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From Farm to Table: Agrifood Systems and Trade Challenges in the Southern Cone

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GLOSSARY & ABBREVIATIONS

AFOLU - Agriculture, forestry and other land use

CIAT - International Center for Tropical Agriculture

CFS - Committee on World Food Security

CO_2 eq. - Carbon dioxide equivalent

COP - Conference of the Parties

EU - European Union

FAO - Food and Agriculture Organization of the United Nations

FOP – Front of Package

GDP – Gross domestic product

GHG - Greenhouse gases

HLPE – High Level Panel of Experts

IICA- Inter-American Institute for Cooperation on Agriculture

IFAD- International Fund for Agricultural Development

IFPRI- International Food Policy Research Institute

IGO – Intergovernmental organizations

INTI – National Institute for Industrial Technology

IPCC- Intergovernmental Panel on Climate Change

IUCN - International Union for Conservation of Nature

LAC - Latin America and the Caribbean

LCA - Life cycle assessment

LDCs - Least developed countries

LUCF - Land-use change and forestry

MEAs - Multilateral environmental agreements

Mesoamerica - Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama

$MtCO_2eq.$ – Metric tons of carbon dioxide equivalent

NCD – Noncommunicable disease

NPM - Nutrient Profile Model

OECD - Organisation for Economic Co-operation and Development

PAHO - Pan American Health Organization

PSE - Producer support estimate

SDG - Sustainable Development Goal

SIDS - Small island developing states

South America - Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, and Venezuela (Bolivarian Republic of).

Southern Cone - Argentina, Brazil, Chile, Paraguay, and Uruguay.

UN – United Nations

UNFCCC - United Nations Framework Convention on Climate Change

UNFSS - United Nations Forum on Sustainability Standards

UNIDO - United Nations Industrial Development Organization

WB - World Bank

WFP - World Food Programme

WHO - World Health Organization

BACKGROUND AND OBJECTIVES

Martín Piñeiro and Valeria Piñeiro

Food production includes a complex and varied set of agricultural and nonagricultural activities, involving a growing number of sectors and actors that influence the way food is produced, processed, distributed, and consumed. Recently, and especially after the 2021 United Nation Food Systems Summit (UNFSS), it has been proposed that this conglomerate of activities and socioeconomic actors be jointly identified as *food systems*. National food systems, which exist in each country, are interrelated through trade and other factors with regional food systems and finally with the global food system.

The concept of food systems has been adopted as a useful tool for understanding the multiple and complex interrelations between different production, distribution, and trade partners and for adjusting policy analysis and design to this complex world. The discussions and documentation prepared during the UNFSS process brought to public attention not only the utility and complexity of this concept but also some of the shortcomings of current food production practices. The summit also highlighted an urgent need to establish processes for identifying such shortcomings, their relative importance, and possible measures that would lead to the transformation of national food systems and the global food system.

The Summit process also brought public attention to four important observations. **First,** the global food system is a major part of the global economy. About 40 percent of the global population derives the main part of their income from activities related to food systems. **Second,** agriculture is a main component of food systems but comprises, at least in developed economies, less than 20 percent of the total value of these systems (Torero et al. 2015). Thus, food system analysis and policy design activities must incorporate a wide array of economic actors and their multiple interrelations in the nonagricultural parts of food systems. **Third,** the analysis of food systems must integrate new dimensions/attributes in addition to productivity and food security concerns. Among these, the impact of agrifood systems on the environment and the wellbeing of farmers, as well as concerns about the safety and nutritional quality of food, stand out as particularly important (Piñeiro et al. 2022). **Fourth,** the strong connectivity between national food systems and the global food system suggests the importance of coordinating domestic policies at regional and global levels to achieve global wellbeing.

Food system contributions to climate change and environmental degradation along with increasing food and nutrition insecurity in many parts of the world, are already explicitly recognized in trade agreements, highlighting growing challenges for all agrifood systems. In particular, the speed and magnitude of these trends represent a significant challenge for developing countries, which will need to adjust and transform their production and distribution practices, especially those that actively participate in food trade. In particular, net food exporters need to adjust to new environmental and nutritional requirements to continue placing their agrifood surpluses in external markets. Net food importing countries need to be aware of the expansion of food system

goals beyond food security to avoid implementing policies that are not compatible with sustainability, nutritional, and health objectives.

