TESS | Forum on Trade Environment & the SDGs

Trade and Climate Change Mitigation and Adaptation in Latin America: A Framework for International Cooperation

POLICY PAPER

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Preface

Regional Perspectives on Trade, Climate Change, and Sustainable Development

Tackling climate change and accelerating the urgently-needed shift to a low-carbon economy will require a substantial reshaping of global production and consumption patterns. At the same time, countries around the world are struggling to adapt their economies and recover from the impacts of the climate crisis.

Trade and trade policies have an important role to play in climate change mitigation and adaptation efforts, facilitating a fair, inclusive, and sustainable transition to a low-carbon economy and fostering climate-resilient development pathways. Although trade and trade policies can exacerbate the climate impact of unsustainable production and consumption patterns, they can also play a vital role in offsetting climate-induced production shortfalls in parts of the world affected by climate change and scaling up the diffusion, development, and uptake of technologies vital to climate mitigation and adaptation, while increasing their accessibility.

Already, a growing number of countries are exploring how to integrate climate change considerations into their trade policies, such as through new regulations and carbon standards, tariff and non-tariff measures, as well as a wide range of green industrial policies, including policies related to subsidies, government procurement, local content requirements, technology, and intellectual property. Depending on how climate-related policies and measures are designed, however, they can lead to trade tensions with potentially significant consequences for the multilateral trading system, for the cooperation critical to ramp up climate ambition, and for the sustainable development prospects of countries facing an increasingly complex global regulatory context.

In today's highly integrated global economy, achieving climate goals will not only require effective domestic policies, but also concerted and inclusive international collaboration. This implies overcoming traditional silos of policymaking to bring climate and trade policymakers together, and taking into consideration the reality and needs of third countries, including vulnerable economies that are most impacted by the climate crisis and developing countries which need pathways to thrive in the climate-resilient, low-carbon economy.

At the World Trade Organization (WTO), recognition of the trade-related dimension of climate mitigation and adaptation measures has prompted discussions in a number of bodies, starting with the Committee on Trade and Environment as well as in committees on market access, technical barriers to trade, and agriculture. In 2022, in the Ministerial Outcome document of the Twelfth WTO Ministerial Conference, WTO members recognized the importance of global environmental challenges including climate change and natural disasters, noting the importance of the contribution of the multilateral trading system to promote the UN 2030 Agenda and its Sustainable Development Goals in its economic, social, and environmental dimensions. Interest in the climate and trade nexus has also given rise to two climate-related member-led initiatives, namely the Trade and Environmental Sustainability Structured Discussions, co-sponsored by over 70 WTO members, and an initiative on fossil fuel subsidy reform involving nearly 50 members.

While many discussions are now taking place on trade and climate change at the WTO and in a range of other international settings, most are dominated by concerns, policies, and proposals from more advanced economies. By contrast, developing country priorities and perspectives on the nexus of trade, climate, and sustainable development receive relatively little attention.

In an effort to spur a more inclusive dialogue on trade and climate nationally, regionally, and internationally that addresses developing country priorities, TESS has commissioned a series of policy papers with partners highlighting regional perspectives on international cooperation on the nexus of trade, climate, and sustainable development. In a first phase, the series includes papers from experts and institutions in Africa, the Caribbean, South America, South Asia, Southeast Asia, and the broader category of least developed countries.

Each regional paper explores how international cooperation on trade and trade-related policies can support the climate change mitigation and adaptation efforts and priorities of developing countries and foster pathways to climate-resilient sustainable development. To achieve this, the analysis takes a bottom-up approach, starting from priorities reflected in commitments under existing nationally determined contributions, technology needs assessments, or national adaptation plans, and then reviews how cooperation on trade and trade policies can advance those domestic priorities. The papers also reflect on how the growing array of trade-related climate actions by governments, businesses, and consumers around the world is impacting the international policy and market landscape and the implications for the trade, climate, and sustainable development goals and policies of developing countries. Finally, each paper in the series puts forward particular areas of interest, options, and recommendations for international cooperation that could be taken up at the regional and multilateral level.

In each case, the starting point for the analysis is the urgency of climate action to achieve the goals of the Paris Agreement, recognizing the principle of common but differentiated responsibilities, as well as the importance of nationally determined contributions. The analysis does not purport to be exhaustive but rather should be seen as an effort to identify broad priority areas for attention and further investigation. To facilitate feedback on the draft papers and dialogue on priorities and opportunities for action, consultations of stakeholders from each region were convened, involving government officials, trade negotiators, and also regional organizations, academia, and civil society.

Notably, the regional approach to this series was chosen as one way to spur a conversation grounded in the circumstances and priorities of developing countries. This regional approach is not, however, meant to imply that countries in the same geographical region necessarily have similar priorities, nor does it mean to imply that the regional context is the priority setting for tackling climate mitigation and adaptation, though it may be a key strategy for some countries. Taken as a group, the papers highlight the diversity of trade and climate priorities among and within regions while also underlining similarities.

We hope these papers will help support inclusive discussions on trade, climate, and sustainable at the WTO and in other international settings that reflect the priorities and concerns of developing countries on the role of trade and trade policies in supporting climate mitigation and adaptation and climate-resilient sustainable development.

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Executive Summary

Latin America's contribution to greenhouse gas (GHG) emissions has been historically small, with a relatively low emissions intensity compared to other regions. This is consistent with the size of Latin American and Caribbean economies in terms of population and GDP. All countries in the region have ratified the Paris Agreement and submitted their first rounds of nationally determined contributions (NDCs) to the United Nations Framework Convention on Climate Change. Most countries have also updated their NDCs, taking on more ambitious commitments and linking them to Sustainable Development Goals.

Trade and investment positively affect economic growth. However, they also contribute to GHG emissions and higher energy consumption. Moreover, the greater frequency and intensity of climate hazards negatively affect agriculture, food security, and trade infrastructure. This is particularly relevant under the current global scenario, which has brought a sharper slowdown in economic activity, higher inflation, and geopolitical frictions.

Based on a literature review and consultations with government representatives and trade experts, this paper describes the linkages between climate measures (mitigation and adaptation) and how they can hamper or favour trade in Latin American countries. The paper also explores some approaches that countries in the region have adopted to maintain the competitiveness of their exports in a more demanding global market and to help ensure global food security.

The paper addresses six areas where Latin American countries have adopted climate measures that affect trade, namely:

- Agriculture sector: Most Latin American NDCs include productivity or competitiveness-enhancing measures affecting crop production. The most recurrent measures included in the NDCs are the diffusion of irrigation, fertilization technology, and the introduction of high-yield or diversified seed stock.

- The NDCs have addressed emissions from livestock production through mitigation measures that include manure management, feed management, and silvopastoralism.

- In the mining industry, some Latin American countries have established climate commitments related to the electrification of machinery, emission reduction from black carbon, and management of fugitive emissions linked to the hydrocarbon production chain. Although the NDCs do not contemplate specific objectives for the extractive industry, many of them are subject to tax on CO2 emissions.

- Electromobility in mass transit systems: Most Latin American countries have embraced electromobility as part of their strategies to reach carbon neutrality or as part of their NDCs commitments, catalysing investment, reducing dependence on fossil fuels, and helping to narrow the trade deficit. Domestic regulation is also advancing through bans of used car imports, tax and subsidy incentives that make the purchase of electric vehicles economically more affordable, the phase-out of combustion vehicles from their passenger transport fleet by 2030, and by favouring low-emission public transport.

- Innovation in new technology and processes ensures reduced carbon footprint and sustainable production in extractive industries and agriculture. Several countries have released strategies and roadmaps for developing green hydrogen to reach the mitigation objectives in their national mitigation plans, NDC, or their long-term strategies. At the same time, industrialized countries have defined hydrogen as a critical technology to achieve their policy goals, opening opportunities for more collaboration and tech transfer.

- Adopting the circular economy approach creates many interlinkages with trade and climate change mitigation. For example, it may bring new opportunities for trade in services such as waste management and remanufacturing. The region is advancing in connecting a circular economy with trade policy, and countries including Chile and Ecuador have explicit circular economy goals in their NDCs to reduce GHG emissions related to material management processes—high material consumption is an important factor in energy demand—and the transition to a more resource-efficient economy. Also, countries in the region have adopted specific policies, such as extended producer responsibility schemes..

The paper also discusses some of the unilateral trade-related climate measures imposed by major trading partners affecting products exported by Latin American countries. These include the European Union (EU) regulation to curb deforestation and forest degradation caused by EU consumption and production, and the implementation of the EU Carbon Border Adjustment Mechanism (CBAM), which aims to reduce carbon leakage. The first measure applies to commodities such as cattle, cocoa, coffee, palm oil, soya, and wood as well as derived products including leather, chocolate, and furniture.

The latter has been discussed in different World Trade Organization bodies, such as the Committee on Market Access, and has raised concerns among developing countries about the CBAM's compatibility with global trade rules, its consistency with the United Nations Framework Convention on Climate Change, the Paris Agreement, and the common but differentiated responsibilities principle, the effectiveness of CBAM in reducing carbon leakage, and the cost due to the higher tariffs on CBAM goods imported into the EU.

Regarding the support that trade can provide to climate adaptation efforts, particularly in the agriculture sector, the report emphasizes the relevance of technology transfer on adaptation technologies and leveraging technology needs assessments, which is a relevant mechanism for technology planning. Technology needs assessments for Latin American and Caribbean countries identify key technologies for adaptation in the agriculture sector, such as more efficient irrigation technologies and farming systems that can help maintain production in areas that suffer from prolonged water stress.

In these categories, countries have prioritized the leading technologies of drip irrigation, micro-sprinklers, soil nutrition, soil conservation, and the introduction of climate-resilient crops. Sustainable agriculture practices can also help to improve crop yields and food security, increase adaptation, and reduce GHG emissions.

Implementing national plans on adaptation requires counting on open and transparent trade to: i) boost access to environmentally sound technology; ii) contribute to food security; and iii) increase access to services related to adaptation technology.

Based on the type of commitments in their NDCs and strategic adaptation and mitigation plans, Latin American countries are more inclined to establish flexible cooperation approaches to achieve the transition to a low-carbon and climate-resilient economy in a just transition context.

This paper argues that multilateral, regional, and bilateral cooperation on trade should be strengthened through traditional mechanisms and instruments, but also through mainstreaming new approaches such as circular economy, traceability of emissions embedded in trade, providing the opportunity to participate in the development of sustainability standards, opening fluid dialogue to address carbon leakage and technology transfer, and expanding aid for trade while not limiting support to countries that receive official development assistance.

ABBREVIATIONS

CBAM	Carbon Border Adjustment Mechanism
CBDR-RC	Common But Differentiated Responsibilities and Respective Capabilities
CO2	Carbon Dioxide
ECLAC	United Nations Economic Commission for Latin America and the Caribbean
ETS	Emissions Trading System
EU	European Union
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
LAC	Latin America and the Caribbean
LUCF	Land-Use Change and Forestry
LULUCF	Land Use, Land-Use Change, and Forestry
MtCO2e	Metric Tonnes of Carbon Dioxide Equivalent
NDC	Nationally Determined Contribution
OECD	Organisation for Economic Co-operation and Development
TBT	Technical Barriers to Trade
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WITS	World Integrated Trade Solution
WTO	World Trade Organization

This paper uses information from the Latin American and Caribbean Demographic Centre, which covers 19 countries of Latin America: Argentina, Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Plurinational State of Bolivia, and Uruguay.

1. Introduction

The latest Intergovernmental Panel on Climate Change (IPCC) report, released in April 2022, confirms again the need for urgent action to address global warming. The most recent estimates indicate that global net anthropogenic greenhouse gas (GHG) emissions continued to rise in 2010–19, as have cumulative net carbon dioxide (CO2) emissions since 1850. Additionally, average annual GHG emissions in 2010–19 was higher than in any previous decade, but the growth rate in that period was lower than in 2000–09. For Latin America and the Caribbean (LAC), per capita CO2-FFI averaged 2.7 MtCO2e in 2019, less than a third of developed countries' CO2-FFI (9.5 MtCO2e) that year.[1]

The IPCC report also indicates that regional contributions to global GHG emissions differ widely. Variations in regional and national per capita emissions partly reflect different development stages, but they also vary significantly at similar income levels.

Although the continued fall in the unit cost of low-emission technologies—such as solar energy, wind energy, and lithium-ion batteries—has supported the decarbonization of energy grids and electromobility, global efforts must be redoubled by amplifying and accelerating the transition to renewable energy sources, as well as changes in production and consumption patterns.

The region has been engaged in the global momentum for climate action, and most countries are working on transitioning to sustainable development including through low-emission and climate-resilient development. All countries in the region have ratified the Paris Agreement and submitted their first round of nationally determined contributions (NDCs) to the United Nations Framework Convention on Climate Change (UNFCCC).

Some countries also updated their NDCs before the 2021 United Nations Climate Change Conference (COP 26) in Glasgow, assuming more ambitious commitments and linking them to the United Nations (UN) Sustainable Development Goals. As of February 2022, six countries in the region had officially submitted their long-term strategies to the UNFCCC and nine had committed to carbon neutrality by 2050.[2] In addition, many others continue working on their long-term strategies.

Countries in Latin America have been participating actively in the international regime for climate change since its inception and, simultaneously, strengthening their participation in global trade through bilateral and regional trade agreements. Furthermore, the region has advocated the principles included in Article 3 of the UNFCCC and in its Paris Agreement, which are especially important for developing countries, such as equity and the principle of common but differentiated responsibilities and respective capacities (CBDR-RC), in light of different national circumstances.[3]

In many Latin American countries, the mitigation policies, strategies, and national plans at the national and subnational levels focus on reducing deforestation rates, improving energy efficiency, and replacing fossil fuels with renewable energies. Some NDCs, national plans, and long-term strategies also include targets related to sustainable production and consumption, including circular economy approaches, as one of the tools available to achieve sustainable development.

Trade and investment positively affect economic growth. However, they also contribute to GHG emissions and higher energy consumption. The greater frequency and

1. CO2-FFI refers to CO2 from fossil fuel combustion and industrial processes. MtCO2e refers to metric tonnes of CO2 equivalent.
2. Chile, Colombia, Costa Rica, Guatemala, Mexico, and Uruguay have submitted their long-term strategies to UNFCCC. Chile was the first Latin American country to announce carbon neutrality by 2050 at the 25th Conference of the Parties that the country hosted in 2019 and include it as a target in its climate change framework law.
3. It is worth noting that the CBDR-RC principle has not been an obstacle for climate action in Latin American countries.

intensity of climate hazards negatively affects agriculture and food security and damages trade infrastructure. This is particularly relevant under the current global scenario with a sharper slowdown in economic activity, higher inflation, and geopolitical frictions.

On the other hand, trade may play a substantial role in mitigation and adaptation efforts. For example, trade can foster and facilitate the expansion of sustainable products, especially in agriculture sectors, and it can accelerate the diffusion of environmental goods and services, such as energy-efficiency products. Trade can efficiently allocate production of environmentally sound technologies to regions/countries with better comparative advantages and eliminate tariff and non-tariff measures that affect the adoption of environmental goods. Thus, trade has a role as an engine of economic growth and as part of the solution to the climate change crisis. There is an opportunity to foster synergies among trade, climate policies, and development (Droege et al., 2016).

Recognizing that climate negotiation is an ongoing process and many concepts have not reached a multilateral consensus, this paper aims to provide a Latin American perspective on how international cooperation on trade and trade-related policies can support climate change mitigation and adaptation efforts by understanding the trade-off of different measures. It is not the aim of this scoping paper to cover all the topics and areas related to the intersection between climate change and trade, but to examine those areas where Latin American countries can contribute positively to the cooperation agenda, in line with the IPCC (2018) special report on global warming of 1.5°C. Some examples include integrating circular economy into the international cooperation agenda, fostering international harmonization, and the role of technology transfer, among other essential topics.

The first and second sections of the document present an overview of Latin America's GHG emissions and their sources, alongside the trade profile of the region. Based on a literature review and consultations with government representatives and trade experts, the third section describes the linkages between climate measures (mitigation and adaptation) and how they can hamper or favour trade, while the fourth section refers to the role of trade in supporting adaptation efforts in the region. Finally, the fifth section focuses on implications for cooperation in trade and suggested recommendations.

2. Greenhouse Gas Emissions and Mitigation Targets in Latin America

Latin America is a heterogeneous region with a wide variety of climates and ecosystems, different socioeconomic profiles, natural resource endowments, and population distribution, and vast biodiversity. With a population of 629.3 million people, the region represents about 8.3% of the world population and accounts for 5.6% of global GDP (World Bank, 2020). However, Latin America is also characterized by high levels of inequality, with poverty reaching 13.8% (86 million) in 2021 (United Nations Economic Commission for Latin America and the Caribbean [ECLAC], 2022).

Latin America and the Caribbean contribute modestly to greenhouse gas stock in absolute terms per capita and per unit of GDP. In 2019, the region's contribution to global GHG emissions was 8.4% (Climate Watch, n.d.)—a small contribution compared to top emitters and a relatively low emissions intensity compared to other regions. However, this number is consistent with the size of LAC economies in terms of population and GDP. For example, total global GHG emissions rose by slightly more than 50% in 1990–2019, while in Latin America they increased by 11.7%, with an inter-annual growth rate of only 0.4% for the same period.

