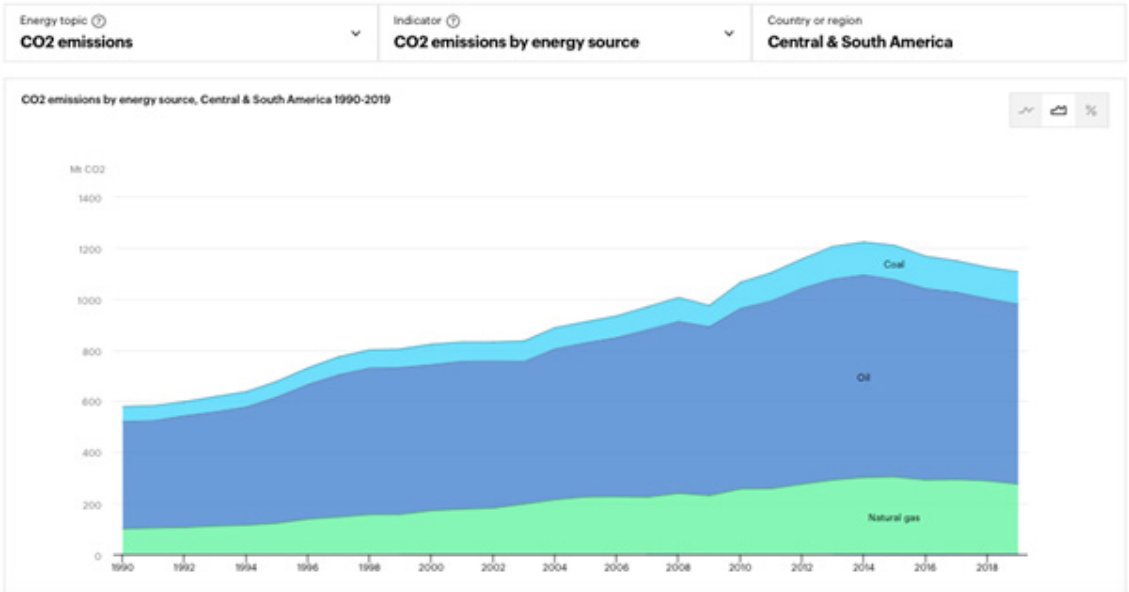

Figure 3 IEA CO2 emissions by sector, Central & South America 1990-2019. Source: IEA, 2022.

Another relevant fact is that in Latin America and the Caribbean the AFOLU (Agriculture, Forestry and Other Land Uses) sectors represent the largest share of total GHG emissions, different from other regions. Lamb et al. (2021) found that AFOLU is not only the largest emitting sector in LAC, but LAC is the region with the most GHG emissions coming from the AFOLU sector. This difference will be relevant for this report, as the LAC region needs to focus its efforts on the AFOLU sector.

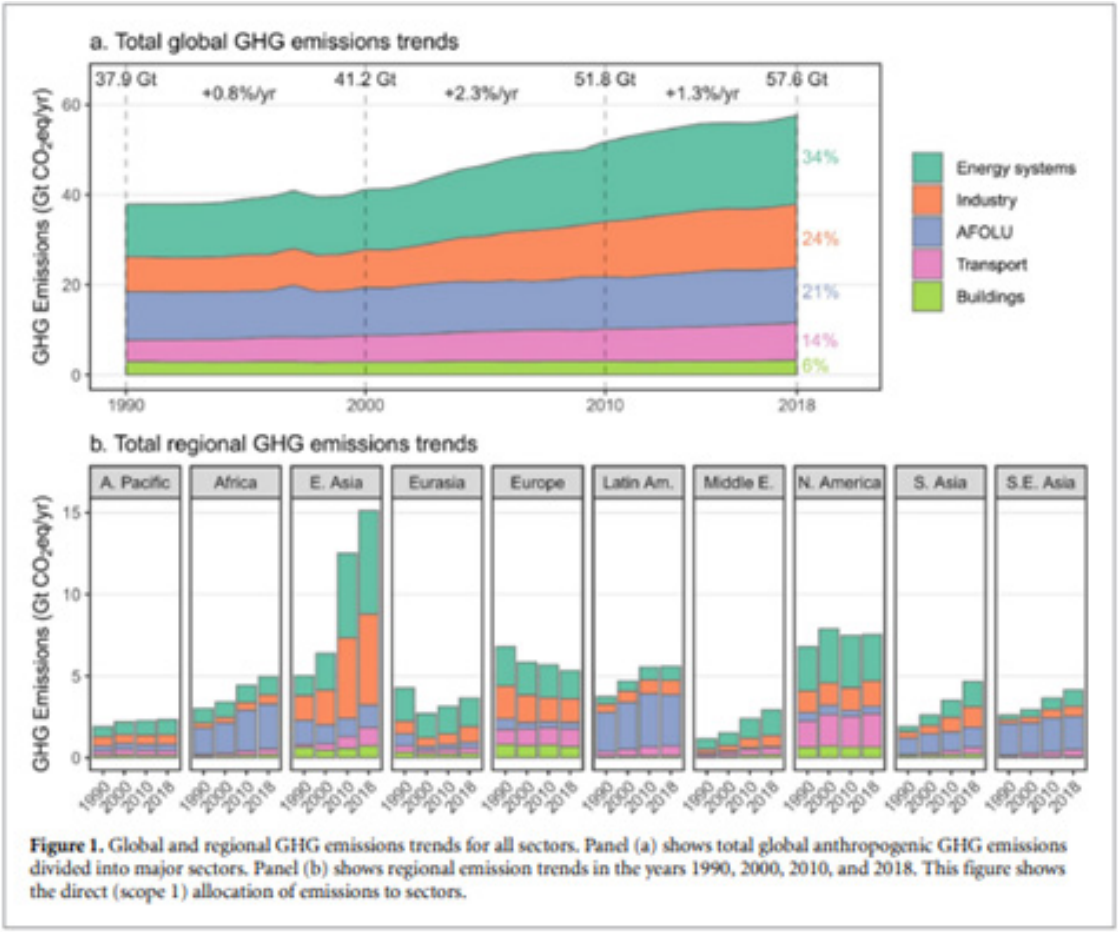

Figure 1. Global and regional GHG emissions trends for all sectors. Panel (a) shows total global anthropogenic GHG emissions divided into major sectors. Panel (b) shows regional emission trends in the years 1990, 2000, 2010, and 2018. This figure shows the direct (scope 1) allocation of emissions to sectors.

Figure 4 Total global GHG emissions trends by sector. Source: Lamb et al. (2021)

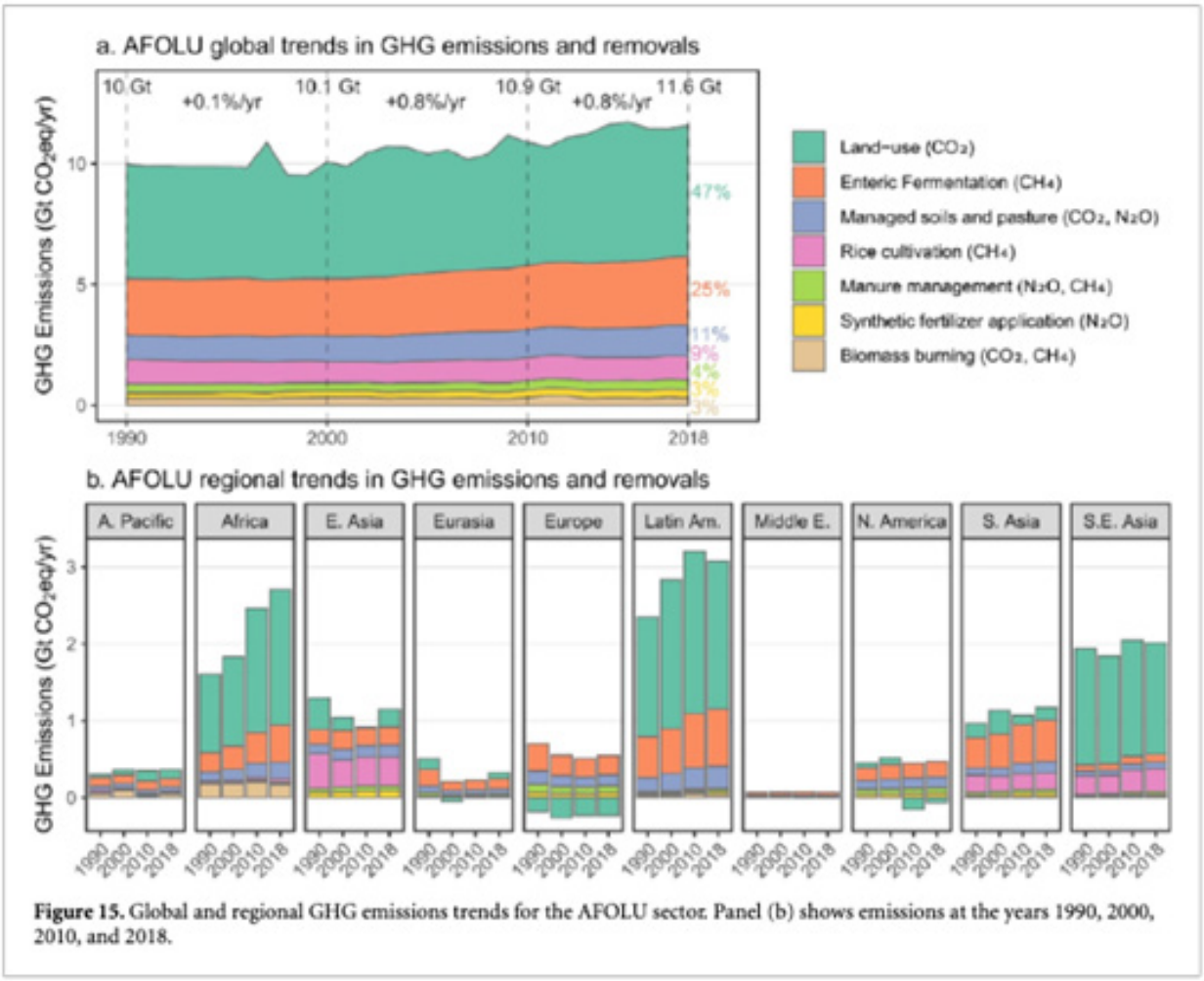

Figure 15. Global and regional GHG emissions trends for the AFOLU sector. Panel (b) shows emissions at the years 1990, 2000, 2010, and 2018.

Figure5 AFOLU global trends in GHG emissions and removals. Source: Lamb et al. (2021)

It is also important to show how the selected countries can face the risks of climate change. The University of Notre Dame has created a matrix that compares the resilience of countries. The vertical axis shows the score of vulnerability and the horizontal axis shows the readiness score. Chile and Costa Rica appear to be the least vulnerable and most ready to act against climate change, while Honduras is the most vulnerable of all five countries and the least ready. Caribbean countries like the Dominican Republic and Jamaica are better rated than Colombia and Brazil, while Haiti is rated worse than Honduras, demonstrating a wide variety of resilience levels (Notre Dame Global Adaptation Initiative, 2022).

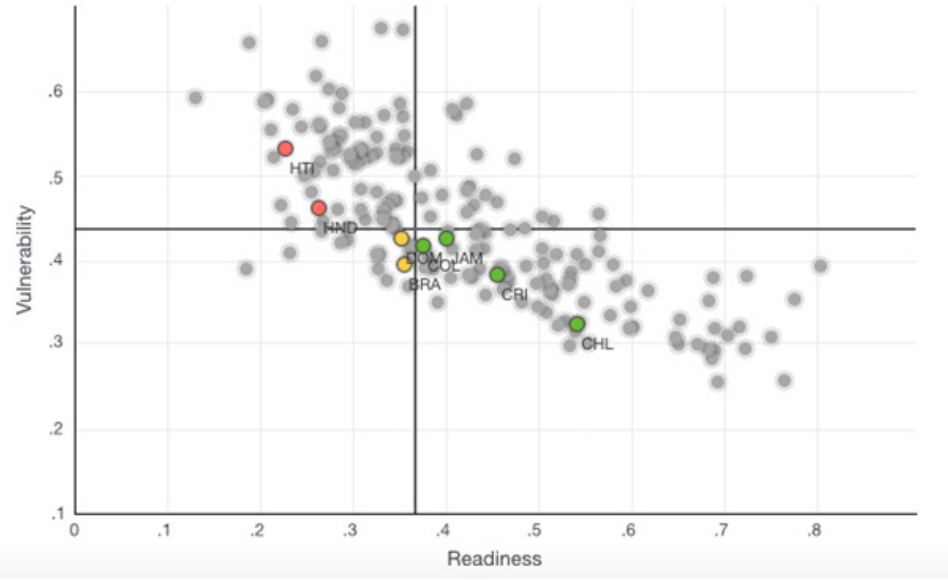

Figure 6 Readiness and vulnerability of selected countries. Source: Notre Dame Global Adaptation

As seen in the next graph from Climate Watch (2018), Costa Rica has the lowest GHG emissions per capita in the selected countries, right after Honduras and Chile, with an average of 3.0t per capita, while Colombia and Brazil are closer to 6.0t per capita. When it comes to other countries from Latin America and the Caribbean, the smaller countries have higher GHG emissions per capita; for instance: Uruguay (9.97t per capita), Bolivia (11.12t per capita), Paraguay (13.70t per capita), Belize (17.81t per capita) and Guyana (24.55t per capita). In the Caribbean the average is relatively low: Jamaica (3.52t per capita), Cuba (3.46t per capita) and Haiti (0.99t per capita). The LAC region is close to the world average of 6.50t per capita, but far below the North America Region (18.33t per capita) and the OECD region (10.88t per capita) (Climate Watch Data, 2022).

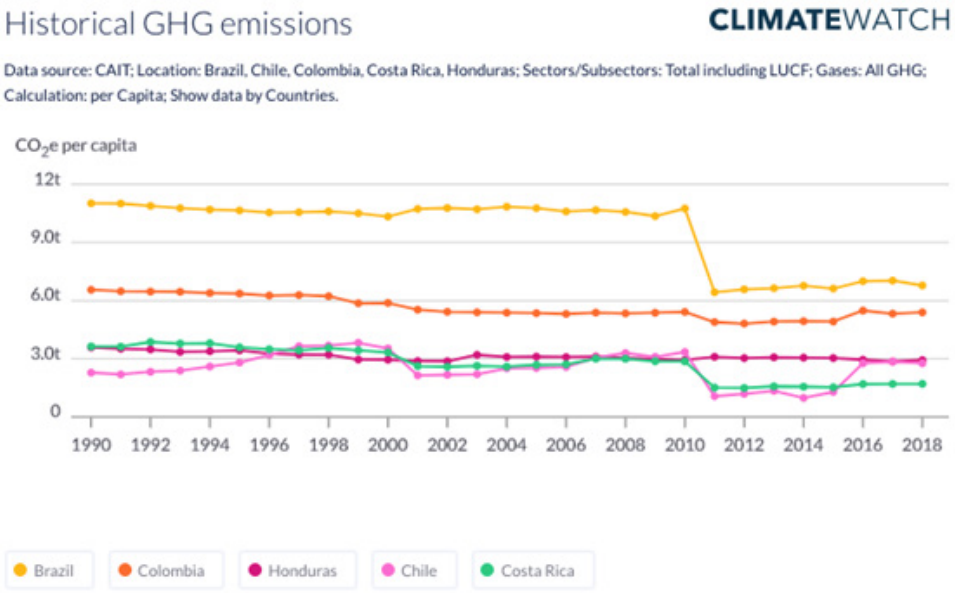

Figure 7 Emissions per capita in Latin America (1990 – 2018). Line chart. Source: Climate Watch

The Climate Action Tracker (CAT) is an independent initiative that analyses and tracks governments´ climate action and measures it against the globally agreed Paris Agreement. As seen in the following table, Costa Rica is the better-rated country, while Colombia and Brazil are the worst. The CAT´s analysis shows the status of current policies and the actions needed for every country (Climate Action Tracker, 2021).

Table 3 CAT rating, policies, and actions needed. Source: CAT 2021

Country	CAT rating	Policies	Actions needed
Brazil	Highly Insufficient	Policies, laws, and efforts are highly insufficient in order to limit global warming to 1.5°C. Bolsonaro's administration ignored the urgent need for climate action in Brazil. Current energy infrastructure planning foresees a very important role for fossil fuels in the decades to come, which very likely will worsen the national climate policy.	Needs stronger measures in order to meet the 1.5°C Paris goal. Brazil urgently needs to reverse the actual trend of weakening climate policy. It needs to accelerate mitigation action plans in every sector of the economy, and reverse the present plans to expand fossil fuel energy sources.
Chile	Insufficient	The current policies planned for 2030 won't lead to falling emissions and are not consistent with the Paris Agreement's 1.5°C temperature limit. Chile´s emissions between 1990 and 2020 increased 121%, from 49 MtCO2e to 109 MtCO2e, excluding LULUCF. CAT estimates emissions will remain stable for the coming years, representing a 21-28% increase above 2010 levels.	The CAT suggests that Chile needs to implement additional policies to meet its unconditional and conditional NDC targets in 2030. For this to happen, it is necessary to implement the planned 2050 Energy Strategy, the complete coal phase-out, and the electromobility strategy.
Colombia	Highly Insufficient	Fossil fuels are still a priority for the Colombian government. The energy and agricultural sectors will continue to be the highest-emitting sectors in the country, and there are no updated mitigations and transition plans for these sectors. Finally, Colombia has not indicated any intention of meeting any aspect of the Paris Agreement or phasing out coal power.	Colombia needs to accelerate the implementation of announced policies, and to implement new mitigation measures within this decade to meet its NDC target. Colombia needs international support to implement further policies in line with full decarbonization.
Costa Rica	Almost sufficient	Policies and regulations are considered consistent with the Paris Agreement. Currently, Costa Rica is on track to achieving its 2030 NDC emissions reduction target. The planned new policies include electrification of the transport sector, the country's largest emitting sector.	Climate commitments are not yet enough, and need some improvements. Costa Rica's actions and plans meet its fair-share contribution to limiting warming to 1.5°C, but it needs international financial support to implement planned policies and additional ones.
Honduras	No information	The CAT does not provide information about Honduras. Nevertheless, Honduras has relatively low historical GHG emissions per capita, but the policies for climate action are still basic and need much more detail in order to be consistent with the Paris Agreement.	Honduras is one of the most vulnerable countries of the region, and there is a need to invest in adaptation and resilience plans.

Costa Rica is probably the best example of impactful climate action and the country that has made the most progress towards the LCT in LAC. Its climate policies are some of the very few that are consistent with limiting global warming to 1.5°C. For instance, their National Decarbonization Plan is the most ambitious in the region and is more comprehensive than Costa Rica's Paris Agreement targets for 2030 and 2050. If Costa Rica achieves the implementation of all the new policies mentioned in its new Decarbonization Plan, it could achieve carbon neutrality by 2050 (Climate Action Tracker, 2021).

Chile and Peru are two other examples of impactful climate action. The recently approved Energy Efficiency Law in Chile (Ley de Eficiencia Energética, Law No. 21.305) aims to promote energy efficiency across sectors which will reduce the final energy consumption by 10% by 2030 and 35% by 2050. Even though there are still missing parts in terms of implementation and execution of the new laws and policies, they target a substantial emissions reduction (Climate Action Tracker).

Peru recently signed the National Program for Sustainable Urban Transport, developing a low-emissions and low-risk transportation model based on cycling. Additionally, the country established the high-level climate change committee and finally, Peru has received funding from Switzerland, KfW Development Bank, and others to finance and promote climate-friendly investments (Climate Action Tracker, 2021).

Latin America and the Caribbean still have a long path towards a significant Low-Carbon Transition and a regional environmental policy that is consistent with the Paris Agreement. Although some countries like Costa Rica and Chile seem to be taking steps in the right directions, countries like Brazil and Honduras have a longer path to go. There is wide diversity in the LAC region regarding the progress for a LCT. On one hand, there is a significant need for additional investment capital, especially for new LCT technologies and their applications (Kober et al., 2016). On the other hand, there is a lack of knowledge, regulations, and public policy implementation capabilities in most of the countries of the region.

1.4.3 Gender Equality and inclusiveness

The impact of climate change is expected to affect more vulnerable people and communities. Due to gender inequality, women will be more affected by climate change. The following section shows the gender inequality and its indicators for Latin America and the Caribbean according to the World Bank[3] and the Global Gender Gap Report (GGGR[4]) from the World Economic Forum (2021).

The GGGR has created the Global Gender Gap Index, which benchmarks the evolution of gender gaps through the dimensions of economic participation, educational attainment, health and survival, and political participation. The closer to 100, the less gender discrimination. Latin America and the Caribbean represent the third-ranked region with a rating of 71.2%, right after North America (76.4%) and Western Europe (77.6%). Regions like Eastern Europe and Central Asia (71.1%), East Asia and the Pacific (68.9%), sub-Saharan Africa (67.2%), South Asia (62.3%), and the Middle East and North Africa (60.9%) have lower ratings.[5] Being the third region is positive, although there is still a 28.8% gender gap yet to close.

There are strong disparities regarding labor force participation in LAC. The proportion of women participating in the labor market for the LAC region averages 59%. For instance, Mexico has a very low participation rate (49.1%), followed by Honduras (54.3%) and Costa Rica (58.3%) with low women´s labor force participation rates. In Brazil, Chile, Argentina, and Colombia, women's participation rates are between 59.1% and 61.9%. Moreover, in LAC, women earn on average 17% less than men, and the gender wage gap is especially wide among workers with the lowest income (Saget et al., 2020).

In the political sphere, the GGGR argues that the LAC region has a gender gap of 27.1%. It is the fourth-best-rated region out of the eight world regions analyzed, although there are mixed results within the region. Nicaragua (5) and Costa Rica (8) are ranked in the top 10 worldwide, while Chile (49), Colombia (67), Honduras (85), and Brazil (108) are ranked far behind. The presence of women among parliamentarians and ministers explains part of the rankings. In Argentina, Bolivia, Costa Rica, Cuba, Mexico, and Nicaragua, about 40% of lower house seats are occupied by women, but in countries like Belize, Bahamas, Paraguay, and Brazil, 15% or less of lower house seats are held by women.

[3] World Bank. Recovered from: https://genderdata.worldbank.org/indicators/

[4] Global Gender Gap Report. Recovered from: https://www3.weforum.org/docs/WEF_GGGR_2021.pdf

[5] All these scores are based on the constant sample of the 107 countries covered continuously, from the 2006 edition to the current edition.

In the educational sphere, gender parity in educational attainment has nearly been achieved, with a rate of 99.7%. In the region, 11 countries have a score between 99.0% and 99.8%, and another 11 countries have attained full parity (100). Regarding the gender gap in access to financial services, there is a constant percentual difference between men and women in the region. When it comes to account ownership at a financial institution, there is a gender difference between 5% - 15%, and there is a difference in access to a loan from a financial institution of 1% to 5%.

Regarding the gender gap in access to resources, the LAC region does not have enough data regarding the proportion of women and men who own land, therefore there is no gender disparity identified, except for Colombia, where 89.1% of women do not own land, and 85.3% of men do not own land.

In most selected countries, women received their voting rights by 1955, Brazil in 1932 being the first country where women voted, and Honduras the last country in 1955. By 2021, all the selected countries allowed surviving spouses to have equal rights to inherit assets and all countries allowed sons and daughters to have equal rights to inherit assets from their parents. Honduras is the only country where women don't have the same right to remarry as men (World Bank, Gender Statistics).

Table 4 Gender gap indexes in the selected countries. Source: World Bank and the Global Gender Gap Report (GGGR) from the World Economic Forum.