An additional result of the UNFSS was the development of institutional mechanisms that aim to advance (1) analysis of food systems, (2) proposals for their transformation and (3) plan for implementation. Three such mechanisms are:

1. **A hub**, located in the United Nations Food and Agriculture Organization (FAO), with the participation of the three UN Rome-based agencies, FAO, IFAD, and the World Food Programme (WFP) that will be responsible for providing coordination and leadership to the overall activities related to transformation of food systems at the national level.

2. **A process** leading to concrete proposals to work with government, civil society, and private sector organizations to transform national food systems, organized by the UN National Coordinators as instructed by the UN Secretariat.

3. A number of **coalitions** to analyze and make proposals on specific themes or challenges related to food systems' transformation, especially at the regional and global level, organized by countries with the participation of multilateral agencies and other participants.

This set of mechanisms suggests that in the follow-up to the UNFSS, national food systems were identified and promoted as the focal point for further work, at least within the purview of UN organizations. Much less attention has been given to the global food system, although this may change in the near future because of new trade regulations being implemented—mainly by the European Union (EU)—that are closely linked to climate change objectives.

Moreover, regional food systems have been largely overlooked, despite their evident and substantial importance. As described and discussed elsewhere, different countries and regions in the world have varying roles in food trade networks. Some regions are mainly food exporters, such as North America, the Southern Cone countries of South America, and Australia and New Zealand. They provide substantial and critically important food exports to net importing regions, such as East Asia and Northern Africa. Each regions' countries have distinct national food systems, and will consequently also have different positions and economic interests in the future evolution and adaptation of trade within the global food system.

Discussions and proposals at the national level, in multilateral bodies, and potentially during trade agreement negotiations will thus involve radically different economic interests, in addition to varying ideologies and personal perspectives. Consequently, countries that have similar economies and where food production comprises an important component of their total trade will likely have similar perspectives and needs, potentially benefiting from collective actions. Such collective actions will need to be based on reliable analyses and science-based evidence on their potential economic, social, and environmental outcomes.

The countries that form the Southern Cone of Latin America (Brazil, Chile, Argentina, Paraguay, Peru, and Uruguay) share similar economic and trade conditions, including food systems with similar structures and levels of development. Thus, they have similar interests in the ways in which

the global food system should evolve, the rules and procedures that should regulate agricultural and food trade, and the possible mechanisms that could be developed for adequate governance of the global food system. These views could also be shared by other net food exporting countries like the United States, Canada, Australia, and New Zealand, with which the Southern Cone has previously cooperated on actions related to agricultural and food trade, based on the “Think Alike” concept[1].

While this book was being prepared, the unexpected invasion of Ukraine by the Russian Federation generated important changes, both in the functioning of the global food system and in the intensity, content, and priorities of discussions at the global level. **First,** the attention of international organizations was diverted to the food crisis that was aggravated in many parts of the developing world. Thus, the functioning of the three mechanisms described above have not received much attention. **Second,** the economic difficulties that most countries encountered due to both the pandemic and the Russia-Ukraine war—including high interest rates, low economic activity, and increasing unemployment—captured the attention and available resources of national governments, which have been unable to fully attend to food security matters, much less the transformation of national food systems. **Third,** the war is generating profound changes in the international food trade environment. Trade is more difficult and expensive, trade partners are changing rapidly, and the potential economic and trade decoupling of major world economies has created uncertainties and new incentives for increasing trade within regions and countries with common interests. These factors will, on one hand, weaken the possibilities and incentives for building up a global food system. On the other hand, they will strengthen the relevance of developing integrated regional food systems, the main subject analyzed in this book. In the new international context, regional food systems could become the major building blocks of a looser and less integrated global food system. If this perspective is effectively the way things develop, it will be one of the many welfare costs resulting from the slow and evolving process of deglobalization, accelerated by the Russia-Ukraine war.

The book attempts to make an analytical contribution by providing information and proposals to inform the political processes involved in the construction of a regional food system in the Southern Cone countries of South America. It outlines how such a regional system could relate to the global food system through trade, investment, the development of value chains, and technology transfer.

The book’s five main chapters analyze the main challenges faced by national agrifood systems in the Southern Cone countries, individually and collectively, especially in relation to new regulations and barriers that may affect international trade and export conditions. A short final chapter summarizes the main content and makes a few policy recommendations.