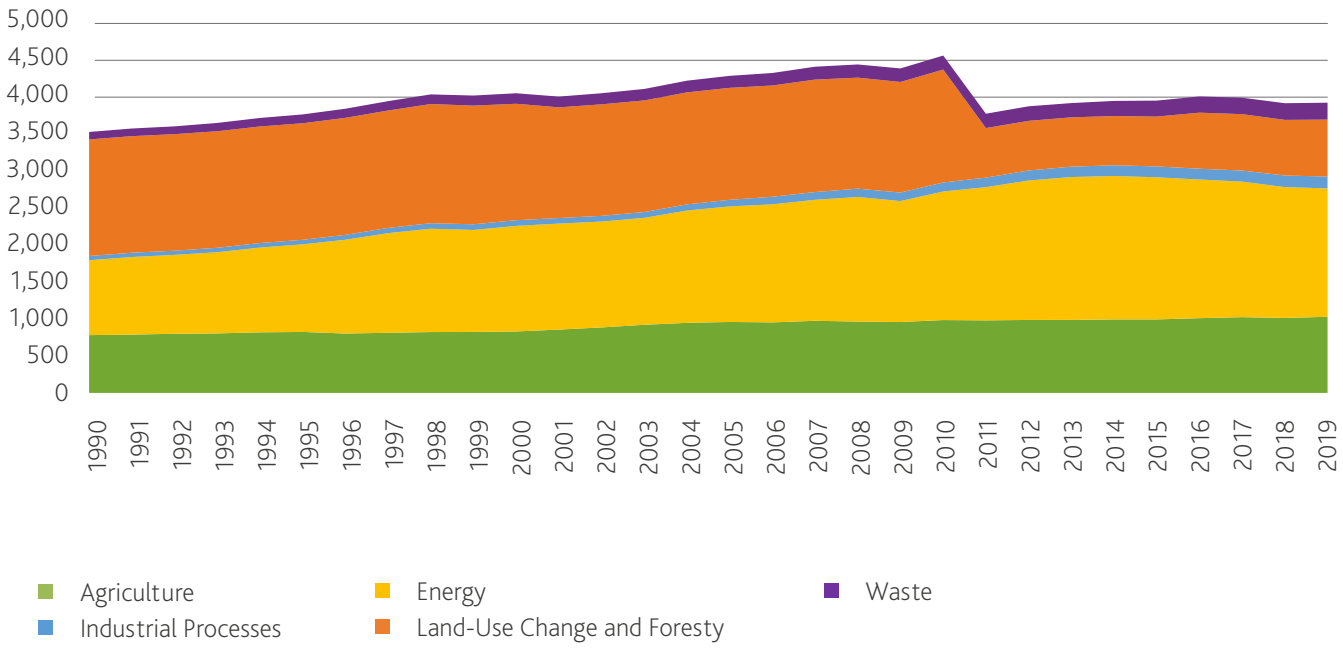
2.1. Evolution of Greenhouse Gas Emissions

Historically, most Latin American GHG emissions have come from agriculture and land-use change and forestry (LUCF) combined, reaching 45.1% compared to the world average of 15.1%. The energy sector was the primary driver

of GHG emissions in 2019, at 45.2%, followed by agriculture and LUCF, at 26.2% and 19.6%, respectively. Latin American GHG emissions peaked in 2011, declining suddenly due to Brazil's substantial decrease in LUCF emissions. In addition, although the deforestation rate in the Brazilian Amazon has been among the highest globally, these rates dropped significantly in 2005–11.

The region has the highest absolute and per capita emissions of any world region (IPCC, 2022). Nonetheless, emissions from energy are increasing and they are almost equal to emissions from agriculture and LUCF. Naturally, countries have differences due to their endowment of factors and productive structure. This implies that recommendations in terms of mitigation actions will be different.

Figure 1. Evolution of Greenhouse Gas Emissions in Latin America by Sector, MtCO2e, 1990–2019

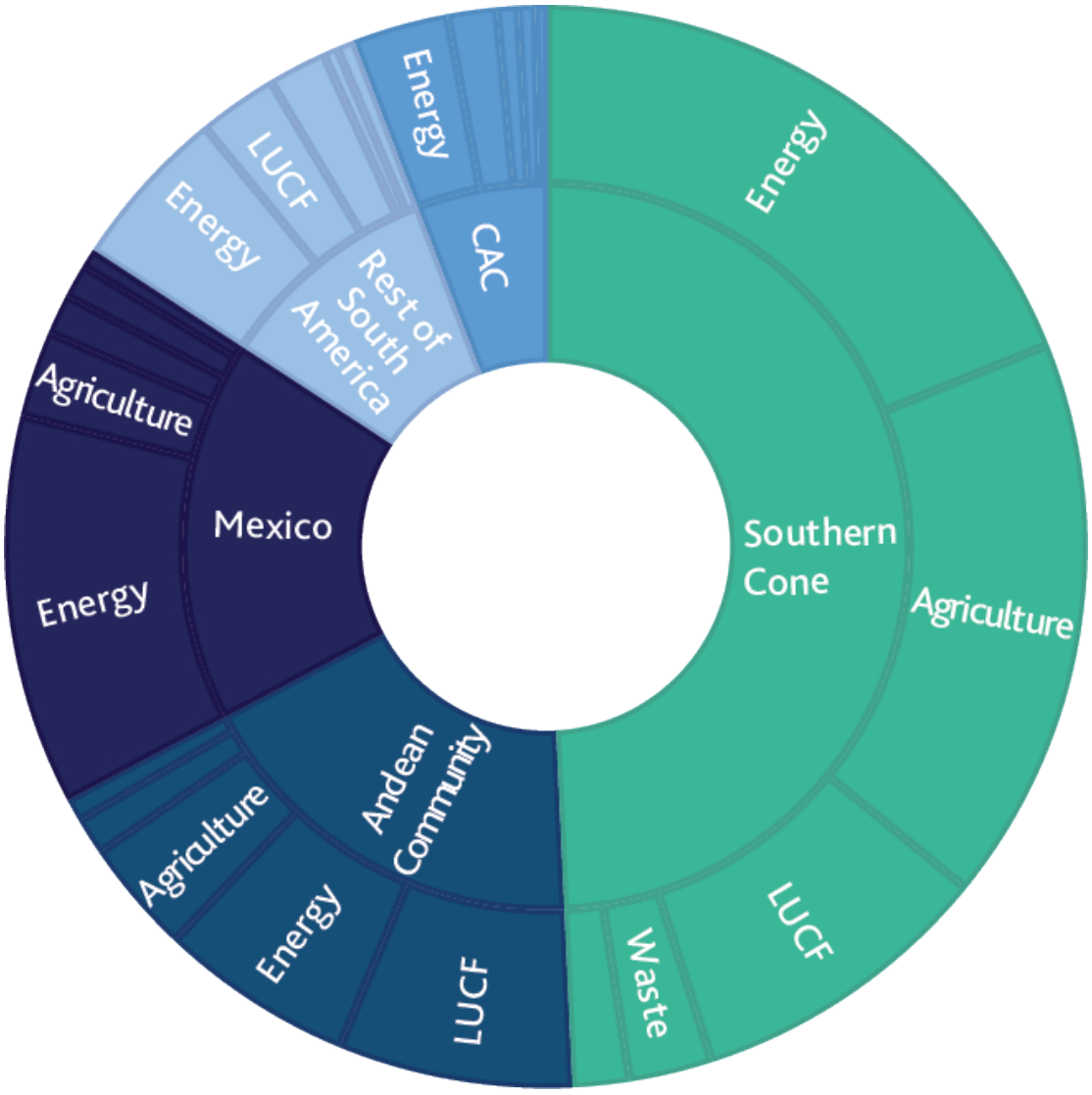


Source: Climate Watch (n.d.).

Brazil and Mexico are among the top 20 world emitters, although their emissions contribute only 2.9% and 1.34%, respectively. They are followed in Latin America by Argentina and Venezuela with 0.8% and 0.6%, respectively. Figure 2 shows the differences in GHG emission by sector of origin, confirming the heterogeneous emission composition among Latin American subregions.

In the Southern Cone countries, energy stands out as the primary source of emissions, except for Uruguay and Brazil, where emissions from the agricultural sector predominate. In Andean countries, the agriculture and LUCF sectors lead emissions, followed by the energy sector. In the rest of South America, emissions from the energy sector prevail (Venezuela and Paraguay). For most countries in Central America and the Caribbean, energy is the primary source of emissions, except for Nicaragua, where LUCF prevail.

Figure 2. Latin America and Greenhouse Gas Emissions by Subregion and Sector, 2019



Note: Southern Cone refers to Argentina, Brazil, Chile, and Uruguay; Andean Community refers to Bolivia, Colombia, Ecuador, and Peru; Central America and Caribbean (CAC) refers to Dominican Republic, El Salvador, Guatemala, Honduras, and Nicaragua; and Rest of South America refers to Paraguay and Venezuela
Source: Climate Watch (n.d.).

Greenhouse gas emissions per capita in the region are estimated at 6.28 MtCO2e (Climate Watch, n.d.). Paraguay ranks first (13.71 MtCO2e), followed by Bolivia (12.05 MtCO2e) and Venezuela (10.51 MtCO2e). Costa Rica registers the lowest CO2 emissions in the region at 1.68 MtCO2e per capita. Figure 3a shows carbon emission intensity by region; LAC ranks third after South Asia and sub-Saharan Africa.

A closer look at the CO2 emission per capita of the largest economies in the region shows that Brazil's carbon intensity per capita reached 6.85 MtCO2e in 2019 (comparable to countries in Europe and Central Asia, where per capita emissions are about 7.81 MtCO2e per capita), while Mexico is below the regional average, reaching 5.26 MtCO2e per capita. On the other hand, Argentina is above the average, amounting to 8.88 MtCO2e per capita.

Carbon emission intensity by GDP means Latin America emits 728.54 MtCO2e per $1 million, compared to 567.167 MtCO2e emitted by the world. Although Latin America showed a decreasing trend in 1990–2011, there was an increase in the emission intensity by GDP in 2014–19.

Figure 3a. Carbon Emission Intensity, MtCO2e Per Capita, 2019

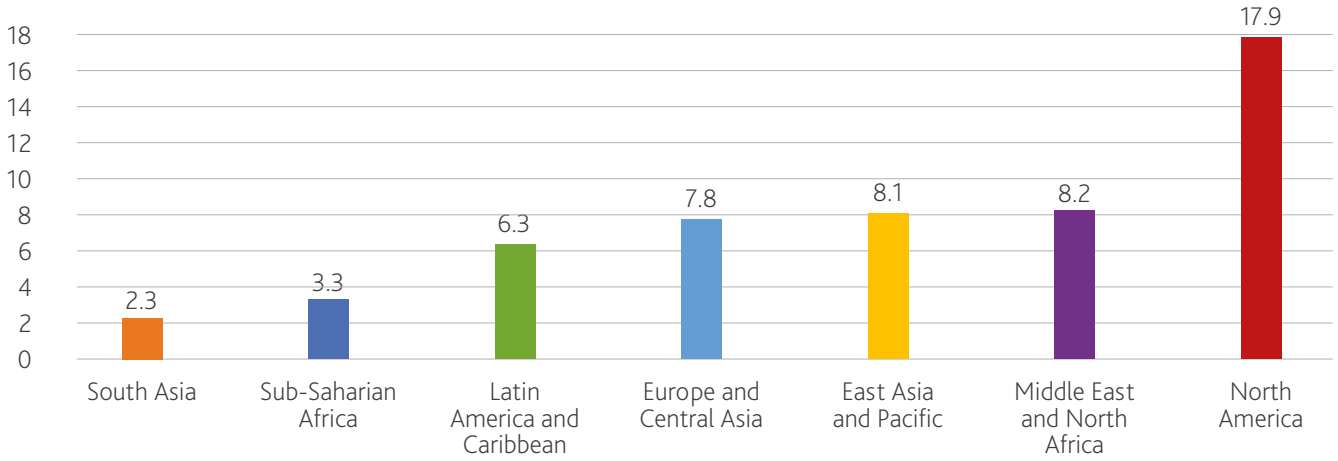
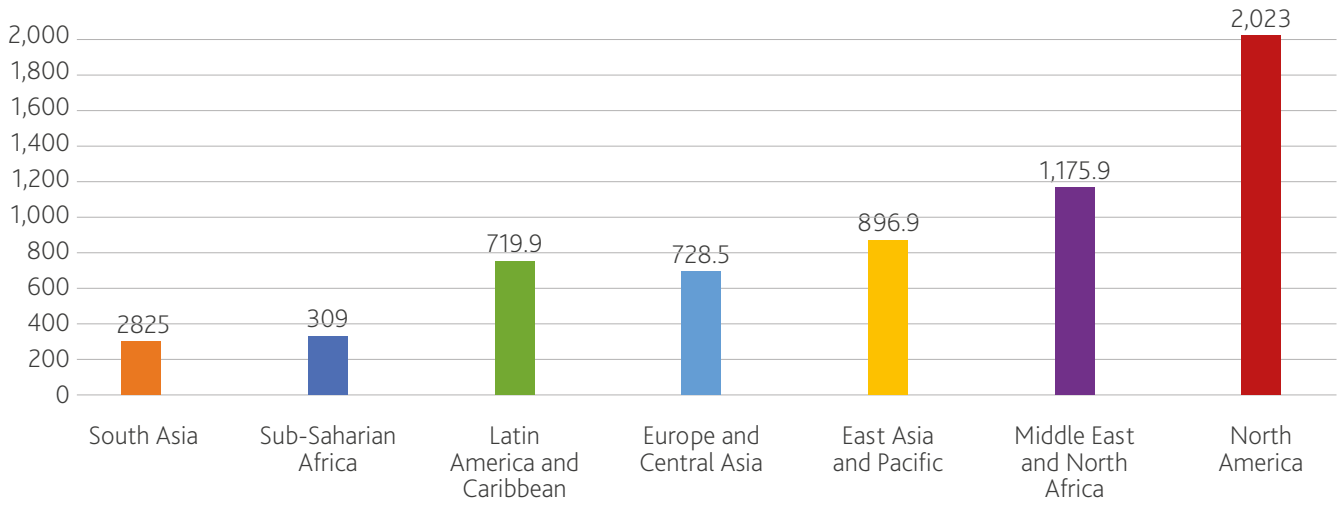


Figure 3b. Carbon Emission Intensity, MtCO2e Per $ Million GDP, 2019



Source: Author's elaboration based on Climate Watch (n.d.).

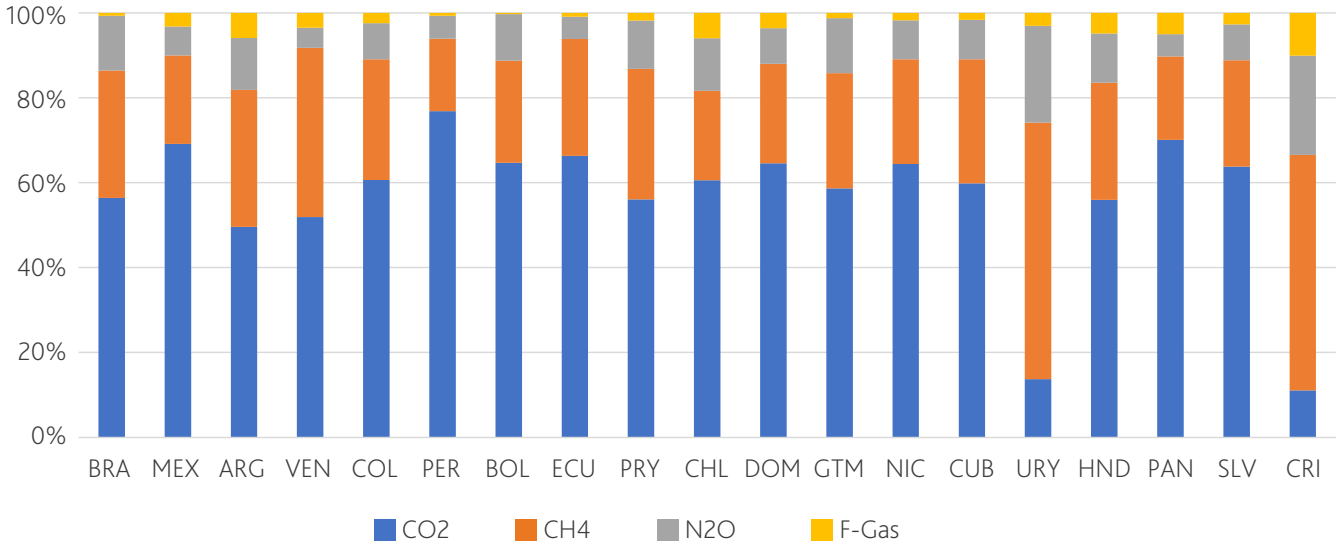
Most countries in Latin America face huge challenges to achieve inclusive economic development and meet their climate targets while adapting to the impacts of climate change—such as hydric scarcity, changes in precipitation patterns, and higher frequency of extreme events (Cui et al., 2020). Following the commitments in their NDCs, the emissions of Latin America's three largest emitters are expected to continue rising in the coming years and reach their peak in this decade. Argentina has committed that it will reach its emissions peak by 2030, while Mexico's emissions projection under business-as-usual (excluding land use, land-use change, and forestry [LULUCF]) would increase until 2030.[4]

According to Brenton and Chemutai (2021), "higher GDP per capita and population growth have been the most important drivers of emission growth" across 59 emerging emitters, including 9 Latin American countries.[5]

Carbon dioxide constitutes more than half of the CO2 equivalent GHG emissions of 17 out of 19 countries (Figure 4). Countries where the agriculture and LUCF sectors are the primary sources of emissions have introduced policies to enforce protected areas, reduce deforestation, increase reforestation rates, and adopt sustainable agriculture practices and technologies that can help mitigate the sectors' emissions. However, non-CO2 gases represent more than 50% of their CO2 equivalent GHG emissions for some countries in the region. This situation is particularly true for countries like Uruguay which faces significant challenges related to livestock production of methane emissions (CH4O).[6]

4. According to Climate Action Tracker (n.d.), current policy projections indicate that 2030 emissions would reach 774–852 MtCO2e a year.
5. Countries included in the list are Bolivia, Chile, Colombia, Guatemala, Haiti, Honduras, Nicaragua, Paraguay, and Peru.
6. In Uruguay, agriculture (including the livestock and forestry sectors) represents 60% of CO2 emissions followed by energy, including the transport sector (31%). Greenhouse gas emissions in Uruguay increased by 12% in 2011–18.

Figure 4. Composition of Greenhouse Gas Emissions Across Latin American Countries, 2019



Note: CO2, carbon dioxide; CH4, methane; NO2, nitrous oxide; F-Gas, fluorinated gases.
Source: Author's calculation based on Climate Watch (n.d.).