Country	Brazil	Chile	Colombia	Costa Rica	Honduras
Gender gap in work opportunities (score 0-100, 2021)	66.5	61.0	70.8	62.4	72.1
Women´s labor force participation rate (%)	61.9	59.1	61.6	58.3	54.3
Women in senior roles (Legislators, senior officials, and managers- %)	39.4	29.9	53.4	30.0	50.9
Professional and technical workers (%)	53.7	46.9	54.2	43.0	51.9
Gender gap in political empowerment (score 0-100, 2021)	13.8	28.3	21.6	54.5	17.9
Percentage of women in parliament (%)	15.2	22.6	18.8	45.6	21.1
Percentage of women in ministerial positions (%)	10.5	30.4	36.8	52.0	28.0
Gender gap in educational opportunities (score 0-100, 2021)	100	100	100	100	100
Gap in literacy rate	100	99.8	100	100	100

Gap in enrollment in primary education	99.9	100	100	99.9	100
Gap in enrollment in secondary education	100	100	100	100	100
Gap in enrollment in tertiary education	100	100	100	100	100
Access to resources					
Women who do not own land (% women 15-49, 2016-2018)	--	--	89.1 (2015)	--	--
Men who do not own land (%, 2016-2018)	--	--	85.3 (2015)	--	--
Account ownership at a financial institution, female (% age 15+, 2017)	67.5	70.6	41.4	60.9	39.3
Account ownership at a financial institution, male (% age 15+, 2017)	72.8	77.4	48.8	75.5	47.0
Loan from a financial inst. or used a credit card, female (% age 15+, 2017)	22.8	30.3	17.2	18.1	11.1
Loan from a financial inst. or used a credit card, male (% age 15+, 2017)	30.2	31.6	25.8	24.6	17.6
Women´s role within households and other rights					
Year received right to vote (2020)	1932	1949	1954	1949	1955
Having the same right to remarry as a man (2021)	yes	yes	yes	yes	no
Surviving spouses have equal rights to inherit assets (2021)	yes	yes	yes	yes	yes
Sons and daughters have equal rights to inherit assets from their parents (2021)	yes	yes	yes	yes	yes
Participating in own health care decisions (% of women, 2016-2018)	--	--	92.6	--	--
Participating in making major households purchase decisions (% of women, 2016-2018)	--	--	80.2	--	--

According to the most recent report from the United Nations (United Nations, UN Women, 2022), worldwide there are approximately 380 million women and girls living in extreme poverty with less than $1.90 USD a day. The UN Women estimates that it would take another 286 years, at the current progress rate, to remove all discriminatory laws and gender gaps worldwide. When it comes to Latin America and the Caribbean, the projections for 2022 estimate that there are 21 million women and girls under the $1.90 USD/day poverty line, 43 million under the $3.20 USD/day poverty line, and 94 million under the $5.50 USD/day poverty line.

Moreover, women are also severely affected by displacements and forced migration. Vulnerable women and girls who are migrants, refugees or internally displaced people tend to face directly the negative consequences of climate change, wars, and human rights violations. Additionally, this vulnerable population often lose their property and assets during the displacement process, and also face a higher risk of violence, trafficking, and sexual abuse. For instance, in Colombia displaced women and girls reported approximately 40% more unintended pregnancies than women and girls who were not displaced. In 2021, about 44 million women and girls were forcibly displaced from their homes worldwide. Out of those 44 million, 12.4 million were refugees, and 2.4 million were refugees in Latin America and the Caribbean (United Nations, UN Women, 2022).

Another sector where women are more affected by climate change than men is in the care economy. The impact of climate change very likely will increase worldwide unpaid care work due to increasing health problems caused the climate crisis. Aguilar et al. (2015) found that climate change is likely to increase unpaid care work as people must manage climate-related health impacts. Care work has historically been performed by women, and this is true for almost every region in the world. On average, women perform 76.2% of total care hours. In the case of the Americas, women work on average 268 minutes per day without getting paid, while men work 155 minutes per day without getting paid (International Labour Organization, 2018).

Another set of initiatives in LAC has focused on gender-based violence. Countries like Brazil, Colombia, and Nicaragua have developed specific plans against gender-based violence. These actions are very important given that indicators of violence against women in the region are relatively high. Some of these plans are aimed at the care and protection of victims of violence. In Honduras, for instance, in 2012 femicide was classified as a specific crime with differentiated sanctions. Mexico classified femicide as a crime and proposed to typify femicide and create specific records in federal entities under its plan (ECLAC, 2019).

Some of the main roadblocks for LAC to achieve gender equality are the low percentage of women in the decision-making process, in ministerial positions and in parliaments, and overall low political empowerment. Additionally, the gender roles and implicit gender bias fostered by cultural traditions limit the professional potential of women in LAC. Finally, there is a need to promote inclusive investments specifically for women and other vulnerable communities (UN Women, 2021).

1.4.2.1 Other inequalities

According to the ECLAC, there has been a constant decreasing trend in Latin America and the Caribbean on the Gini index since 2002, which has meant a greater equality of income distribution. Latin America´s index started at 0.535 in 2002 and ended at 0.460 in 2019. This decreasing trend is consistent for most countries of the region with the exceptions of Argentina, Brazil, Colombia, Costa Rica, Ecuador, and Honduras, where there is an increase in the Gini index from 2017 to 2019 (ECLAC, 2020).

According to the IDB, the Gini index for the region had a visible increase during 2020, which was mainly caused by the pandemic and the economic crisis (Acevedo et al., 2021). There has been a historically large gap between other regions and Latin America and the Caribbean regarding the Gini index. In 1990, there was a gap of about 20 percentage points between LAC and the OECD countries, meaning the LAC region was 20 percentage points (Gini) more unequal than the OECD. Although the gap has been decreasing over the years, in 2018 the gap was still about 15 percentage points (Inter-American Development Bank, 2020).

There is a substantial gap in the access to and completion of education in Latin America and the Caribbean, where 12 million children and adolescents between the ages of 7 to 18 are out of the education system. In LAC, 2.3 million children are out of primary school, and when it comes to secondary level, 2.5 million adolescents are out of school and 7.2 million out of upper secondary (UNICEF- Investing in education). The LAC region has a population dynamic where 25% of the population is between the ages of 0-14, 65% of the population is between 15-65, and 10% is more than 65 years old (World Bank – Data Bank, 2021)

Regarding youth employment, the International Labor Organization (ILO) said that the average youth unemployment rate for Latin America reached its peak in the first trimester of 2021 at 23.8%, which meant that around 2 to 3 million

young people fell out of the workforce (Portafolio, 2021). As shown in the next table there is a strong and constant youth – adult disparity in the region where youth unemployment is higher in Brazil (31.2%) and Costa Rica (42.1%).

Table 5 Unemployment rate of youth in 2020, LAC. Source: ECLAC/ILO, 2021

Unemployment rate (%)	Youth (15-24)	Adult (25+)	Youth-adult disparity	Unemployment
LAC	23,20	8,50	2,73	10.5
Brazil	31,10	10,10	3,08	13.5
Chile	25,00	9,70	2,58	10.7
Colombia	27,90	14,00	1,99	16.1
Costa Rica	42,10	15,70	2,68	19.5
Honduras	--	--	--	10.9

Finally, it is important to mention that there are significant income and salary inequalities among ethnic minorities in Latin America. In 2017, the community of African descent had, on average, about 15% less salary income, and indigenous people had around 25% less salary income. Although this inequality gap has been decreasing since 2003, there is still a large and significant salary inequality among ethnic and racial minorities (Inter-American Development Bank, 2020).

1.4.4 Recovery from the COVID-19 pandemic

The COVID–19 pandemic has shown humanity how easily a natural disaster can crash the world economy (Volz, 2020). The pandemic and its consequences have exposed several vulnerabilities of our health and social systems and the fragility of our economies. It is very important to ensure that not only are we better and more prepared to face and overcome new pandemics, but also other major global challenges such as climate change (Volz, 2020). Although there is no evidence directly linking the COVID-19 outbreak to climate change, COVID-19 has tested our resilience in responding to potential climate change and its related consequences (OECD, 2020). Before the pandemic, LAC had the slowest economic growth in decades and macroeconomic vulnerability (ECLAC, 2021). In the decade after the financial crisis (2010-2019) the regional GDP growth rate went from 6% to 0.2%; additionally, between 2014 and 2019 the region went through one of the lowest growth rates since 1950 (ECLAC,2021). The GDP gap between LAC and the G7 countries has stayed the same since 2008, where the G7 GDP is 3 times higher. The Gini index of family income in Latin America during 2019 was about 0.47, while Africa´s was 0.42, and Asia and the Pacific´s was 0.36 (OECD et al., 2019). The poverty rates for Latin America and the Caribbean before the pandemic had a decreasing trajectory since 2002, with a small increase since 2014 and a stable trend up to 2018. Regarding the Gini coefficient, we can see a clear decreasing trajectory from 2002 to 2014, when the region seems to show a more stable trend (OECD et al., 2019).

In addition to the pandemic, it is important that future reports and analysis take into account other social and international crises such as the Russia–Ukraine crisis which has affected the world economy, and like the pandemic, has clear effects on the worldwide Low-Carbon Transition.

1.4.4.1 Economic impact of the pandemic

On March 11, 2020, the WHO declared the pandemic. The first cases of COVID-19 arrived in Latin America and the Caribbean at the beginning of March. In response, all national governments from the region implemented different measures to stop the spread of the virus. Many of them adopted local and national, optional as well as mandatory, quarantines, which highly impacted their economies (ECLAC, 2020). Over 2.7 million companies were closed (ECLAC, 2021).

Latin America and the Caribbean were the most affected developing regions by the pandemic regarding health standards. With 8.4% of the world population, by 2021 Latin America and the Caribbean registered 27.8% of the deaths due to COVID-19 (ECLAC, 2021).

Although some protection measures prevented the worst effects on poverty indexes, according to the ECLAC there was a 12-year setback in poverty and 20 years in extreme poverty. Furthermore, vulnerability increased compared to 2019, where 467 million lived under vulnerability circumstances. In 2020, 491 million people lived under these conditions (ECLAC, 2021).

The effects of the pandemic impacted women significantly more than men. Given that 70% of the total workers in the LAC health system are women, they faced the extreme conditions that the health system was exposed to during the pandemic (ECLAC, 2021), including higher death rates as well as more stressful and complex situations.

- After the pandemic, 76% of women in paid domestic work do not have pension coverage.
- Regional unemployment increased with acute labor gender gaps.
- Inequality deepened in terms of employment and work income. With announced pandemic measures taken, the Gini index worsened by 2.9% (ECLAC, 2021).

Given that in the LAC region women present high social and economic disparities (poverty, education, access to capital, among others), food insecurity is more prevalent among women. Economic and health crises, like the one generated by COVID-19 and by extreme climate events, intensify food insecurity. With fewer economic resources, including

access to land, information, and credit, women tend to be more affected by such crises. According to the UN Global SDG Indicator Database (2022), during the pandemic 33.9% of the male population in the LAC region were in moderate or severe food insecurity (2021), while 45.2% of the female population in the LAC region were in moderate or severe food insecurity (2021) (United Nations, UN Women, 2022).

Regarding the economic impact of the pandemic, the World Bank established that in 2018 the regional GDP growth rate was 1.6%, in 2019 it was 0.7%, in 2020 it was -6.7% (pandemic), and in 2021 the GDP had a strong growth rate (6.8%) as the region started recovering from the pandemic (World Bank, GDP growth, 2022). The Economic Commission for Latin America and the Caribbean estimated a GDP growth rate of 3.2% for 2022, and a GDP growth rate of 1.4% for 2023.

When it comes to poverty rates, the pandemic increased about 2 percentage points the regional poverty rate and the regional extreme poverty rate, representing approximately 15 million more people under the poverty line and about 10 million more people under extreme poverty in Latin America. The poverty rates for 2019, 2020, 2021, and 2022 (projections) were 30.4%, 32.8%, 32.3% and 32.1% respectively. Regarding the extreme poverty rates, they were 11.4%, 13.1%, 12.9%, and 31.1% for the same years. All this meant that in 2022, 201 million people lived in poverty and 82 million lived in extreme poverty in Latin America (ECLAC, 2022a). Regarding inequality, the Gini index went from 0.456 in 2019, to 0.464 in 2020, and to 0.452 in 2021. Although the changes don't seem significant, there is a wide variety within countries (ECLAC, 2022a).

The pandemic also had a strong impact on the labor market, which is still felt in the LAC region. As seen in the following figure, men's unemployment went from 6.8% in 2019 to 9.1% in 2020, 7.7% in 2021, and 7.8% in 2022. Women's unemployment went from 9.5% in 2019, to 12.1% in 2020, 11.3% in 2021 and 11.6% in 2022. Both showed an increase from 2019 to 2020 and from 2021 to 2022.

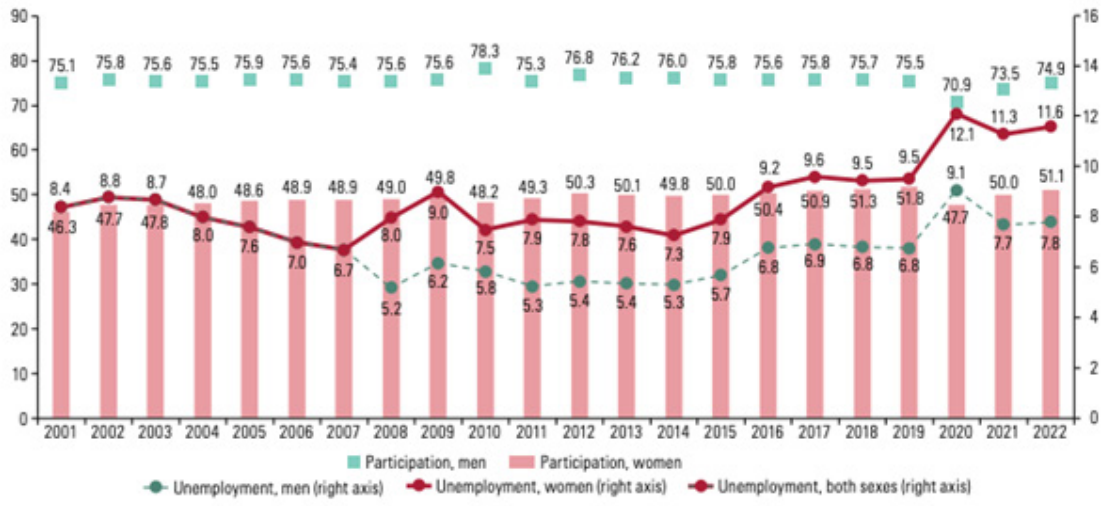

Figure8 Latin America and the Caribbean (24 countries): trend in labour market participation and unemployment, by sex, 2001–2022 (percentages). Source: ECLAC, 2022a

1.4.4.2 Impact on carbon emissions and policy implementation

Understanding the impacts of the pandemic, or any other economic or health crisis, takes multiple years of data analysis, therefore the available information on the impacts of the pandemic on carbon emissions is still in progress. Nevertheless, economic crises and recessions tend to result in a global reduction of CO2 emissions (Peters et al., 2012). According to the IEA, 2020 had a significant drop in global total CO2 emissions, where in 2019 total emissions were estimated at 33,577.7 Mt of CO2 and in 2020 emissions were estimated at 31,665.4 Mt of CO2, representing a reduction of 6%. Regarding Central and South America, there was a reduction of 10%, coming from 1,097.6 Mt of CO2 in 2019 to 985.4 Mt of CO2 in 2020 (International Energy Agency, 2022). These reductions relate to reductions in the economic activity and GDP, which is likely one of the main causes of the reduction in CO2 emissions.

The pandemic could have triggered some permanent behavioral changes that may or may not support action against climate change. For instance, businesses might cut business travel and CO2 emissions as online tools become more efficient. On the other hand, economic uncertainty caused by the economic crash might reduce or postpone investment in the energy sector and the LCT sector. Additionally, the economic crisis affected small and young firms more severely, which tend to be the major drivers of the innovation so needed in the LCT industry (OECD, 2020). Many countries in Latin America and the Caribbean have adopted some sort of recovery packages to reignite economic growth and generate jobs. This is important given the LCT in LAC could add up to 10.5% new jobs by 2030 (OECD et al., 2022). These tend to be inconsistent with climate support, but not always so (OECD, 2020). The pandemic opened opportunities to generate changes in public policy in favor of the LCT.

During the pandemic, some countries developed green recovery packages which aimed to reactivate the economy with an environmental perspective. In an analysis of such packages, the OECD concluded that investment support without long-term carbon price signals (removal of fossil fuel subsidies and carbon pricing), is not enough to develop investment in low-carbon technologies (OECD, 2020). Therefore, it is suggested that governments should build ex-ante and ex-post impact evaluations into green stimulus packages to monitor the success of such programs (OECD, 2020). Another conclusion is that investment in energy-efficient building contributes to maintaining jobs and economic activity in the construction sector while contributing to reducing emissions, but this might not be the case for all sectors as green packages do not necessarily generate new jobs in the short term (Popp et al., 2020). Hence, green packages should be combined with other effective economic policy measures to revive the economy. Finally, the OECD recommended that LAC countries invest in low-carbon infrastructure, renewable energy infrastructure, communication networks, and carbon pricing (OECD, 2020).

1.5 Visions for an inclusive Low-Carbon Transition (LCT&GE)

1.5.1 Regional trends for LCT&GE

Latin America and the Caribbean as a region have been committed to the LCT since the Paris Agreement. At the center of the Paris Agreement are the Nationally Determined Contributions (NDC), where each party is supposed to present an NDC on a five-year cycle with increasingly ambitious goals. Almost every country has submitted their NDC, has made updates to them, and has publicly expressed their intentions to reach net-zero emissions. Although there is wide variety in the levels of commitment, every country is advancing in their efforts towards an LCT. There are several challenges that need to be faced and solved in order to be consistent with the Paris Agreement's 1.5°C temperature limit and in order to fully implement the climate action plans. It is important to mention that the regional CO2 emissions were growing until 2014, and then experienced a small decrease up to 2019 (IEA, 2022).

One of the main roadblocks is the economic incentive to continue with high levels of emissions and dependence on fossil fuels. There appears to be a positive relationship between GDP growth and GHG emissions. In the period between 1990 - 2015, countries with higher GDP growth tended to have higher greenhouse gas emissions. Chile and Panama had high GDP growth with high emissions, while Colombia had low emissions with medium GDP growth. Finally, Brazil and Honduras had medium-low GDP growth with medium-high average greenhouse gas emissions (OECD et al., 2019). Therefore, it is hard to persuade countries, governments, and policymakers to reduce their GHG emissions, as they might associate the emissions with GDP growth.

Another roadblock is the lack of investment, especially from the private sector (Jiménez, n.d). There are also technical and institutional roadblocks, both in formulating and implementing environmental laws and linking these to the NDCs. Finally, there is weak political will to enact climate action plans. For instance, carbon taxes in Latin America have low-rated, large exemptions, which limits the GHG emissions reductions (Cárdenas et al., 2021).

1.5.2 National LCT&GE visions, strategies, and programs

1.5.2.1 International commitments for decarbonization: Analysis of NDCs, conditional and unconditional commitments and long-term strategies.

In the LAC region, most countries have submitted a second NDC. Out of the countries which submitted a second NDC, Argentina, Chile, Colombia, Costa Rica, Honduras, Peru, Paraguay, Jamaica, Saint Kitts and Nevis, Saint Lucia, Barbados, and Grenada increased the ambition of their targets, while Brazil, Suriname, Venezuela, Antigua and Barbuda, Dominican Republic, Cuba, Panama, Nicaragua, El Salvador, Guatemala, Belize, and Mexico did not add any ambitions to their NDCs. The LAC NDCs have a better quality than the global average, as they include transparency mechanisms and interest in global carbon markets (Cárdenas and Orozco-Sanchez, 2022).

Regarding the Long-Term Strategies (LTS) in LAC, the following countries have submitted their LTS: Chile, Colombia, Costa Rica, Guatemala, Mexico, and Uruguay. Colombia and Chile are committed to achieving carbon neutrality by 2050, Uruguay commited to achieve CO2 neutrality by 2050, Costa Rica aims to achieve net-zero emissions by 2050, and Guatemala and Mexico seek reductions of 59% and 50%, respectively.

Brazil is the largest CO2 producer in the region, and its commitments to transition to a low-carbon economy are still weak. Therefore, it is important that Brazil strengthens its commitments. According to the World Resources Institute, at COP26, the major emitters proposed commitments that fall short of the Paris Agreement. Brazil's case does not offer credible pathways to achieve their net-zero targets, meaning that they might not achieve their goals and NDC (Taylor et al., 2021).

Out of the selected countries, Costa Rica is the only country with policies and regulations considered consistent with the Paris Agreement. Currently, Costa Rica is on track to achieving its 2030 NDC emissions reduction target. Costa Rica's actions and plans meet its fair-share contribution to limiting warming to 1.5°C, but it needs international financial support to implement additional policies, as well as the planned ones.

Most of the commitments in the selected countries are unconditional, but there are some conditional targets and commitments. For instance, Brazil has expressed that the whole Paris Agreement could be jeopardized if Article 6 is not negotiated. Honduras is the only country with conditional goals based on international support, especially on capacity building, financing, technology development, innovation, and research.

Table 6 Unconditional and conditional targets of selected countries. Source: Countries' NDCs from Climate Watch

Country	Unconditional target	Conditional target
Brazil	-37% by 2025 and –50% by 2030 compared to 2005 levels	None
Chile	-30% compared to 2007 levels	-35% – 45% compared to 2007 levels
Colombia	-20% compared to BAU scenario	-30% compared to BAU[6] scenario
Costa Rica	-44% compared to BAU scenario	None
Honduras	None	-15% compared to BAU scenario

The estimated costs of implementing the NDCs are difficult to determine due to changing circumstances and technical uncertainty. Nevertheless, Colombia estimates an investment of 0.2% of GDP per year to implement the adaptation plan, while Brazil estimates the country requires an investment of at least US$ 10 billion per year to address the numerous challenges it faces. The cost of implementing the conditional and unconditional NDCs in other countries has not been specified. The estimated costs of implementing the net-zero targets have not been specified either.[7]

Part of the funding to finance the NDCs, net-zero targets, and other climate action policies will come from market mechanisms and the sustainable development mechanism (SDM) stipulated under Article 6, paragraph 4 of the Agreement, as it has the potential to facilitate the implementation of the Paris objectives in the LAC region. Chile will finance part of their NDC with the support of the Ministry of Finance, the Financial Market Commission, the Superintendence of Pensions, and the Central Bank of Chile. Most countries in the region will engage national and local government resources on some level. Along with Chile, Colombia and Honduras plan on financing their targets

[6] Business As Usual

[7] Climate Watch Data: Recovered from: https://www.climatewatchdata.org/ndcs/country/COL/overview?document=revised_first_ndc&section=finance_and_support (overview-financial support section).

through the Green Climate Fund (GCF) and the Adaptation Fund. Finally, it is important to mention that most countries in the region, especially smaller and less developed ones, will require international resources at the financial level. To achieve this, Costa Rica is currently developing instruments aimed at facilitatating the identification of more specific financial needs.

The NDCs from the LAC region are very comprehensive and cover a wide range of sectors, such as energy, agriculture and land use, industry, transportation, and waste. The majority of the NDCs submitted by the selected countries have an inclusive component that includes gender and indigenous communities, except for Brazil's NDC, which doesn't mention these components.

Brazil, Chile, Colombia, and Costa Rica have the net-zero target in a policy document, while Honduras does not have a document submitted. Other countries such as Panama, Uruguay, and the Dominican Republic have their targets in a policy document, while Argentina, Barbados, and Jamaica have them in a political pledge (Climate Watch – Net-Zero Targets, 2022).

Based on the information from the NDCs provided by Climate Watch, implementation of the adaptation strategies has taken place in Chile, Colombia, Costa Rica, and Honduras, especially in the areas of financial support, technology transfer, and capacity building. Brazil´s NDC does not specify if there has been implementation of the adaptation strategies and policies. The following table summarizes some key information of the NDCs in selected countries in order to show the trends and commitments the selected countries have made.

Table 7 Summary of selected countries' NDCs. Source: countries' NDCs

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Country	2nd NDC submitted	2nd NDC submitted before COP26	GHG reduction target type	Increased ambition on 2nd NDC	Sectors covered in mitigation strategy	Conditionality of Targets on NDCs	Financial conditionality	Conditionality on capacity building or technology transfer
Brazil	Yes	No	Base year target	No	Economy-wide	Unconditional NDC only	No	No
Chile	Yes	Yes	Fixed level target and trajectory target	Yes	Energy, industrial processes, use of solvents and other products, agriculture and waste. Does not include the LULUCF sector	Unconditional NDC only	Yes	Yes
Colombia	Yes	Yes	Fixed level target	Yes	All emission sectors acknowledged by the Intergovernmental Panel on Climate Change (IPCC)	Unconditional NDC only	Yes	Specified
Costa Rica	Yes	Yes	Fixed level target	Yes	Energy, Industrial Processes and Product Use, Agriculture, Forestry and Other Land Uses and Waste	Costa Rica's contribution and ambition is not conditioned by the availability of international climate finance	Yes	Yes
Honduras	Yes	Yes	Baseline scenario target	Yes	Energy, Industrial Processes and Product Use; Agriculture; Waste	Partially conditional NDC (unspecified mix of domestic/ international resources)	Yes	Yes

(continued)

Country	(10) NDC Targets conditional on ambition levels of commitments from other countries	(11) Intention to participate in international carbon market mechanisms from NDC	(12) Status of Net-Zero Target	(13) Adaptation priorities included	(14) Adaptation barriers mentioned	(15) Financial needs mentioned	(16) Adaptation achievements mentioned	(17) Loss-and-Damage mentioned on NDCs	(18) Gender mentioned on NDCs	(19) Youth mentioned on NDCs	(20) Indigenous and local communities mentioned on NDCs
Brazil	No	Yes, when appropriate	In political pledge and in policy document	Not Specified	Not Specified	Not Specified	Yes	Not Specified	Not Specified	No	Yes
Chile	No	Yes / Possible	In policy document	Yes	Not Specified	Not Specified	No	Yes	Yes	No	Yes
Colombia	No	Yes / Possible	In political pledge and in policy document	Yes	Yes	Yes	Yes	Not Specified	Yes	Yes	Yes
Costa Rica	No	Yes	In policy document	Yes	Not Specified	Yes	No	Yes	Yes	Yes	Yes
Honduras	No	Possible	No document submitted	Yes	Yes	No Specified	No	Not Specified	Yes	Yes	Yes

1.5.2.2 Negotiations at COP26 and COP27

Some of the main conclusions of the COP26 are that the goal of maintaining global temperature below 1.5 degrees is still credible, but there is a need to make promises real and to strengthen global commitments as soon as possible. A positive conclusion of COP26 was that around 400 financial firms which control about US$130 trillion in assets committed to aligning their portfolios to net-zero by 2030, showing that financial institutions recognize the importance of climate actions (Mountford et al., 2021). Another achievement of this conference was the creation of a rulebook for international carbon markets. It is intended to promote the implementation of ETS through Article 6, and it gives countries tools to avoid double counting emissions and fosters private capital for developing countries (Cárdenas and Orozco-Sanchez, 2022).

During the COP27 that took place in Egypt during November 2022, some progress was made regarding adaptation and financial resources. It was stated that adaptation to the climate crisis for developing countries could cost around $160-340 billion USD annually by 2030, and that the numbers could increase up to $565 billion USD by 2050 if climate change continues to accelerate. The COP27 achieved an agreement between states to pledge $230 million USD to the Adaptation Fund to support vulnerable communities around the world in their adaptation process to climate change (UN Environment Programme, 2022).

Similar to past years, plenty of concerns were raised about the non-compliance of developed countries with the $100 billion USD per year commitments made in past years, which created some discomfort from developing countries. Nevertheless, the COP27 concluded with countries reaffirming their commitments to limit global warming to 1.5 degrees Celsius above pre-industrial levels. Finally, the UN's Intergovernmental Panel on Climate Change argued that greenhouse gas emissions must decline 45% by 2030 to limit global warming to 1.5°C (United Nations Framework Convention on Climate Change, 2022).

Latin America and the Caribbean countries have signed and endorsed several of the alliances, pledges, and statements promoted at COP26 and COP27. The following table shows the countries that are members or endorsed each commitment.

Table 8 COP 26 outcomes and commitments for LAC. Source: various

COP26 Outcome	Countries or stakeholders in the region that are members or endorsed the outcome
Powering Past Coal Alliance	Chile, Costa Rica, El Salvador, Mexico, Peru, Uruguay, Puerto Rico.
Global Coal to Clean Power Transition Statement	This statement was only supported by Chile and Ecuador, which is worrying, especially for Colombia as it is a large coal producer.
Global Methane Pledge	Argentina, Barbados, Belize, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Panama, Peru, Suriname, Uruguay.
Statement on International Public Support for the Clean Energy Transition	Costa Rica and El Salvador
Declaration on Forests and Land Use	Argentina, Belize, Brazil, Chile Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay.
Roadmap on Forests, Agriculture and Commodity Trade	Brazil, Colombia, Peru, Uruguay.
Declaration on electric vehicles	Chile, El Salvador, Uruguay, Dominican Republic, Mexico, Paraguay, Secretariat of Mobility, Bogota, La Paz, Rio de Janeiro, Sao Paolo.
Adaptation Action Coalition	Argentina, Chile, Costa Rica. Colombia, Jamaica, Paraguay, Peru, Uruguay.
Adaptation Research Alliance	Universidad Colegio De Antioquia, Universidad Nacional de Rosario, Municipality of Caldas. There are some other global organizations such as Global Innovation Fund, Global Resilience Partnership, International Union for Conservation of Nature, Oxfam, Save the Children, SouthSouthNorth, the Bill and Melinda Gates Foundation, United Nations Development Program, UNESCO Etxea (Centro UNESCO del País Vasco), United Nations Environment World Program Conservation Monitoring Center (UNEP-WCMC), United Nations University Institute for Environment and Human Security, World Health Organization, World Resource Institute, etc.

1.5.2.3 Sectoral analysis of GHG emissions in the LAC region

Efforts for the LCT cover several sectors, industries, and sources of emissions. The following section briefly identifies the main elements in each sector, and the progress being made in the LAC region.

Coal phase-down: Several governments will still use coal as a energy source beyond 2030, including Colombia. Chile, on the other hand, is moving away from coal, but still dependent on gas and fossil fuels, (Climate Action Tracker, 2021) but at least Chile has signed onto commitments to scale up technologies this decade to fully move away from unabated coal by 2030.

In 2019, the world produced 162,375,732 terajoules (TJ) from coal, and Central and South America produced 1,355,678 terajoules from coal (0.8%). When it comes to consumption, in 2019 the world overall consumed 39,786,218 TJ while Central and South America consumed 454,441 TJ (1.1%). In LAC the largest producers are Brazil (648,095 TJ), Mexico (293,837 TJ), Chile (255,788 TJ), and Colombia (200,528 TJ), while the largest consumers are Brazil (303,745 TJ), Mexico (105,150 TJ) and Colombia (95,014 TJ) (International Energy Agency, 2019).

Methane: In 2021, the world produced an estimated 356,889 kt methane emissions. Agriculture is the largest emissions source. These emissions represent 38% of the energy sector emissions. Central and South America produced an estimated 37,551 kt, which represented 10.5% of the global emissions in 2021. Brazil produced 19,556 kt representing 5.5% of global emissions, and Mexico produced 6,330 kt representing 1.8% of global emissions. Both countries are ranked in the top ten world emitters of methane in 2021 (International Energy Agency, 2022). Argentina, Venezuela, and Colombia are also large methane emitters, representing 1.4%, 1.2%, and 0.8% of global emissions, respectively. Given that most countries

in the region are committed to the Global Methane Pledge (except Venezuela), there are clear intentions of reducing methane emissions by at least 30% from 2020 levels by 2030.

Fossil fuel subsidies: The International Energy Agency's 2020 data on fossil fuel subsidies in LAC are shown in the following table. The total subsidy as a share of GDP does not exceed 1.5% in most of the countries except for Venezuela. The average subsidization rates of Colombia, Ecuador, and Mexico are relatively low, while Argentina, El Salvador, Trinidad and Tobago, and Venezuela have rates above 18%. Venezuela and Trinidad and Tobago have extremely high subsidies per capita. All countries have had strong reductions in fossil fuels subsidies since 2013; nevertheless, subsidy schemes need to be reevaluated (Alatorre, 2021).

Table 9 Fossil fuel subsidies in selected countries. Source: International Energy Agency, Fossil Fuel Subsidies Database (2020)[8]

Country[9]	Average subsidization rate (%)	Subsidy per capita ($/person)	Total subsidy as share of GDP (%)
Argentina	19%	85	1.0%
Bolivia	11%	23	0.7%
Colombia	3%	7	0.1%
Ecuador	3%	41	0.7%
El Salvador	18%	45	1.2%
Mexico	3%	13	0.2%
Trinidad/ Tobago	33%	229	1.5%
Venezuela	54%	167	6.8%

Deforestation: The global trend regarding deforestation shows that if the signing (Paris) countries achieve their goals of reducing deforestation and forest loss, by 2030 the world would go from 3.8 Gt CO2e per year to 0 Gt CO2e per year (Taylor et al., 2021).

An analysis of the driving forces of forest loss and forest degradation made by Curtis et al. (2018) shows that between 2001 and 2015 Latin America was the region with the highest forest loss, with 5.1 million hectares (Mha) deforested. LAC accounts for nearly a 33% of the world's forests, 50% of its tropical forests, and about 25% of its mangroves. Although the deforestation rates have slowed down over the past 15 years, they are still high. According to the Food and Agriculture Organization of the United Nations, between 2015 and 2020, South America lost 3 million hectares of forest every year, the second-highest total for any of the world's regions. Brazil (1.5 million hectares per year), Paraguay (0.3 million), and Bolivia (0.4 million) were listed in the top ten countries with the highest annual net loss of forest per year (Blackman, 2020).

Deforestation has multiple causes and depends on several variable factors. Arias-Gaviria et al. (2021) studied the drivers and effects of deforestation in Colombia. It was found that drivers operate differently and in different magnitudes across the country, and they can be legal and illegal activities. Some of the main drivers included agriculture, extensive livestock, land grabbing, colonization, and immigration phenomena, illegal mining, and coca crops. The authors conclude that policy instruments aimed to reduce deforestation requires a local analysis that encompasses a site-specific context and analysis (Arias-Gaviria et al., 2021).

In 2017, illegal coca crops in Colombia caused 24% of total deforestation (Erasso and Vélez, 2020). Some of the policies implemented to eradicate illegal crops have generated more deforestation. According to the Transnational Institute, the use of glyphosate and forced eradication of illegal crops causes coca and marijuana growers to move deeper and deeper into the jungle, running away from authorities and causing critical deforestation (Olson, 2022). Deforestation and the drug war also have an important link with gender. As mentioned before, environmental leaders, social leaders, and peace defenders constantly suffer gender-based violence, which has made the LAC region one of the most dangerous for women defending the environment (García, 2022). Moreover, the war against drugs has negatively affected the rate of incarcerated women. In Colombia, 46% of incarcerated women had committed drug-related crimes. About 81% of those were related to the cultivation, processing, and commercialization of drugs, but were not related to violence or criminal organizations. According to Dejusticia, the war on drugs is a war against vulnerable communities, which historically has meant a war involving low-income women and their families (Chaparro Hernández (n.d.).

There are some positive initiatives in the region that aim to

[8] International Energy Agency. Recovered from: https://www.iea.org/data-and-statistics/data-product/fossil-fuel-subsidies-database#subsidies-database

[9] The IEA measures fossil fuel consumption subsidies using a price-gap approach. This compares final end-user prices with reference prices, which correspond to the full cost of supply, or, where appropriate, the international market price, adjusted for the costs of transportation and distribution. The estimates cover subsidies to fossil fuels consumed by end-users.

reduce deforestation. For instance, the partners of the Land Restoration Projects in Latin America, also called the Initiative 20x20, have committed to restoring 50 million hectares of land by 2030. By 2014, the project had restored 8.2 million hectares, and 14.6 million hectares became new conservation areas. Another growing initiative is the Reducing Emissions from Deforestation and Forest Degradation, known as REDD+. More than a single initiative, it is a set of global efforts and forest-related activities that promote conservation, sustainable management of forests, and the enhancement of forest carbon stocks. The program gives financial value to the carbon stored in forests, so developing countries would receive payments based on their results in reducing deforestation and promoting afforestation, conservation and other sustainable activities (UN-REDD Program Collaborative Workspace, 2016).

REDD+ was developed in the agenda of the United Nations Framework Convention on Climate Change (UNFCCC) in 2005, and is now one of the most common policies in the AFOLU sector. The mitigation benefits from reducing deforestation could be diminished due to extreme climate-related events, like fires and droughts. Therefore, it is important to expand the implementation of initiatives like REDD+. This instrument is a cost-effective policy for mitigating climate change's impact and could supply a large share of global abatement of emissions from the AFOLU sector. A regional example is the Amazon Fund in Brazil, which was officially created in 2008 and has received financial support from the Brazilian Development Bank (BNDES), the Norwegian government, the Federal Republic of Germany and Petrobras, Brazil's largest oil company (Smith et al., 2014).

Transportation: According to the International Energy Agency, Central and South America produced 450 Mt CO2 from the transport sector in 2019, representing 5.4% of the world's total emissions from the transport sector. Most countries in the region have an increasing trend between 1990 and 2019, doubling or even tripling the emissions coming from the transport sector. Brazil started at 82 Mt CO2 in 1990 and ended at 194 Mt CO2 in 2019, Chile went from 9 Mt CO2 to 29 Mt CO2, Colombia from 16 Mt CO2 to 31 Mt CO2, Costa Rica from 2 Mt CO2 to 6 Mt CO2, and Honduras from 1 Mt CO2 to 4 Mt CO2 in the same time period. The OECD´s total emissions from the transport sector also had an increasing trend, although smaller; emissions went from 2,781 Mt CO2 in 1990 to 3,604 Mt CO2 in 2019.

Adaptation: The United Nations Framework Convention on Climate Change (UNFCCC) has created the NAP Central, where countries can upload their National Adaptation Plan (NAP). The countries in LAC that have submitted their NAPs are Brazil, Chile, Colombia, Grenada, Guatemala, Paraguay, Peru, Saint Lucia, Saint Vincent and the Grenadines, and Suriname (NAP Global Network). Uruguay has also submitted some documents to the UNFCCC platform. It is important to mention that the Caribbean region is the most vulnerable to climate change impacts (UNDP, 2019).

One example of adaptation policies can be found in Barbados' Roofs to Reefs Program (R2RP). This is a program that integrates mitigation and adaptation interests with social and infrastructure resilience to climate change. With support from the Ministry for Economic Affairs and Investment, the program's objective is to improve housing resilience and improve access to water and sanitation. In the case of Colombia´s National Adaptation Plan, the multi-sector governance framework that has been developed can be highlighted. The National System for Disaster Risk Management (SNGRD) manages disaster responses, and also helps to prevent disasters through improvements in territorial planning. Uruguay is also a good example of aligning its public expenditures and economic planning with the mitigation and adaptation of national policies, as they are prioritizing green and sustainable economic recovery (Cárdenas et al., 2021)

1.5.2.4 National laws and policies for the LCT & GE

In the 1980s and 1990s, most countries in LAC created their environmental ministries mirroring those in more developed countries. According to the IDB, today most policymakers in Latin America and the Caribbean know the importance of climate action. Costa Rica's National Decarbonization Plan 2018-2050 is a good example of laws that contribute to the LCT. The plan developed a roadmap to achieve net-zero emissions by 2050, and it includes specific targets in all sectors. A key component is the shift towards an electromobility solution. Costa Rica's 2018 legislation for a fossil fuel-free transport system mandates the deployment of public charging infrastructure and setting an EV sales target of a 5% increase by 2030, and 50% by 2040. Another example is Chile´s National Energy Strategy, which promotes renewable energy to reduce the country's dependence on generation from (and imports of) fossil fuels. Chile is the only country in LAC with a legal framework to reach a 20% share of unconventional renewable sources by 2025 (Cárdenas et al., 2021).

Brazil's Without Extreme Poverty Plan is an example of inclusiveness for poor and indigenous people. The plan generates employment opportunities for the sustainable use of natural resources, as established in the National Law No.3.135 State Policy on Climate Change and Law No. 53

State System for Protected Areas. In 2013, the program helped 8,500 families and covered 10 million hectares (Cárdenas et al., 2021).

Moreover, in 2022, the Parliament of The Bahamas approved the Climate Change and Carbon Market Initiatives Act. Its objective is to ensure the Bahamas will comply with the 2015 Paris Agreement through the implementation of national emissions reduction initiatives. In 2021 Colombia approved Law 2169/2021 whose objective is to promote low-carbon development through the establishment of goals to reach carbon neutrality and resilience. In 2020, the Dominican Republic approved Law 94-20, which aimed to include and promote environmental education into all levels of the country's schooling and academic system. The Grantham Research Institute on Climate Change and the Environment of the London School of Economics and Political Science created the Climate Change Laws of the World platform, where they organize information regarding the climate laws, policies, and litigation cases from each country. Out of the selected countries, Brazil has a total of 62 climate laws and policies, followed by Colombia with 39, Chile with 33, Costa Rica with 28, Dominican Republic with 18, Honduras with 16, and Haiti with 2 (Grantham Research Institute on Climate Change and the Environment, n.d)

The following table shows some of the most relevant equality policies and plans in the LAC region addressing gender issues. Almost every country has developed some sort of action plan and national policy, but there is still a long path to the effective implementation of all these plans and policies.

Table 10 Latin America and the Caribbean: equality policies and plans, 2016. Source: ECLAC, 2019

Country	Year	Name of the plan	Responsible entity
Belize	2013	Revised National Gender Policy 2013	National Women's Commission Ministry of Human Development, Social Transformation and Poverty Alleviation
Bolivia	2008	National Equal Opportunity Plan "Women building the new Bolivia in the interest of living well"	Department for Gender and Generational Affairs (VGAG) Ministry of Justice
Brazil	2013-2015	Third National Plan for Women´s Policies, 2013-2015	Office of the President Special Secretariat on Policies for Women
Chile	2011-2020	Gender Equality Plan 2011-2020	National Women's Service (SERNAM)
Colombia	2013-2016	Indicative Action Plan 2013-2016 of the National Policy for Gender Equality for Women	Office of the Advisory Council for Women's Equity
Costa Rica	2007-2017	III Action Plan of the National Policy on Gender Equality and Equity	National Women's Institute (INAMU)
Cuba	1997-2018	National Action Plan for Follow-up of the Beijing Conference	State of Cuba and Federation of Cuban Women
Dominican Republic	2007-2017	Second National Plan on Gender Equality and Equity (PLANEG II) 2007-2017	Ministry for Women's Affairs
Ecuador	2011-2017	National Agenda for Women and Gender Equality 2011-2017	National Council for Gender Equality
El Salvador	2014	National Women's Policy 2011-2014	Salvadoran Institute for the Development of Women (ISDEMU)
Guatemala	2008-2023	National Policy for the Advancement and Comprehensive Development of Women (PNPDIM) and Equal Opportunities Plan (PEO), 2008-2023	Presidential Women's Secretariat (SEPREM)
Honduras	2010-2022	Second Honduran Gender Equality and Equity Plan, 2010-2022 (II PIEGH)	National Women's Institute (INAM)
Jamaica	2011	National Policy for Gender Equality (NPGE)	Bureau of Women's Affairs (Gender Affairs), Gender Advisory Committee
Mexico	2013-2018	National Program for Equal Opportunities and Non-Discrimination against Women, 2013-2018 (PROIGUALDAD)	National Women's Institute (INMUJERES)
Nicaragua	2006-2010	National Gender Equality Program 2006-2010	Nicaraguan Women's Institute (INIM)
Panama	2012	Public Policy on Equal Opportunities for Women (PPIOM)	National Women's Institute (INAMU)

Paraguay	2008-2017	Third National Plan for Equal Opportunities for Women and Men, 2008-2017	Department for Women's Affairs of the Office of the President
Peru	2012-2017	National Gender Equality Plan 2012-2017 (PLANIG)	Ministry for Women's Affairs and Vulnerable Populations
Suriname	2013	Gender Work Plan 2013	National Bureau for Gender Policy Ministry of Home Affairs
Trinidad and Tobago	2009	National Policy on Gender and Development of the Republic of Trinidad and Tobago. Draft Document	Ministry of Community Development, Culture and Gender Affairs
Uruguay	2007-2011	First National Plan for Equal Opportunities and Rights 2007-2011	National Women's Institute (INMUJERES)
Venezuela	2013-2019	"Mamá Rosa" Plan for Gender Equality and Equity 2013-2019	People's Ministry of Women's Affairs and Gender Equality

Although there are plenty of policies and plans addressing gender, the relationship between LCT and GE is not very clear in these documents and national policies in LAC. According to the Energy HUB,[10] Energy Transition Guidelines in LAC do not consider gender equality, and 68% of public policy documents related to energy transition do not mention gender. For instance, Colombia mentions gender and has specific documents for gender and energy. Argentina, Paraguay, Bolivia, Suriname, Panama, Dominican Republic, Guatemala, Honduras, and Mexico mention gender in their public policy but do not have specific documents for gender and energy. Chile is the only country in the region that has specific documents for gender and energy. Finally, Brazil, Uruguay, Peru, Ecuador, Guyana, Costa Rica, Nicaragua, Belize, Jamaica, and Bahamas do not mention gender or have specific documents for gender and energy (Hub de Energía América Latina y el Caribe, n.d.).

LCT and GE policy instruments and initiatives have difficult roadblocks to overcome in LAC. First of all is the disconnection, mentioned before, between LCT and GE in public policy documents. Another challenge is the lack of investment, especially from the private sector. One reason is that public and private sectors have very different processes of financing, so it is important to find ways to merge both systems (Jiménez, n.d). Developing countries tend to face technical and institutional roadblocks, both in formulating and implementing environmental laws and linking these to the NDCs. There is a clear need in the region for a multi-sectoral long-term climate action plan that ensures human capital and financial resources, which is tied to sustainable outcomes and emissions reductions. Finally, there is a weak political will to enact climate action plans, which means enforcement and compliance policies are inefficient and imperfect.

1.5.2.5 Political economy of the LCT

Since the beginning of the 21st century, Latin America and the Caribbean have been involved in a fluctuating political sphere. Most countries have faced political instability with constant changes in the political regimes. A wave of progressive governments — Argentina (2003), Bolivia (2005), Brazil (2002), Chile (1990, 2014), Ecuador (2006), El Salvador (2009), Honduras (2009), Nicaragua (2006), Paraguay (2012), Uruguay (2004), and Venezuela (1998) — tried to challenge the assumptions of the neoliberal doctrine (Cálix, n.d.). Most of these progressive regimes eventually changed, as in Brazil in 2018 with President Bolsonaro, Argentina in 2015 with President Macri, or Chile in 2010 with President Pinera. Nevertheless, there is not a clear relationship between the total CO2 emissions of these countries and the political regimes that ruled them (IEA, 2022).

As corruption poses a major challenge in terms of development in LAC, it also affects regional efforts for LCT. The survey made by Hübner, Mignozzetti, et al. (2019) of 697 influential people in Latin America concluded that 73% of the respondents believed companies lobbying to protect fossil fuels will be successful in their goals. The survey also concluded that corruption would have a negative influence on the region´s capacity to face the challenges of climate change. For instance, the Vitol Group, one of the world's largest

[10] Hub de Energía América Latina y el Caribe. The HUB aims to concentrate information and promote the use and generation of data on energy in Latin America and the Caribbean in a single place, making it accessible, interactive, intuitive, comparable, and useful for its users. It also aims to reduce information gaps and promote knowledge creation for innovation, energy efficiency and better decision-making in the sector.

oil firms, recently was fined by United States authorities for bribes in Brazil, Mexico, and Ecuador (Kimani, 2020; Delgado et al., 2021).

The 2021 Capacity to Combat Corruption Index[11] measures corruption across countries. The third edition of AS/COA and Control Risks' CCC Index explored 15 Latin American countries' ability to detect, punish, and prevent corruption.

The ranking (1-10) for Latin America in 2021 was;

Uruguay (7.80 out of 10)
Chile (6.51)
Costa Rica (6.45)
Peru (5.66)
Argentina (5.16)
Brazil (5.07)
Colombia (4.81)
Ecuador (4.77)
Panama (4.55)
Dominican Republic (4.38)
Mexico (4.25)
Paraguay (4.08)
Guatemala (3.84)
Bolivia (2.43)
Venezuela (1.40)

The Economist Intelligence Unit's Democracy Index analyses the state of democracy worldwide. In 2020, Latin America and the Caribbean´s score was 6.09/10 which meant a decline for the fifth year in a row. Uruguay, Chile, and Costa Rica (highest to lowest score) were the only countries which have a full democracy and a score higher than 8 out of 10. On the other hand, Cuba, Nicaragua, and Venezuela experience authoritarian regimes. Other countries' scores range from fragile democracies (13) to hybrid regimes (5) (The Economist Intelligence Unit, 2020).

Even with the high levels of corruption and weak democracies, people in LAC still believe governments should act against climate change. According to Gray and Jackson (2020), in Colombia around 87% of the population believes the government needs to combat climate change, being ranked as first worldwide. Chile (83%), Peru (82%), Brazil (74%), Argentina (71%), and Mexico (69%) are also ranked in the top 30 countries.

It is very important to mention that Latin America and the Caribbean are the most dangerous regions for environmental defenders. According to Global Witness, 227 environmental activists were murdered in 2020, which constitutes the highest number ever recorded: Colombia (65), Mexico (30), Brazil (20), Honduras (17), Guatemala (13), Nicaragua (12), and Peru (6). Nicaragua, Honduras, Colombia, and Guatemala represent the top 4 environmental activist killings per capita in the world (Global Witness, 2021).