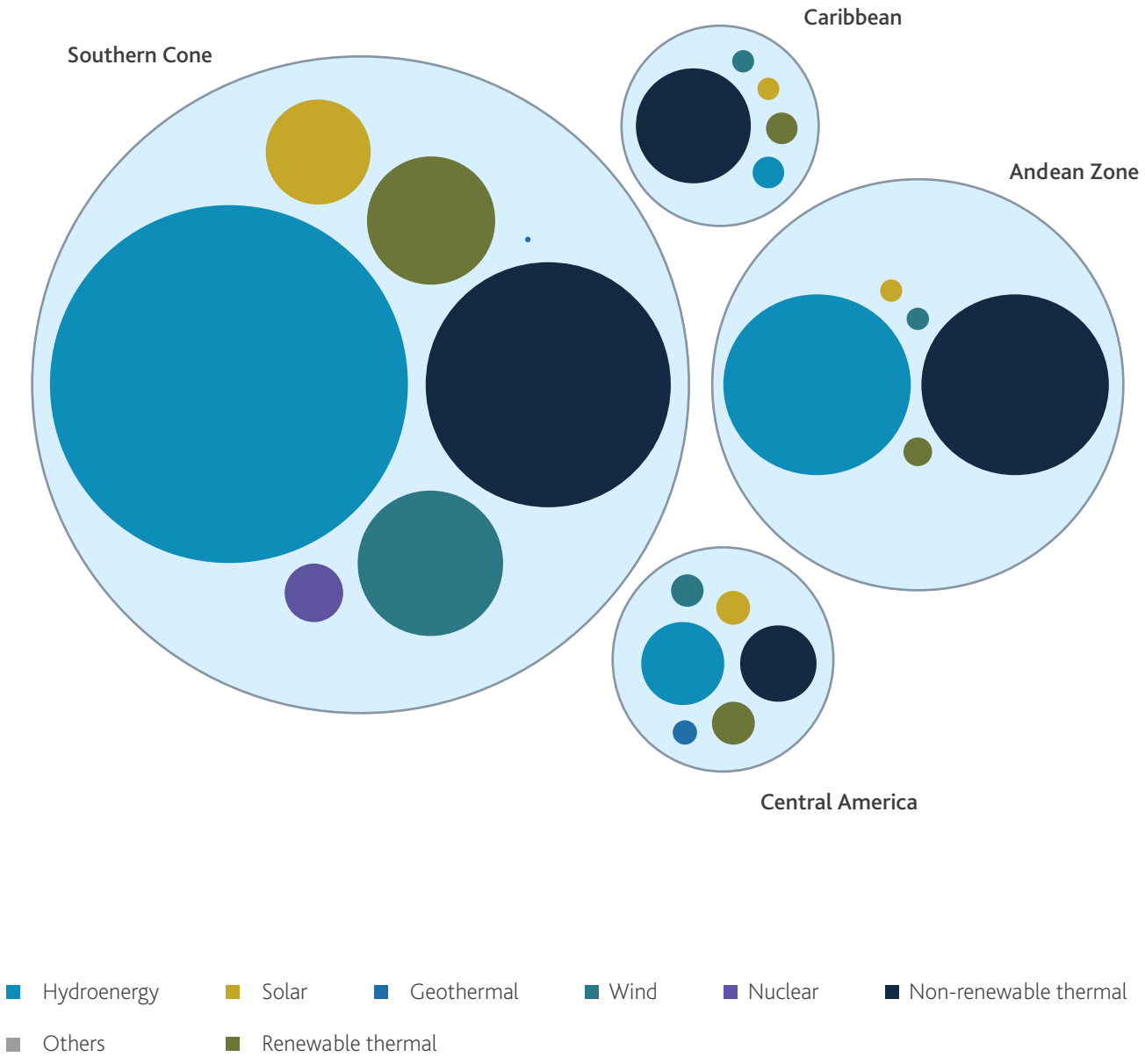
2.2.Energy Sector

Some 46.2% of all energy in Latin America and the Caribbean comes from hydropower. The region's second leading source of electricity is non-renewable thermal, at 36.3% (Organización Latinoamericana de Energía [OLADE], n.d.). In terms of installed electricity generation capacity by fuel type, renewable sources reach 59.9%, followed by non-renewable and nuclear energy at 38.9% and 1.17%, respectively. The Southern Cone has the biggest share of hydro energy, followed by the Andean Zone and Central America (see Figure 5a).

The region benefits from plenty of renewable energy, such as hydro energy, geothermal, solar, and wind, among others. Almost 89% of Brazil's electricity generation comes from renewable sources, while Argentina, Chile, and Mexico have favourable conditions for increasing solar energy investments. It is worth noting that Uruguay is one of the leading countries in renewable energy generation: its energy grid is almost entirely green as 98% of its energy generation comes from renewable sources. The bulk of its electricity comes from hydropower (60%), followed by wind, solar, and biofuels. The share of its power from wind and solar rose in 2020, reaching 50% of total generation (Demôro et al., 2021).

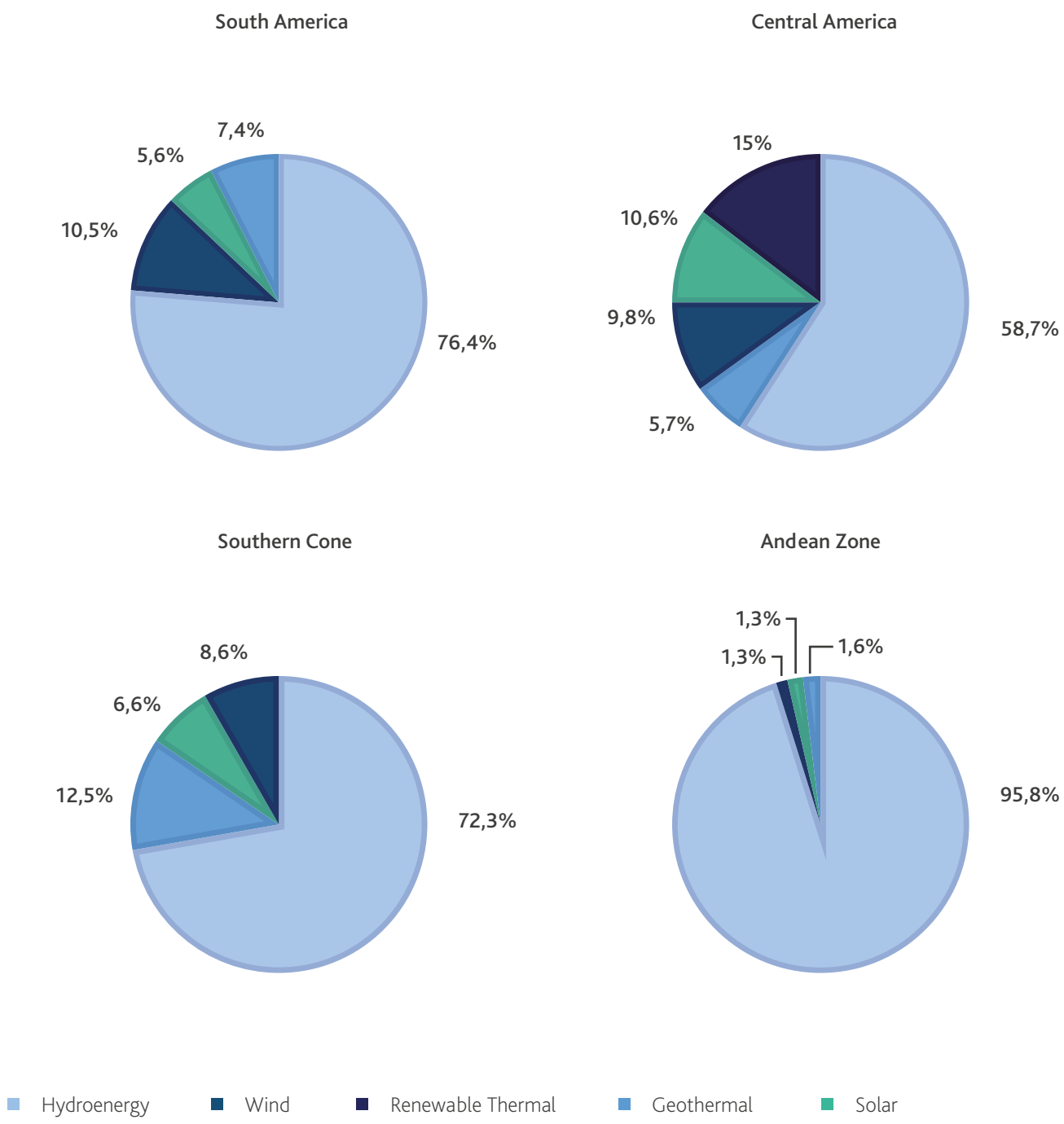
In South America, 76.4% of renewable capacity is hydroelectric energy, followed by wind (10.5%) and renewable thermal (biomass) energy (7.4%). Solar energy represents 5.6%. Regulatory changes have enabled increasing investment in renewable and greener energy generation.

Figure 5a. Installed Capacity: Electricity Generation in Latin America and the Caribbean by Fuel Type, 2020



Note: Southern Cone refers to Argentina, Brazil, Chile, and Uruguay; Andean Community refers to Bolivia, Colombia, Ecuador, and Peru; Central America and Caribbean (CAC) refers to Dominican Republic, El Salvador, Guatemala, Honduras, and Nicaragua; and Rest of South America refers to Paraguay and Venezuela.
Source: OLADE (n.d.).

Figure 5b.Structure of Renewable Energies by Subregion of Latin America, 2020



Note: Central America countries are Belize, Costa, El Salvador, Guatemala, Honduras, Nicaragua, and Panama; Andean Zone countries are Bolivia, Colombia, Ecuador, Peru, and Venezuela; Southern Cone countries are Argentina, Brazil, Chile, and Uruguay; and South America countries are the Andean Zone plus the Southern Cone countries.
Source: Based on OLADE (n.d.).

2.3. Agriculture and Land-Use Change and Forestry

Agriculture uses more than a third of the region's land area and consumes almost three-quarters of its freshwater (Morris et al., 2020). The agriculture sector accounted for 22.1% of emissions in 1990. That share remained relatively stable until 2002, but emissions have since grown steadily to reach 26.2%. The main sources of GHG emissions are from the expansion of crop production related to agricultural land use, livestock production (Argentina, Brazil, and Uruguay) and the burning of crop residues.

Additionally, LAC countries produce about a quarter of the global emissions attributed to land-use change (Ardila et al., 2021). The LUCF sector is responsible for 17.2% of total emissions in LAC. Emissions from the LUCF sector accounted for almost 43% in 1990 and fell to less than 15% in 2011. Brazil has the highest GHG emissions among LAC countries, emitting 394.7 MtCO2e in 2019, followed by Peru at 89.93 MtCO2e, Colombia at 83.19 MtCO2e, and Bolivia at 77.93 MtCO2e.

Agriculture expansion was South America's main driver of deforestation over 1990–2005, followed by commercial crops. However, the underlying causes of deforestation can differ at the country level. Hotspots for deforestation driven by commercial cropland increases were Brazil (Mato Grosso State), northern Argentina, eastern Paraguay, and central Bolivia (De Sy et al., 2015). The expansion of small- to mid-scale agriculture and cash crops such as coffee, cacao, and palm oil, among others, largely drives deforestation in the Peruvian Amazon. The Food and Agriculture Organization of the United Nations estimates that South America lost almost 3 million hectares of forest ever year from 2015–20. Agriculture (including large-scale, small-scale and colonization) and livestock are among the main causes of deforestation in the Amazon (Bennett, 2017).

Emissions from LUCF rose from 1,364 MtCO2e in 1990 to 1,462.6 MtCO2e in 2010. As Figure 1 shows, there was a sudden decrease in LUCF emissions in 2011 when Brazil reduced emissions by implementing various programmes and strategies to fight deforestation. The intensification of illegal deforestation has become a challenge for Brazil in recent years, however, and has contributed to an increase in GHG emissions, which, as noted, reached 394.37 MtCO2e in the LUCF sector in 2019. Although this number is still well below the historical average, it represents a regression considering that the emissions curve had decreased.

In the case of Chile, LUCF has been the only sector acting as a carbon sink during the last two decades, with an average emissions absorption of 50.6 MtCO2e a year in 2000–19. Chile's carbon sink relies entirely on its native forest, and the negative number reflects the increase in biomass from renewables from native forests and forest plantations. This capacity of the LULUCF sector, where the forestry sector represents more than 80% in absolute terms, is essential to achieving carbon neutrality in Chile by 2050.

2.4. Waste Sector

Global emissions from the waste sector rose from 19.5% to 1,629.87 MtCO2e in 1900–2019. The main sources of waste-related emissions in 2019 were landfill and solid waste, including domestic and industrial wastewater treatment.

Waste is the fourth-biggest source of GHG emissions in LAC, accounting for 6% of total GHG emissions in 2019. Brazil and Mexico are the top emitters, at 70.89 MtCO2e and 47.6 MtCO2e, respectively. Emissions from the waste sector grew over 1990–2019 due to population growth, consumption patterns, urbanization, and the consequent surge in solid and liquid waste generation.

Waste generation in LAC is increasing steadily and generates about 10% of global waste (United Nations Environment Programme [UNEP], 2018c). While various policies and programmes have been implemented to address the emissions from municipal solid waste, more than 35,000 tonnes of waste are left uncollected daily in the LAC region, affecting more than 40 million people, and about 145,000 tonnes end up in open dumps every day. An estimated 10% of the waste generated is recovered (UNEP, 2018c).

3. Overview of Exports and Imports of Goods in Latin America

Trade plays a central role for Latin American countries. It has been a vehicle of economic growth and employment in the last 30 years, and a critical component of several countries' development strategies. The productive regional structure and consequent sectoral specialization have deepened reliance on primary commodities and natural resource-based manufacturing, putting more pressure on the environment.

Regional exports have slowly declined over the last decade, reaching a low in 2015. Then, the region started a new cycle characterized by slow growth in exports, reaching its peak in 2016. After sluggish export growth in 2018 and a slight decrease in 2019, the COVID-19 pandemic noticeably affected trade volumes. The value of LAC goods exports fell sharply in 2020 due to a supply shock (the partial lockdown in many economic activities) and the decline in demand from Europe, the United States, and the region itself, partly offset by sustained Chinese demand for agricultural products, food, and, to a lesser extent, minerals and metals (ECLAC, 2020b).

3.1. Main Trading Partners and Intraregional Trade

Latin American exports and imports are geographically diversified. The United States is the region's main destination for goods, accounting for 47.2% of total exports, followed by Eastern Asia (19.2%) and Europe and Central Asia (11.4% each).[7] The leading mineral exporters in South America are Bolivia, Chile, and Peru, while Colombia, Ecuador, and Venezuela lead hydrocarbon exports. Argentina, Paraguay, and Uruguay are the top agriculture exporters.

South America has lower levels of intraregional trade and is less integrated in terms of production compared to Central America. Total South American exports to the region amounted to about $75 billion, led by manufactured goods, while machinery and transport equipment and food ranked second and third respectively.

Central American exports to the United States reached $37 billion, which is 41.8% of its total exports. South America is less dependent on the United States, and China has been its main trading partner since 2015 (ECLAC, 2021). South American exports to the United States accounted for 14% of total exports in 2019.

It is worth noting that Mexico is highly integrated into the United States' supply chains, which are linked to medium- and high-tech manufacturing. The United States accounted for 77.9% of Mexico's exports in 2019.

Figure 7 underscores the importance of Mexican total exports, which account for almost half of all Latin American exports, followed by Brazil, Chile, and Argentina. The top five goods exported from the region are petroleum oils ($46.3 billion), copper ore and concentrates ($33.1 billion), soya beans ($31 billion), iron ore and concentrates ($24.3 billion), and gold ($18.9 billion).[8]

According to ECLAC (2021), Latin America has one of the lowest levels of intraregional trade globally (13%) and its integration into global value chains is modest. The COVID-19 pandemic exacerbated this because of the supply chain disruptions. Nevertheless, ECLAC recognizes that despite the greater dynamism of intraregional exports, these only reached 13%, well below their peak in 1994 and 2008 (24%). Another element that explains the low level of intraregional trade is China's role as the region's second-largest trading partner, as Chinese demand for commodities causes raw material exports to increase (ECLAC, 2021).

Latin America's participation in global value chains has been irregular. The Inter-American Development Bank identifies the failure to harmonize preferences and rules in the region's preferential trade agreements as a barrier to increased intraregional trade and the formation of sophisticated

7. Regional groups follow classification of the World Bank's World Integrated Trade Solution (WITS, n.d.).
8. WITS based on UN Comtrade (n.d.) using the Harmonized System 2017 edition four-digit codes.

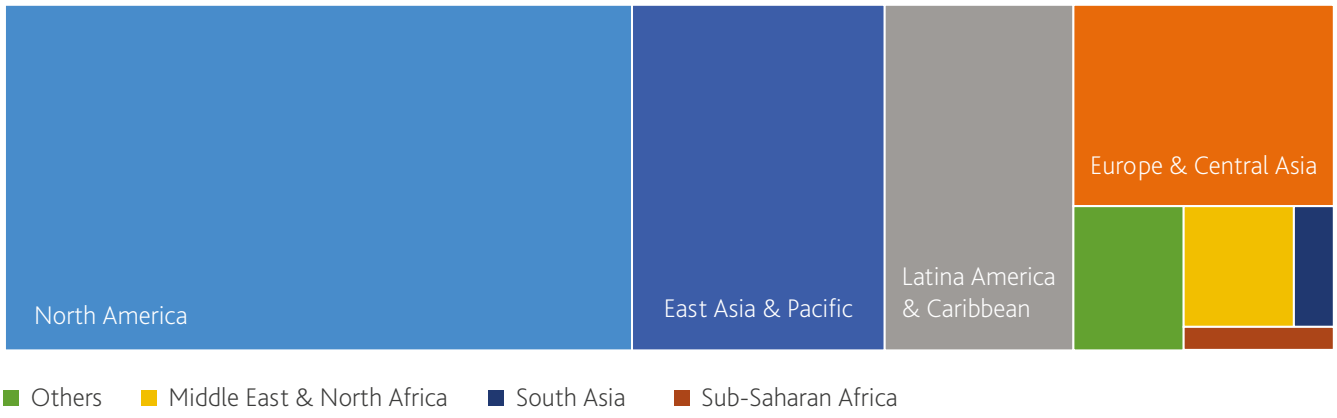
supply chains. The region is mainly integrated in simple or less complex global value chains associated with mining industries or exports of primary commodities. Nonetheless, there are some interesting examples of advanced manufacturing, such as the automotive industry (Brazil, Mexico, and Central America), aerospace (Mexico and Brazil), and medical devices (Mexico, Costa Rica, Dominican Republic, and Brazil).

Considering the processing stage of exported goods, the share of raw material exports is not very different from the share of capital goods exports. However, when Mexico is removed from the analysis, raw material exports reach almost 50% of total Latin American exports. The Mexican export basket contains a significant proportion of manufactured goods such as cars, computers, vehicle parts, and delivery trucks.