1.5.3 Assessment of gender inclusiveness in LCT visions

Most countries in the LAC region are fairly committed to inclusiveness in their actions plans concerning LCT; this is evidenced in the concepts and definitions used in the NDCs. The following table replicates the analysis done by Sophia Huyer (2017) relating the NDCs and their inclusiveness. It looks at the inclusion of gender terms, concepts, and differentiation in the NDCs to understand the level of commitment to GE that each country has. Countries like Chile, Colombia, Costa Rica, and Honduras have a clear commitment to inclusiveness, especially gender equality. Brazil, on the other hand, has a more summarized NDC which does not include concepts and references to gender inequality in the categories shown in the table. Gender vulnerability is the most common reference in the selected countries' NDCs, adaptation and mitigation are often included, and decision-making is the category where gender is least mentioned. Regarding other forms of inclusiveness, please see the table. The summary of selected countries' NDCs shows the inclusion of youth references in Colombia, Costa Rica, and Honduras, while all five countries include indigenous communities in their NDCs.

Table 11 Reference to gender inequality in NDCs. Source: Countries' NDCs

Country	Brazil	Chile	Colombia	Costa Rica	Honduras
Adaptation		yes	yes	yes	yes
Gender mainstreaming		yes	yes	yes	yes
Vulnerability	yes	yes	yes	yes	yes
Mitigation		yes	yes		yes
Capacity development		yes	yes	yes	
Resilience			yes		yes
Human rights			yes		yes
Decision-making				yes	yes
Agents of change		yes	yes		yes
Finance				yes	yes

[11] Americas Society (AS), and Council of the Americas (COA) (2021).

According to the UN Environment Program, 6 out of 33 (18.1%) environmental ministries in Latin America and the Caribbean are led by women. It is important to mention that not all the information is updated, but there is a clear gender gap in environmental ministry positions in LAC. When it comes to all ministries, the Gender Equality Observatory for Latin America and the Caribbean found that only Nicaragua and Costa Rica have more than 50% of their ministries led by women (ECLAC, 2019). Brazil was one of the worst cases with only 4.9% of ministries led by women (Gender Equality Observatory for Latin America and the Caribbean, 2019). Evidently, there is a wide variety in the numbers, which shows the diverse reality of the LAC region in terms of gender issues. It is important to highlight Chile´s case where the government led by Gabriel Boric has broken the quota record for the region; 14 out of 24 (58.3%) ministries are led by women. Additionally, María Heloísa Rojas was selected as Minister for the Environment (Alzate, 2022). On the other hand, during 2022 Colombia went through some legal problems because the gender quota for ministerial positions was not fully achieved (Portafolio, 2022). However, with the new administration for 2022-2026, Susana Muhamad was elected to lead the Environmental Ministry.

Gender inequality is present not only in the heads of ministries. In Colombia the presidency is advised by around 12 high-level councils. They cover issues like transparency, human rights, children and youth, gender, national security, disabilities, etc. In the 2020, 2021, and 2022 councils´ executive reports the gender high council was one of the least funded councils (except for disabilities, and human rights in some cases). This shows inequality even in the funding of the initiatives and policies for these government priorities (Presidencia de la República, 2022).

The LAC region is also lagging behind in terms of women's participation in the Women´s Energy Council.[12] The council comprises the 275 most influential women in the energy boardroom. North America´s participation is around 41.4%, Europe´s 36.5%, Asia´s 6%, Africa's 5.6%, and Latin America's only 4.8%. Clearly, there is a large opportunity to improve for this region (Zoghbi, 2021). Finally, it is important to mention that the existing gender patterns and traditions of inequalities tend to block women's ability to access green technologies and warning systems (UNDP, 2011).

1.5.4 Challenges and opportunities of the LCT & GE vision

Chile has a promising initiative and strategy for creating an independent national scientific body that formulates science-based recommendations (Cárdenas et al., 2021). In addition to this, Chile created the Inter-Ministerial Technical Team on Climate Change, which helps with the implementation of the recommendations from the independent scientific body. This helped Chile formulate a very complete NDC document, which includes a comprehensive policy framework for oceanic, coastal wetlands, forests, and peatlands conservation and management.

Another very promising initiative is the Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean, or Escazu Agreement. Adopted at Escazu, Costa Rica, on March 4, 2018, the agreement's objective is to guarantee the full and effective implementation in Latin America and the Caribbean of the rights of access to environmental information, public participation in the environmental decision-making process, and access to justice in environmental matters. Out of the 24 countries that signed the agreement in 2018, only 12 have ratified it and made it a national law. For instance, in Colombia, the ratification of Escazu has faced several political difficulties in Congress. Along with political will, it is important to strengthen regional integration so that positive climate action policy from one country can be replicated in another. So far, there are few regional efforts to achieve LCT and GE. Finally, the Renewable Energy Latin America and Caribbean (RELAC) initiative is very promising, as it is a regional effort made by 13 countries in LAC that have the objective of promoting cooperation between countries to achieve the goal of 70% of electric power generation from renewable sources by 2030 (OLADE, 2021).

Another important opportunity for GE in Colombia is based in the implementation of the Peace Accords. The Peace Accords are considered an international accomplishment for the Women, Peace, and Security UN agenda. It is an opportunity to reduce inequalities between rural and urban areas, women and men, and among the ethnic communities.

[12] The Energy Council started as a single conference in 2010. A decade later it has become the world's leading network of senior energy executives and continues to grow. The Energy Council is no longer just one singular conference, but a network followed by over 100,000 professionals around the globe. The network's primary mission is to connect energy executives to each other and to the finance and investment communities surrounding them.

There are 130 specific commitments that focus on women and gender, especially Point 1 - Agrarian Reform and the Illegal Crops Substitution Program. If these initiatives are not implemented completely and integrally, with the active participation of women in the decision-making process, the Peace Accord will not be possible. According to the Kroc Institute, in 2018 only 8% of the specific gender commitments were accomplished, compared to 25% accomplishment of the general commitments. There is a definite need to fully commit to and complete those initiatives that involve women (Instituto Kroc, 2019). Moreover, the Peace Accords represent an important environmental opportunity as violent conflict and human rights protection are linked to the protection of the environment and natural resources (García and Slunge, 2015).

Africa recently created the Africa Nationally Determined Contributions (NDC) Hub. It was launched in 2017 during the COP23 in Bonn, Germany. The main goal of the Hub is to provide information, tools, and data required to implement policy and achieve the Paris commitments in a coordinated way between African countries. For instance, the Hub has updated information regarding Africa´s share in global climate finance (African NDC Hub, n.d). It is an important opportunity for LAC to replicate this model and strengthen the climate integration in the region.

In recent years, there has been a growing movement of women in the energy and environmental sector. This has been represented by several women's associations, interest groups, networks, and cooperatives that work to change perceptions about the role of women in the energy sector. Their goals are to achieve gender equality, empower women, and to socialize with men so that the importance of the role and capacity of women is understood (Mujeres y Energía, ECLAC, 2020). The promotion of these interest groups is a great opportunity for strengthening the link between LCT and GE in the LAC region. Some examples of these women's groups are;

- Solar Women of Totogalpa (Mujeres Solares de Totogalpa). It is one of the pioneer groups of women in energy in Nicaragua and Central America.
- Gender and Energy Advocacy Network (Red de Incidencia en Género y Energía, RIGE). Women agents of change in the energy sector in Nicaragua.
- Association for Leadership and Social Ascension (Asociación para el Liderazgo y Ascenso Social, ALAS), an organization that seeks to promote a new generation of women and men with gender sensitivity to senior management positions in decision-making bodies in the private and institutional sectors.
- Network of Women in Renewables in Latin America (Red de Mujeres en Renovables de América Latina, MERL). They promote the development of women in renewable energies, proposing a paradigm shift in the sector.
- Gender, Society and Environment Network (Red Género, Sociedad y Medio Ambiente, GESMA). It was founded in 2015 and its objectives are to articulate and promote a work agenda for research and academic training on gender, society, and the environment.
- Women in Renewable Energy Mexico (Mujeres en Energía Renovable México, MERM), an association of national and international manufacturers, developers and suppliers for renewable energies in Mexico.
- Women's Network in Renewable Energy and Energy Efficiency (Red Mujeres en Energía Renovable y Eficiencia Energética, REDMEREE). It was launched in April 2016 and aims to promote a renewable energy and energy efficiency sector that promotes sustainable development.
- Dominican Association for the Development of Women (Asociación Dominicana para el Desarrollo de la Mujer (ADOPEM ONG).

Turning to the challenges, according to the Gender Equality Observatory for Latin America and the Caribbean, the GE national plans lack a monitoring and evaluation system that includes clear indicators for the analysis of each action or goal, which make it difficult to evaluate their progress and effectiveness. GE plans are still a work in progress, however; intersectorality has not been included and analyzed enough as it has not been part of the institutional culture of Latin America governments. The incorporation of intersectorality requires the active participation of diverse sectors in the development of the GE plans. Additionally, the budgetary gender inequality highlights inconsistencies in the development of GE policies, meaning that GE plans should be financed equally to other strategic national plans (ECLAC, 2019).

It is important to mention the cultural and traditional barriers that might appear in the LCT. LAC cultures and traditions might, in some cases, become a barrier to the implementation of policy instruments for LCT and GE. For instance, the study made by Rhodes et al. (2014) found that in Peru the transition to clean cooking might be difficult since women continue to use traditional stoves to maintain traditional food preparation practices, which are relevant components of cultural identity (Ravillard et al., 2020).

The roadblocks for these and other promising LCT and GE initiatives tend to be related to a weak political will to act

against climate change and promote the LCT. Although in some cases weak political will can be caused by corruption and clientelism, it is also caused by a lack of evidence, knowledge, and accessible and understandable information related to climate change. Therefore, there is a potential knowledge and research gap regarding the relationship between politics and LCT, and regarding the different factors that might affect political will in relation to LCT.

1.6 Policy instruments for LCT & GE

1.6.1 Introduction - Regional trends

Under current policies, it is extremely challenging, and even out of reach in some cases, for the LAC region to achieve the NDC goals, the Paris commitments and the LCT (Cárdenas and Orozco-Sanchez, 2022). Nevertheless, there are multiple examples of policy instruments for Low-Carbon Transition and Gender Equity in Latin America and the Caribbean, but they still face several difficult challenges. Most if not all common policy instruments can be found in the region, from carbon taxation to ETS and fossil fuel taxes and subsidies. Some of the complex challenges these instruments face are political will and political feasibility, lack of knowledge and technical support, and the need for regional and global cooperation. These challenges have limited the development of national policy instruments for LCT and GE. So far, only five countries — Argentina, Chile, Colombia, Uruguay and Mexico — have carbon taxes, while Mexico is the only country that has implemented an ETS. Regarding fuel taxes and subsidies, there is a wide variety of scenarios in the region. The average subsidization rates vary from 3% in Colombia, Ecuador, and Mexico to 33% in Trinidad and Tobago and 54% in Venezuela. Nevertheless, all countries have had strong reductions in fossil fuels subsidies since 2013. Other policy instruments include renewable energy subsidies, technology standards, payment for ecosystem services, forestry, and land use. Promoting and implementing renewable energy sources is critical to meet the Paris Agreement and the NDCs. Finally, the chapter examines the inclusiveness of these instruments, taking a deeper look at the role of women and indigenous and poor communities in each policy instrument. Although the region has made substantial progress in access to clean cooking and electricity, there is still a huge amount of progress to be made.

1.6.2 Tax on Carbon Emissions

1.6.2.1 Taxes and fees

Several economists argue that carbon taxation and carbon pricing are very powerful policy instruments to combat climate change (García and Sterner, 2021). According to the Carbon Pricing Dashboard from the World Bank,[13] Argentina, Chile, Colombia, Uruguay and Mexico have a carbon tax scheme already in place. As seen in the next table, the models were implemented between 2014 and 2022. Two different states in Mexico have also adopted carbon tax schemes: Zacatecas and Tamaulipas with carbon tax prices of US$10/tCO2e and US$13/tCO2e respectively, which is substantially higher than most models in LAC. According to Cardenas (2021) the optimal carbon tax price in the LAC region to achieve the targets of the Paris Agreement would be around US$40/tCO2e.

Looking at the total CO2 emissions of four countries, the implementation of the carbon taxes seems to have a positive correlation with a reduction of emissions in Mexico and Argentina, which is not the case for Chile and Colombia. It is important to clarify that the positive correlation between a reduction in CO2 emissions (IEA, 2020)[14] and the implementation of the carbon tax does not necessarily imply a causality. In the case of Chile, Vera and Sauma (2015) and Mardones and Flores (2017) argue that the implementation of the carbon tax did not generate the expected CO2 reduction. The carbon tax imposed in Chile is expected to reduce emissions by only 1% in the 2014–2024 period, meaning that the carbon tax will have larger effects in raising tax revenues rather than reducing emissions.

Calderon et al. (2016) studied several possible scenarios of climate policy, carbon taxes, and abatement targets in Colombia. It was found that these policy instruments have significant potential to reduce CO2 emissions, but is it is likely that the GDP will be affected by these measures. The authors conclude that the design of new and future climate policy instruments needs to include evaluation of the costs and benefits of each measure to be taken. Another estimation made by Titelman et al. (2022) found that with the implementation of carbon taxes, Brazil and Colombia will face a net revenue increase as revenue from carbon taxes will offset losses from oil exports. In the case of Mexico, revenue could make up for half of the losses.

[13] World Bank. Carbon Pricing Dashboard. Recovered from: https://carbonpricingdashboard.worldbank.org/

[14] https://www.iea.org/data-and-statistics/data-browser?country=COLOMBIA&fuel=CO2%20emissions&indicator=TotCO2

When it comes to the main goal of each carbon tax, they vary depending on the country. For instance, Argentina´s carbon tax aims to replace past fuel taxes in order to have macroeconomic stability, not to increase energy prices or increase tax revenue (Cárdenas et al., 2021). Chile´s carbon tax revenues are intended to finance education. During 2020, Chile collected US$165 million from the carbon tax.

Carbon taxes in Latin America are full of challenges. First, there is not enough political support. Although LAC carbon taxes cover a substantial share of GHG emissions, the low rates and numerous exemptions limits their scope of action (Cárdenas et al., 2021). The limited political support can be caused by clientelism and corruption, but also by public opposition to carbon taxes. This opposition could be grounded in distributional and economics preoccupations (Cárdenas et al., 2021).

According to Cárdenas et al. (2021), Latin American carbon taxes lack compensation and redistribution mechanisms for different segments of the population, so they can be affected by these taxes. Additionally, there is not enough regional cooperation, which is very important as the LAC region is more connected than ever (Cárdenas et al., 2021). Carbon taxes can increase the costs of fuels and transportation, and thus the price of food and other essential goods. Given the high levels of poverty and inequality in the LAC region, carbon taxes tend to have low social acceptance and political support. The recent cases of social unrest in Colombia and Ecuador demonstrate that citizens are not yet ready for subsidies reductions and increases in fuel (Cárdenas and Orozco-Sanchez, 2022). Cárdenas et al. (2021) suggest that policymakers should embrace a gradual approach to carbon taxes where the social cost of carbon pricing is countered, by offering support to the most affected households, such as conditional cash transfers.

Table 12 Carbon tax models in Latin America and the Caribbean (2022). Source: Carbon Pricing Dashboard

Country	Year of implementation	Share of the country´s GHG emissions covered	Sectors and fuels covered	Price level	Government revenue (2022)
Argentina	2018	20%	Carbon tax applies to CO2 emissions from all sectors, with some exemptions	US$5/tCO2e	US$272 million
Chile	2017	29.4%	Carbon tax applies to CO2 emissions mainly from the power and industry sectors	US$5/tCO2e	US$160 million
Colombia	2017	23%	Carbon tax applies to GHG emissions from all sectors with some minor exemptions	US$5/tCO2e	US$89 million
Uruguay	2022	0.1%	Carbon tax covers gasolines for any use	US$137/tCO2e	--
Mexico	2014	44%	Carbon tax applies to CO2 emissions from all sectors, and covers all fossil fuels except natural gas	US$4/tCO2e	US$314 million

More countries in LAC should implement carbon tax models. The OECD and the IMF have repeatedly recommended the use of clear carbon pricing policies that allow forward planning for businesses. Sweden is a successful example of the use of carbon pricing policies, where carbon prices were implemented about three decades ago and have risen from EUR 23 per ton to EUR 110 per ton of carbon emissions. This has significantly reduced emissions, and the country has maintained economic prosperity (Government Offices of Sweden, 2020; Andersson, 2019; OECD, 2020). Additionally, carbon tax revenues could be distributed to support low-income households or communities and programs to help those affected by the transition to a low-carbon economy or the effects of climate change (Volz, 2020).

The fact that only four countries have implemented carbon taxing is evidence that policy instruments like this still need to be developed and adopted with more forcefulness. Stevens (2021) studied the implementation process in Mexico, and found that it was politically viable given the presidential system and the centralization of the budgetary process. Either way, the details of the taxing model were determined in collaboration with more stakeholders (Stevens, 2021).

1.6.2.2 Tradable emission permits

Currently, Mexico is the only country in the LAC region that has successfully implemented an Emissions Trading System (ETS) up to 2022. Chile and Colombia have a clear intention of implementing an ETS, but they are still under consideration, in the legislative process, or in the public policy formulation stage (Carbon Pricing Dashboard). Mexico´s three-year "test program" is made up of a two-year pilot phase and an additional transition year. The pilot started in 2020 and is expected to be fully operational by 2023. The main objective of the pilot phase is to improve the quality of emissions data and build capacity in emissions trading.

With Mexico´s example, one of the biggest challenges was the need for technical support and assistance. The design of this ETS program counted on support from the German government and the World Bank (Gobierno de México, 2021). Another challenge is related to the companies and entities that make up part of the ETS, as there are several requisites needed to take part in the scheme. As the ETS is a very new method of reducing carbon emissions, many companies do not understand the concept, the intentions, and the need to regulate these emissions, therefore the compliance level might be low. Another limitation to the emergence of ETS in LAC is the lack of trust in institutions and their enforcement capacities (Cárdenas et al., 2021).

It is difficult to evaluate the ETS in LAC due to the few examples and recent implementation of these schemes in the region. There is not yet an evaluation of Mexico´s ETS and there is not enough information about the social acceptance of it. According to Gutierrez González (2021), the goal of an ETS in Mexico is to help achieve the NDC, which aims to reduce 22% GHG emissions by 2030, or by 36% with international support. But just as with carbon taxes, there is a chance these schemes will increase the price of fuels, transportation, and food; therefore, public opposition might arise.

Table 13 ETS models in Latin America and the Caribbean. Source: ICAP, 2020

Country	Year of implementation	Observations	Sources of information
Chile	Under consideration	The government is working on a Framework Law on climate change that sets a carbon neutrality goal for 2050. As of 2021, the draft law is still in legislative process after it was submitted to Congress in January 2020. The Ministry of the Environment would certify the emissions limits. These reductions could then be sold to other regulated entities to help those entities meet their regulated emissions limit.	Ministries of Environment and Energy launch cooperation project to prepare carbon market
Colombia	Under consideration	On July 27, 2018, Colombia adopted its climate law, which outlines provisions for the establishment of an ETS. The climate change law establishes a 3-year timeline to regulate all its instruments. The ETS will complement the existing carbon tax and the annual cap will be aligned with Colombia's national GHG emission reduction targets.	Colombia's experience developing its carbon pricing policy mix Law 1931 from 2018 – article 29
Mexico	2020	On January 1, 2020, the Mexico pilot ETS started operation as part of a two-phase process to gradually establish a fully-fledged ETS for promoting cost-effective emission reductions without harming the international competitiveness of covered sectors. The ETS model covers 40% of Mexico´s total GHG emissions, and the emissions annual cap is around 273.1 MtCO2e (2020).	Official provisional website of the ETS pilot phase

Oliveira et al. (2019) developed a hypothetical model in which Latin America implemented an ETS regulating carbon emissions from the electricity generation and energy sectors. The model found that it is possible to curb the CO2 emissions at a minimum cost, expanding opportunities for mitigation. Oliveira suggested ETS should include land use and forestry emissions. Along this same line, Benavides et al. (2021) found that the possible implementation of an ETS in Chile will help the country meet its mitigation commitments made in the NDC. Again, it was concluded that forestry, agriculture, and the waste sector should be included in the implementation of ETS. Real estimations have been conducted in China, where the world's largest ETS was implemented in 2013. Wen et al. (2021) estimated reductions of 12.8% in total industrial CO2 emissions, while Cui et al. (2021) estimated reductions of 16.7% of total emissions.

1.6.3 Fuel-Based Tax

1.6.3.1 Taxes: Coal access and other charges added to fuel cost

According to the OECD´s Taxing Energy Use Index (2019),[15] Chile, Mexico, Argentina, Colombia, and Brazil have implemented fuel excise taxes for road use. Chile has an average effective carbon tax (road) of 90.6 EUR per tCO2,[16] while Mexico (89.6), Argentina (61.4), Colombia (43.6), and Brazil (3.1) have lower rates. Regarding fossil fuel taxes, Ecuador, Guatemala, Jamaica, Dominican Republic, Costa Rica, and Uruguay have implemented specific fossil fuel taxes. The following table shows the effective carbon rates.[17]

Table 14 . Fossil fuel tax rates 2018. Source: OECD Taxing Energy Use Index (2019)

Country	Average Effective Carbon Rate (ECR) Coal and other solid fossil fuels, EUR per tCO2	Average ECR on fuel oil, EUR per tCO2	Average ECR on diesel, EUR per tCO2	Average ECR on gasoline, EUR per tCO2
Simple Average – OECD	13.39	30.68	123.52	224.04
Costa Rica	0	12.14	79.57	161.54
Dominican Republic	0	27.57	49.88	134.73
Guatemala	0	0	14.28	60.2
Jamaica	0	17.19	87.87	108.46
Uruguay	0	1.79	4.07	273.49
Ecuador	0	-17.34	-90.33	-90.72

1.6.3.2 Fossil Fuel Subsidies reforms

Estimates from the OECD and the IEA indicate that governments worldwide spent USD 478 billion in fossil fuel support and subsidies in 2019, more than double the support received by renewable energy sources (OECD, 2020; IEA, 2019). Fossil fuel subsidies have proven to be inefficient policy instruments in delivering affordable and accessible energy because, historically, they have been wrongly targeted. For the OECD, the phase-out of fossil fuel subsidies is a global recommendation (OECD, 2020).

As mentioned before, the average subsidization rates of Colombia (3%), Ecuador (3%), and Mexico (3%) are relatively low, while Argentina (19%), El Salvador (18%), Trinidad and Tobago (33%), and Venezuela (54%) have rates at or above 18%. Venezuela, Trinidad and Tobago have extremely high subsidies per capita. All countries have had strong reductions in fossil fuels subsidies since 2013; nevertheless, subsidy schemes need to be reevaluated (Alatorre, 2021, IEA, 2020) .[18] According to the IMF, countries with poorer institutions that are energy rich tend subsidize more. Countries in Central America are an example.

In 2013, energy subsidies in LAC amounted to $86 billion USD (2% regional GDP), and in 2015 about $45 billion USD due to the decline in oil prices. According to Jewell et al. (2018), the resources used for fossil fuel subsidies could cover a large part of the investment needed to achieve the SDG goals. According to Cárdenas et al. (2021), it could cover 60% of the investment needed in Bolivia and 45% in El Salvador. Additionally, it is estimated that the removal of all subsidies could lead to a reduction of 5% of total emissions compared to the baseline scenario.

Fossil fuel subsidies reforms tend to be difficult because they have been associated with negative short-term economic and social consequences, especially when the subsidies have existed for a long time, because people perceive them as entitlements and will not support their elimination. As a consequence, many countries that have started reforms have not yet finished their efforts. The experience with energy subsidies reforms in LAC shows that reforms are more likely to succeed if business cycles, oil price cycles, and political context are all considered. Positive experiences have occurred

[15] Compare your country. Recovered from: https://compareyourcountry.org/taxing-energy/en/1//ranking/

[16] The sum of average explicit carbon tax and average fuel excise tax.

[17] Compare your country. Recovered from: https://compareyourcountry.org/taxing-energy-use-for-sustainable-development

[18] International Energy Agency. Recovered from: https://www.iea.org/data-and-statistics/data-product/fossil-fuel-subsidies-database#subsidies-database

when oil prices have fallen, and the reforms have been implemented gradually (Di Bella et al., 2015).