For Mexico and Brazil in particular, capital goods are the main imported products, followed by consumer goods and intermediate goods. Total imports to the region are roughly equal to exports, $922 billion. Most of these imports come from the United States, China, Brazil, Germany, and Japan.[9]

According to the World Bank, "the most recent estimates show that around one-quarter of all global emissions are linked to international trade flows" (Brenton & Chemutai, 2021). Moreover, the global regulatory environment is becoming more stringent as more ambitious climate policies and measures enter into force, affecting demand for carbon-intensive goods and firms' competitiveness. Some countries are adjusting to these new circumstances by adopting sustainability standards, these include livestock management policies and coffee standards.

Figure 6. Latin American Exports of Goods by Region, 2019



Note: Cuba, Dominican Republic, Panama, and Venezuela were omitted because data were unavailable.
Source: WITS based on UN Comtrade (n.d.).

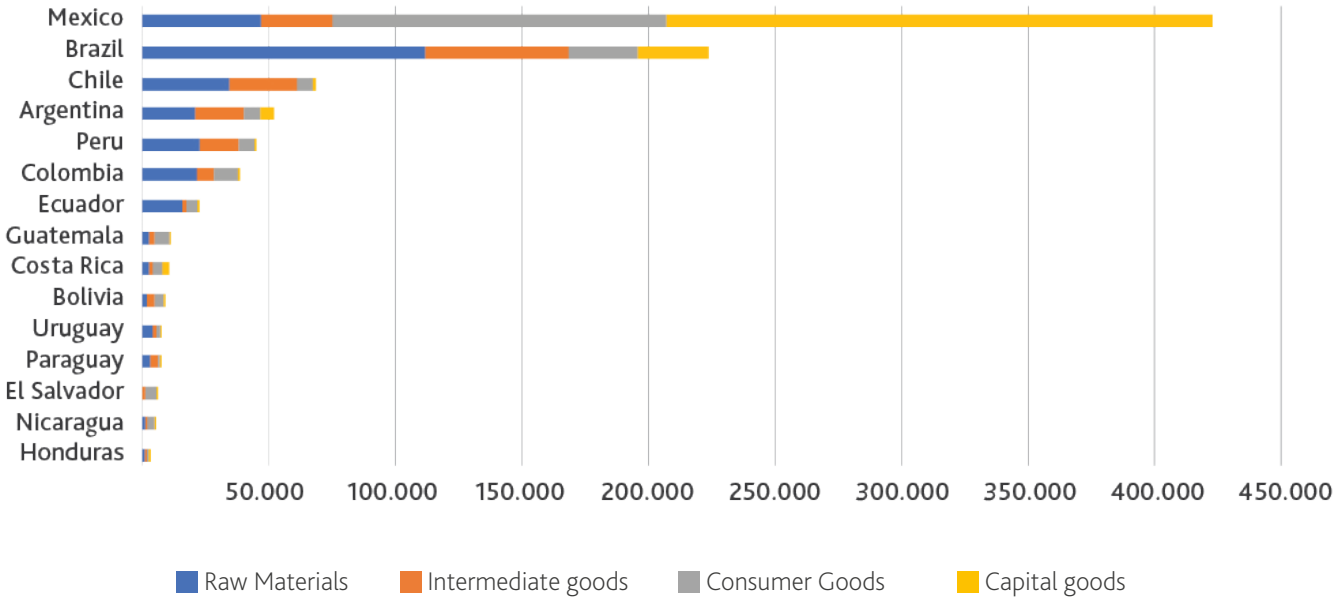
Despite numerous efforts to diversify its export basket, Latin America mainly exports commodities. The region's factor endowments and China's high demand for these products have shaped this pattern. At least three main determinants help characterize trade: diversification across different product categories, product sophistication, and economic complexity.

For Ding and Hadzi-Vaskov (2017), a country's export composition depends on four dimensions: revealed comparative advantage, diversification, sophistication, and economic complexity. Their study, which covered 1962–2013, grouped exports into seven categories and found that:

- The LAC region has consistently maintained a comparative advantage in mineral fuels and non-fuel primary commodities over the past half-century. The region did not have a comparative advantage in any group of skill- and technology-intensive manufacturers. The study also found that since the 1980s, various Central American countries[10] and the

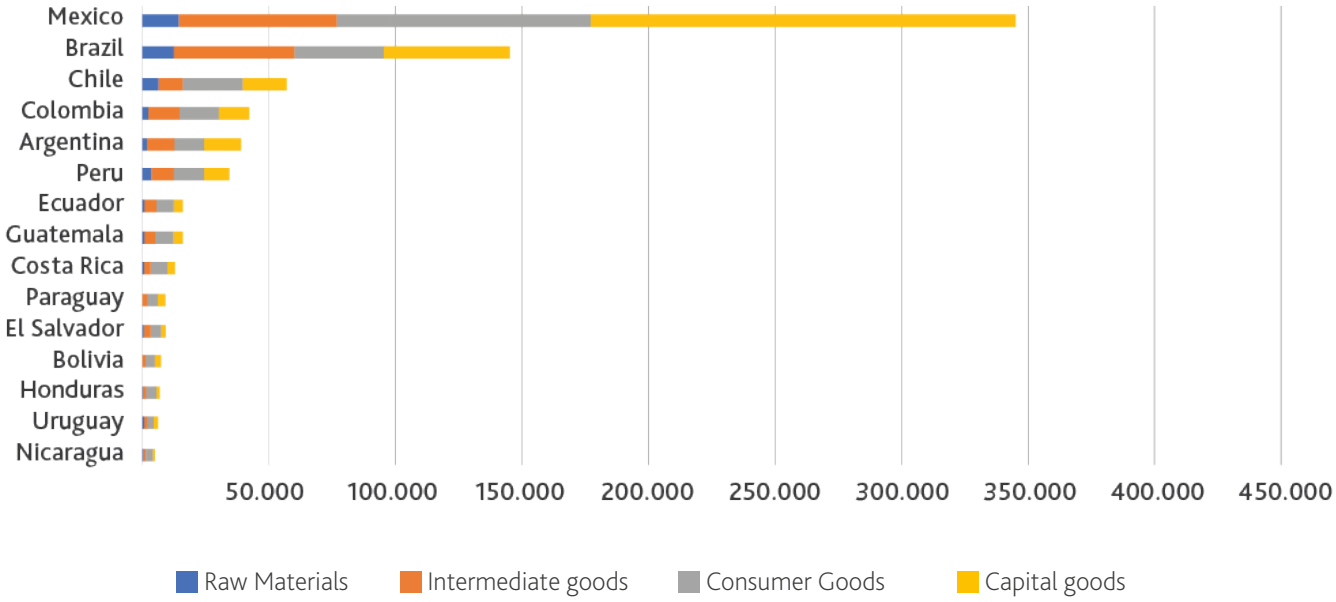
9. Based on WITS (n.d.) data.
10. Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama.

Figure 7. Exported Goods, Selected Latin American Countries, 2019



Source: WITS based on the UN Comtrade (n.d.).

Figure 8. Imported Goods, Selected Latin American Countries, 2019



Source: WITS based on the UN Comtrade (n.d.).

Dominican Republic created special economic zones for textile maquila, footwear, and the assembly of simple components that allowed them to improve their comparative advantage in low-skill and technology-intensive manufacturing.

- The export portfolio of LAC countries has been one of the most diversified among major country groups, although Brazil and Mexico have mainly driven this development. Using the Herfindahl concentration index, the authors found that the concentration index has declined since the mid-1980s, with differences among subgroups. For example, smaller Central American economies have higher product concentration levels than a subgroup of Latin American countries comprising Brazil, Chile, Colombia, Mexico, Peru, and Uruguay. On the other hand, the two largest economies (Brazil and Mexico) have more diversified export baskets.

- Latin America and the Caribbean followed a trend of increasing export complexity and sophistication until the late 1990s. This trend was interrupted and reversed somewhat by the commodity boom in the 2000s.

3.2.Greenhouse Gas Emissions Embedded in Latin American Trade

The latest IPCC (2022) report states that a growing share of total GHG emissions is released in manufactured products that are traded across international borders. Here lies the relevance of GHG emissions embedded in trade as a measure to monitor consumption-based emissions, which are adjusted for trade and provide information about which countries are net exporters or net importers of CO2.

A study by Li (2021) provides a proxy of emissions related to trade in the LAC region.[11] The study quantifies the contribution of production and intentional transportation to LAC's total export-related GHG emissions, indicating that (i) the LAC region's GHG emissions from export-related production are lower than those of other regions and only accounted for 4% of the world total in 2014, although this is due more to low export levels than low GHG emission intensity; (ii) the top 10 contributors to LAC´s GHG emissions from export-related production are Brazil, Mexico, Trinidad and Tobago, Chile, Argentina, Colombia, Bolivia, Ecuador, Peru, and Costa Rica; and (iii) manufacturing accounted for 72% of GHG emissions from export-related production, agriculture for 10%, and mining for 18%. The LAC region's export-related production emissions increased by 375% in 1990–2014. The scale effect was the main driver of this increase. In contrast, technology, the composition of goods, and the composition of origin countries lowered emissions.

Li (2021) also found that the LAC region has high export-related transportation CO2 emissions, accounting for 17% of the world total in 2018. Sea transportation contributed 53%, air transportation 23%, and rail just 1% of CO2 emissions. Again, the manufacturing sector is the most significant contributor, with 55%, followed by mining (32%) and agriculture (12%).

The latest figures from ECLAC (2019) show that the main Latin American countries are net importers of carbon emissions. The emissions associated with exports are not limited to those generated in the country, but also include emissions contained in the foreign inputs used in the production of exported goods and services. ECLAC (2019) analysed the carbon emissions of exports and imports of seven Latin American countries[12] and concluded that (i) the carbon footprint of exports (associated with fossil fuels) that are intensive in natural resources is similar to that of other countries with a similar export profile; (ii) countries with exports concentrated in technology-intensive manufactures and services (e.g. Germany, France, the United Kingdom, and the United States) show lower emission intensity than those specialized in exporting raw materials; and (iii) except for Argentina, all the Latin American countries analysed register CO2 emissions associated with consumption (including imports) larger than production. As a result, the analysed countries are proven to be net importers of carbon.

11. The analysis is based on an extensive database that covers 189 countries and 10 sectors from 1990–2014 with the aim of quantifying the contribution of production and international transport to total export-related GHG emissions from LAC.
12. Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, and Peru.

Latin American countries are net importers of carbon because of the fragmentation of value chains. More complex value chains enable a country to import carbon-intensive products; therefore, emissions linked to exports must consider both emissions within the territory and emissions from the inputs used to produce the goods that will then be exported. The study found that Costa Rica and Mexico registered a significantly higher proportion of emissions generated outside their territory than the other countries analysed. In the case of Mexico, this finding is related to a relatively high level of backward linkage with the United States and Asia (mainly China). In the case of Costa Rica, the carbon emissions contained in exports have a lower proportion of domestic content of carbon versus foreign content as the bulk of energy generated in Costa Rica come from renewable sources with low carbon intensity.

The study by Li (2021) also found differences among each country's top five export sectors. For example, products from agriculture, livestock, forestry and fishing, food products, beverages, and tobacco present a low relative intensity of emissions compared to mining products. In addition, the sectors that are most relevant to the exports of Argentina, Costa Rica, and Peru present emission intensity levels below the world average. In the case of Brazil, Chile, Colombia, and Mexico, there is greater heterogeneity.[13]

4. Trade-Related Climate Policies in Latin American Countries

The linkages between trade and climate change can be categorized in two areas: the impacts of trade liberalization on climate change and the impacts of climate change on trade, the latter referring to changes in comparative advantage and impacts on infrastructure.

This section seeks to capture how trade-related policy measures adopted by Latin American countries positively contribute to climate action or hamper it. Inversely, some climate measures and policies can create concerns about their impacts on trade and investment.

4.1. Latin American Climate Commitments That Affect Trade

Several Latin American countries submitted new or updated NDCs to the UNFCCC in 2021, raising their climate ambitions compared to the initial round of NDCs. These NDCs include pledges for mitigation and adaptation and a just transition that may affect trade flows in the short term. In addition, due to abundant renewable energy in Latin America and the increasing incidence of power in GHG emissions, most countries included mitigation targets that rely on solar and wind investments and have prepared strategies to foster sustainable investment and zero-emission fuels.

Building on the methodology developed by Brandi (2017), Saalfield (2021) reviewed the trade-relevant content of these Latin American and Caribbean NDCs, which may negatively impact the trade balances of Latin American countries by raising expenditure on clean technology imports and reducing short-term revenue from land-intensive exports. Saalfield concluded that the following measures would raise the cost of imports: (i) import ban on old or energy-inefficient goods, (ii) new standards and labelling requirements, and (iii) renewable energy development. Measures that would lower import costs are: (i) reduction of tariff and non-tariff barriers for renewable energy technology, (ii) initiatives to reduce dependence on imported fuel, and (iii) encouraging technology transfer from advanced economies.

Saalfield also studied measures affecting export revenue, focusing on the main export categories that are subject to climate mitigation or adaptation measures, namely: (i) crops (vegetables, fruits, and cereals); (ii) livestock; (iii) forestry (timber yield from both native forests and commercial crops); (iv) extractives (minerals, metals, raw materials); (v) fishing; (vi) manufacturing; and (vii) tourism.

13. A detailed analysis can be found in ECLAC (2019).

Each category analysed by Saalfield may contribute positively or negatively to export revenues. However, when the costs of the commitment assumed in the NDC are compensated to the producers, the effect on export revenues can be deemed neutral or ambiguous. Below are some measures associated with NDCs for agriculture, livestock, and raw materials from the mining sector.

Emission reductions in agriculture and crop production. The agriculture sector is extremely sensitive to climate change, which affects both production and food security. As mentioned, the Latin American agricultural sector is a significant source of GHG emissions compared to other regions and an important source of exports. Most Latin American NDCs include some productivity- or competitiveness-enhancing measures that affect crop production. The most recurrent measures included in the NDCs are the diffusion of irrigation and fertilization technology as well as the introduction of high-yield or diversified seed stock.

Agriculture commodities and crops are sensitive to non-tariff barriers, which can come in different forms—such as certifications and sustainability standards, which seek to introduce good practices in the production process and impact indicators. These standards are considered voluntary to avoid conflicts with World Trade Organization (WTO) rules, but they are essential to access specific markets. In practice, voluntary standards do not always provide social and economic impacts that favour small producers. It depends on the type of product, context, and target market, and their implementation requires support and capacity building for small producers.

Nevertheless, the agriculture sector is subject to many standards or certifications aiming to measure the carbon footprint, water footprint, and soil and biodiversity conservation practices, among other indicators. Latin American countries have the most standards (41.4 on average), followed by countries in the Asia-Pacific region (35.1) (Olmos, 2017). Mexico and Brazil have the highest coverage of standards (79 each) and are among the top five countries in the world in this respect (International Trade Centre & European University Institute, 2016).

Livestock production. As of November 2021, 74 countries included livestock in their climate mitigation or adaptation commitments. The NDCs of Argentina, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Paraguay, and Uruguay address emissions from livestock production. Mitigation measures include manure management, feed management, and silvopastoralism. Table 1 shows examples of livestock measures in LAC countries. While Costa Rica emphasizes low-emission production systems for livestock, Uruguay has set a strong mitigation target to reduce emissions from livestock production.

Table 1. Examples of Livestock Measures in New and Updated NDCs in Latin America and the Caribbean

Country	Mitigation Measures	Commitment
Costa Rica	Specific measures for livestock production	In 2030, 70% of the cattle herd and 60% of the area dedicated to livestock will implement low-emission production systems that incorporate adaptation and resilience measures.
Cuba	Feed management	"Improve the composition of feed for livestock by adopting agro-sylvo-zootechnical integration systems." GHG impact of action: "Reduce methane emissions from enteric fermentation by 3% in 2025 and 2030 from 2015."
Uruguay	Livestock – general reference (unconditional) Livestock – specific target Specific measures for livestock production	▪ 57% reduction in CH4 emissions intensity per GDP unit, including cattle raising. ▪ 48% reduction in NO2 emissions intensity per GDP unit, including cattle raising. ▪ Set an unconditional target for intensity reduction of GHG emissions of 33.6% for beef production. Adoption of good practices of natural grasslands management and management of breeding herds in livestock production in 1 million hectare (10% of grasslands), including the supply of forage, regenerative management, and appropriate nitrogen management towards 2025.

Source: Selected countries' NDCs.

Box 1. Uruguay's Methane Emissions and Livestock Management

Agriculture is an essential pillar of Uruguay's economy, representing 70% of its exports and contributing about 80% of the country's GHG emissions, of which 55% are from the natural biological process of enteric fermentation in cattle farming, whose main diet is natural grasslands. Methane is a short-lived GHG (12.4 years), unlike CO2, which has a long-term presence and accumulates in the atmosphere.

Uruguay's NDC includes a specific unconditional target of 32% to reduce enteric methane intensity of beef production relative to 1990 level, by 2025. Achieving this reduction implies transforming the ruminant production systems of resource-poor farmers to increase livestock productivity while reducing GHG emissions. Uruguay managed to reduce the intensity of methane emissions by 27% in an essential export item such as beef through a combination of herd and health management, nutrition and feeding management strategies, and genetics that increased productivity. These measures were borne from public policies that supported the private sector in adopting more efficient technologies.

In 2021, Uruguay developed a new standard for its beef: "carbon footprint verified," which certified the cattle went through the process of measuring the carbon emissions related to the rearing livestock production system. It is verified that carbon emissions have been neutralized by the presence of trees on the property.

Under the methodology followed by Saalfield (2021), the proposed emission-reduction target restricts productivity and competitiveness and thus could negatively affect beef exports. However, Uruguay's productivity-enhancing policies and measures and the new standard's implementation allowed it to become the first country in South America to export certified carbon-neutral meat to Switzerland, keeping it internationally competitive and satisfying the most demanding markets, contributing positively to its emission reduction target.

Source: Agencia Uruguaya de Cooperación Internacional (2019) and Dempsey (2022).

Extractives industries. Strategic minerals and raw materials are essential for developing electromobility and new energy storage sources. Empirical evidence has demonstrated that imposing export restrictions on these products could result in severe price increases and temporary supply shortages. In addition, the lithium market has experienced more dynamism in recent years due to the demand for ion-lithium batteries.