1.6.4 Emission pricing and market experiences and challenges

Emission pricing and market-based policy instruments have faced multiple challenges in their short history of implementation in LAC. There are some environmentalists and social groups that disagree with environmental taxes, sometimes motivated by risks to employment and sometimes by distributional injustices. In general, it is a concern if these taxes and policy instruments are regressive. Environmental taxes can be regressive when household expenditures on carbon-intensive goods represent an outsize share of the income of low-income families. In this case, there have been proposals to implement transfer programs to the most affected families. Cronin et al. (2019) and Metcalf (2009) have described a carbon tax scheme for the United States that was both effective at reducing emissions and also neutral (not regressive) in terms of revenue and distribution. According to Klener et al. (2018), there are several policy options to limit the regressive effects of environmental taxes: transfers to affected firms, tax cuts for firms, transfers aimed at hard-hit households, and progressive and other tax cuts for households. On the other hand, there are studies that show that carbon pricing can be progressive. Dorband et al. (2019) found that for countries with per capita income lower than $15,000 per year, carbon pricing is, on average, progressive. Additionally, Sterner (2012) found that for more than 20 low-income countries, fuel taxes were in fact progressive. The definitive confirmation of this premise for developing countries could serve as an argument against public opposition to carbon pricing (García and Sterner, 2021).

Determining the optimal price, rate, or tax is also a common challenge for policymakers. There are several factors that should be taken into account in order to determine the optimal tax rate or carbon pricing mechanism. Political, economic, social, cultural, technical and many other factors are relevant. Additionally, evaluating such policy instruments is also a very challenging exercise given the complexity of the variety of emissions and the high level of technology needed to measure emissions. Without impact evaluations of each policy instrument, it is difficult to determine their effectiveness (García and Sterner, 2021).

It is especially difficult to evaluate policy instruments that aim to reduce emissions from AFOLU, compared to policy instruments focused on emissions from fossil fuels. Emissions from land-use change, including deforestation and agriculture, tend to be difficult to monitor and measure, which hinders the development of a price mechanism (Kerr et al., 2017). Given that in the LAC region one of the main sources of emissions is AFOLU, it is a challenge for the countries to evaluate the reduction in emissions (Lamb et al., 2021; García and Sterner, 2021).

There are also political challenges that emission pricing instruments face. According to García and Sterner (2021), political feasibility remains one of the most important barriers to the implementation of carbon pricing. The ways in which environmental taxes affect different political actors directly affects the political feasibility of climate actions and regulations. Brulle (2018) estimated that from 2000 to 2016, $2 billion USD were spent on lobbying against climate change legislation in the U.S. Fossil fuel, transportation, and trade were the major sectors involved in the lobbying. Brulle concluded that expenditures on lobbying appear to be related to the introduction of climate legislation.

Another challenge involves global cooperation and the SDG 17. García and Sterner (2021) make an argument about carbon leakage, where there is a need for a single carbon price across and within countries, otherwise some countries might take advantage of the climate efforts being made by other countries. Given the wide variety of incentives to undertake climate mitigation actions, countries will act differently in relation to carbon pricing. According to the authors, carbon leakage might occur when emission reductions made by one country or group of countries increase market prices, which can be seen as an incentive for other countries to increase their fossil fuel production (Hoel, 1994). The possible presence of carbon leakage demonstrates the importance of coordination in climate policy at the regional and global levels. Partnerships and accords like the Paris Agreement are needed for global carbon pricing (García and Sterner, 2021).

Finally, Carattini, Carvalho, et al. (2018) and Klenert et al. (2018) showed how public acceptance of environmental taxes can increase when tax revenues are invested in the most affected households and when government effectively communicates the nature and impact of carbon tax and emissions pricing (García and Sterner, 2021).

1.6.5 Other instruments

Since the 1980s, in LAC price subsidies and regulations have been promoted in order to scale up renewable energy sources. Although these strategies seemed inefficient, in 2015 wind and solar energies were cheaper than traditional fossil fuels. Promoting and implementing renewable energy sources is critical to meet the Paris Agreement and the NDCs. Colombia, for instance, has led the collective target of achieving 70% of renewable energy use by 2030 (Cárdenas

et al., 2021).

Another policy instrument to promote renewable sources of energy is found in clean energy auctions. Since 2006, Brazil and Uruguay started clean energy auctions and they have proven to foster the development of renewable projects. However, these actions need several regulatory policies in order to be efficient. After Brazil and Uruguay opened the first clean energy auction in the region, several countries followed: Peru (2009), Honduras (2010), Panama (2011), Guatemala (2012), EL Salvador (2013), Jamaica (2013), Belize (2014), Mexico (2015), Chile (2015), Argentina (2016), Costa Rica (2016), and Colombia (2019) (Cárdenas et al., 2021). One of the main advantages of auctions is that they signal long-term policy goals which benefit the investment environment as they set regulations and transparency in the market process. Although clean energy auctions have grown in LAC, they are not always successful. Colombia in its first attempt failed to meet with the competition requirement and investment expectations, mainly due to the complexity of these policy instruments (Viscidi and Yepez, 2019).

In Latin America and the Caribbean, the lack of conservation regulations, weak institutions, land property problems, and increasing cattle and livestock consumption have all contributed to expanding the agricultural frontier, reducing forest coverage and increasing emissions (Cárdenas et al., 2021). Some LAC countries have addressed these problems through payment for ecosystem services,[19] forestry and land use solutions. Costa Rica, for instance, demonstrated strong efforts in reforestation as forest coverage. The country's forest cover represented 77% of the country's territory in 1943 and decreased to 41% in 1986. Through strong fiscal and financial incentives for reforestation, payment for environmental services, and cattle ranch subsidy reforms, the country reached 52.4% of forest coverage by 2010 (Cárdenas et al., 2021). Without policy instruments that avoid the expansion of the agricultural frontier, and measures for sustainable agriculture and livestock farming, it will be very challenging, if not impossible, for LAC to achieve the NDC goals (Cárdenas and Orozco-Sanchez, 2022).

In this context, the United Nations Convention to Combat Desertification (UNCCD) developed an impact investment fund for Land Degradation Neutrality: the LDN fund. During the COP21, the firm Mirova (Natixis Investment Managers) was selected to manage a US$100 million fund from public, private, and philanthropic sectors (UNCCD, 2020). The fund's objective is to finance projects and initiatives that focus on sustainable land management and land rehabilitation, including sustainable agriculture, livestock management, agro-forestry, and forestry. The first investment was made in Peru, with the objective of reforestation of 9,000 hectares, reducing CO2emissions by 1.3 million tons, and helping 2,400 farmers (Cárdenas et al., 2021).

Regarding new technology standards and developments that can help the LCT, it is important to highlight the regional effort made to promote Electric Vehicles (EV). Purchase subsidies and tax exemptions have played a major role in promoting these technologies, as they reduce the cost of EV and scale their use. But EV are still expensive and require national and local strategies to keep growing. For example, Colombia, Costa Rica, and Ecuador have reduced the EV Value Added Tax, and Brazil, Colombia, Costa Rica, Mexico, and Argentina lowered tariffs on EV (Cárdenas et al., 2021).

In Uruguay, technology standards are being incorporated into livestock farming. Uruguay is responsible for only 0.0538% of global GHG emissions, but 73.8% of the country's emissions come from the agriculture sector (Taylor et al., 2021). The country needs to address the issue of emissions from agriculture. In partnership with the private sector, research has been developed for the utilization of more technology in farming to reduce emissions, which for Uruguay has meant more competitive products to position in other markets (Alvarez-Hess et al., 2019).

Just as in the case of Uruguay, for the LAC region reducing the cattle and livestock production footprint must be viewed as a priority and a competitiveness issue for a region that produced 16% of total global food exports in 2015. This is because the global market of agricultural and livestock products is constantly enforcing environmental regulations. For example, France, Germany, and the UK recently announced that some livestock exports from LAC would be conditioned on the adoption of low-carbon agriculture practices. This wouldn't be the first time the European market has asked for better policies. In 1990 some countries in the region had to adapt to comply with human and social regulations to access the European flower market (Cárdenas et al., 2021). Additionally, to reduce cattle and livestock production, global meat consumption should be reduced. According to the IEA, reducing meat consumption globally

[19] More related information can be found in the appendix.

could reduce GHG emissions by more than 1 gigaton CO2-eq by 2050 (Cárdenas and Orozco-Sanchez, 2022).

Some countries have adapted to these new environmental regulations. For example, Brazil´s private sector is actively investing in the decarbonization of the bovine meat supply chain. The Rural Sustentável is a low-carbon agricultural program. Launched in 2013, it promotes sustainable rural development, conservation of biodiversity, and climate protection. It counts on the support of the Ministry of Agriculture, the IDB, and the Brazilian Institute for Development and Sustainability. The funding of this program comes from the United Kingdom's Department of Environment, Food, and Rural Affairs, and the support of Banco do Brazil and Embrapa. With funding of US$30 million, Rural Sustentável has positively impacted and benefited around 18,570 people and has help prevent the degradation of 36,038 hectares and the deforestation of 8,550 hectares, which has led the country to a reduction of 8.9 million tons of CO2.

Finally, there are the debt-for-climate swaps and debt-for-nature swaps. These take place when creditors provide debt relief to indebted governments in exchange for investments or commitments to protect the environment, biodiversity, etc. These instruments seek to free national financial resources so governments can invest in climate solutions in their territories without sacrificing resources assigned to other goals. Although uncommon, these instruments have been implemented for decades. An estimated 34 out of 59 developing countries that are most vulnerable to climate change impacts also have high financial instability and fiscal risks, which is the reason that debt swaps can be a practical solution for developing countries as they reduce their debts while protecting the environment and possibly reducing their risk of climate impacts (International Monetary Fund, 2022). Recent debt-for-nature swaps have taken place in Latin America, specifically in countries like El Salvador, Colombia, Jamaica, Peru, Costa Rica and Chile, with the US and Germany the main creditors (Yue and Nedopil Wang, 2021). An example of this is Belize, which recently signed a debt-for-nature swap with The Nature Conservancy that helped reduced the external debt by around 10% of national GDP (Owen, 2022)

1.6.6 Intersectional Inclusiveness of these policy instruments

The LAC region has made some progress in the development of gender equality initiatives. An important advance is the construction of national equality plans. Most countries in the region developed these plans through participatory processes and consultation with civil society. Brazil, for example, held a series of national conferences to develop public policies for women. Brazil's Third National Conference on Policies for Women was held in December 2011, and it was attended by 200,000 women (ECLAC, 2019).

Another very common initiative in LAC that addresses gender equality is the adoption of quotas in government. Between 2019 and 2020, ten countries of LAC approved a large number of gender parity political-electoral laws (UN Women, 2021). This led to an important rise in the proportion of women in national parliaments and municipal councils all over the region. Colombia´s quota law (581/2000) established that 30% of administrative positions be filled by women. In 2014, 59.7% of all bodies countrywide achieved at least 30% of positions filled by women (Administrative Department of Public Functions of Colombia, 2014). More women in parliaments might lead to stronger and better climate policies. Mavisakalyan and Tarverdi (2019) found a positive relationship between female representation and more stringent climate change policies.

1.6.6.1 Energy Access and Inclusiveness

Energy has become an absolutely essential resource for development in the 21st century. It plays a major role in facilitating access to fundamental necessities like clean water, sanitation, health care, and the provision of lighting, cooking, transportation, and telecommunication services. In order to achieve development goals, it is important to include climate change impacts and gender equality principles in energy regional policies (UNDP, 2013[20]).

In this century LAC has achieved some critical development standards. By 2020, 89% of the Central and South American population had access to clean cooking. This meant that 445 million people had access, but 55 million more still live without access to clean cooking. Haiti, Honduras, Guatemala, Nicaragua, and Paraguay are the most worrying cases, with only 5%, 45%, 50%, 56%, and 69% of their populations, respectively, having access to clean cooking (IEA, 2022).

Table 15 Access to Clean Cooking in Central and South America. Source: IEA, World Energy Outlook- 2021[21]

[20] UNDP. Recovered from: https://www.undp.org/sites/g/files/zskgke326/files/publications/PB4-AP-Gender-and-Energy.pdf

[21] International Energy Agency. Recovered from: https://www.iea.org/data-and-statistics/data-product/sdg7-database#access-to-electricity

Access to Clean Cooking, Summary by Region							
	Proportion of the population with access to clean cooking					Population without access	Population relying on traditional use of biomass
						(million)	
	2000	2005	2010	2015	2020	2020	2020
Central and South America	80%	83%	86%	88%	89%	55	49
Argentina	95%	>95%	>95%	>95%	>95%	<1	<1
Bolivia	63%	68%	76%	83%	86%	2	2
Brazil	89%	92%	94%	>95%	>95%	9	8
Colombia	78%	83%	87%	91%	94%	3	3
Costa Rica	89%	91%	92%	94%	>95%	<1	<1
Cuba	68%	73%	77%	79%	81%	2	<1
Dominican Republic	84%	87%	87%	89%	92%	<1	<1
Ecuador	89%	93%	94%	94%	94%	1	<1
El Salvador	58%	68%	77%	85%	90%	<1	<1
Guatemala	41%	38%	38%	43%	50%	8	8
Haiti	<5%	<5%	<5%	<5%	<5%	11	11
Honduras	31%	38%	43%	45%	45%	6	5
Jamaica	76%	83%	86%	85%	84%	<1	<1
Nicaragua	34%	40%	45%	51%	56%	3	3
Panama	>95%	>95%	>95%	>95%	>95%	<1	<1
Paraguay	49%	49%	58%	65%	69%	2	2
Peru	43%	56%	66%	76%	83%	6	5
Trinidad and Tobago	>95%	>95%	>95%	>95%	>95%	<1	<1
Uruguay	>95%	>95%	>95%	>95%	>95%	<1	<1
Venezuela	>95%	>95%	>95%	>95%	>95%	<1	<1
Other Central and South America	82%	86%	89%	92%	93%	<1	<1

Regarding electricity access, it is important to mention that 97% of Central and South America has access to electricity, meaning that 17 million people still live without access. Again, the case of Haiti is extremely worrying, with only 39% of the population having access to electricity. Although there is some progress made in LAC regarding energy access, there are some communities and social groups that are marginalized and excluded from such progress. There is also a large urban-rural gap in electricity access, with a 14-percentage-point difference between urban (99%) and rural (85%) contexts in LAC for 2020.

Access to electricity is very important for productivity. Studies from Brazil have shown that girls in rural areas with access to electricity are 1.5 times more likely to complete primary education by the age of 18 than girls in rural areas without access to electricity. Access to electricity also correlates with a 59% increase in wages for rural females (United Nations, UN Women, 2022).

Table 16 Electricity Access in Central and South America. Source: IEA, World Energy Outlook-2021[22]

[22] International Energy Agency. Recovered from: https://www.iea.org/data-and-statistics/data-product/sdg7-database#access-to-electricity

Electricity Access in Central and South America								
	Proportion of the population with access to electricity							Population without access (million)
	National					Urban	Rural	
	2000	2005	2010	2015	2020	2020	2020	2020
Central and South America	88%	91%	94%	96%	97%	>99%	86%	17
Argentina	95%	97%	99%	99%	99%	>99%	85%	<1
Bolivia	55%	65%	79%	88%	88%	99%	61%	2
Brazil	95%	97%	99%	>99%	>99%	>99%	98%	<1
Colombia	87%	92%	96%	97%	97%	>99%	81%	2
Costa Rica	97%	98%	>99%	>99%	>99%	>99%	97%	<1
Cuba	94%	96%	97%	>99%	>99%	>99%	>99%	<1
Dominican Republic	92%	94%	96%	97%	98%	98%	96%	<1
Ecuador	89%	92%	93%	98%	97%	>99%	92%	<1
El Salvador	80%	88%	92%	95%	98%	99%	94%	<1
Guatemala	74%	84%	83%	92%	92%	>99%	83%	1
Haiti	34%	34%	36%	38%	39%	59%	11%	7
Honduras	43%	52%	64%	74%	86%	95%	73%	1
Jamaica	90%	88%	92%	98%	98%	>99%	95%	<1
Nicaragua	49%	53%	70%	85%	99%	>99%	97%	<1
Panama	76%	86%	88%	94%	94%	>99%	81%	<1
Paraguay	82%	95%	98%	>99%	>99%	>99%	>99%	<1
Peru	69%	73%	82%	93%	97%	>99%	88%	<1
Trinidad and Tobago	99%	>99%	99%	98%	>99%	>99%	>99%	<1
Uruguay	96%	97%	>99%	>99%	>99%	>99%	99%	<1
Venezuela	94%	96%	98%	99%	99%	>99%	91%	<1
Other Central and South America	83%	88%	93%	96%	96%	>99%	92%	<1

Gender gaps in the region also affect the energy sector and energy access. According to the Women in Power and Utilities Index 2016,[23] in Latin America and the Caribbean, only 9% of women are in executive directors' positions in the renewable energy sector, while 7% are in non-executive director positions and 17% in senior management teams. It is important to have more engagement of women in the energy sector, and to increase their incomes in general. Moreover, IDB reported that women represent an estimated 20% or less of total workers in the energy sector. It adds that promoting gender equality can help improve effectiveness of energy access and social benefits in general (Latin American Energy Organization, 2018). It is important for community development that more women develop their careers and make economic progress, given their support for their communities.

Regarding access to energy, it is important to mention that the absence of energy places higher costs on women, due to existing gender inequality, gender roles, and social norms (ENERGIA, World Bank, 2018). Inadequate access limits women´s likelihood to access education and economic opportunities (UNDP, 2019a/ Duflo, 2012). Access to electricity supports women's economic empowerment because it facilitates productive employment opportunities. For example, in Nicaragua, access to reliable electricity has increased the likelihood of rural women working outside the home by approximately 23%. In Brazil, girls are 59% more likely to complete their primary education in rural areas that have access to electricity (ENERGIA, World Bank, 2018). Moreover, studies found that women generally reinvest a larger share of their income in their families and communities. Additionally, women tend to invest larger portions of their income in the education of their children than men do (ENERGIA, World Bank, 2018).

1.6.6.2 Impact of Policy Instruments on Inclusiveness

In general, data related to the impact of policy instruments is rather limited, especially when it comes to policy instruments targeting inclusiveness. The Small Grants Program (Programa de Pequeños Subsidios, PPS in Spanish) from the UNDP is another example. It is a mechanism for implementing sustainable development projects at the community level. The program emphasizes reaching out to indigenous populations and women's organizations. PPS's portfolio of projects focusing on female beneficiaries has grown over the years. One of the selection criteria for PPS projects is the consideration of gender equity, and the program requires the meaningful participation of women in the design and implementation of the projects (UNDP, 2011). In Chile and the Dominican Republic, PPS has been present since 1994 and has supported more than 500 community initiatives to promote sustainable and inclusive development in the last two decades (Yañez, 2004; UNDP).

Colombia and the Peace Accords have created an opportunity for a larger impact on inclusiveness. The National Development Plan 2018-2022 recognized that rural women had less access to land, less participation in decision making, and less access to financial instruments; nevertheless, with the implementation of the Peace Accords, Colombia has developed some initiatives like strengthening of sustainable agricultural activities, traditional agroforestry systems, and community nurseries for indigenous communities. Additionally, eight projects have been implemented that have benefited 1,327 women, and 10 specific projects for communities of African descent, benefiting 376 women. The creation of the Formalizar para Sustituir program promotes illegal crops substitution through the formalization and legalization of property and land titles. Up to March 2019, 1.546 land titles were given, of which 728 were for women (Instituto Kroc, 2019).

Regarding natural disaster policy inclusiveness, there is the case of Antigua and Barbuda's government, which implemented a training program for health care, security personnel, and shelter managers with a gender emphasis. The program is focused on the increased risks of gender-based violence (GBV), its prevention, and intervention during and after natural disasters and hazards. Dominica and Guyana are also developing programs to address the causes of GBV to reduce its impact both after disasters and in normal circumstances (Sirker. 2021).

Policy instruments focused on fossil fuels tend to have specific and larger effects on higher economic social groups and high-income households. For instance, the ECLAC found in Argentina, Chile, Guatemala, and Mexico, 10% of the highest-income households consumed more than 25% of fossil fuels for transport. In the case of Guatemala, it was 65%. Since high-income households have larger consumption of fossil fuels, they tend to be directly affected by policy instruments and taxes focused on fossil fuels. But it is important to mention that these instruments usually affect

[23] Clean Energy, Education and Empowerment (C3E) Programme. (2017). https://iea.blob.core.windows.net/assets/82784632-9bba-4751-9c51-6a9919c90568/C3E_Brochure_WEB.pdf

the cost of transportation, and with that the price of food and other basic products. This increase in prices will affect the most economically vulnerable social groups. These negative effects created by carbon and fuel taxes could be mitigated by investing the revenue in the vulnerable social groups, but this redistribution of resources tends to be inefficient in Latin America and the Caribbean. As shown by the ECLAC and OECD, the Gini coefficient doesn't change much pre- and post taxes. Additionally, tax revenues as a percentage of GDP are relatively low in the region. All countries in the region, with the exception of Cuba, have a lower tax revenue than the OECD average. This shows that there is a need to strengthen the impact of policy instruments for the LCT regarding inclusiveness.

1.6.6.3 Inclusiveness in the design and implementation of LCT-related policy instruments

A study made by the IDB in 2020 found that 80% of the new jobs created by the decarbonization agenda in the LAC region will be in today's male-dominated sectors, meaning that women will not benefit from job creation as much as men, unless the current gender disparity in the different sectors is addressed. The study found that men could gain 18.5 million new jobs and lose 6 million by 2030 if LCT plans are followed, while women could gain 4 million new jobs and lose 1.5 million (Saget et al., 2020). Although the renewable sector is multi-disciplinary, women still face important employment barriers, as women's participation in STEM jobs is lower than in administrative jobs (IRENA, 2019). Therefore, there is a need to generate a clear pathway to reduce the job opportunity gender gap in the LCT agenda in the years to come.

A great example to strengthen inclusiveness in the LCT, and especially in the energy sector, is to generate legislation and policy that require gender-impact studies for LCT projects, just as the Economic Community of West African States is currently working on (SeforAll, 2017).

When it comes to policy instruments that are implemented in rural areas, it is even more important that gender issues are taken into account. In general, women have less access to land, market access, education, and health care compared to men, but rural women have even larger gaps in most indicators (Jost et al., 2016).

Moreover, the World Bank has made a list of suggestions and recommendations to take into account in the design of policy instruments and their gender inclusiveness. In a policy brief made by the World Bank and other international organizations, it is suggested that countries should:

- Create gender-responsive global and national energy policy regimes through new policy instruments based on existing evidence
- Invest in decentralized sustainable energy technologies focused in supporting gender equality and women's economic empowerment
- Promote women's entrepreneurship in the energy sector and LCT
- Develop systematic and sex-disaggregated data collection and analysis of gender statistics to support policy formulation (ENERGIA, World Bank, 2018)

1.6.7 Knowledge and research gaps in policy instruments

First, there is a need to centralize and update all the information regarding policy instruments for LCT and GE. Additionally, there is a need to standardize policy instruments, so that policies across countries can be compared with homogenous criteria. This will also allow regional integration and an exchange of experiences and ideas.

There is an important knowledge gap regarding impact evaluations of the policy instruments focused on LCT and GE. Very few countries have evaluated these policy instruments, making it more difficult to compare them and understand their impacts. For example, British Columbia and California have evaluated the impact of their carbon tax and found important effects on employment and carbon emissions reduction. These studies allow policymakers to approach future decisions with evidence (García and Sterner, 2021). In this context, it is difficult for LAC countries to reduce their agricultural frontier and their oil, gas and minerals exportation given the importance of these sectors in national exports and overall GDP. Therefore, concrete evaluations are needed to calculate the possible economic impact of the policy instruments and LCT measures to be taken.

Another important knowledge gap is in the AFOLU sector. Given it is the most representative emissions sector for LAC and the abatement costs are comparably low, it should be the main contributor to the LCT and the sector where more policy instruments are developed and implemented in order to reduce emissions (Cárdenas and Orozco-Sanchez, 2022). But the region is following a northern tendency of focusing the LCT on the energy and transport sectors.

Additionally, it is important to research the role lobbying and especially anti-climate lobbying has played in climate legislation in Latin America and the Caribbean. As shown before, lobbying has had an impact on climate legislation in the United States. Closing such knowledge and research gaps will help to better understand the barriers to and limitations on policy instruments that LCT and GE might face in the

future.