Chile is the second-largest producer of lithium in the world, while South America (excluding Bolivia) accounts for 52.3% of global lithium reserves. Mexico has the 4th largest reserves in Latin America after Bolivia, Argentina, and Chile. There is a substantial opportunity for Argentina, Bolivia, Brazil, and Chile to expand production capacity and improve their export revenues. Processing lithium from salt flats is environmentally less concerning than the extraction of spodumene in terms of carbon emissions (Vekic, 2018). Some private sector firms have committed to expanding their lithium in a neutral carbon-intensive manner through 2030 (Albermarle, 2021).

However, processing lithium risks groundwater and freshwater usage in salt flats. In order to conciliate environmental objectives and trade, importing and exporting countries could work on an enhanced cooperation mechanism. It has also been suggested that a sectoral plurilateral agreement could address the issue. Making extractive industries more sustainable is the real challenge. Mining activities require a large amount of capital, financing, and energy; and they substantially contribute to fiscal revenues.

In the mining sector, some South American countries have established climate commitments related to the electrification of machinery, such as Chile, while Colombia focuses on reducing emissions from black carbon and managing fugitive emissions linked to the hydrocarbon production chain. The NDCs do not contemplate specific objectives for the extractives industries, though many of these industries are subject to taxes on CO2 emissions. In some cases, the regulator has set a deadline for firms to make technological change that enables them to reduce emissions.

Box 2. Lithium and Non-Tariff Barriers: From Lithium to Lithium-Ion Battery

Argentina and Chile account for 71.3% of the global lithium reserves, while big powers—China, Europe, and the United States—are racing to produce ion-lithium batteries.[14] Batteries are essential components of electromobility, but also for storing clean energy. Therefore, South American countries would benefit from increased demand for lithium and copper and be interested in attracting investment for sustainably producing its components.

The private sector and policymakers closely follow a recent proposed European Union (EU) regulation on batteries that would create mandatory requirements for all batteries—portable, automotive, electric vehicle, and industrial—placed on the EU market. It would include rules requiring battery importers and manufacturers to identify and address actual and potential human rights and environmental abuses in the supply of essential raw materials such as bauxite, copper, and iron, as well as cobalt, graphite, lithium, and nickel. The proposed regulation also includes supply chain due diligence obligations, eco-design requirements, and, as a result, it is likely that demand for recycled copper, cobalt, and lithium will increase. In order for exports of copper, iron, and lithium from Argentina, Brazil, Bolivia, Chile, and Peru not to be affected by this regulation it is important to examine the supply chain of lithium and other key minerals to maintain their competitiveness.

Source: European Parliament (2022).

Encouraging electromobility in mass transit systems. Most Latin American countries have embraced electromobility as part of their strategies to reach carbon neutrality or as part of their NDC commitments. For example, Costa Rica updated its NDC, establishing that at least 8% of the public transport fleet will be zero emissions by 2030. Colombia, Mexico, and Paraguay have also submitted NDCs with e-mobility targets. In most cases, NDCs and long-term strategies are accompanied by electromobility strategies, which include charging infrastructure and regulatory changes that offer incentives for adopting new technology. Countries including Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Paraguay, and Uruguay have introduced value-added tax and import duty incentives to reduce purchasing costs and make use of their networks of preferential free trade agreements.

Electromobility has proven to be a successful strategy to accelerate the deployment of low-carbon technology in the transport sector, catalyse investment, reduce dependence on fossil fuels, and help to reduce the trade deficit in many Latin American countries.

Regulation is advancing by banning imports of used cars in some cases or implementing tax and subsidy incentives that make the purchase of electric vehicles economically more feasible.[15] Other countries have announced plans to phase out combustion vehicles from their passenger transport fleet by 2030 and favour low-emission public transport.

Developing innovations that help to reduce embedded GHG emissions in exported goods. Investing in research and development is necessary to develop technology and processes that ensure a reduced carbon footprint and sustainable production in extractive industries and agriculture. Several countries in Latin America have presented strategies and roadmaps for developing green hydrogen to reach their mitigation objectives.

At the same time, industrialized countries also have defined hydrogen as a critical technology to achieve their policy objectives. Countries like Chile, Colombia, and Paraguay include green hydrogen in their national mitigation plans, NDCs, or long-term strategies and have the potential to become net exporters.

14. Total global reserves are estimated at 14 million tonnes. Chile has the world's largest known lithium reserves (8 million tonnes) while Argentina has 2 million tonnes.
15. Uruguay produces excess electricity from renewable sources during non-peak demand hours. Because of the excess electricity, the Uruguayan government created tax incentives and subsidies to promote electric vehicle adoption in the country, making the purchase of an electric vehicle economically more affordable. The incentives apply to various vehicle types such as vans, buses, and taxis.

Table 2. NDC Targets on Electromobility, Selected Latin American Countries

Country	NDC General Contribution	NDC Targets on Electromobility
Colombia	Commitment to emit a maximum of 169.44 MtCO2e in 2030 and reduce black carbon emissions by 40% compared to 2014 levels.	The unconditional target is to develop regulations to accelerate the transition to electric mobility to reach the registration of 600,000 electric vehicles by 2030.
Costa Rica	The unconditional target is maximum absolute net emissions of 9.11 MtCO2e in 2030, including LULUCF.	By 2030, 8% of light vehicles to be electric; by 2022, operate the Limón electric freight train; the electric passenger train in the Greater Metropolitan Area to be operated with renewable energy; by 2025, shift towards a zero-emission motorcycle fleet
Mexico	Unconditional reduction of GHG emissions by 22% and black carbon by 51% compared to business-as-usual projections by 2030. Conditional reduction of GHG emissions by 36% and black carbon by 70% compared to business-as-usual projections by 2030.	Commitment to develop and implement the National Electric Mobility Strategy.
Paraguay	Unconditional reduction of GHG emissions by 10% compared to business-as-usual projections by 2030. Conditional reduction of an additional 10%, for a total of 20% compared to business-as-usual projections by 2030.	Mitigation actions include the replacement of conventional vehicles with electric and hybrid vehicles and promotion of green hydrogen for public and private passenger transport.

Source: Country NDCs.

Box 3. Regulatory Changes in Latin American Countries to Incentivize the Adoption of Electromobility

Under Costa Rica's electromobility law N° 9518 law on incentives and promotion for electric transport, adopted in 2018, purchases or repairs of electric vehicles and production equipment are exempted from or enjoy lower import and sales taxes. The law also mandates the gradual renewal of bus fleet for electric buses at a rate of no less than 5% of the fleet every two years. Parking is free for electric vehicles in selected areas, and the law establishes electric tax incentives.

In 2015, Chile introduced a tax that applies to purchases of new light-duty vehicle and medium-duty vehicle models and is based on CO2 and NOx (nitrogen oxides) emissions. The tax is paid at the time of purchase. Electric vehicles are exempted from this green tax. Additionally, both the National Electric Mobility Strategy and the Energy Roadmap contemplate increasing the fleet of electric vehicles and reaching 100% of electric public transport by 2040. The energy efficiency law issued in 2021 aims to reduce energy intensity by at least 10% by 2030 (from 2019 levels). It establishes energy-efficiency standards for imported vehicles with an additional incentive for electric vehicles, plug-in hybrids, and zero emissions. The law also establishes subsidies for electric taxis and home charging points. Decree 145 of 2019 establishes technical and security requirements aligned with EU, United States, Japanese, and South Korean regulations.

In 2017, Argentina reduced the import tariff on hybrids and electric cars from 35% to 5% and 2% respectively, for a maximum of 6,000 units in a period of 36 months, depending on whether the vehicle was assembled in the country. The measure allowed 6,000 units to be imported. A second decree issued in 2018 (Executive Decree 51/2018) applied to imports of electric buses and reduced the import tariff for up to 350 units. It also provided for an import quota of 2,500 fast chargers (power greater than or equal to 50kW) at a 2% tariff, destined for recharging infrastructure. In March 2019, the government extended the import tariff reduction to include importers of vehicles manufactured abroad through Executive Decree 230/2019.

Source: UNEP (2018a).

Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean. Known as the Escazú Agreement, this is the region's first treaty on environmental matters and the world's first to include provisions for human rights defenders in environmental matters (ECLAC, 2018). The agreement, negotiated by the 33 states of Latin America and the Caribbean, with civil society participation, was adopted on March 4, 2018. It was ratified by 13 countries and entered into force in April 2021.[16]

The Escazú Agreement resulted from decisive, coordinated regional action and addressed critical aspects of environmental management and protection through four pillars:

- Access to comprehensible non-technical information on the environment
- Access to participation in environmental decision-making
- Access to justice in environmental matters
- Protection for environmental defenders

The Escazú Agreement is expected to affect the region's trade with its trading partners and incentivize responsible investment. Furthermore, the agreement will significantly contribute to the transparency and participation of civil society because it provides global legitimacy for environmental protection and the need for effective, timely, public, transparent, impartial, and affordable procedures (Barchiche et al., 2019).

16. The countries that have ratified the Escazú Agreement are Antigua and Barbuda, Argentina, Bolivia, Chile, Ecuador, Mexico, Nicaragua, Saint Vincent and the Grenadines, Saint Kitts and Nevis, Saint Lucia, and Uruguay.

4.2. Circular Economy as a Response to Climate Change Mitigation

The Organisation for Economic Co-operation and Development (OECD) in a 2018 report underlined that the circular economy has important interlinkages with international trade and may potentially affect trade flows (OECD, 2018). On the one side, demand for primary materials, secondary materials, and waste may decrease in certain economies. Conversely, the circular economy may bring new opportunities for trade in services, such as waste management and remanufacturing. The OECD also highlights the need to ensure the mutual supportiveness of circular economy policies and trade policies. According to the OECD, trade can bring potential opportunities by channelling waste and materials to countries/regions with comparative advantages in sorting and processing these materials but may hinder imports of second-hand goods and the transition towards energy-efficient and low-carbon economies due to slower market transformation (OECD, 2018).

The preceding analysis is relevant as several countries in the LAC region support and promote the circular economy as part of their transition to a low-carbon economy and sustainable development, which is also part of their NDC commitments submitted the UNFCCC.

The region is advancing in connecting the circular economy with trade policy. For example, Chile and Ecuador's NDCs have explicit circular economy goals as a response to reducing GHG related to material management processes and the transition to a more resource-efficient economy.[17] Other countries in the region made progress through specific policies such as Brazil's National Policy for Agroecology and Organic Production, Chile's Law on Extended Producer Responsibility, Colombia's Resolution N°1407 from 2010, which established an extended producer responsibility scheme regulating the management of containers and packaging, Costa Rica's National Strategy for replacing single-use plastic with renewable and compostable alternative, Ecuador's 2021 Law for an inclusive Circular Economy, and Peru's 2020 Circular Economy Roadmap for Industry.

However, few circular economy strategies incorporate specific measures related to trade. For example, Chile and Colombia are considering rules for importing circular products and waste recycling, while Ecuador is weighing a review of tariffs and special provisions in its trade agreements looking at, for example, the promotion of circular economy approaches.[18] The Pacific Alliance countries include actions to attract foreign direct investment through searching for international investment funds.

The latest available data on secondary raw materials and used goods show that the region trades $237 billion a year and the main categories are rubber and tyres ($143 million), textiles ($90.9 million), and construction materials ($3.7 million). The fastest-growing category for the period 2015–20 is textiles, with an increase of 1.7%. The top five exporters are Brazil ($74.1 million), Mexico ($71.6 million), Honduras ($27.8 million), Dominican Republic ($27.3 million), and Nicaragua ($13 million). The top five importers in the region are the United States, Argentina, Haiti, Honduras, and Colombia (Chatham House, n.d.).

Yamaguchi (2020) has found that measures to facilitate the circular economy transition have numerous linkages to international trade and trade policy. For example, measures that address direct changes in production processes include extended producer responsibility schemes, standards for recyclability and reparability of products, and standards for recycled content that could become barriers to market access without proper international harmonization. In addition, they can affect competition and trade due to the higher administrative and transport costs that importers face.

17. High material consumption is an important factor in energy demand, increasing GHG emission.
18. Ecuador's Organic Law of Inclusive Circular Economy proposes mechanisms to transition from a linear to an inclusive circular economy. The law also prohibits the import of waste of any kind for final disposal (Article 7). The Joint Statement of the United States-Ecuador Trade and Investment Council, dated 18 February 2022, makes reference to "actions to address climate change and marine debris, including promoting circular economy approaches."

Trade in primary minerals and raw materials. The transition to a circular economy is expected to affect extractive industries to the extent that the decreasing demand for raw materials is induced by an accelerated transformation to the circular economy in the two most relevant destination markets for exports under this category, China and the EU.[19] Under this long-term scenario, lower demand for certain primary materials represents a challenge for Latin American producers. However, a proactive and accelerated adoption of a circular economy in the mining sector will improve the sector's competitiveness while demand for primary metals and minerals declines due to advances in product reuse, material recovery, and recycling technologies.

Trade in secondary raw materials could have important implications for Latin America. Secondary raw materials are those that have been manufactured and used at least once. They are then recovered and used again for further manufacturing (e.g. manufactured clothing made from plastic waste). The most critical barrier is how to trace trade flows. For instance, it is not always possible to distinguish them from hazardous or contaminated waste.

Identifying those that will be transformed into secondary raw materials is often challenging. It is therefore crucial that the Harmonized System be modernized to incorporate changes that recognize this category of products with more accurate definitions and descriptions. Some progress has been included in the seventh amendment to the Harmonized System, which enters into force in 2022.

The circular economy approach implies the substitution of virgin raw materials with secondary raw materials, which could lead to a reduction in trade flows. Conversely, implementing a circular economy model in extractive industries, such as mining, may result in a cheaper market for secondary raw materials compared to virgin raw materials (Dellink, 2020).

Second-hand imported goods can provide potential benefits and contribute to the circular economy. These goods can be refurbished and remanufactured, extending their useful life. However, Yamaguchi (2021) points out that some trade-offs must be considered when (i) importing jurisdictions want to accelerate their transition to a low-carbon economy (e.g. import restrictions on inefficient second-hand vehicles), (ii) potential issues may arise related to the right to repair and their relationship with protecting intellectual property rights in certain trade agreements, and (iii) importing countries raise concerns of potential loopholes for illegal trade in hazardous or contaminated waste. In addition, as there are no common standards across jurisdictions to classify these products. Remanufactured or refurbished goods can face trade barriers.

The waste trade can create economies of scale and improve the use of waste and recyclables. However, coherent trade and environmental policies are necessary for sound environmental management at the destination market. According to the OECD, the top 20 exporters and importers of waste and scrap accounted for 80% of world exports and 85% of world imports; Mexico is the only Latin American country in this group (Yamaguchi, 2021).

As noted, the circular economy and international trade overlap/intersect at least in the following areas: (i) global value chains, (ii) increased shipment of end-of-life or second-hand goods, secondary materials, scrap, and waste to countries which can deal with such goods and materials in the most cost-effective manner, (iii) trade in technologies which enable circular activities such as repair, remanufacturing, and recycling, and (iv) increased trade in services such as circular design, research, and development, among others.

The region presents opportunities in sectors such as minerals and metal. Increasing the availability of secondary raw materials of good quality to complement the production of primary raw materials is an opportunity, even if circularity is fully implemented, as demand for raw materials will continue to increase (ECLAC, 2020a).

19. China enacted its Circular Economy Law in 2008 and the EU adopted a new circular economy action plan in 2020.

Box 4. Circular Economy in Extractive Industries

By 2050, more than 3 billion tonnes of metals and minerals will be required to move towards the widespread use of wind, solar, and geothermal energy, as well as for energy storage (Hund et al., 2020). Global value chains linked to minerals and metals as well as forestry-pulp-paper have the greatest potential for circularity due to the energy savings associated with their transformation for reuse (Mulder & Albaladejo, 2020).

Chile was the first Latin American country to include the circular economy in its updated NDC by (i) elaborating a Circular Economy Roadmap that identifies potential emission savings from transitioning to a circular economy; [20] (ii) elaborating a national organic waste strategy to address emissions that come from food; and (iii) establishing metrics and indicators on circularity by 2020.

The Climate Change Law approved in 2022, the Circular Economic Roadmap, and the National Mining Policy 2050 released in 2021 are complementary strategic documents. The latter sets its environmental goals based on innovation, technology, and new production methods while boosting the circular economy through waste, reuse, and efficient use of resources.

Chile has adopted an approach that seeks to increase sustainability and competitiveness in the mining industry and move the industry to the forefront of innovation, relying on rising demand for strategic minerals used in low-carbon technologies and new technology development. To reach these goals, the Chilean Copper Commission identified opportunities to exploit all types of mining waste, excluding materials other than the rock from the deposit and its processing by different mining processes (Cochilco, 2021).

At the same time, another recent study stresses the need to strengthen the local supply chain and investment in research and development and technologic innovation, particularly in small and medium-sized enterprises, and to establish legal incentives that allow the use of massive mining and industrial waste. The study also analyses the market opportunities for tailings and grinding balls for Chile, Colombia, and Peru (Centro de Estudios del Cobre y a Minería et al., 2022).

Table 3. Examples of Circular Economy Policies and Their Impact on Trade

Policy	Predicted Impact on Trade
Development of circular strategies in importers' countries of raw materials, such as steel.	▪ Latin American producers of primary raw materials (e.g. iron) could decrease their exports. ▪ Reduced demand for primary raw materials could incentivize to move away from a commodity-dependent industrial model towards value-added industries.
Development of extended producer responsibility schemes	▪ Decreased trade in primary raw materials ▪ Increased trade in secondary materials
Import ban on certain types of scrap plastics and unsorted wastepaper.	▪ Waste exporters improved the quality of their waste export to keep the market share, while their low-quality waste exports are sent to alternative markets.
Minimum requirements/standards for product durability, reparability, and the reuse of components through eco-design and labelling.	▪ Increased trade in products that meet circular economy standards requirements.

Source: van der Ven (2020).

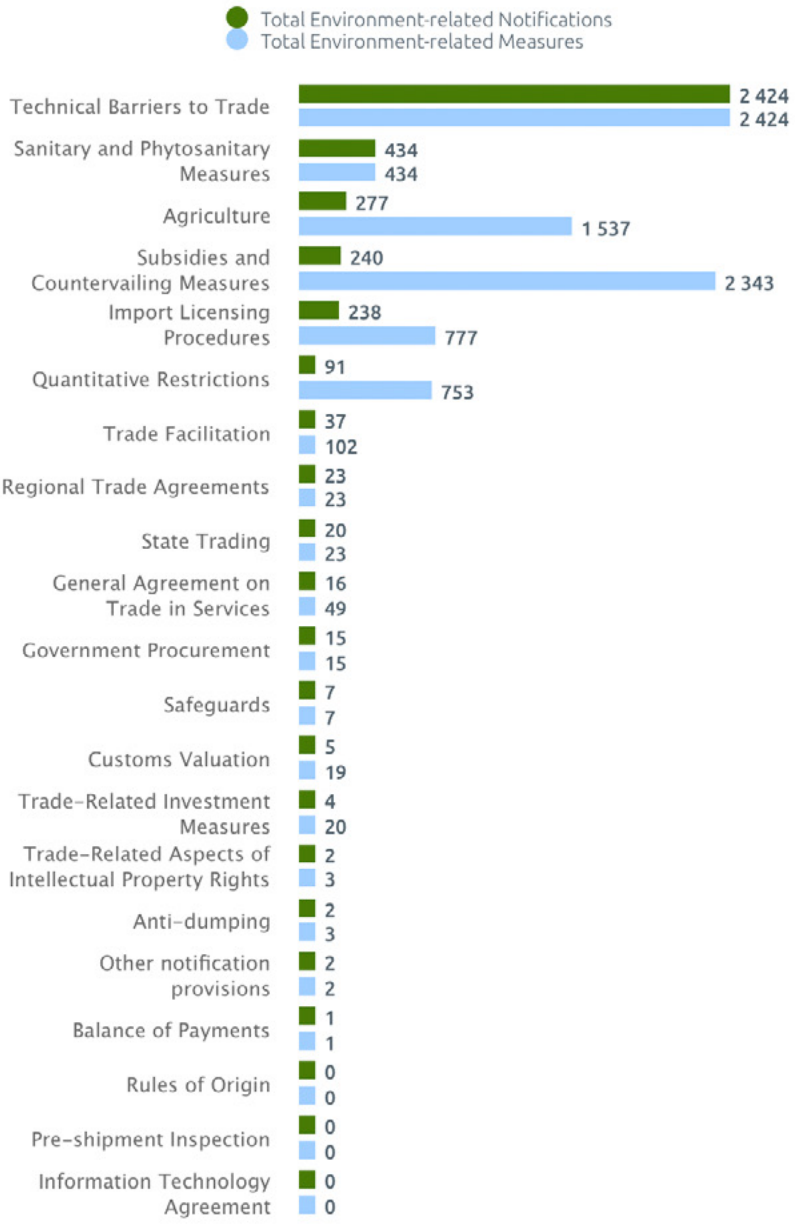
20. The roadmap identifies short-, medium-, and long-term measures to reach 2040 goals.

4.3. Non-Tariff Measures With Impacts on Greenhouse Gas Emissions

Many non-tariff measures positively contribute to climate action, allowing the internalization of costs caused by GHG emissions and thus affecting the relative prices of traded goods. Some examples include rationalizing or reducing fossil fuel subsidies, eliminating agricultural subsidies, and prohibiting imports of incandescent light bulbs, among many others. However, given their production structure and export profile, a subgroup of Latin American countries is more sensitive to possible unilateral measures applied by their main trading partners, which seek to stimulate production and consumption patterns with lower carbon content.

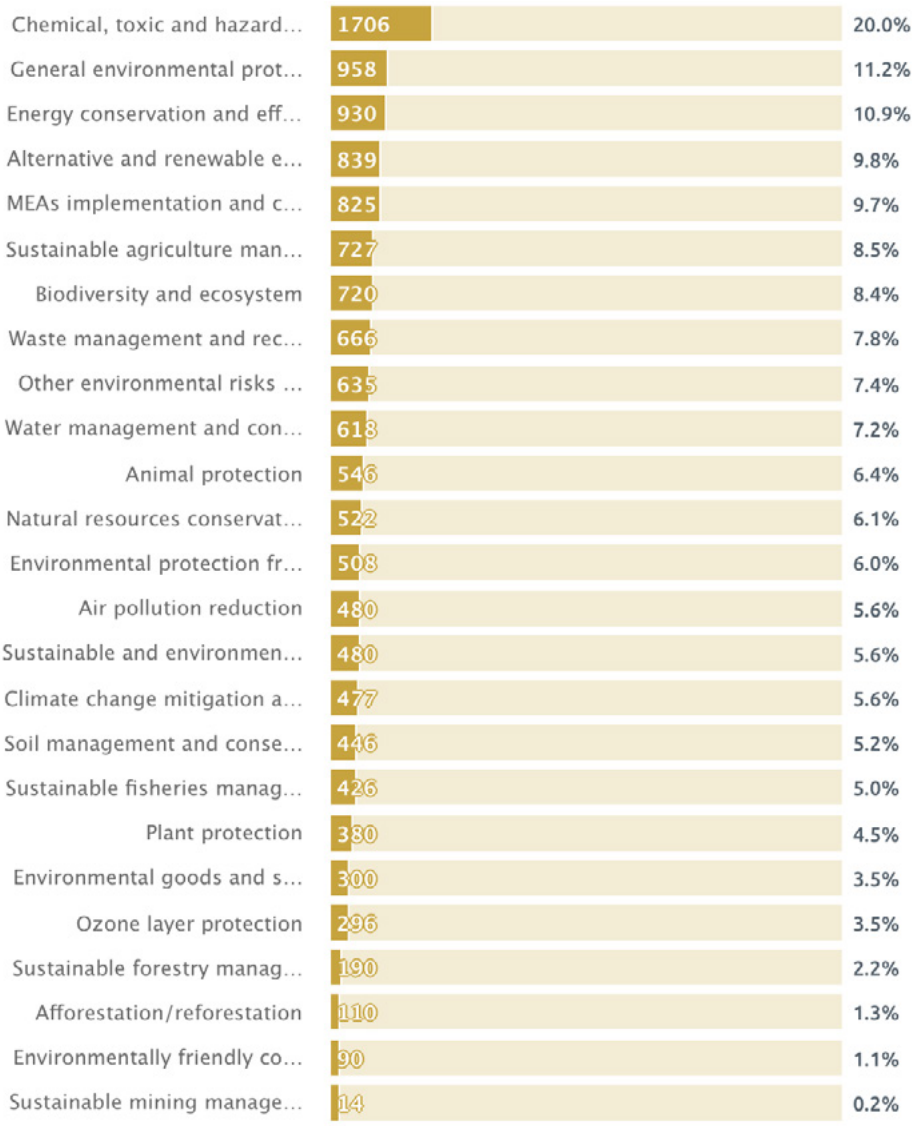
WTO members notified 3,838 environment-related notifications and 8,535 measures in 2015–21. These include 2,424 technical barriers to trade (TBT), 2,343 subsidies and countervailing measures, 777 import licences, and 753 quantitative restrictions (WTO, n.d.). The EU, the United States, Australia, and China (in decreasing order) adopted the most environmental measures. A total of 477 measures (5.6% of all notified measures) were related to climate change mitigation and adaptation objectives

Figure 9a. Number of Environment-Related Notifications and Measures by Agreement, 2015–21



Source: WTO (n.d.).

Figure 9b. Number of Environmental Measures by Type of Environment-Related Objectives, 2015–21



Note: Since more than one objective can be mentioned in a notified measure, the total number may exceed 100%.
Source: WTO (n.d.).

Latin American countries have made limited use of this instrument and notified only 6.5% of the measures that directly address climate change mitigation and adaptation objectives in the period under study, mainly in manufacturing (15) and agriculture (11). These notifications primarily seek to protect the environment and health (e.g. reduce air pollution). Table 4 shows examples of domestic measures notified to the WTO by Latin American countries that address climate change and their potential impact on trade.

Table 4. Examples of Non-Tariff Measures Notified to the WTO by Latin American Countries

Sector	Country	Measure	Environment-Related Objective	Type of Measure
Energy	Costa Rica	Establishing the quality technical specifications for anhydrous fuel ethanol and its mixtures with 91 RON and 95 RON gasoline, which are used as a fuel nationwide. It also applies to anhydrous fuel ethanol and its mixtures with 91 EX RON and 95 EX RON gasoline, which are sold nationwide, with regard to both their bulk distribution and sale to the end consumer.	Protecting the environment by establishing the quality technical specifications for anhydrous fuel ethanol and its mixtures with 91 RON and 95 RON	Technical regulation
	Colombia	Establishing the maximum level for ratio indicators relating to the greenhouse gas emissions inventory for denatured anhydrous fuel ethanol and adopting other provisions.	Protecting the environment, human, and animal life	Technical regulation
Transport	Uruguay	Import ban on used vehicles.	Air pollution reduction	Ban/prohibition
	Mexico	Draft amendment to Mexican Official Standard NOM-044-SEMARNAT-2006 establishing the maximum permissible limits for emissions of total hydrocarbons, non-methane hydrocarbons, carbon monoxide, nitrogen oxides, and particles from the exhaust pipes of new diesel engines to be used for the propulsion of new motor vehicles of a gross vehicle weight exceeding 3,857 kg.	To protect the environment by establishing the maximum permissible limits for emissions of ammonia (NH3), hydrocarbons (HC), non-methane hydrocarbons (NMHC), non-methane hydrocarbons plus nitrogen oxides (NMHC + NOx), carbon monoxide (CO), etc.	Technical regulation

Source: WTO (n.d.).

Annex 3 describes the measures and country coverage. Most measures were pursuant to Article 9.2.1 of the WTO TBT Agreement. The measures affecting agriculture were notified under Annex 2 of the Agreement on Agriculture (green box). These measures relate to direct payments to producers associated with climate risk insurance, investment credit, and infrastructure services that seek to reconstruct infrastructure affected by climate change events or to buy machinery and equipment. Only two measures are quantitative restrictions and refer to the exclusion and prohibition of importing used cars.

The EU and its members, the United States, and Australia have notified the most measures (129, 66, and 64

measures, respectively, in the period analysed). The EU and United States' measures mainly target the energy and manufacturing sectors. In the case of the EU, 11% of the measures support the agricultural sector.

Data from the WTO (n.d.) Environmental Database show that in 2009–21, WTO members notified 155 measures affecting trade in plastics for environmental reasons, mainly under the TBT Agreement. These measures included technical requirements related to waste management, import licensing schemes to control trade flows, and bans on single-use plastic items or shopping bags. However, South and Central American countries notified only 7% of these measures in the period analysed (see Table 5).

Table 5. Examples of Measures Notified to the WTO by Latin American Countries Affecting Trade in Plastics, 2009–21

Country	Measure Description	Types of Measure	Coverage
Chile	The notified decree seeks to establish collection and recovery targets and other obligations relating to packaging, a priority product, to prevent the generation of waste and to promote the reuse and recovery of packaging.	Technical regulation	Packaging of cartons, metal, paper, plastic, liquid packaging carton (Tetra Pak), or glass
Dominican Republic	Dominican Standard (NORDOM) No. 83:2-005: Plastics industry. Recycling. Terminology.	Technical regulation	Plastics
Ecuador	Draft technical regulation of the Ecuadorian Standardization Institute (PRTE INEN) No. 074: "Exposing and testing plastics that degrade in the environment by thermal, photo-oxidation, and/or biodegradation processes."	Technical regulation	Plastics
Ecuador	Draft technical regulation of the Ecuadorian Standardization Institute (PRTE INEN) No. 071: Disposal of disused plastic products and plastic waste.	Technical regulation	Disused plastic products and plastic waste
Panama	Export processing zones.	Full exemption from national direct and indirect taxes, contributions, duties, and levies	All natural and legal persons, whether nationals or foreigners, engaged, among others, in recycling of waste activities (cardboard, steel, wood, plastic, etc.)

Table 5. (Continued)

Country	Measure Description	Types of Measure	Coverage
Paraguay	Plastic bags and biodegradable bags. Import licensing for plastic bags and biodegradable bags is an automatic procedure. It applies to the following tariff headings of the Mercosur Common Nomenclature, for the products described in Ministerial Resolution No. 353/2017 of the Ministry of Industry and Trade. Ministry of Industry and Trade Resolution No. 353/2017 implementing Article 2 of Decree No. 5.537/2016 regulating Law No. 5.414/2015 "Promoting the reduced use of polyethene plastic" and establishing the prior import licensing regime for plastic bags and biodegradable bags.	Import licences	Plastic bags and biodegradable bags
Paraguay	Plastic bags and biodegradable bags	Import licensing	Plastic bags and biodegradable bags, sacks, and bags (including cones): Of polymers of ethylene Of a capacity not exceeding 1,000 cm3 Others.
Paraguay	Law 294/93 on the assessment of the environmental impact of the recycling, importing, or exporting enterprise; SEAM Resolution No. 374/07 creating the environmental safety certificate, the register of importers and exporters, and the register of certifying, recycling, and consultancy firms working with non-hazardous recyclable materials, establishing fees, and regulating procedures.	Import licensing	Scrap such as aluminium, iron, copper, bronze, PET plastics, in general
Uruguay	Ban on the import of non-biodegradable plastic bags	Prohibition	Non-biodegradable plastic bags

Source: WTO (n.d.).

WTO members also submitted 257 measures that explicitly refer to the circular economy during the period under analysis. The EU (60) and its members (26), China (46), and the United States (26) notified the greatest number of measures of this type. At the same time, South America and Central America submitted just eight notifications. Expanding the analysis to "waste management and recycling," 1,136 measures were notified with Latin America responsible for 98 notifications.

In 2018, UNEP released a report analysing national laws on plastic bags, single-use plastics, and microplastics. The report showed that 14 countries from LAC had adopted legislation related to a ban on free retail distribution (UNEP, 2018b).

4.4. Climate Measures by Trading Partner That Affect Latin American Exports

Fighting deforestation. Deforestation and land degradation are key drivers of climate change in Latin America's agriculture and LUCF sectors. Sustainable management of forests, domestic policies, and programmes—including fiscal policies, land-use regulations, energy and transportation infrastructure, and import-export policies—are part of the region's toolkit to cope with deforestation and reduce the environmental impacts of illegal logging.

The EU is an important importer of commodities associated with forest loss and forest degradation. In November 2021, the European Commission issued a draft regulation to curb deforestation and forest degradation caused by EU consumption and production. The measure applies to commodities such as cattle, cocoa, coffee, palm oil, soya, and wood and derived products such as leather, chocolate, and furniture. The EU proposal targets all deforestation and degradation, and companies must conduct due diligence to ensure that only deforestation-free products are allowed into EU jurisdictions. In addition, under the draft regulation, commodity importers will be required to collect and report the geographic coordinates of the land from which the commodities imported into the EU are sourced.[21]

The United Kingdom and the United States have also introduced similar regulations focusing on illegal deforestation. For example, the United States Congress introduced a bill in October 2021 proposing rules on commodity imports to tackle illegal deforestation in the commodity supply chain. The bill considers "covered commodities" as palm oil, soybeans, cattle, cocoa, rubber, and wood pulp. However, unlike the proposed EU regulation, the United States bill seeks to provide financial assistance to countries where production takes place, stop importing commodities from deforested land, shore up corporate supply chain management, and set up United States government procurement standards.[22]

If these pieces of the draft legislation are approved, they will negatively affect exports from countries such as Argentina, Brazil, Colombia, Mexico, and Paraguay. Forest replacement by cattle pasture is most prevalent in Brazil and Paraguay, while forest replacement by arabica coffee plantations in 2001–15 was common in Brazil, Peru, and Colombia. In the case of deforestation due to soy plantations, the most affected export countries are Argentina, Bolivia, Brazil, and Paraguay (World Resources Institute, n.d.).

Some Latin American countries have adopted sustainability standards to help differentiate their exports; this is the case with coffee in Colombia and soybeans in Argentina. Indeed, Argentine soybean producers who certify greater sustainability, transparency, and traceability throughout the soy value chain can access the Sustainable Agriculture Certification. Additionally, Argentina is promoting Round Table on Responsible Soy certification, which fosters the production, trade, and use of responsible soy through cooperation with relevant actors in the soy value chain (OECD et al., 2021).

In the case of Colombia, the Caribbean Network on Environmental Footprint of Coffee, created in 2014 with the support of ECLAC, was the only non-European group that actively provided inputs in creating the European standard that assesses the environmental sustainability of coffee (Olmos, 2017).

The EU's planned Carbon Border Adjustment Mechanism (CBAM). The EU's CBAM faces many administrative, trade, and political challenges with numerous elements that must be defined. In 2018, the EU adopted a new directive that updated the Emissions Trading System (ETS) for 2021–30, including a reduction in the number of allowances by 2.2% annually as of 2021. It also includes stricter rules to prevent the risk of carbon leakage, such as the proposal for a CBAM that would require importers of certain goods into the EU to pay a levy based on the GHG emissions embedded in those products.[23]

21. European Commission, *Proposal for a regulation of the European Parliament and of the Council on the making available on the Union market as well as export from the Union of certain commodities and products associated with deforestation and forest degradation and repealing Regulation*, 2021/0366(COD), 17 November 2021.
22. House of Representatives, *Fostering overseas rule of law and environmentally sound trade [FOREST] act of 2021*, H.R.5508, 8 October 2021.
23. European Commission, *Proposal for a regulation of the European Parliament and of the Council establishing a carbon border adjustment mechanism*, 2021/0244(COD), 15 July 2021.

The CBAM aims to protect EU producers from unfair competition from producers based in third countries with less stringent climate policies. The mechanism would initially apply to imports of aluminium, cement, electricity, fertilisers, iron, and steel, and possibly extend to other products in the future. The CBAM is closely linked to the EU ETS since the price of CBAM certificates would be tied to the price of emission allowances. The mechanism is expected to be phased in gradually from 2023–26, while the free allocation of allowances will be phased out gradually over 10 years, from 2026–35.[24] In 2021, the European Parliament adopted a resolution that stresses that least developed countries and small island developing states should be given special treatment to consider their specificities and potential adverse effects.[25]

The effects of the CBAM on third countries depend on their export specialization, the carbon intensity of their production processes, and their carbon policies. Up to $16 billion in exports from developing countries will face additional charges if the mechanism is applied to all the goods covered by the ETS (Lowe, 2021). For example, Argentina and Peru could have to pay a tax of $6.3 and $11 per tonne on steel and ferrous metal, respectively, while Brazilian steel would face a tax of $3.30 per tonne of CO2, which increases costs for exporters (United Nations Conference on Trade and Development [UNCTAD], 2021).[26] Table 6 shows the effects of implementing a CBAM ad valorem equivalent at $44/CO2 tonne for different products.