A better understanding of carbon taxes, ETS, fossil fuel taxes and subsidies, and other policy instruments will also improve public awareness and acceptance of these environmental policies. The concern that taxation unfairly punishes the poor, women, and indigenous communities is very common. Therefore, impact evaluation of carbon taxes could clarify such concerns. Carattini and Carvalho (2018) and Kallbekken (2013) analyzed the factors which influence public support for carbon taxation in developed countries and found that impact on personal finance, effectiveness at reducing emissions, and fairness concerns are the major determinants. Public support might also increase when tax revenue is invested in poor communities or in research on green energy. If carbon taxation and other policy instruments are to grow and expand, climate awareness and effective communication from governments will be crucial in helping citizens understand the reasoning behind these environmental policies (García and Sterner, 2021).

1.7 Alignment of climate finance with national policies

1.7.1 Introduction to climate finance instruments and mechanisms available

The following section reviews the multiple sources of funding the LCT has and could have in LAC. It looks at national and international sources of funding, and takes a deeper look into green banking, green bonds, the private sector, and bilateral and multilateral agreements as powerful sources of funding. It is clear that there is not yet enough funding for the LCT, but there is an important potential that needs to be unleashed to reduce the gap between current funding and needed funding to achieve a real LCT. As mentioned before, there is an important knowledge gap regarding sources of funding for the LCT in the AFOLU sector.

1.7.2 Regional trends

The financial reality of the region has been vulnerable. In recent years, for many countries in the region, public spending has outweighed revenue, which meant cutbacks in public investment (ECLAC, 2015a). This changed the constant increase of the 2000-2015 period where on average public investment went from 4.5% of GDP in 2000 to 6.0% in 2015 in Latin America, while in the Caribbean it went from 4.7% to 5.7% in the same time period (ECLAC, 2017).

The LAC region is one of the world's most indebted regions and has the highest ratio of external debt service to exports of goods and services, which is around 59%. The reduction in public revenue (0.5% of GDP) has been influential, but the major factor was the increase in public spending (3.3% of GDP) used to respond to the pandemic and the negative economic consequences. These fiscal deficits increased public borrowing, which increased the debt levels in 2020 (ECLAC, 2021a).

Similar to other regions, extreme climate-related events are becoming more frequent and more expensive to deal with in the region. This has impacted the countries' finances, as public resources need to be allocated and invested in reconstruction, recovery, infrastructure, and mitigation of these events. Extreme climate-related events can increase the fiscal deficit of a LAC country up to 0.8%-0.9% of their GDP, and could also reduce tax revenue by 0.9%-1.1% of their GDP (ECLAC, 2017). This exemplifies the importance of climate finance, and the high risk that climate change and extreme climate-related events can impose on national finances. This consideration is of the highest importance for climate justice, considering that the region has more need for climate adaptation than other regions with larger GHG emission.

According to the IDB, addressing the climate crisis in the LAC region will require an annual spending for the provision of infrastructure between 2% - 8% of the regional GDP, and an annual spending in social services related to climate change between 5% - 11% of GDP. Adding it up, Galindo, Hoffman, and Vogt-Schilb estimate that in order to achieve the climate goals, Latin America and the Caribbean need to invest a total of 7% - 19% of their annual GDP, which represent an estimated $470 billion USD - $1,300 billion USD. Although a substantial amount of financial resources, the benefits from these investments will be far greater than the possible costs due to climate change impact (IDB, 2022). This reality puts, again, Latin American and Caribbean in an asymmetrical position in relation to the world, as Europe and the US will have to invest around 6% of their annual GDP to achieve their climate goals. To sum up, LAC has low levels of GHG emissions but is highly vulnerable to climate impact, and to achieve the climate goals it has to invest a larger portion of its resources in comparison with other developed countries (Cárdenas and Orozco-Sanchez, 2022).

Even though most LAC countries have already developed their NDC and their Long-Term Strategies (LTS) for the LCT and to reduce emissions, most of them haven't developed solid financial plans to achieve those LTS. As mentioned before, the LCT in LAC requires major investments, but so far financial resources have been limited and have problems in their distribution (Cárdenas and Orozco-Sanchez, 2022).

According to the countries´ NDCs, sources of funding for the LCT are the market mechanisms and the sustainable

development mechanism (SDM) stipulated under Article 6, paragraph 4 of the Paris Agreement, which aim to facilitate the implementation of the Paris objectives in the LAC region. The regions have some differences across countries. Chile will finance part of its NDC with the support of the Ministry of Finance, the Financial Market Commission, the Superintendence of Pensions, and the Central Bank of Chile. Most countries will engage national and local government resources at some level. Along with Chile, Colombia and Honduras plan on financing their targets through the Green Climate Fund (GCF) and the Adaptation Fund. Finally, most countries in the region, especially smaller and less developed countries, will require international resources at the financial level. Costa Rica is currently developing instruments that will facilitate the identification of more specific implementation and support needs. Costa Rica has financial needs for adaptation, which are being assessed in the development of other adaptation strategies (Disaster Risk Management Plan, National Adaptation Plan, six socioeconomic plans, climate risk mapping). Potential financing sources identified in Brazil's NDC are market mechanisms and a voluntary carbon market.

As mentioned before, Colombia is in the process of quantifying the costs of implementing the NDC and the financial structuring required from the national, international, public, and private levels. Colombia estimates an investment of 0.2% of GDP per year to implement the adaptation plan. Annual investment of 0.2% GDP until 2023 will be required to close the gap between potential economic growth and economic growth under the impacts of climate change; that corresponds to 2 billion Colombia pesos in 2019 annually (or US$ 6 million). This figure should be taken as a minimum value, considering the investment in human and physical capital. Brazil estimates the country requires an investment of at least US$ 10 billion per year to address the numerous challenges it faces. The cost of implementing the conditional and unconditional NDCs in other countries has not been specified (Climate Watch Data).

The OECD Development Assistance Committee (DAC) publishes data on the amount of official development assistance (ODA) committed that each receives to promote the LCT. The following table shows the contributions from multilateral organization during the years 2000-2020 to some countries in Latin America and the Caribbean. As seen in the table, Brazil is the country that has received the highest contribution with about $10.4 billion USD, followed by Colombia with S4.6 billion USD, and Costa Rica with $2.2 billion USD. Here is important to highlight that the distribution of multilateral funding seems to benefit the more developed countries rather than the least developed countries, where Brazil received about 8 times what countries like the Dominican Republic, Haiti or Honduras received. Out of the $21.7 billion USD contributed from all multilateral organizations mentioned, the Inter-American Development Bank led the group with $7.6 billion USD donated, followed by the Development Bank of Latin America who contributed $4.6 billion USD, and the International Bank for Reconstruction and Development who contributed $4 billion USD (OECD DAC External Development Finance Statistics, 2020).

Table 17. Multilateral sources of LCT funding in LAC – Commitment between 2000 and 2020 – 2020 USD thousand and percentage. Source: OECD DAC External Development Finance Statistics

Multilateral Organization/ donor	Brazil	Chile	Colombia	Costa Rica	Dominican Republic	Haiti	Honduras
Adaptation Fund	$ -	$ 10.585,1	$ 8.253,1	$ 9.548,6	$ 10.229,5	$ -	$ 10.256,4
	0,000%	1,127%	0,176%	0,416%	0,890%	0,000%	0,730%
Caribbean Development Bank	$ -	$ -	$ -	$ -	$ -	$ 6.083,1	$ -
	0,000%	0,000%	0,000%	0,000%	0,000%	0,740%	0,000%
BBVA Microfinance Foundation	$ -	$ -	$ 1.072,0	$ -	$ 2.204,1	$ -	$ -
	0,000%	0,000%	0,023%	0,000%	0,192%	0,000%	0,000%
Central American Bank for Economic Integration	$ -	$ -	$ -	$ 699.160,0	$ -	$ -	$ 250.000,0
	0,000%	0,000%	0,000%	30,461%	0,000%	0,000%	17,806%
Climate Investment Funds – Clean Technology Fund	$ 20.161,7	$ 191.485,0	$ 141.508,5	$ -	$ -	$ 17.004,2	$ 18.675,7
	0,193%	20,388%	3,018%	0,000%	0,000%	2,070%	1,330%
Climate Investment Funds – Strategic Climate Fund	$ 98.705,2	$ -	$ -	$ -	$ -	$ 53.485,0	$ 52.473,8
	0,943%	0,000%	0,000%	0,000%	0,000%	6,510%	3,737%
Development Bank of Latin America	$ 3.091.626,4	$ 89.883,1	$ 1.000.653,4	$ 382.105,1	$ 79.030,6	$ -	$ -
	29,531%	9,570%	21,338%	16,648%	6,878%	0,000%	0,000%
EU institutions (EIB)	$ 1.081.046,4	$ 186.732,3	$ 137.872,5	$ 64.635,3	$ 67.818,1	$ 353.747,6	$ 213.547,5
	10,326%	19,882%	2,940%	2,816%	5,902%	43,055%	15,210%
GEF Special Climate Change Trust Fund (SCCF)	$ -	$ 2.490,1	$ 549,9	$ 4.932,3	$ -	$ 17.367,9	$ -
	0,000%	0,265%	0,012%	0,215%	0,000%	2,114%	0,000%
Food and Agriculture Organization	$ -	$ -	$ -	$ 13,5	$ 2,9	$ -	$ 49,8
	0,000%	0,000%	0,000%	0,001%	0,000%	0,000%	0,004%
Global Environment Facility General Trust Fund	$ 209.174,1	$ 10.438,8	$ 116.597,9	$ 29.017,4	$ 13.407,9	$ 26.783,4	$ 17.447,1
	1,998%	1,111%	2,486%	1,264%	1,167%	3,260%	1,243%
Global Green Growth Institute	$ -	$ -	$ 1.737,1	$ 109,7	$ -	$ -	$ -
	0,000%	0,000%	0,037%	0,005%	0,000%	0,000%	0,000%
Green Climate Fund	$ 591.777,5	$ 52.460,5	$ 68.727,4	$ 54.119,1	$ -	$ 9.900,0	$ 35.969,8
	5,653%	5,586%	1,466%	2,358%	0,000%	1,205%	2,562%
Inter-American Development Bank	$ 3.364.369,5	$ 372.418,7	$ 1.545.872,4	$ 933.477,7	$ 639.537,0	$ 332.862,7	$ 415.617,8
	32,136%	39,653%	32,965%	40,670%	55,657%	40,513%	29,602%
International Development Association	$ -	$ -	$ -	$ -	$ -	$ -	$ 369.676,6
	0,000%	0,000%	0,000%	0,000%	0,000%	0,000%	26,330%
International Bank for Reconstruction and Development	$ 1.952.450,4	$ 22.691,4	$ 1.666.628,2	$ 118.133,4	$ 327.809,1	$ -	$ -
	18,650%	2,416%	35,540%	5,147%	28,528%	0,000%	0,000%
International Fund for Agricultural Development	$ 59.741,3	$ -	$ -	$ -	$ 9.034,1	$ 4.378,7	$ 20.323,7
	0,571%	0,000%	0,000%	0,000%	0,786%	0,533%	1,448%
Total Multilateral[24]	$ 10.469.053,4	$ 939.186,0	$ 4.689.473,3	$ 2.295.253,1	$ 1.149.074,2	$ 821.613,6	$ 1.404.039,3
	100,000%	100,000%	100,000%	100,000%	100,000%	100,000%	100,000%

[24] Totals might exclude some minor donations and contributions.

The OECD´s Development Assistance Committee also publishes data on the amount of official development assistance committed from bilateral funding in the LAC region during the period of 2000-2020. Different from multilateral funding, bilateral funding is made from one country directly to another. Just as with the multilateral contributions, Brazil and Colombia are the top receivers with $6.6 billion USD and $3.9 billion USD, respectively. It is important to highlight that there is a total of 24 developed countries that have strongly contributed to the LCT in LAC, contributing since 2000 a total amount of $14.2 billion USD to the countries shown in table 18. Germany leads the contributions with $4.8 billion USD, followed by France with $4.7 billion USD and Japan with $1.3 billion USD, respectively (OECD DAC External Development Finance Statistics, 2020).

Table 18. Bilateral sources of LCT funding – Commitment between 2000 and 2020 – 2020 USD thousand and percentage. Source: OECD DAC External Development Finance Statistics

Bilateral donor	Brazil	Chile	Colombia	Costa Rica	Dominican Republic	Haiti	Honduras
Australia	$ 1.570,2	$ 1.068,0	$ 926,9	$ 1.116,8	$ 380,7	$ 993,8	$ 175,4
	0,024%	0,183%	0,023%	0,158%	0,050%	0,122%	0,022%
Austria	$ 7.191,1	$ 236,8	$ 2.691,0	$ 1.516,6	$ -	$ -	$ -
	0,109%	0,040%	0,067%	0,214%	0,000%	0,000%	0,000%
Belgium	$ 10.117,1	$ 257,4	$ 5.544,7	$ 2.464,2	$ 520,2	$ 24.274,5	$ 4.895,0
	0,153%	0,044%	0,139%	0,348%	0,068%	2,986%	0,626%
Canada	$ 5.937,7	$ 5.900,2	$ 44.833,4	$ -	$ 2.176,2	$ 228.787,0	$ 90.056,2
	0,090%	1,009%	1,121%	0,000%	0,284%	28,147%	11,512%
Czech Republic	$ -	$ 143,8	$ 21,0	$ -	$ -	$ -	$ 18,0
	0,000%	0,025%	0,001%	0,000%	0,000%	0,000%	0,002%
Denmark	$ 348,2	$ 1.316,5	$ -	$ -	$ 6.461,5	$ 6.357,9	$ 7.207,3
	0,005%	0,225%	0,000%	0,000%	0,842%	0,782%	0,921%
Finland	$ 1.152,0	$ 131,5	$ 2.283,2	$ -	$ -	$ 12.199,2	$ 2.069,2
	0,017%	0,022%	0,057%	0,000%	0,000%	1,501%	0,265%
France	$ 2.163.259,9	$ 18.432,5	$ 1.863.600,5	$ 18.925,9	$ 602.434,2	$ 63.226,5	$ 36.000,9
	32,679%	3,151%	46,590%	2,674%	78,511%	7,778%	4,602%
Germany	$ 2.419.269,3	$ 535.576,4	$ 1.316.386,9	$ 213.249,1	$ 69.840,7	$ 122.685,1	$ 134.605,6
	36,546%	91,553%	32,910%	30,126%	9,102%	15,093%	17,208%
Greece	$ 1.991,5	$ 10,3	$ -	$ 10,3	$ 30,6	$ 30,6	$ -
	0,030%	0,002%	0,000%	0,001%	0,004%	0,004%	0,000%
Hungary	$ 44,7	$ -	$ 48,7	$ -	$ -	$ -	$ -
	0,001%	0,000%	0,001%	0,000%	0,000%	0,000%	0,000%
Ireland	$ 689,5	$ 18,7	$ 369,6	$ -	$ -	$ 4.892,8	$ 4.243,2
	0,010%	0,003%	0,009%	0,000%	0,000%	0,602%	0,542%

Italy	$ 12.973,6	$ 112,8	$ 6.605,0	$ 0,7	$ 1.457,6	$ 2.619,6	$ 2.723,7
	0,196%	0,019%	0,165%	0,000%	0,190%	0,322%	0,348%
Japan	$ 642.619,0	$ 8.115,3	$ 11.277,2	$ 439.419,9	$ 12.980,1	$ 63.346,0	$ 218.406,2
	9,708%	1,387%	0,282%	62,077%	1,692%	7,793%	27,920%
Korea	$ 23,5	$ 5,7	$ 8.160,1	$ 456,4	$ 982,4	$ 5.104,6	$ 31.621,7
	0,000%	0,001%	0,204%	0,064%	0,128%	0,628%	4,042%
Luxembourg	$ 252,0	$ 72,7	$ 206,1	$ -	$ -	$ 506,5	$ -
	0,004%	0,012%	0,005%	0,000%	0,000%	0,062%	0,000%
Netherlands	$ 14.075,3	$ 240,8	$ 135.193,2	$ 17.071,7	$ -	$ 353,9	$ 1.449,5
	0,213%	0,041%	3,380%	2,412%	0,000%	0,044%	0,185%
Norway	$ 1.078.449,6	$ -	$ 87.412,7	$ 1.486,7	$ 60,5	$ 40.454,9	$ 14.271,4
	16,291%	0,000%	2,185%	0,210%	0,008%	4,977%	1,824%
Portugal	$ 283,8	$ -	$ -	$ -	$ -	$ -	$ 11,7
	0,004%	0,000%	0,000%	0,000%	0,000%	0,000%	0,002%
Spain	$ 14.683,3	$ 2.977,9	$ 97.161,5	$ 3.974,6	$ 39.186,1	$ 48.667,3	$ 71.218,7
	0,222%	0,509%	2,429%	0,561%	5,107%	5,987%	9,104%
Sweden	$ 3.563,5	$ 115,3	$ 36.043,4	$ 937,8	$ -	$ 6.543,7	$ 6.592,0
	0,054%	0,020%	0,901%	0,132%	0,000%	0,805%	0,843%
Switzerland	$ 4.222,8	$ 2.791,4	$ 66.950,6	$ 3.446,3	$ -	$ 46.258,3	$ 45.375,6
	0,064%	0,477%	1,674%	0,487%	0,000%	5,691%	5,801%
United Kingdom	$ 128.307,3	$ 3.132,9	$ 143.996,0	$ 860,6	$ 23,1	$ 65,2	$ 607,4
	1,938%	0,536%	3,600%	0,122%	0,003%	0,008%	0,078%
United States	$ 108.682,6	$ 4.335,5	$ 170.283,4	$ 2.929,9	$ 30.787,6	$ 135.472,7	$ 110.700,5
	1,642%	0,741%	4,257%	0,414%	4,012%	16,667%	14,152%
Total Bilateral[25]	$ 6.619.708,6	$ 584.993,3	$ 3.999.996,2	$ 707.868,6	$ 767.322,7	$ 812.841,2	$ 782.249,9
	100,000%	100,000%	100,000%	100,000%	100,000%	100,000%	100,000%

[25] Totals might exclude some minor donations and contributions.

1.7.2.1 Ease of doing business and Foreign Direct Investment for the LCT

Foreign direct investment (FDI) will continue to play a major role in climate finance in Latin America and the Caribbean, as most of the countries have expressed, through their NDCs, their need for financial support. In order for FDI to occur and materialize, countries receiving the investment must meet some requirements. The University of Notre Dame Global Adaptation Index (ND-GAIN) measures a country's ability to leverage investments and convert them into adaptation actions through the readiness score. The following table shows the international ranking and scores of the selected countries, the top 3 countries and the bottom 3 countries. It is clear that Honduras, Brazil, and Colombia have low scores and rankings, and although Chile and Costa Rica are better placed, there is still a lot of work to be done.

Table 19 Readiness index in the selected countries, top 3 and bottom 3. Source: ND-GAIN

World Ranking	Country	Score
1	**Monaco**	0.850
2	**Singapore**	0.805
3	**Norway**	0.773
38	**Chile**	0.546
73	**Costa Rica**	0.459
108	**Colombia**	0.377
124	**Brazil**	0.349
172	**Honduras**	0.269
190	**Venezuela**	0.199
191	**Chad**	0.190
192	**Central African Republic**	0.140

The lack of access to international debt markets in some countries can generate a compounding effect, and eventually become a poverty trap as extreme climate-related events might negatively affect the national economy, which will reduce countries' access to international financing and limit the countries´ capacity to face future extreme climate-related events (Cárdenas et al., 2021).

According to the World Investment Report, Latin America and the Caribbean are far below the FDI inflows in comparison with other countries. In 2020, the LAC region received around $88 billion USD, while North America received $180 billion USD and Asia $535 billion USD. Out of the top 20 countries receiving FDI, only Mexico and Brazil were included, in the places 9 and 11, respectively. The top three receiving countries were United States ($156 billion USD), China ($149 billion USD), and Hong Kong ($119 billion USD) (UNCTAD, 2021). However, is important to mention that FDI can also be invested in non-LCT projects.

A specific example of Foreign Direct Investment is the Caribbean Resilience Fund, which helps finance public investment to increase resilience to extreme weather in the Caribbean region. It also finances infrastructure and green industrial policies to diversify the economies. The fund is financed with resources linked to debt repayment, equivalent to approximately US$ 7 billion or 12.2% of the total public debt of Caribbean small island developing states (SIDS) (ECLAC, 2021a).

1.7.3 Domestic sources of funding: Institutional setup

Finance and environment ministries play major roles in the domestic funding for LCT. They include climate investments in national budgets and should avoid the funding of programs and policies that go against the Paris Agreement objectives. Ferro et al. (2020) found that Argentina, Colombia, Jamaica, Mexico, and Peru allocate between 1.1% and 3.3% of their national budgets to actions and programs to fight climate change, but the budget allocated to actions and programs with negative impact on climate change efforts is higher, as it ranges from 1.9% to 8.6% of the total national budget (Delgado et al., 2021). To sum up, it is urgent that countries align all public expenditures and their tax systems with the climate goals, commitments, and priorities (Volz, 2020).

Additionally, it is important to mention the high levels of unequal funding within a country. The resources collected by national governments are not only low in the LAC region, but they are also highly unequal. Some regional jurisdictions generate up to 90% of their resources and total income, while some others only generate 5%. In Latin America and the Caribbean, regional economic inequality is very high. The ratio between the regions with the highest and lowest per capita GDP in the countries generally exceeds 6:1 —with the exception of Uruguay and Bolivia— while in developed countries it is rarely more than 3:1 (ECLAC, 2017).

Finance ministries are another source of climate financing. The Coalition of Finance Ministers for Climate Action was created in 2019 and is led by the finance ministries of Chile and Finland. Today the Coalition of Finance Ministers for Climate Action represents an international practice group that includes several Latin American and Caribbean countries (Argentina, Bahamas, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Jamaica, Mexico, Panama, Paraguay, Peru, and Uruguay) as well as their counterparts from across all continents and institutional partners such as the International Monetary Fund. In 2020, the member countries represented about 35% of global carbon emissions and 65% of global GDP (The Coalition of

Finance Ministers for Climate Action).

1.7.3.1 Green Banks and commercial financing

The OECD has defined Green Banks as public or non-profit entities established specifically to facilitate private investment into domestic low-carbon, climate-resilient infrastructure (Green Bank Network). The International Finance Corporation from the World Bank report called "What is the Latin American banking sector doing to mitigate climate change?" provides some insights about the Green Banks situation in Latin America and the Caribbean (International Finance Corporation, 2017).

The report concluded that the banking sector has a privileged position in the promotion and the protection of the environment through the direction of capital flow towards green projects and companies. Yet Latin American banks are not fully promoting a vision for green finance and environmental sustainability as a strategic principle. Since banks are devoted to their shareholders, clients, and employees, and climate finance represents an opportunity for banks to diversify and differentiate themselves in a very competitive market, the report predicts banks will become more sustainable, and will increase their investments in green finance and environmental management as they realize it offers environmental responsibility and profitability.

Latin American banks have a poor commitment to adopting the Green Bank model, but during the COP 26 the CAF – the Development Bank of Latin America – committed to mobilize $25 billion USD over the next five (CAF Development Bank of Latin America, 2021). Banking regulators and central banks especially will play an important role in the LCT (International Finance Corporation, 2017). Green financial markets are rapidly developing in LAC, in particular green bond markets. According to the report, most banks are interested in being part of a green bond market, but so far, the demand for these financial instruments exceeds the existing supply. Some banks in the region have accessed this bond market, and at the same time they are developing new business models and green portfolios, which in many cases are supported by multilateral institutions such as the IFC (International Finance Corporation, 2017).

Nevertheless, green banking, worldwide, needs to be seen with skepticism and a critical view. Not all banks and green banks are as aware and committed to fighting climate change as they appear to be on paper and in their marketing strategies. For instance, Stuart Kirk, Global Head of Responsible Investment at HSBC Asset Management, recently gave a talk titled "Why investors need not worry about climate risk". Although he received several criticisms from the environmental movements and other sectors (Krugman, 2022), he said what many investors and banks actually believe; climate change poses an insignificant risk to the global economy (Eccles, 2022).

1.7.3.2 Green Bonds

Green bonds are fixed-income securities that provide capital to sustainable and climate-related projects. Issuers

vary, ainclude corporations, financial institutions, and governments. They have demonstrated efficiency addressing financial gaps for renewable energy projects. The European Investment Bank (EIB) and the German Development Bank (KfW) are two of the largest and most successful issuers in Europe. Since 2014, the KfW has issued €21 billion in green bonds. In 2019, green bond issuances reached record-high levels of US$ 190 billion (Cárdenas et al., 2021).

Still, green bond adoption in Latin America is limited, and has only contributed 2% of global green bonds between 2004 and 2019 (US$ 12.8 billion of a global total of US$ 636 billion). Brazil, Mexico, and Chile lead the issuance of green bonds in the region, with 41%, 25%, and 14% of the regional volume, respectively. The bond issuers vary between countries; in Brazil, main issuers are non-financial corporations; in Mexico, development banks; in Argentina, local governments; in Chile, sovereign deals; and in Colombia, financial corporations. Most green bonds have been directed to renewable energy projects, followed by transport and land-use projects.

The Climate Bonds Interactive Data Platform provides public information regarding the issuance of green bonds per region. It is the first sustainable debt data tool of its kind. The last update was made by the end of June of 2022. The following table shows the issuance of green bonds in Latin America and the Caribbean since 2015. There is a wide variety of realities regarding green bonds issuance, where Chile and Brazil have pioneered this policy instrument, and up to 2022, they issued about $11.9 and $11.1 billion USD, respectively, and least-developed countries like Uruguay, Dominican Republic, and Barbados have issued $108 million USD, $20 million USD, and 8.5 million USD, respectively. This without taking into account all the other countries that haven't yet issued green bonds. In total, the LAC region has issued $32 billion USD in green bonds, 2020 being the top year with $9.1 billion USD.

Table 20. Annual green bond issuance by some countries in Latin America and the Caribbean – thousand USD. Source: Climate Bonds Initiative

COUNTRY	2015	2016	2017	2018	2019	2020	2021	2022[26]	TOTAL
CHILE			$500.000.000	$166.791.100	$2.579.141.856	$4.461.168.448	$4.193.600.000		$11.900.701.404
BRAZIL	$563.750.016	$856.680.000	$2.730.120.013	$219.537.244	$1.310.088.473	$2.695.108.550	$2.398.272.599	$397.481.044	$11.171.037.939
MEXICO	$500.000.000	$156.680.000	$242.968.992	$787.494.784	$128.984.992	$1.257.235.738	$526.645.953		$3.600.010.459
ARGENTINA			$537.062.528	$100.000.000		$50.021.896	$449.546.454	$659.000.000	$1.795.630.878
COLOMBIA		$115.206.000	$215.703.472	$152.282.832	$41.317.120	$158.999.460	$428.042.848	$156.181.968	$1.267.733.700
PERU				$30.006.600	$652.084.236	$200.000.000			$1.086.090.836
BERMUDA							$700.000.000		$700.000.000
COSTA RICA		$500.000.000			$3.500.000				$503.500.000
PANAMA					$42.000.000	$287.644.000			$329.644.000
VIRGIN ISLANDS							$200.000.000		$200.000.000
ECUADOR					$150.000.000				$150.000.000
URUGUAY				$108.400.000					$108.400.000
DOMINICAN REPUBLIC								$20.000.000	$20.000.000
BARBADOS					$1.500.000		$7.000.000		$8.500.000
TOTAL	$1.063.750.016	$1.628.566.000	$4.225.855.005	$1.564.512.560	$4.908.616.677	$9.110.178.092	$8.903.107.854	$1.232.663.012	$32.841.249.216

These trends of green bond adoption in LAC demonstrate that the green business of banks is consolidating. With nearly US $8 billion of issuances in 2017, Latin America's green bond market had doubled the total bond issuance in the region by 2020 (Climate Bonds Initiative, Bloomberg, 2018), but there is still a lot to be done to increase awareness of and promote these green financial instruments. The International Finance Corporation report and survey found that 81% of regional banks surveyed (101) had heard about green bonds, but only 9% had actually used them, and only 44% planned on using them (International Finance Corporation, 2017).

Another powerful tool that promotes green bonds is the Green Bond Transparency Platform. It is an initiative developed in 2019 by the Inter-American Development Bank (IDB) to promote transparency in the green bond market in LAC. The platform helps standardize information related to green bonds. It enables all users to analyze where the proceeds of the bonds are invested, and what environmental performance was realized (Green Bond Transparency Platform, 2022).

Blue bonds are emerging as an innovative financial solution to mobilize capital and create sustainable business opportunities in ocean and freshwater conservancy. Just as with green bonds, they are still an unexplored financial instrument for nature conservation and climate action. Blue bonds are especially important for LAC, since 25% of its population lives on the coast and the Caribbean is home to 23 small islands surrounded by coastlines that are more susceptible to the effects of climate change. The first blue bond in the region was issued by the IDB Investment Group for an amount of 50 million Australian dollars, for a 10-year fixed-rate bond. The announcement was made during the UN COP26 (IDB Invest, 2021). Belize also committed to conserving the world´s

[26] The current cut-off for issue dates is end of June (H1) 2022.

second-largest coral reef in exchange for US$ 553 million – 10% of their GDP. The Nature Conservancy (TNC) lent the funds for these blue bonds (Mentel and Carlos, 2022).

1.7.3.3 Private sector

When it comes to private capital engagement, about 50% of total climate investment in the LAC region comes from private sources, representing the highest share in comparison with other regions (Climate Policy Initiative, 2021). For the IFC and the IBD, the private sector has the greatest potential to generate green funding, and it will be the responsibility of the private sector to mobilize these resources to achieve the decarbonization of the economy (Delgado et al., 2021). Together with the implementation of carbon taxation, green, social, and blue bonds, private sector investments will allow LAC countries to achieve a stable and efficient LCT (Semmler et al., 2021). Given that the private sector, especially micro and small enterprises, represent 67% of regional employment and 99% of all productive units (Ferraro and Rojo, 2018), including it in the LCT is completely necessary (Cárdenas et al., 2021). But these businesses tend to have limited knowledge and technical capacity to take action in favor of the low-carbon transition. Additionally, businesses will be worried about the implementation of policy instruments such as carbon taxes and other green taxes, as they might increase the general tax rates. Therefore, all policy instruments must be implemented gradually. It is important to mention that in some cases market organizations can become an obstacle for LCT because the private market is very large, dynamic, and a mix of several actors with a wide variety of interests. Therefore, LCT will not be in every private actor's interest (Delgado et al., 2021).One way in which the private sector can contribute to the LCT is by developing a regulation of climate-related risks. The LAC region has not yet fully included or addressed climate-related risks in the financial sector, which can become an obstacle for green financing. However, several countries in the region have generated self-regulatory measures through the private sector. Argentina, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Mexico, Paraguay, and Peru have developed private sector initiatives to measure environmental and social risks in different investments and projects. This can be considered as a first step in the creation of a well-designed regulation of climate-related risks (Delgado et al., 2021).Given that public funding is expected to be stable in the coming years, private investments need to scale up to cover the deployment needed to mitigate climate change. This is also an opportunity for the private sector to leverage funding offered by public and multilateral institutions, and also to acquire the relevant experience in LCT projects which will be larger and more common over the years. The private sector will also have the responsibility to fill the investment gaps that public and multilateral institutions might not cover in the future (Cárdenas et al., 2021).The OECD´s Development Assistance Committee (DAC) also publishes data on the funding private donors have given to the LAC region between 2000 and 2020. As seen in the following table, Brazil and Colombia again lead the list of donations received, with $74 million USD and $66 million USD, respectively, showing a large gap with Chile, Costa Rica, Haiti and Honduras, which received less than $260 thousand USD, and the Dominican Republic that received no funding from the private donors mentioned. Compared to the multilateral ($21.7 billion USD) and bilateral ($14.2 billion USD) sources of funding, the private donations represent a much smaller amount with a total of $140 million USD. The top three private donors were the Howard G. Buffett Foundation, the Children's Investment Fund Foundation, and the Oak Foundation, with donations of $55.5 million USD, $34.5 million USD, and $13.3 million USD, respectively (OECD DAC External Development Finance Statistics, 2020).

Table 21. Climate funding from international private donors between 2000-2020 – 2020 USD thousand and percentage. Source: OECD DAC External Development Finance Statistics

Private donors	Brazil	Chile	Colombia	Costa Rica	Dominican Republic	Haiti	Honduras
Bill & Melinda Gates Foundation	$ 36,9	$ -	$ -	$ -	$ -	$ -	$ 258,3
	0,0498%	0,000%	0,000%	0,000%	0,000%	0,000%	100,000%
Bloomberg Family Foundation	$ 4.552,1	$ 141,3	$ 2.073,0	$ -	$ -	$ -	$ -
	6,148%	76,944%	3,141%	0,000%	0,000%	0,000%	0,000%
Bezos Earth Fund	$ -	$ -	$ 7.200,0	$ -	$ -	$ -	$ -
	0,000%	0,000%	10,908%	0,000%	0,000%	0,000%	0,000%
Charity Projects Ltd (Comic Relief)	$ 138,5	$ -	$ -	$ -	$ -	$ -	$ -
	0,187%	0,000%	0,000%	0,000%	0,000%	0,000%	0,000%
Children's Investment Fund Foundation	$ 34.347,2	$ 42,4	$ 168,1	$ -	$ -	$ -	$ -
	46,389%	23,056%	0,255%	0,000%	0,000%	0,000%	0,000%
Citi Foundation	$ 250,0	$ -	$ -	$ -	$ -	$ -	$ -
	0,338%	0,000%	0,000%	0,000%	0,000%	0,000%	0,000%
David & Lucile Packard Foundation	$ 70,9	$ -	$ 20,3	$ -	$ -	$ -	$ -
	0,096%	0,000%	0,031%	0,000%	0,000%	0,000%	0,000%
Ford Foundation	$ 913,2	$ -	$ -	$ -	$ -	$ -	$ -
	1,233%	0,000%	0,000%	0,000%	0,000%	0,000%	0,000%
Gordon and Betty Moore Foundation	$ 1.950,0	$ -	$ -	$ -	$ -	$ -	$ -
	2,634%	0,000%	0,000%	0,000%	0,000%	0,000%	0,000%
Howard G. Buffett Foundation	$ -	$ -	$ 55.559,2	$ -	$ -	$ -	$ -
	0,000%	0,000%	84,172%	0,000%	0,000%	0,000%	0,000%
IKEA Foundation	$11.207,7	$ -	$ -	$ -	$ -	$ -	$ -
	15,137%	0,000%	0,000%	0,000%	0,000%	0,000%	0,000%
John D. & Catherine T. MacArthur Foundation	$ 140,6	$ -	$ 986,2	$ -	$ -	$ -	$ -
	0,190%	0,000%	1,494%	0,000%	0,000%	0,000%	0,000%
Laudes Foundation	$ 744,8	$ -	$ -	$ -	$ -	$ -	$ -
	1,006%	0,000%	0,000%	0,000%	0,000%	0,000%	0,000%
Oak Foundation	$13.173,6	$ -	$ -	$ 187,4	$ -	$ -	$ -
	17,792%	0,000%	0,000%	100,000%	0,000%	0,000%	0,000%
UBS Optimus Foundation	$ 489,9	$ -	$ -	$ -	$ -	$ -	$ -
	0,662%	0,000%	0,000%	0,000%	0,000%	0,000%	0,000%
Wellcome Trust	$ 69,3	$ -	$ -	$ -	$ -	$ 157,368	$ -
	0,094%	0,000%	0,000%	0,000%	0,000%	$ 1,000	0,000%
William & Flora Hewlett Foundation	$ 5.957,6	$ -	$ -	$ -	$ -	$ -	$ -
	8,046%	0,000%	0,000%	0,000%	0,000%	0,000%	0,000%
Total Private[27]	$ 74.043,2	$ 184,7	$ 66.007,8	$ 188,4	$ -	$ 158,4	$ 259,3
	100,000%	100,000%	100,000%	100,000%	0,000%	100,000%	100,000%

[27] Totals might exclude some minor donations and contributions.

1.7.4 Funding allocations for mitigation and adaptation

It is known that investing in adaptation and mitigation has positive returns. The Global Commission on Adaptation (2019) found that the return on investment for adaptation is substantially high, where the cost-benefit ratios varying from 2:1 up to 10:1. This means that investing US$1.8 trillion globally in five areas from 2020 to 2030 could generate US$ 7.1 trillion in damage mitigated. The Global Commission on Adaptation also summarizes some ways in which adaptation investments generate benefits and financial profit. First, they reduce risks, which lower financial costs and make investments more appealing. Second, they improve productivity. Third, adaptation measures tend to drive innovation (Cárdenas et al., 2021).

Peru, for instance, has made important investments in risk management and adaptation. The country increased their investment from 60 million soles in 2010 to more than 1.7 billion soles in 2018, as a result of the Budget Program 068 called "Reduction of vulnerability and response to disaster-related emergencies". But this is not the case for every country in the region. Only 27% have funds directed for climate change adaptation and only 42% have funds for Disaster Risk Management. Mexico and Chile are two cases that should be highlighted in this section, as they have made relevant efforts in adaptation and mitigation investments: Mexico, through its Natural Disaster Prevention Fund (FOPREDEN), and Chile through its National Action Plan for Climate Change (PANCC) which emphasizes the high degree of vulnerability experienced by cities (Delgados et al., 2021).

According to the National Adaptation Plan (NAP) Global Network, 90% of the NAPs submitted mention financing sources for adaptation programs. Around 56% have an entire section dedicated to financing, while 30% have financing integrated throughout the document. The main financing sources described in the NAPs are the private sector (63.3%), International Climate Finance (83.3%), and Domestic Budgets (86.6%). Finally, 60% of the NAPs mention a separate resource mobilization strategy (NAP Global Network).

The Development Assistance Committee of the OECD also makes an analysis of the destination of the resources coming to the LAC region, differentiating between adaptation and mitigation. After filtering the database with the Recipient Region of Caribbean & Central America and South America, it is clear that there is a larger focus on mitigation rather than adaptation in the funding for LCT in LAC. Out of the 20,104 contributions made to the LAC region from multilateral organizations, bilateral, and private funding, 16% had a principal objective of adaptation, while 21.6% had mitigation efforts as their principal objective. Moreover, the resources committed for adaptation-related issues was estimated at $16.1 billion USD, while those for mitigation were $28.4 billion USD (OECD DAC External Development Finance Statistics, 2020). It seems counterintuitive that more efforts and resources are being designated for mitigation, given that the LAC region only produced about 7% of global GHG emissions (Cárdenas and Orozco-Sanchez, 2022) and it is registered as one of the most vulnerable regions to climate change (ECLAC, 2015). Therefore, it is important that the region makes effort to transfer more resources to adaptation efforts, rather than mitigation efforts.

Although there has been some progress in adaptation and mitigation in the region, there are still several challenges that need to be addressed. The first challenge is the financial one. According to Serebrisky et al. (2017) the LAC region requires an investment in climate change adaptation and mitigation of around US$ 30 billion annually. Other challenges might include developing financial strategies for implementing countercyclical fiscal policies in the event of disasters and reorienting public investment toward resilient infrastructure, and using methodologies for efficiently quantifying and managing climate change and natural disaster-related public spending (Delgado et al., 2021).

1.7.5 Inclusive finance and budgeting

Over the past two decades, LAC has gone through a gradual decline in government spending in social programs, more specifically those programs meant to foster gender equity. It is important to generate a deeper analysis of fiscal policies in order to better understand gender biases in the countries' budgets. GE will require the compilation of evidence of the links between macroeconomic factors and GE. Finally, the coordination of political and technical policies that tie in with a national and regional gender agenda (with the focus on the 2030 Agenda) is a development planning priority for the short term (ECLAC, 2019).

Just as with green bonds and blue bonds, other thematic bonds, such as social and gender bonds, have been developed and applied in order to finance programs, projects, and policies with social and/or environmental impact. Gender bonds are relatively new, innovative investment instruments for investors interested in promoting gender equality and gender equity.

The first gender bond in the world was issued in 2013 by the International Finance Corporation (IFC). Worth US$ 268 million, it was aimed to encourage financial institutions to provide financing to women entrepreneurs. In Latin America and the Caribbean, the private sector has been the

main issuer of gender bonds. The first gender bond in that region was issued in 2019 by Banistmo bank in Panama (subsidiary of Bancolombia – Colombia), for a total amount of US$ 50 million, and it had the objective of financing small and medium-sized companies headed by women. Other Colombian financial institutions have issued gender bonds both in the primary market (e.g., Bancolombia, Banco de Bogotá, Bancóldex and the Corporation for Territorial Development (Findeter)) and in the secondary market (Banco Davivienda and Banco W). The Banco del Estado de Chile is the regional leader in government gender bond issuance. It has issued three rounds of "Bono Mujer" on international markets. The last placement was made in October of 2020 for a value of US$ 95 million (ECLAC, 2021a).

Another successful experience of inclusive financing takes place in Costa Rica. It is the only country that explicitly established budget allocation for inclusiveness in the NDC. The country committed to creating the Inclusive Fund for Sustainable Development (Fondo Inclusivo de Desarrollo Sostenible), with a seed capital of US$ 1.2 million dedicated to the promotion of productive projects led by rural women, and their contributions to mitigation and adaptation to climate change (United Nations Climate Change). Another example of inclusive finance is the indigenous climate and environmental funding created by the Government of Canada. It consists of a series of programs funded by federal money, aimed to support indigenous climate action for a safer and cleaner environment (Government of Canada, n.d.).

Several studies have documented the existence of prevailing inequalities between women and men in access to financial services, especially credit (UNDP, 2011; United Nations Department of Economic and Social Affairs, 2009; International Fund for Agricultural Development, 2009; van Staveren, 2002; Baden, 1996; and World Bank, 1995). For instance, a recent review of gender-based legal differences in economies around the world found that in 103 of the 141 economies surveyed, there is at least one legal difference between men and women that can harm women's economic opportunities and access to financial resources (World Bank, 2011). Financial decision-making in the public sector, such as tax policies and interest rates, can also have gender-differentiated effects that affect women's participation in financial markets (UNDP, 2011).

It is important to mention that in Latin America and the Caribbean, there is a significant gender gap in financial access to credit cards and to financial institution accounts. The following tables show the credit card ownership for people above 15 years old and financial institution account ownership for people above 15 years old, all differentiated by gender. There is a clear inequality that needs to be targeted in order to achieve more inclusive gender finance for the LCT and GE.

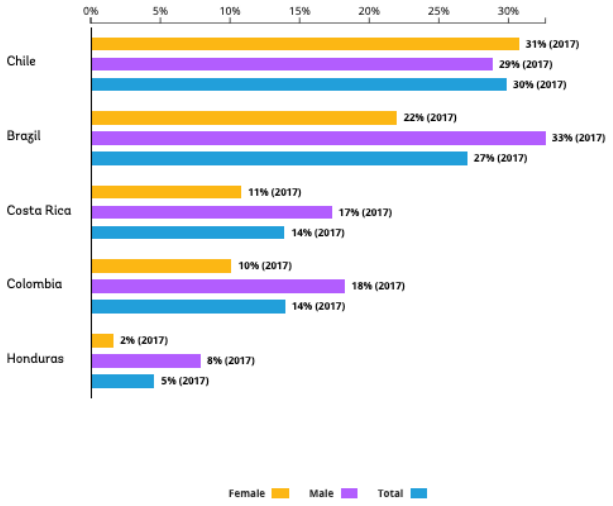

Figure 9 Credit card ownership (% age 15+). Source: World Bank, Gender Data Portal

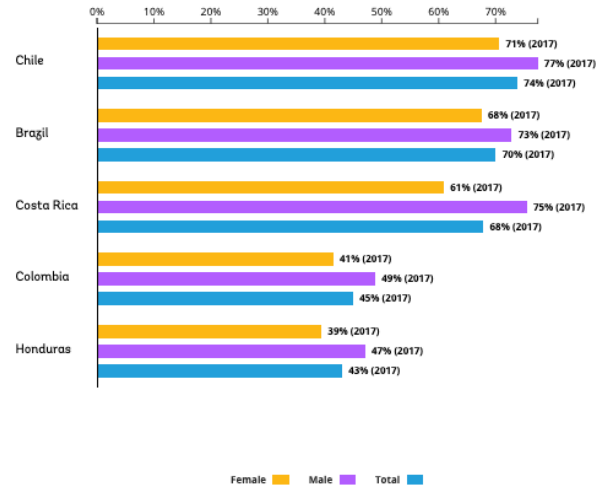

Figure10 Financial institution account (% age 15+). Source: World Bank, Gender Data Portal

Moreover, the financial resources coming to the LAC region from multilateral, bilateral, and private sources of funding need more gender focus. After filtering the database with the Recipient Region of Caribbean & Central America and South America, only 8.29% of contributions had as a "principal" objective gender issues, 44.51% had gender issues as a "significant" objective, and 47.2% of the contributions coming to the region did not target gender at all (OECD

DAC External Development Finance Statistics, 2020). It is important that most, if not all, contributions to the LAC region and its LCT have some level of gender objectives.

1.7.6 Constraints and opportunities

A relevant constraint is the territorial inequalities in the LAC region. One important difference between urban and rural areas is the technical capacity to take climate action. While large cities like Bogotá can have a District Environment Secretary, with several experts and clear public policy, smaller municipalities are unlikely to have staff working on environmental issues. Fiscal capacity is another factor of inequality between central governments and subnational governments. The difference between territories can be measured by the ratio between the GDP per capita of the richest regions compared to the poorest regions. In LAC the ratio can exceed 6:1, while developed countries rarely exceed 3:1. The territorial inequality can be also measured by using the coefficient of variation of the GDP per capita. It again reveals a high level of inequality in the region compared with the OECD. The following graph shows the values for the region (ECLAC, 2017).

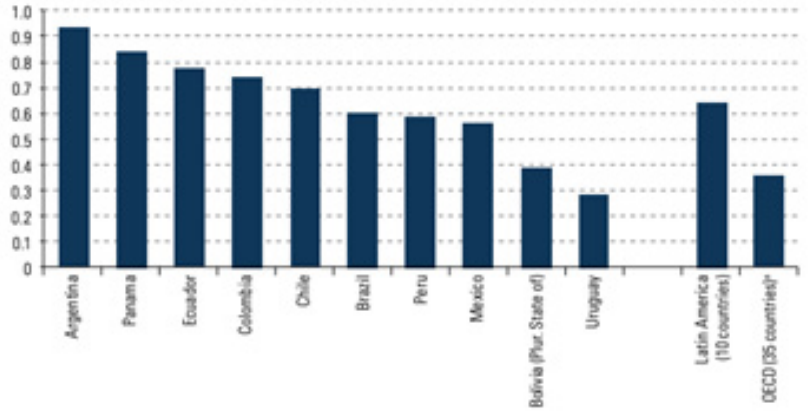

Figure IV.2
Latin America (10 countries) and Organization for Economic Cooperation and Development (OECD): coefficient of variation of per capita GDP, 2012-2015

Source: Economic Commission for Latin America and the Caribbean (ECLAC).
* The value for the coefficient of variation for the GDP of the OECD countries was taken from Bartolini, Strossberg and Blöchliger (2016).

Figure11 LAC and OECD coefficient of variation of per capita GDP (2012-2015). Source: ECLAC, 2017

When it comes to the adoption of green finance in the banking sector, the survey made by the IFC found several challenges in the LAC region. First, there is insufficient support from top management, low client demand, lack of technical knowledge and capacity, and unknown costs of implementing green finance as a new business line. Therefore, there is a need and an opportunity for senior leadership in the banking sector to increase the commitment level with sustainable banking. There is a great opportunity for capacity-building initiatives aimed at promoting sustainable banking knowledge throughout the banking sector. Moreover, regulations and markets for clean products are under-developed in LAC. Finally, multilateral institutions and international funders can be catalysts in the promotion of knowledge and technologies that allow banks to deepen their knowledge and information on green finance matters.

Regarding the opportunities, some examples like the regulations implemented in Brazil and Peru can and should be replicated throughout the region. It is recommended that both regulators and policymakers work together with banking associations to create a sustainable banking market. Institutions like the Sustainable Banking Network, a global knowledge platform directed at emerging economies, is capable of providing support by facilitating learning and accelerating the pace of sustainable banking change and commitment (International Finance Corporation, 2017).

Thematic bonds, especially green bonds, face an important barrier which limits their adoption and promotion in local, national, and regional markets, and that is the lack of local investors and lack of awareness about the bonds' benefits (Cárdenas et al., 2021). As mentioned before in the International Finance Corporation report and survey, it was found that most (81%) of regional banks know about green bonds but very few (9%) use them (International Finance Corporation, 2017).

1.7.7 Knowledge gaps and research priorities

A 2014 World Resources Institute study estimated the fiscal and economic costs that rising sea levels generate for a wealthy city such as Miami (Tompkins and Deconcini, 2014), but few studies like this exist for Latin American cities. This represents an important knowledge gap. In the LAC region there are very few studies that estimate the possible costs of extreme climate-related events. In addition, there are few studies that estimate the rate of return on climate investments. This is a barrier for climate investments, as it increases uncertainty (Cárdenas et al., 2021).