Table 6. Carbon Border Adjustment Ad Valorem Equivalent, at $44/CO2 Tonne by Country

Country	Paper Products	Aluminium	Steel, Ferrous, Metals	Petroleum, Coal Products	Cement, Glass	Chemicals, Fertilizers
Argentina	0.8	2.6	6.3	1.4	8.2	2.6
Brazil	0.8	4.4	3.3	0.9	7.0	0.8
Chile	1.9	0.1	2.5	1.0	4.5	1.1
Colombia	0.9	0.1	3.4	1.7	3.6	0.9
Mexico	1.2	1.2	2.5	2.3	10.9	1.8
Peru	0.3	0.3	11.0	0.5	3.4	0.3
Uruguay	1.5	0.2	0.1	1.2	2.3	0.2

Source: UNCTAD (2021).

Different WTO bodies, such as the Committee on Market Access, have debated the CBAM. They have discussed the concerns of developing countries about the compatibility of the CBAM with WTO rules,[27] its consistency with the UNFCCC and the Paris Agreement, the principle of common but differentiated responsibilities, the effectiveness of the CBAM in reducing carbon leakage, and the cost due to increased tariffs on CBAM goods imported into the EU.[28]

24. Ibid.
25. European Parliament, *A WTO-compatible EU carbon border adjustment mechanism*, 2020/2043(INI), 19 March 2021.
26. The UNCTAD study used a computable general equilibrium model. It is worth noting that the results were released before the EU disclosed its plan for the CBAM.
27. Some authors consider the CBAM as a restriction on imports based on product carbon content (carbon intensity). In this regard, the mechanism may violate provisions on non-discrimination. Linked to the national treatment provision, the concept of "like" products is essential as it is part of the foundation of the trading system. Under trade jurisprudence, the distinction between products based on the carbon content used in their manufacturing is unjustified. A legal analysis on the feasibility of BCAs under WTO law can be found in Monkelbaan (2021).
28. World Trade Organization, Committee on Market Access, *Minutes of the Committee on Market Access*, WTO Doc. G/MA/M/74, 29–30 April 29–30, 2021, and WTO Doc. G/MA/M/75, 11 October 2021.

As the CBAM regulation is an ongoing process, it is difficult for governments to anticipate specific reactions or responses. Yet, if it is implemented, it is worth considering the application of equivalent measures by Latin America and the Caribbean that could affect the volume and composition of trade. Meanwhile, some extractive industries in Latin America have adapted more sustainable production processes and practices. In this regard, academia, governments, and firms are working together to develop technology through pilot programmes that allow them to produce at net zero. Several countries in Latin America also have carbon pricing in place, while others are considering the establishment of their own ETS.

Mexico's updated NDC (2020) states that its conditional mitigation efforts could be increased up to 36% by 2030 subject to several conditions, including if a global agreement on an international price for carbon trading and adjustment of tariffs for carbon content is reached. The Mexican Climate Change Law was modified to reflect this commitment if a global accord is adopted.

Advancing on ETS in Latin American countries would pave the way for eventual climate clubs with the EU or individual countries.[29] Meanwhile, it is crucial to maintain a fluid dialogue between the EU and Latin American countries in different WTO bodies, promoting non-discriminatory approaches for unilateral regulations based on carbon content. It is also essential to continue engaging through the mechanisms established in regional trade agreements between the EU and Latin American partners to increase cooperation and support for reducing their industries' emissions and addressing their companies' carbon leakage under UNFCCC discussions.

4.5. Subregional Integration Schemes Addressing Trade, Environment, and Climate Change

Different subregional integration schemes have addressed trade and environmental matters. One of the most recent is the Pacific Alliance, through its Technical Group on Environment and Green Growth, created in 2016. This group has carried out several studies and joint initiatives designed to systematize experiences and lessons learned under a green growth approach. Its work has been guided by three issues: (i) sustainable consumption and production, (ii) the development of green markets and decoupling of economic growth from environmental degradation, and (iii) green investments. The group has identified four areas of common interest: (i) instruments to reduce GHG emissions, (ii) information systems for environmental management, (iii) promotion of green markets, and (iv) policies for waste management.

The group's work is based on a fluid dialogue and exchange of experiences among stakeholders. For example, it has created a dedicated subgroup on climate change comprised of climate change offices in the ministries of environment.

The Presidential Declaration on Sustainable Plastic Management (the Presidential Declaration) of the Pacific Alliance, released in 2019, is an exceptional example of coordination among countries in the region. It highlights the importance of and concerns over the generation and accumulation of microplastic waste and its negative environmental consequences. The Presidential Declaration established collaborative work in the following areas: (i) plastic bag regulation, (ii) prohibition of plastic cutlery and straws in natural and cultural protected areas, (iii) promoting research and innovation in the plastic industry, (iv) characterization of plastics to facilitate information to consumers, (v) foster substitutes for single-use plastics, and (vi) development of regulation and promotion instruments, guidelines, and actions to prevent and reduce pollution by plastic waste and microplastics in rivers, lakes, lagoons, reefs, and marine and coastal ecosystems.

In December 2020, Pacific Alliance countries released a Roadmap Towards Sustainable Plastic Management with concrete actions to pursue. They agreed to analyse the potential for trade and investment in plastics among the countries that make up the Pacific Alliance and identify opportunities and challenges with partners and relevant trading blocks. The roadmap identified the need to (i) generate information through reports on the intra-Pacific

29. Mexico and Colombia have the legal mandate to develop an ETS.

Alliance plastics trade and studies on the costs and opportunities of replacing single-use plastics in sectors each country prioritizes, (ii) promote dialogue and a shared vision among the four countries regarding international discussions on the sustainable management of plastics, and (iii) create a permanent panel for exchange and dialogue on plastics with partners relevant to the Pacific Alliance.

In the case of Mercosur, the environment is addressed from its inception in the preamble of the Asunción Treaty in 1991, recognizing that trade expansion must consider "the efficient use of available resources and the preservation of the environment."

In 1992, the Common Market Group created a specialized Meeting on the Environment and approved the Basic Environmental Policy Guidelines based on GMC Resolution 10/94. A year later, a working subgroup linked to the Common Market Group was created, SGT-6 Environment, which focused on technical discussions. Finally, in 2004, the meeting of ministers of the environment began to guide the dialogue and joint actions on the subject.

Several instruments and information systems have been developed in Mercosur to address environmental matters, with recommendations on harmonizing environmental standards and adopting common measures. One key initiative is the Promotion and Cooperation Policy on Sustainable Consumption and Production[30] and the action plan to implement it in 2007. Another is biodiversity and the development of a plan to prevent, monitor, control, and mitigate invasive alien species.

A follow-up programme derived from the promotion and cooperation policy on sustainable consumption and production is the cooperation programme on econorms, which supports the economic integration of Mercosur's sustainable consumption and production policy within a sustainability-driven framework.

The Andean Community signed the Andean Environmental Charter in 2020, establishing mechanisms and goals to combat climate change, defend ecosystems and biodiversity in the region, and jointly achieve the UN Sustainable Development Goals (Comunidad Andina, 2020). The charter comprises general principles, objectives, and thematic axes. It recognizes the need to work together to combat environmental crimes such as biopiracy, illegal mining, illegal burning and logging, and illegal wildlife trafficking and related crimes as a priority.

The Andean Environmental Charter also establishes a common objective to identify mechanisms for cooperation in the field of circular economy based on the exchange of knowledge and experience of multiple actors. It is further expected that mechanisms could help design and implement pilot projects between the parties. In addition, the charter seeks to consolidate a shared subregional vision concerning circular economy that can be positioned in different international fora.

Under the Andean Environmental Charter, the Andean countries have agreed to include six new thematic lines of work: (i) comprehensive management of water resources; (ii) conservation and sustainable use of biodiversity, ecosystem services/environmental functions aligned with Sustainable Development Goal 12; (iii) disaster prevention and response, including comprehensive fire and forest fire management; (iv) fight against illegal mining and related crimes; (v) promotion of the circular economy; and (vi) strengthening the environmentally sound management of chemical substances and waste throughout their life cycle.

30. Consejo del Mercado Común, *Política de promoción y cooperación en producción y consumo sostenibles en el Mercosur*, Mercosur/CMC/Dec. N°26/07, 28 June 2007.

5. How Can Trade Support Climate Adaptation Efforts?

Latin America is highly vulnerable to climate change. This can be seen in the Notre Dame Global Adaptation Initiative (n.d.) country index (which monitors more than 145 indicators) and the Germanwatch Global Climate Risk Index (Eckstein et al., 2021). The latter analyses extent to which countries and regions are affected by the impacts of weather-related loss events.

The Global Climate Risk Index 2021 identified Bolivia as one of the 10 most vulnerable countries in 2019, while Brazil, Chile, Colombia, and Paraguay ranked among the 30 most vulnerable. Over 2000–19, Guatemala ranked 16th, followed by Bolivia (24th) and El Salvador(28th) (Eckstein et al., 2021).

As mentioned, climate change affects the agricultural sector and crop commodities the most. Climate change has already affected food production and is likely to disproportionately affect food production and trade in emerging and developing countries (IPCC, 2019). The Global Commission on Adaptation (2019) expected this scenario to lead to shifts in agricultural production and yields among countries and regions.

The relevance of agriculture for Latin America is reflected in its contribution to GDP and exports and to the populations that depend on agriculture as a means of subsistence. Land is a key productive resource; Gardi et al. (2014) estimate that and the region has 576 million hectares of agricultural land (Gardi et al., 2014) and Trivelli and Berdegué (2019) estimate that more than 15 million farmers and two million fishermen produce enough food to meet the energy needs of 821 million people (Trivelli & Berdegué, 2019).

Droughts and floods have had devastating effects on the production of crops and commodities in Latin America. They can potentially diminish agri-commodity output, affecting prices in the international market. In a study based on five crops that are important for LAC economics and food security (beans, maize, rice, soybeans, and wheat), Prager et al. (2020) showed that climate change reduced the average growth of yields, the total area under cultivation, and output. These impacts caused trade deficits in several LAC countries, suggesting increased exposure to food insecurity except for the Southern Cone.

Adaptation technologies. Technology transfer is a critical element of the international response to climate change. In this regard, the technology needs assessments for LAC countries identify key technologies for adaptation in the agriculture sector, such as more efficient irrigation technologies and farming systems that can help maintain production in areas that suffer from prolonged water stress.[31] In these categories, drip irrigation, micro-sprinklers, soil nutrition, soil conservation, and the introduction of climate-resilient crops are the leading technologies prioritized by countries.[32]

Sustainable agricultural practices can help improve crop yields and food security, increase adaptation, and reduce GHG emissions. For example, sustainable agricultural practices in Ecuador have been used in cocoa production and livestock management in Uruguay.

In the water sector, which is intrinsically linked to agriculture, the top five technologies that support adaptation are (i) water management and monitoring and modelling, (ii) water catchment and harvesting, (iii) organizational structure, (iv) water storage and harvesting, wastewater treatment and recycling, and resilient infrastructure, and (v) desalination of saltwater and water supply and storage.

This information can be enhanced and supplemented with information on technology needs provided by Latin American countries in their revised NDCs. For example, Nicaragua has identified as part of its technology needs the "modernization of the country's hydrometeorological services, allowing for the maintenance of accurate forecasts and early warning systems for an effective and efficient

31. Technology needs assessment countries in LAC in 2009–21 include Antigua and Barbuda, Argentina, Belize, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guyana, Haiti, Honduras, Jamaica, Panama, Peru, Suriname, Trinidad and Tobago, and Uruguay.
32. The UN Climate Technology Centre and Network is the implementation arm of the UNFCCC's Technology Mechanism. It provides technical assistance mainly for technology planning, development of efficiency standards and policies, and legal and regulatory frameworks with the potential to accelerate the transfer of environmentally sound technologies.

response, which includes modernization in observation, assimilation and forecasting systems, access to sensors and technologies." In the specific case of technologies to be deployed, Chile mentions in its NDC increasing "electric vehicles, including private vehicles, commercial vehicles, and public vehicles (taxis and buses)."

International technology transfer mainly takes place through trade in goods, foreign direct investment, and patent licensing.[33] Intellectual property rights are fundamental for all.[34] For Latin American countries, the challenge of technology transfer and particularly environmentally sound technology goes hand in hand with removing distorting subsidies in the agricultural sector.

To meet the challenge of climate change, governments should put more emphasis on international cooperation on technological innovation. According to the IPCC (2022), experience suggests that international cooperation on technology development and deployment are most effective when approaches are results-oriented, innovation cooperation is done via equitable partnership between donors and recipients, and local innovation capabilities are developed. Emerging ideas for international cooperation on innovation and technology transfer include promoting country participation in technology programmes, climate-related innovation system builders, universities acting as a central hubs for capacity building, sectoral agreements, and international emission standards. Such cooperation is based on political will towards building a fair, transparent, and predictable international trading system. Additionally, countries could seek to foster a joint work programme between the WTO and the UNFCCC technology mechanism so that both agendas can be leveraged.[35]

Resilient infrastructure. Hurricanes, floods, and tidal waves can seriously affect trade infrastructure. Central American countries have experienced enormous losses due to hurricanes and storms. Trade infrastructure not only consists of transport infrastructure like ports, highways, and airports; logistics infrastructure and information and communication technology infrastructure for information transmission that supports trade transactions can be seriously damaged.

Latin America has attracted growing numbers of tourists in recent decades and tourism has become an important economic activity and source of export revenues and employment. As weather events increase in frequency, however, tourism infrastructure is seriously affected. Additionally, changes in rainfall patterns and prolonged droughts affect the ecosystem's characteristics and biodiversity—for example, the ice and glaciers of Patagonia melt, affecting tourism income. The impacts of climate change are distributed unevenly in the tourism industry. But the consequences are most substantial on the most vulnerable types of tourism and on small businesses with limited flexibility to adapt their business model, jeopardizing their tourism activity.

Food security in supply chains are becoming increasingly important as transportation and distribution are key components to maintain food stability, availability, and access at regional and international levels (Banerjee et al., 2021). Supply chains must work correctly to secure timely access to food, especially agricultural goods. This implies investing in sustainable infrastructure and supporting the open trade of food and fertilizers.

Climate measures that affect trade can be found in the NDCs as well as long-term strategies and national adaptation plans, disaster risk management strategies, and sectoral adaptation plans. The priority sectors mentioned in the NDC adaptation component are smart agriculture, biodiversity and ecosystems, disaster risk management, energy, forestry, and water and irrigation.

Some examples of adaptation measures addressing climate change that are related to trade are:

33. The IPCC lists several channels through which technology transfer takes place, including joint ventures, research cooperation, education, and training.
34. The topic has been much discussed at the WTO's Committee on Trade and Environment.
35. The UNFCCC Technology Mechanism seeks to facilitate the implementation of enhanced technology development and transfer to support action on mitigation and adaption. The Joint Work Programme of the UNFCCC Technology Mechanism for 2023–27 includes, among others, the following activities: development of technology roadmaps, analysis of the potential for digital technologies to provide solutions across sectors and industries, digitalization, and work on gender and technology and technology and NDCs. For further information see UNFCCC (2022).

- "10 agricultural subsectors (rice, corn, potatoes, beef cattle, dairy cattle, panela cane, cocoa, banana, coffee, and sugar cane) will have improved capacities to adapt to climate variability or climate change." (Colombia's NDC, December 2020). Most of these agricultural products are vulnerable at different levels to the impacts that climate change and variability may cause. The adaptation measures will help improve their productivity so that they can maintain their competitiveness in international markets.

- "Reduction of climate risk in the value chains of the oil and mining industry and the electrical generation, transmission, distribution, and commercialization infrastructure, through the development of vulnerability and climate risk studies specific to the sector, which allows identifying, proposing, and implementing adaptation measures to the effects of climate variability and climate change." (Ecuador's NDC, 2019).

- Chile's updated NDC (2020) sets adaptation goals for water management, sanitation, and disaster risk management. Specific measures include updating studies and analyses on climate vulnerability, increasing information on water management, and strengthening mechanisms to manage the climate impact on water resources. These goals and measures address different sectors, but all seek better use of water resources and sustainable infrastructure.

As noted, trade and trade policy are key elements to help countries adapt to the impacts of climate change and reduce vulnerability, particularly in agriculture. Implementing national plans on adaptation requires open and transparent trade to (i) increase access to environmentally sound technology, (ii) contribute to food security, and (iii) improve access to services related to adaptation technology.

6. Implications for International Cooperation in Trade

In terms of climate change, Latin America's main challenge is reaching mitigation objectives while ensuring that adaptation strategies are correctly implemented under difficult macroeconomic conditions. Nonetheless, the transition to a low-carbon and resilient economy represents an opportunity from an economic and trade perspective. Renewable energy, the circular economy, bioeconomy and sustainable agriculture, digitalization, and electromobility have great potential to foster innovation, create jobs, help meet climate goals, contribute to export diversification, and increase intraregional trade. The NDCs, long-term strategies, and national and sectoral plans for adaptation and mitigation make explicit references to these areas.

Based on the types of commitments in their NDCs and strategic adaptation and mitigation plans, Latin American countries are more inclined to establish flexible cooperation approaches to transition to a low-carbon, climate-resilient economy in the context of a just transition and respect of the principle of common but differentiated responsibilities.

Enhance collaboration to address negative spillovers associated with trade-related climate measures in Latin American countries to avoid affecting their transition towards low-carbon economies. Fostering greater collaboration at the bilateral, regional, and multilateral levels would help deal with a wide range of topics related to mitigation and adaptation, such as access to low-carbon technology transfer vis-à-vis intellectual property rights. This cooperation can materialize through technical assistance and building capacity.

Improve sustainability standards. The development of standards and local regulation on sustainability aligned with global trends and best practices is very important for producers in relevant sectors to adapt and improve their products. Taking the agricultural sector as an example, the development and application of sustainability standards are also crucial so that consumers of agricultural products from other regions recognize the contribution of sustainable production such agroforestry crops for example. Therefore,

there is an opportunity to strengthen regional and local bodies as well as technical professionals in charge of developing these standards.

Increase the visibility of emissions embedded in trade. In general, there is a lack of data on emissions embedded in consumption. Emissions from production and transportation are systematically collected, but not from consumption. There is an opportunity for academics and multilateral organizations to join efforts to design mechanisms to quantify the emissions in a less burdensome way for exporters.

Leverage current formal and informal mechanisms and platforms to address trade-related frictions or tensions on climate change. The WTO Committee on Trade and Environment provides a deliberative space for addressing climate change and trade linkages, while the member-led Trade and Environmental Sustainability Structure Discussions initiative is more suitable for technical dialogue, sharing best practices, and learning from member experiences. These mechanisms can help to diffuse knowledge and expertise, enhance transparency, and build confidence. To take advantage of these channels, governments need to engage at different levels with trade experts and technical staff in other relevant ministries.

Expand the Aid for Trade initiative to projects that seek alignment and coherence between climate objectives and trade. For example, Latin American countries have developed sectoral strategies and a roadmap for adaptation and mitigation actions, including references to climate measures that intend to change production and consumption patterns and incorporate resilience in productive sectors as well as in strategic infrastructure, which is critical for trade.

Additionally, a long-standing objective pursued by Latin American countries in their trade agreements is how to capture the transfer of environmentally sound technologies through cooperation, mainly because a continued effort is needed to catch up with the fast pace of technological innovation. This objective can be met by expanding the scope of the Aid for Trade initiative through specific programmes and pilots that serve as vehicles to build climate resilience and reduce emissions and not limiting this assistance to countries classified under official development assistance. Finally, expanding the scope of official development assistance and aid for trade could be an alternative to channelling funds without creating additional bureaucracy in the international architecture for development finance.

It is important to encourage joint work between WTO bodies and the UNFCCC to address challenges associated with the transfer of technology, leveraging the work done by the UN Climate Technology Centre & Network and the UN Technology Needs Assessment process.

The current global economic environment demands that Latin American countries continue to benefit from international trade without creating additional barriers or imbalances between countries at higher levels of development and developing countries seeking to build a more sustainable development path.

Latin America has abundant sources of renewable energy that give it comparative advantages relative to other regions. This means that Latin America has one of the cleanest energy grids. Expanding different energy sources, such as wind and solar, will enable the region to accelerate its energy transition and rise to the challenges and opportunities related to the urgent need to tackle global warming. Regional and multilateral cooperation is essential to foster synergies between trade, climate, and sustainable development so that countries can proactively prepare their economies and the sectors linked to international trade for a constantly changing environment.

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ANNEX 1. Total Greenhouse Gas Emissions, Including LUCF, in MtCO2e by Country, 2003–19

Country	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
Brazil	1.451,6	1.434,5	1.475,8	1.455,9	1.366,9	1.385,0	1.344,9	1.319,5	1.276,5	2.109,7	2.009,2	2.036,2	2.032,9	1.998,2	2.006,4	1.993,4	1.946,7
Mexico	670,8	669,6	688,1	689,7	681,9	663,5	674,6	687,0	679,1	577,0	559,9	569,4	564,9	552,9	532,6	508,4	499,6
Argentina	398,9	405,0	407,6	403,2	435,8	428,8	431,0	421,2	416,1	434,8	429,3	449,6	445,1	432,6	418,1	414,2	397,9
Venezuela	299,6	337,1	363,8	393,2	479,9	502,5	505,1	502,8	466,5	448,9	440,8	449,5	437,4	442,3	443,0	429,1	413,7
Colombia	270,5	265,4	256,5	261,5	232,0	231,2	227,5	220,6	221,7	241,7	236,8	233,2	232,5	227,0	225,8	224,1	222,3
Peru	190,7	187,8	187,5	190,0	186,1	184,4	180,7	178,8	178,5	150,2	145,5	141,4	136,5	132,5	133,1	131,5	127,4
Bolivia	138,7	129,6	129,2	130,4	119,7	116,7	115,9	115,3	114,4	125,5	103,7	105,2	109,9	104,8	102,7	106,6	94,0
Ecuador	98,7	98,8	97,7	99,0	91,2	92,6	91,0	87,9	88,0	99,4	95,8	92,3	90,6	90,9	88,4	86,7	82,6
Paraguay	96,6	94,6	96,5	93,5	114,7	114,3	112,4	110,8	109,6	96,5	94,1	92,0	93,9	90,7	90,5	89,2	91,3
Chile	55,3	49,9	50,9	48,8	21,3	15,3	22,5	19,3	16,9	55,6	50,5	53,0	48,2	40,4	39,2	38,5	33,2
Dominican Rep.	39,8	37,6	35,5	36,2	35,4	32,9	32,6	32,8	32,0	30,8	29,5	30,0	29,9	28,7	26,7	25,4	26,1
Guatemala	38,5	37,1	35,2	35,8	38,6	35,7	34,6	33,4	32,7	38,2	38,3	36,7	38,1	36,4	37,1	35,0	36,0
Nicaragua	38,4	37,9	37,8	38,1	29,3	28,4	27,4	27,2	26,8	38,3	37,9	37,9	38,0	37,8	37,7	37,2	37,7
Cuba	38,2	39,2	38,8	40,1	32,5	30,5	32,5	32,1	31,1	33,5	32,5	31,7	32,3	31,3	30,3	30,2	30,8
Uruguay	34,4	34,5	34,6	35,3	29,9	30,0	30,5	31,5	30,7	26,0	28,4	28,9	26,3	27,3	25,2	25,0	23,1
Honduras	28,1	27,9	26,6	27,0	27,4	27,0	26,6	25,8	25,8	23,9	23,7	23,7	23,6	22,9	22,5	21,8	22,1
Panama	25,3	21,9	21,7	22,3	22,1	22,1	21,6	21,7	21,0	19,9	19,2	17,6	17,5	17,5	17,0	15,3	15,3
El Salvador	13,9	12,9	12,6	13,3	13,3	12,9	12,6	13,3	13,2	13,3	13,5	13,9	14,5	13,9	13,4	13,0	12,7
Costa Rica	8,5	8,5	8,2	8,0	7,1	7,2	7,2	6,7	6,7	12,8	12,7	13,1	13,0	11,6	11,2	10,7	10,7

Source: Climate Watch (n.d.).

ANNEX 2. Greenhouse Gas Emissions by Country, Including LUCF, 2019

Country	Total CO2 Emissions Including LUCF	Share of LAC (%)	Per Capita Emissions Including LUCF (MtCO2e)	Regional Rank Per Capita Emissions	Per GDP Emissions Including LUCF (MtCO2e Per $ Million)
Brazil	1,451.6	36.9	6.85	6	789.03
Mexico	670.8	17.6	5.26	12	528.69
Argentina	398.9	10.1	8.88	5	895.53
Venezuela	299.6	7.6	10.51	3	N/A
Colombia	270.5	6.9	5.37	11	835.95
Peru	190.7	4.8	5.86	9	840.46
Bolivia	138.7	3.5	12.05	2	3,392.07
Ecuador	98.7	2.5	5.68	10	918.65
Paraguay	96.6	2.5	13.71	1	2,532.46
Chile	55.3	1.4	2.92	15	195.98
Dominican Republic	39.8	1.0	3.70	13	447.07
Guatemala	38.5	1.0	2.32	17	501.78
Nicaragua	38.4	1.0	5.87	8	3,067.94
Cuba	38.2	1.0	3.37	14	N/A
Uruguay	34.4	0.9	9.92	4	613.02
Honduras	28.1	0.7	2.89	16	1,121.22
Panama	25.3	0.6	5.96	7	378.77
El Salvador	13.9	0.4	2.16	18	515.21
Costa Rica	8.5	0.2	1.68	19	137.29
Honduras	28.1	0.7	2.89	16	1,121.22
Panama	25.3	0.6	5.96	7	378.77
El Salvador	13.9	0.4	2.16	18	515.21
Costa Rica	8.5	0.2	1.68	19	137.29
Total Latin America	**3,936.6**	**100**	**6.3**		

Source: Climate Watch (n.d.).

ANNEX 3. Non-Tariff Measures Notified to the WTO Explicitly Targeting Climate Change, Latin American Countries, 2015–21

Notifying Member	Agreement	Year	Notification Pursuant to	Measure Description	Type of Measure	Coverage of the Measure
Argentina	Agriculture	2019	Annexe 2 of the Agreement on Agriculture (Green Box Measures)			
	Agriculture	2019	Annexe 2 of the Agreement on Agriculture (Green Box Measures)			
	Agriculture	2019	Annexe 2 of the Agreement on Agriculture (Green Box Measures)			
	Agriculture	2019	Annexe 2 of the Agreement on Agriculture (Green Box Measures)			
	Agriculture	2019	Annexe 2 of the Agreement on Agriculture (Green Box Measures)			
Brazil		2016	Article 6.2 of the Agreement on Agriculture (Development Programmes)[1]	Funds for agricultural investments: ABC (Low Carbon Agriculture Programme)	Investment credit	Rural structure, acquisition of machines, equipment, vehicles, and animal services
Colombia	Technical Barriers to Trade	2017	Other: Transparency	Draft Resolution of the Ministry of the Environment and Sustainable Development "Establishing the maximum level for ratio indicators relating to the greenhouse gas emissions inventory for denatured anhydrous fuel ethanol and adopting other provisions."	Technical regulation	Denatured anhydrous fuel ethanol
Costa Rica	Technical Barriers to Trade	2018	Article 2.9.2 of the TBT Agreement; Article 5.6.2 of the TBT Agreement	The notified regulation establishes the quality technical specifications for anhydrous fuel ethanol and its mixtures with 91 RON and 95 RON gasoline, which are used as a fuel nationwide. It also applies to anhydrous fuel ethanol and its mixtures with 91 EX RON and 95 EX RON gasoline, which are sold nationwide, regarding both their bulk distribution and sale to the end consumer.	Technical regulation; conformity assessment procedures	Biofuels
Ecuador	Technical Barriers to Trade	2019	Article 2.9.2 of the TBT Agreement	The notified Ecuadorian technical regulation establishes the requirements to be met by ductless air conditioners, prior to the marketing of domestic and imported products, with the aim of protecting the environment and preventing deceptive practices. (...)	Technical regulation	Window or wall types, self-contained or "split-system;" other, incorporating a refrigerating unit

Notifying Member	Agreement	Year	Notification Pursuant to	Measure Description	Type of Measure	Coverage of the Measure
El Salvador	Technical Barriers to Trade	2020	Article 2.9.2 of the TBT Agreement	Electrical products. Split-type, free-flow, ductless inverter air conditioners with variable refrigerant flow. Energy-efficiency specifications. The notified regulation establishes the minimum seasonal energy efficiency ratio, test methods, conformity assessment procedure and labelling requirements for split-type, free-flow, ductless inverter air conditioners with variable refrigerant flow, which are manufactured, imported or marketed in the states parties.	Technical regulation; conformity assessment procedures	Ventilators, fans, air conditioners
	Technical Barriers to Trade	2017	Article 2.9.2 of the TBT Agreement	Salvadorian Technical Regulation (RTS) 29.01.01:15: Energy efficiency. Three-phase squirrel-cage AC induction motors with a rated output of 0.746 to 373 kW. Limits, test method and labelling.	Technical regulation	Motors
	Technical Barriers to Trade	2016	Article 2.9.2 of the TBT Agreement	Salvadorian Technical Regulation (RTS) No. 97.02.01:15: Energy efficiency. Self-contained commercial refrigeration appliances. Maximum energy consumption limits, test methods, and labelling. The notified regulation establishes the maximum electricity consumption levels per litre of usable refrigerated volume, the test methods for determining compliance therewith, and the labelling and marking requirements for all self-contained commercial refrigeration appliances.	Technical regulation or specifications	Self-contained commercial refrigeration appliances
	Technical Barriers to Trade	2016	Article 2.9.2 of the TBT Agreement	Salvadorian Technical Regulation (RTS) No. 97.01.01:15: Energy efficiency. Household refrigerators and freezers. Limits, test methods and labelling notified Technical Regulation establishes the maximum energy consumption levels for household refrigerators and freezers using hermetic motor-driven compressors, the test methods for determining such energy consumption, and the particulars to be included on the energy consumption label.	Technical regulation or specifications	Household refrigerators and freezers
	Technical Barriers to Trade	2016	Article 2.9.2 of the TBT Agreement	Salvadorian Technical Regulation (RTS) No. 23.01.01:15: Energy efficiency. Central, packaged or split air conditioners. Limits, test methods and labelling. The notified Salvadorian Technical Regulation establishes the minimum seasonal energy efficiency ratio for central, packaged or split air conditioners, the test methods for verifying compliance with this ratio, and the information to be included on the label.	Technical regulation or specifications	Central, packaged, or split air conditioners
	Technical Barriers to Trade	2016	Article 2.9.2 of the TBT Agreement	Salvadorian Technical Regulation (RTS) No. 23.01.02:15: Energy efficiency. Room air-conditioners. Limits, test methods, and labelling	Technical regulation or specifications	Room air conditioners
	Technical Barriers to Trade	2016	Article 2.9.2 of the TBT Agreement	Salvadorian Technical Regulation (RTS) No. 23.01.03:15: Energy efficiency. Split-type, free-flow, ductless air-conditioners. Limits, test methods and labelling. The notified Salvadorian Technical Regulation establishes the minimum seasonal energy efficiency ratio for split-type, free-flow, ductless air conditioners (known as mini-split and multi-split air conditioners), whether single-cycle (cooling only) or reverse-cycle (heat pump), with air-cooled condensers. It also specifies the test methods for verifying compliance with this ratio and the information to be included on the label.	Technical regulation or specifications	Split-type, free-flow, ductless air conditioners

Notifying Member	Agreement	Year	Notification Pursuant to	Measure Description	Type of Measure	Coverage of the Measure
Mexico	Technical Barriers to Trade	2016	Article 2.10.1 of the TBT Agreement	Technical Regulation of the Eurasian Economic Union "On Safety of Perfume and Cosmetic Products" (TR CU 009/2011) (13 pages, in Russian). This technical regulation covers pre-packed perfume and cosmetic products destined for circulation within the Eurasian Economic Union. It establishes requirements for products and manufacture processes to protect human life and health, property, environment, safety, and deceptive practice.	Emergency technical regulation	Motor vehicles
	Technical Barriers to Trade	2016	Article 2.9.2 of the TBT Agreement	Draft Mexican Official Standard PROY-NOM-168-SEMARNAT-ASEA-2016: Maximum permissible levels for emissions from aero-derivative open-cycle or combined-cycle gas turbines, and the measurement thereof notified text is binding on natural and legal persons responsible for new or existing gas turbines, and systems comprising two or more gas turbines, with an overall nominal power rating exceeding 0.5 MW, which is powered by gaseous or liquid fuel and used in industry, commerce and services.	Technical regulation or specifications	Petrochemicals
	Technical Barriers to Trade	2016	Article 2.10.1 of the TBT Agreement	Emergency Mexican Official Standard NOM-EM-002-ASEA-2016 establishing test methods and parameters for the operation, maintenance and efficiency of gasoline vapour recovery systems in service stations selling gasoline to the public, for emission control purposes notified Emergency Mexican Official Standard applies to vapour recovery systems in service stations selling gasoline to the public that are located in the delegations and municipalities covered by the Atmospheric Environmental Contingency Programme applicable to the Metropolitan Area of the Valley of Mexico.	Emergency technical regulation	Vapour recovery systems
	Technical Barriers to Trade	2015	Article 2.9.2 of the TBT Agreement	Draft Amendment to Mexican Official Standard NOM-044-SEMARNAT-2006 establishing the maximum permissible limits for emissions of total hydrocarbons, non-methane hydrocarbons, carbon monoxide, nitrogen oxides, and particles from the exhaust pipes of new diesel engines to be used for the propulsion of new motor vehicles of a gross vehicle weight exceeding 3,857 kg.	Technical regulation or specifications	Vehicles other than railway or tramway rollingstock and parts and accessories thereof

Notifying Member	Agreement	Year	Notification Pursuant to	Measure Description	Type of Measure	Coverage of the Measure
Peru	Agriculture	2020	Annex 2 of the Agreement on Agriculture (green box measures)	General services: Infrastructural services: Works to protect against the El Niño climate phenomenon	General services: Infrastructural services: Works to protect against the El Niño climate phenomenon	El Niño rehabilitation and reconstruction activities
	Technical Barriers to Trade	2019	Article 2.9.2 of the TBT Agreement	The notified draft Supreme Decree amends the quality requirements for the importation of used land transport motor vehicles, which are established in Article 1 of Supreme Decree No. 843.	Technical regulation	Motor vehicles for the transport of 10 or more people, including the driver; chassis fitted with engines, for the motor vehicles of headings; motorcycles (including mopeds) and cycles fitted with an auxiliary motor, with or without side-cars; side-cars; other vehicles, with spark-ignition internal combustion reciprocating piston engine; other vehicles, with compression-ignition internal combustion piston engine (diesel or semi-diesel); other, with spark-ignition internal combustion piston engine; Road tractors for semi-trailers; g.v.w. not exceeding 5 tonnes; g.v.w. exceeding 5 tonnes but not exceeding 20 tonnes; crane lorries; concrete-mixer lorries
	Technical Barriers to Trade	2017	Article 2.9.2 of the TBT Agreement	Draft Peruvian Metrology Standard (PNMP) No. 024:2016, Instruments for measuring vehicle exhaust emissions - Part 1: Metrological and technical requirements, and Part 2: Metrological controls and performance tests	Technical regulation	Measuring instruments in general. Tanker vehicles- 9027.10.10.00: Gas or smoke analysis apparatus, electrical or electronic; - 9027.10.90.00: Other gas or smoke analysis apparatus
Uruguay	Agriculture	2018	Annex 2 of the Agreement on Agriculture (green box measures)	Environmental programmes: Development and Climate Change Adaptation Programme	Not specified	Development and Climate Change Adaptation Programme
	Agriculture	2016	Annex 2 of the Agreement on Agriculture (green box measures)	Payments under environmental programmes: Development and Climate Change Adaptation Programme	Payments	Development and Climate Change Adaptation Programme
	Agriculture	2015	Annexe 2 of the Agreement on Agriculture (green box measures)	Payments under environmental programmes: Development and Climate Change Adaptation Programme	Payments	Agricultural sectors
	Quantitative Restrictions	2020	Decision G/L/59/Rev.1	Prohibitions on importing used vehicles	Prohibition	Used vehicles: automobiles and light commercial vehicles (up to 1,500 kg load capacity; buses; trucks; truck tractors for semi-trailers; motorized or non-motorized chassis; trailers or semi-trailers; bodies and/or cabs; motorcycles (including mopeds) and velocipedes equipped with an auxiliary motor, with or without a sidecar, sidecars, as well as used parts and accessories of said vehicles (temporary prohibition).Harmonized System code has ex.
	Quantitative Restrictions	2020	Decision G/L/59/Rev.1	Exclusions on importing used vehicles	Non-automatic licensing	Used vehicle

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