Another knowledge gap is the lack of information about estimates of the total costs of financing the goals proposed in the NDCs, and the total cost for each country to achieve an efficient LCT. Adding it up, there is no clear and reliable information on the total funding each country has received for the LCT. It is necessary to understand where, how, and when these funds have arrived in each country and how they are being invested. This will allow researchers to identify more clearly the funding gap between the financial resources each country has received for the LCT and how much more funding is needed. Finally, it is important that every country in LAC submits their National Adaptation Plan so that their needs can be analyzed and adaptation goals established for implementing concrete actions and targets (WWF, 2021).

1.8 Key inputs to the development of the LCT & GE research agenda

1.8.1 Key constraints and opportunities for an LCT & GE transition

The following section briefly mentions the main constraints and opportunities that the LAC region has in order to achieve the LCT and GE. These ideas should be taken as recommendations for policymakers in the region, in order to understand what might be the main challenges and roadblocks for the Low-Carbon Transition, and where should governments focus to take advantage of current and future opportunities.

- There is a significant need for additional investment capital, especially for new LCT technologies and their applications (Kober, Tom et al., 2016), and especially from the private sector (Jiménez, n.d.). More investment will help to overcome technical and institutional roadblocks, both in formulating and implementing environmental laws and linking these to the NDCs.
- A significant constraint for the LAC region relates to the lack of political will to achieve a LCT. As mentioned before, policy instruments like Carbon Pricing and ETS have low-rated, large exemptions, which limits the GHG emissions reductions (Cárdenas et al., 2021). This also relates to the high levels of corruption in the region, which also limits the LCT.
- A relevant constraint is the territorial inequalities in the LAC region. These inequalities are determining factors in the differences in fiscal capacity between central governments and subnational governments. This means that inequality limits the financial capacity of certain regions to invest in LCT.
- The difference between territories can be measured by the ratio between the GDP per capita of the richest regions compared to the poorest regions. In LAC the ratio can exceed 6:1, while developed countries rarely exceed 3:1. The territorial inequality can be also measured by using the coefficient of variation of the GDP per capita. It again reveals a high level of inequality in the region compared with the OECD.
- Another constraint is the low percentage of women in the decision-making process, in ministerial positions, in parliaments, and overall low female political empowerment. Additionally, the gender roles and implicit gender bias fostered by cultural traditions limit the professional potential of women in LAC. Finally, there is a need to promote inclusive investments specifically for women and other vulnerable communities (UN Women, 2021). UNDP´s report "Asegurando la equidad de género en la financiación para hacer frente al cambio climático" ("Ensuring gender equity in financing to address climate change") made general recommendations regarding climate finance and gender: incorporate tools for gender analysis in all phases of program design, implementation, monitoring and evaluation; ensure the effective and balanced participation of women in decision-making, and develop the capacities of women to participate effectively (UNDP, 2011).
- As mentioned, the AFOLU sector plays a major role in the emissions in the LAC region. Policy instruments should focus more on this sector, but it is highly complicated to evaluate policy instruments that aim to reduce emissions from the AFOLU sector.
- Another roadblock is the economic incentive to continue with high levels of emissions and dependence on fossil fuels. There appears to be a positive relation between GDP growth and GHG emissions. In the period between 1990 – 2015, countries with higher

GDP growth had a tendency to have higher greenhouse gas emissions. Chile and Panama had high GDP growth with high emissions, while Colombia had small emissions with medium GDP growth. Finally, Brazil and Honduras had medium-low GDP growth with medium-high average greenhouse gas emissions (OECD et al., 2019). Therefore, it is hard to persuade countries, governments, and policy-makers to reduce their GHG emissions, as they might associate the emissions with GDP growth.

- Another roadblock relates to private finance and thematic bonds. Despite great potential to redirect private funding from brown to green investments, green bond issuance in LAC has been somewhat limited, and has only contributed 2% of global green bonds in the period 2004 – 2019. Most funds raised through green bonds in LAC financed renewable energy projects, followed by transport projects. However, greenhouse gas (GHG) emissions from land use outnumber those from fossil fuels across the region. A notable exception of use-of-funds is Brazil, where a relatively large proportion of green bonds issuance (25%) finance projects related to land use and land-use change.
- There also relevant constraints regarding the financial resources and funding dedicated to the LCT in Latin America and the Caribbean. On one hand, there is a risk that international funding and commitments coming from developed countries might not become a reality. Just as the $100 billion USD goal for 2020 was not reached, future funding could not be accomplished. Moreover, there are some inconsistencies in the distribution of international funding. Multilateral, bilateral and private donor resources tend to be directed to mitigation rather than adaptation, even though the LAC region only produced about 7% of global GHG emissions (Cárdenas and Orozco-Sanchez, 2022) and it is registered as one of the most vulnerable regions to climate change (ECLAC, 2015). Also, these resources tend to be received by upper-middle-income countries rather than least-developed countries. Finally, not all resources have a gender equity focus or goal.
- Another constraint and challenge relates to the multiple sources of information regarding GHG emissions and LCT. Most international sources of information and data have small differences between them. Although most have similar numbers in general, and show similar trends, the detailed numbers and dates usually don't match. This is also a challenge when comparing different regions, as there very few sources of information that cover all countries.

Some of the main opportunities that the OECD identified for the promotion of the LCT in LAC are detailed next. One is to develop a set of regional large-scale low-carbon projects, which should be evaluated before implementation. It is necessary to improve the understanding of economic and environmental impacts of green policy packages using quantifiable metrics to help design more effective policies. It is recommended that those green policy packages support job creation and resilience for vulnerable communities.

It is also important that national, regional, and local governments support innovation in the energy sector, specifically in renewable sources of energy and the LCT, growing the market of renewables through risk-sharing between public and private sectors. The market for renewable sources of energy can be promoted ensuring incentives for low-carbon consumption and investments, which can be achieved with the removal of fossil fuel subsidies and the promotion on carbon pricing. Finally, the OECD talks about the importance of enhancing the political acceptability of carbon pricing and the LCT over all (OECD, 2020).

It is key that the government incentivizes the development of green projects, while the banks' clients recognize the need for specialized green products and services offered by banks that help them meet their sustainability needs. As more banks start to adopt sustainable banking practices to catch up with leading banks, they also realize the need to provide technical capacity to the market and raise awareness about what is considered a green asset or project, the benefits of investing in them, and the need to consider them as part of core business in order to be more efficient and/or meet regulations (International Finance Corporation, 2017).

Another opportunity is based on reforestation and afforestation and the chance of reducing emissions from the AFOLU sector. As noted by Cárdenas and Orozco-Sanchez (2022), policymakers in LAC should pay more attention to the AFOLU sector, since it has a very large portion of GHG emissions, and because of its potential for low-cost carbon abatement. The costs of reducing deforestation are relatively low compared with the costs of reducing emissions from the manufacturing or transportation sectors. Therefore, LAC countries need to prioritize actions in the AFOLU Sector.

Some other opportunities for the LCT in Latin America and the Caribbean are related to the expansion and improvement of the sources of funding, which evidently are still insufficient. Also, it's important to widen the studies and research in all the themes related to the LCT and GE. And

finally, it is highly recommended that LAC countries improve, expand, and update their NDCs.

1.8.2 Key knowledge gaps and research needs to enable an LCT & GE transition

1. **Estimate costs of climate impact.** As mentioned before, there is a relevant knowledge gap regarding estimates of the costs of climate-change-related events and disasters. There are very few studies and literature for LAC that analyze these topics. Moreover, there are very few estimations of the costs each country should face in order to achieve all their commitments made in their NDCs. There is a need to develop a clear and accurate methodology to estimate the Marginal Abatement Cost Curves for each country and the region overall.
2. **Impact evaluation of policy instruments.** There is an important knowledge gap regarding impact evaluations of the policy instruments focused on LCT and GE. The region has already implemented several instruments such as ETS, fuel taxes and subsidies, carbon pricing and taxes, renewable energy subsidies, technology standards, payment for ecosystem services, forestry and land use, etc. But very few countries have evaluated these policy instruments, making it more difficult to compare them and understand their impacts. For example, British Columbia and California have evaluated their carbon taxes, and assessed what their effects are on employment, carbon emissions reduction, lobbying interests and operations, and investments. This allows policymakers to approach future decisions with evidence (García and Sterner, 2021).Additionally, it is important to better understand local acceptance of renewable energy projects. Whereas there is widespread public support for increasing renewable energy supply generally, specific renewable energy projects are often met with local resistance. In LAC, indigenous communities have opposed the development of wind farming in areas of great generation potential. Thus, there is a need to better understand the relationship between renewable energy companies and local communities in the region. **Agriculture, Forestry and Other Land Uses (AFOLU) sector.** In Latin America and the Caribbean, the AFOLU sectors represent the largest share of the total GHG emissions, different from other regions. Lamb et al. (2021) found that AFOLU is not only the largest emitting sector in LAC, but LAC is the region with the most GHG emissions coming from the AFOLU sector.
3. **Knowledge gap in the relation between GE and LCT.** This report is one of the first efforts to acknowledge the relationship between Climate Change and Gender Equity/Equality. The relationship between these two factors is not very clear to the general public. It is important to deepen the research specifically into this relationship, and exemplify how all around the world women are disproportionally more affected by climate change. Although there are several policies and plans addressing gender across the regions, the relationship between LCT and GE is not very clear in these documents and national policies. Another gap is based on the fact that there is no clear methodology with an approach that integrates gender issues and priorities and the empowerment of women in the analysis of risks and vulnerabilities of climate change, or in the framework of financing to face climate change. An analytical risk assessment framework is needed to focus on women's exposure to risks from climate change and severe weather events. This can help ensure that climate finance responds appropriately to gender-differentiated risks and vulnerabilities (UNDP, 2011).
4. **Lobby and corruption´s role in the LCT in LAC.** Corruption presents a major challenge in LAC as it affects regional efforts for LCT. There is a weak political will to enact climate action plans, which means enforcement and compliance policies are inefficient and imperfect. For instance, carbon taxes in Latin America have low rates and large exemptions, which limits the GHG emissions reductions (Cárdenas et al., 2021). Therefore, there is a potential knowledge and research gap regarding the relationship between politics and LCT, and regarding the different factors that might affect political will in relation to LCT. It is also important to research the role that lobbying and especially anti-climate lobbying has played in climate legislation in Latin America and the Caribbean. Lobbying has had an impact on climate legislation in the United States. Closing such knowledge and research gaps will help in better understanding the barriers and limitations policy instruments for LCT and GE might face in the future. Furthermore, new research on the political economy of LCT is needed to understand some of the main causes of deforestation. Studies like the one carried out by Xu (2020) helped understand the political origins of deforestation in the Brazilian Amazon region.
5. Finally, there is a knowledge gap and research opportunity analyzing the **regional integration of LCT**

policies. LAC countries share a common history and, to some extent, cultural background, but there is a high degree of fragmentation in climate policies implemented in the region. Integration is important as it may lead to higher economic efficiency and lower risk of leakage.

1.9 Conclusion

The Low-Carbon Transition in Latin America and the Caribbean is a process which is well directed. There are clear and consistent efforts being made in several sectors and countries. Although the LAC region is not one of the main CO2 emitters, it is one of the most vulnerable to climate-related impacts. The LAC region has one of the cleanest energy matrixes in the world, where nearly 60% of total electricity generation comes from renewable sources, compared to a global average below 40%, yet it represents only around 7% of global GHG emissions. Nevertheless, the LAC region experiences some of the harshest consequences of climate change, where extreme weather events have doubled during the last two decades (Cárdenas and Orozco-Sanchez, 2022). This situation is fairly similar for most of the Global South, where emissions are relatively small but most of global hotspots of high human vulnerability are located in it (IPCC, 2022).

Another relevant conclusion is about violence against climate activists and defenders of the environment. As the most dangerous region for these leaders, it is clear there is a need for local, national, and regional efforts to stop these violent behaviors, especially when it comes to GBV. Women are the most negatively affected by climate change, and social norms also tend to increase gender-based violence when confronted with climate impacts (ONU, 2020). In Latin America and the Caribbean, women are disproportionately affected by climate change´s effects, because they have less secure land tenure (only 25% of landowners) and less access to economic subsidies and other incentives (Erthal Abdenur, 2020). The LAC region has made some progress in the development of gender equality initiatives. An important advance is the construction of national equality plans. Most countries in the region developed these plans through participatory processes and consultation with civil society.

Latin America and the Caribbean still have a long path towards a significant Low-Carbon Transition and a regional environmental policy that is consistent with the Paris Agreement. Almost every country has submitted their Nationally Determined Contributions (NDC), has made updates of them, and has publicly expressed their intentions to reach net-zero emissions. Although there is a wide variety in the levels of commitment, every country is advancing in their efforts towards a Low-Carbon Transition. Nevertheless, it is necessary that absolutely all countries in the region, and the world, submit their NDCs, update them, and improve them in a way that they can strengthen their commitments with the LCT and the Paris Agreement. The roadblocks for these and other LCT and GE promising initiatives tend to be related to a weak political will to act against climate change and promote the LCT. Although in some cases weak political will can be caused by corruption and clientelism it is also caused by a lack of evidence, knowledge, public support, and accessible and understandable information related to climate change.

There are multiple examples of policy instruments for Low-Carbon Transition and Gender Equity in Latin America and the Caribbean, but they still face several difficult challenges. Most if not all common policy instruments can be found in the region, from carbon taxation to ETS and fossil fuel taxes and subsidies. Some of the complex challenges these instruments face are political will and political feasibility, lack of knowledge and technical support, and the need for regional and global cooperation. These challenges have limited the development of national policy instruments for LCT and GE. Very few countries have implemented carbon taxation and ETS in the region, so it is important to overcome the challenges in order to expand and promote those important policy instruments in order to achieve the LCT.

Some of the main constraints for an LCT and GE transition are based on the need for additional investment capital, new technologies, and technical and institutional roadblocks, both in formulating and implementing environmental laws and linking these to the NDCs. A relevant constraint is the territorial inequalities in the LAC region. These inequalities are determining factors in the differences in fiscal capacity between central governments and subnational governments. This means inequality limits the financial capacity of certain regions to invest in LCT.

Some of the main roadblocks to GE are related to the political participation of women, especially in the decision-making process. Moreover, it is very important that more policy instruments focused on GE are developed, implemented, and monitored. GE needs to play a more relevant role in public policy, especially all those instruments for LCT. Additionally, most of the funding coming to LAC for the LCT does not have a gender perspective. As mentioned before, only 8.29% of contributions had as a "principal" objective gender issues, 44.51% had gender issues as a "significant" objective, and

47.2% of the contributions coming to the region did not target gender at all (OECD DAC External Development Finance Statistics, 2020). It is important that most, if not all, contributions to the LAC region and its LCT have some level of gender objectives.

Some of the main opportunities that the OECD identified for the LAC region and for the promotion of LCT and GE are: help firms manage liquidity problems across sectors. Consider making direct support to firms and companies contingent on environmental improvements to provide an opportunity for governments to actively manage the transition from fossil fuels to low-carbon technologies. Make use of opportunities to support behavioral changes that may help a Low-Carbon Transition, for example through facilitating teleworking and rolling out high-speed broadband. Finally, it is key to improve the understanding of economic and environmental impacts of green policy packages. Using quantifiable metrics will help in designing more effective policies (OECD, 2020).

In regard to climate finance, the LAC region has made some progress committing national resources for the LCT and also progress in raising funding from multilateral, bilateral, and private donors. As shown previously, the LAC region has raised an estimated $32 billion USD from green bonds (Climate Bonds Initiative), $21.7 billion USD from multilateral organizations, $14.2 billion USD from bilateral sources, and $140 million USD from private donors (OECD DAC External Development Finance Statistics, 2020). However, these resources are far from achieving the need in the region, as Latin America and the Caribbean need to invest a total of 7% - 19% of their annual GDP, which represent an estimated $470 billion USD - $1,300 billion USD (Cárdenas and Orozco-Sanchez, 2022). Europe and the US will have to invest around 6% of their annual GDP to achieve the climate goals. In other words, LAC has low levels of GHG emissions but it is highly vulnerable to climate impact, and to achieve the climate goals it has to invest a larger portion of its resources to achieve the climate goals, in comparison with other developed countries (Cárdenas and Orozco-Sanchez, 2022).

Eventhough most LAC countries have already developed their NDC and their Long-Term Strategies (LTS) for the LCT and to reduce emissions, most of them haven't developed solid financial plans to achieve those LTS. As mentioned before, the LCT in LAC requires major investments, but so far financial resources have been limited and have problems in their distribution (Cárdenas and Orozco-Sanchez, 2022). On one hand, more resources are being designated for mitigation rather than adaptation. This seems counterintuitive, given that the LAC region only produced a small fraction of global GHG emissions and it is one of the most vulnerable regions to climate change (ECLAC, 2015). On the other hand, funding seems to benefit the more developed countries rather than the least-developed countries. In the case of multilateral funding, Brazil received about 8 times what countries like the Dominican Republic, Haiti, or Honduras received.

The climate finance analysis for LAC is aimed to understand the financial sources, challenges, constraints, and opportunities for the region, and to promote stakeholders, multilateral organizations, private donors, and national governments to invest in the LCT and GE in LAC, and foster them in playing a major role and have more impact in the region.

Finally, it is important to understand that there is a wide level of diversity within the LAC region regarding the LCT. More specifically, there are countries with multiple and effective policy instruments for the LCT, while others with really few instruments and few efforts made to protect the environment. Also, regarding funding, there is substantial difference between countries and the amount invested and received for the LCT. This happens also with the efforts made towards GE, as some countries show important commitments, laws, and policies, while others don't.

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Appendix

Sector Analysis on Sustainable Energy Transition, Forestry and Land Use Change, and Transport Infrastructure
Sustainable Energy Transition:

It is key to mention once more that the LAC region has one of the cleanest energy matrixes in the world, which means it has made substantial progress in the sustainable energy transition. Nearly 60% of total electricity generation comes from renewable sources, compared to a global average below 40% (Cárdenas and Orozco-Sanchez, 2022).

Calderon, S. et al. (2016) found that CO2 emissions can be reduced by increasing the development and implementation of wind and hydro power, biomass, and even the use of coal and gas in electricity generation. The authors´ simulations confirm that these alternative sources of energy are feasible in countries like Colombia given the state of resources and opportunities. In any case, it is important to remove and overcome the several legal barriers that non-conventional renewable energy sources face in LAC. Moreover, it is important to highlight that electricity generation coming from renewable sources is already cost-competitive with traditional sources in several regions (NEA, 2010; Kåberger, 2018), but there are still several barriers like the cost of capital, business model, institutional framework, etc. (Agutu et al., 2022). Therefore, it is important to overcome these constraints in order to keep promoting clean energy sources._

The Renewable Energy for Latin America and the Caribbean Initiative (RELAC) was implemented in December 2019 by the United Nations Secretary General's Climate Action Summit. It has the objective of achieving carbon neutrality from electricity systems in LAC and improving the resilience and sustainability of the sector and the region. The RELAC has brought together international agencies that support the energy transition in the region, for instance the Inter-American Development Bank (IDB) and the International Renewable Energy Agency (IRENA).

The energy transition will strongly depend on the funding it receives. America has relatively low levels of investment in renewable powers and fuels. According to the Renewable 2022 Global Status Report, in 2021 the American continent (excluding Brazil and the United States) invested a total of $9.7 billion USD, compared to the $11.6 billion USD invested by Brazil, $46.7 billion USD by the United Sates, and $137.2 billion USD by China (REN21, 2022).

Forestry and Land Use Change:

Forests have two mayor responsibilities for climate change. On the one hand, they remove carbon from the atmosphere. On the other, they regulate several environmental processes like temperature, rainfall, water filtration, crop pollination, etc. According to Cardenas and Orozco-Sanchez (2022), reforestation and afforestation could be LAC's most significant contribution to decarbonization and the LCT. This is because it is a less costly mitigation strategy than most other alternatives, and because the LAC region has the highest potential to abate carbon emissions from deforestation in the world. An estimate of 250 million hectares could be reforested today, mainly in countries like Brazil,

Colombia, Panama, and Central America. This represents an important opportunity for LAC to trade negative emissions (Cárdenas and Orozco-Sanchez, 2022).

The Latin American and Caribbean region is home to 33% of the world's forests. Between 1990 and 2020, forest cover in the region declined steadily from 53% to 46% of its land area. Considering the whole region, the area covered by natural forest decreased by 150 million hectares between 1990 and 2020. The loss of forest area is explained by new uses of land for agriculture, forestry, and stockbreeding and, to a lesser extent, by the expansion of cities and highway building associated with a variety of economic activities (ECLAC, 2021).

Some of the main policy instruments that have promoted reforestation in LAC are the Payment for Ecosystems Services (PES), which reduce deforestation and changes in land use by the promotion of conservation. PES programs have been developed in Brazil, Costa Rica, Mexico, and Ecuador. Brazil's Without Extreme Poverty Plan provides a conditional cash transfer for ecosystem conservation to the extremely poor communities. Through the Law No. 3.135 State Policy on Climate Change, Brazil has generated employment and helped over 8,500 families, who have protected over 10 million hectares since 2013. The Bolsa Floresta program is one of the largest PES programs in the world. The program rewards indigenous peoples for their conservation work and provides training and support for sustainable production (Saget et al., 2020). The Payment for Environmental Services scheme in Costa Rica (Pago por Servicios Ambientales - PSA) abandoned its previous formal land-title requirements in order not to exclude indigenous, poor, and landless households from participating in the program (Wunder, 2008). In the case of Mexico, the Payment for Hydrological Environmental Services (PSAH) is helping the poorest communities (Muñoz-Piña et al., 2008). The Socio Bosque program in Ecuador offers poor communities yearly payments in return for maintaining forest cover.

Some of the PES programs mentioned above include a strong focus on indigenous and poor communities. The Bolsa Floresta program in Brazil, the Payment for Environmental Services scheme in Costa Rica, the Payment for Hydrological Environmental Services (PSAH) in Mexico, and the Socio Bosque program in Ecuador all offered programs and rewards to poor and indigenous communities for their conservation services.

One important challenge for PES programs is the fact that several programs are funded with fossil fuel taxes, which creates a conflict of interest, since the promotion of PES programs will need promotion of fossil fuel taxes and might lead to higher levels of consumption. In Costa Rica, for example, this has been a major issue of public debate. Another challenge and constraint for reforestation can be new policies against LCT. In 2012, Brazil's National Congress modified the National Forest Code, which weakened environmental standards and regulations governing forests, which is onereason that Brazil has one of the highest levels of deforestation today (Roriz et al., 2017).

Transport infrastructure:

The transport sector is one of the main sources of GHG all over the world. Therefore, there is a clear need to improve policies to decrease the climate impact and consequences of the this sector. All climate policies should encompass the transport sector and clear actions to foster low-carbon transport infrastructure. The LAC region has done some significant work developing clean transport systems; nevertheless these efforts are not enough and not fully aligned with the Paris Agreement and its goals. Some of the main initiatives to reduce the emissions from the transport sectors are mentioned next.

The most common initiatives are to increase the share of biofuels and to accelerate the transition of vehicles to electric vehicles. Colombia and Argentina have proposed a shift from a heavy-duty fleet into rail-based transportation, and in the case of Colombia, fluvial routes. Chile, on the other hand, aims to use hydrogen to fuel heavy-duty vehicles, while Brazil is focusing in biofuels (Cárdenas and Orozco-Sanchez, 2022).

Moreover, Chile has developed a normative framework to regulate all motor vehicles. It was a progressive instrument that has been including more motor vehicles over the years, starting with motorcycles, then all gasoline vehicles, up to diesel vehicles. Chile also developed tax incentives to use biofuels in transport. Colombia, on the other hand, has been promoting vehicular natural gas and biofuels like alcohol and biodiesels; these have improved air pollution levels in the past years. Costa Rica also implemented laws to reduce vehicle emissions and encourage the conversion of gasoline vehicles to liquified petroleum gas. Costa Rica also has a program of recycling road surface materials to build new roads. Argentina is working in the expansion of the subway system while improving the traffic signs to reduce travel times. Ecuador is renewing the public transport fleet with low emissions new vehicles (Erazo, R., 2010).

The study made by Erazo (2010) concluded that countries in LAC, generally, did not have comprehensive policies on low-carbon transport infrastructure, nor did they have the policy instruments necessary to monitor the few policies aiming to reduce the transport sector emissions. Clearly, there is a need to include the concept of low-carbon transport infrastructure in the development of national development plans. Erazo argues that the early adoption of these concepts can reduce emissions and negative externalities at a reasonable cost.