The first two chapters describe the environmental sustainability and nutritional quality of food systems, their relationships and tradeoffs with food security, and the way they express themselves in the countries of southern South America, which are main food exporters.

[1] The concept of "think alike" in geopolitics today refers to the idea that countries with shared values and interests are more likely to cooperate and coordinate their actions.

Chapter 1, prepared by Pablo Elverdin, describes the agricultural production systems and food security conditions of the South American region and the contributions the region makes to global food security. It argues that agricultural production uses resources (land, water, biological resources) that are scarce globally. Given the existing regional disparity in resource endowments and the different modes of production used worldwide, not all agrifood systems exert the same pressure on natural resources. Global collective action is needed to optimize their sustainable productive use. A fair and transparent global trade system is a major component of the needed collective action, and the main instrument to correct food and environmental imbalances at the global level. Subsidies applied to agriculture by many countries are a main source of production and trade distortions. The alternative of repurposing existing subsidies to optimize their impact in relation to climate and sustainability concerns is an important component of the analysis.

Chapter 2, prepared by Maria Nieves Pascuzzi, introduces the less explored but increasingly important concern related to the nutritional quality of food and its relationship with non-transmissible human diseases. This important problem reflects the need for food value chains to be reorganized and transformed to ensure an appropriate response. One important element is labeling systems that inform consumers about the composition of processed foods, and their relevance to trade. The design of good labeling methods and the possibility of moving to an international agreement on labeling procedures are analyzed.

The following three chapters deal with the relationships between trade and food systems. In particular, they examine the way in which new regulations and requirements being proposed by importing countries may affect trade and consequently global food security.

Chapter 3, prepared by Eduardo Bianchi, analyzes the way in which growing concerns about agrifood systems and their impact on the environment have been incorporated into recent bilateral and regional agreements. He identifies and highlights the issues incorporated into the trade agreements analyzed, framing their scope and the challenges they represent for countries in the region.

Chapter 4, prepared by Sabine Papendieck, shows that in the context of growing concern for environmental sustainability and the climate change impacts of food production, a growing number of seals, standards, and public and private traceability systems seek to provide more information on products, the way they are produced, and their impact on climate change. This responds to the growing demand for information by consumers. However, the potential proliferation of standards and "mirror" measures for environmental issues act as a potential trade barrier to market access, especially for small and medium producers in developing countries. The chapter includes a survey to identify the main instruments used to respond to these demands, analyzing their effectiveness and posing challenges and opportunities for their improvement.

Chapter 5, prepared by Agustin Tejeda and Nelson Illescas, argues that national and global agrifood systems need to be transformed in a balanced way in response to global food security needs and taking into consideration new concerns that conform to the other dimensions of food systems, especially those related to environmental issues and new consumption trends related to nutritional requirements. An imbalanced approach to these competing demands may have serious consequences on global food security and the livelihoods of thousands of producers. However, the transformation should rely on policies that do not affect trade in ways that put global food security at risk. The chapter shows the potential negative effects that some measures being applied or discussed could have on trade and the efficient use of natural resources.

Finally, Chapter 6, prepared by Martin Piñeiro and Valeria Piñeiro, presents some general conclusions and recommendations that emerge. The main focus of these recommendations relates to the strong relationships that exist between the national agrifood systems of the Southern Cone countries and international food trade and their impact on food security at the global level. From these close interrelationships emerges a possible agenda for action that could lead to a more efficient and balanced global food system.

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CHAPTER 1:

ENVIRONMENTAL SUSTAINABILITY OF AGRIFOOD SYSTEMS: SEARCHING FOR GLOBAL EFFICIENCY IN FOOD PRODUCTION

Pablo Elvedin

INTRODUCTION

One of the greatest challenges for humanity is how to balance the urgent need to mitigate both climate change and the degradation of natural resources with requirements to increase the production of safe and nutritious food in the context of a constantly increasing global population.

Regional imbalances between food supply and demand, global disparities in the endowment of natural resources, and the different agroecological conditions for sustainable food production are closely linked, and require a globally coordinated response to eradicate hunger with greater environmental efficiency in food production. Some regions show significant comparative advantages over others in this regard. The most efficient global response would be to promote a sustainable increase in the production and export of food from these regions.

AGRIFOOD SYSTEMS AND THE ENVIRONMENT

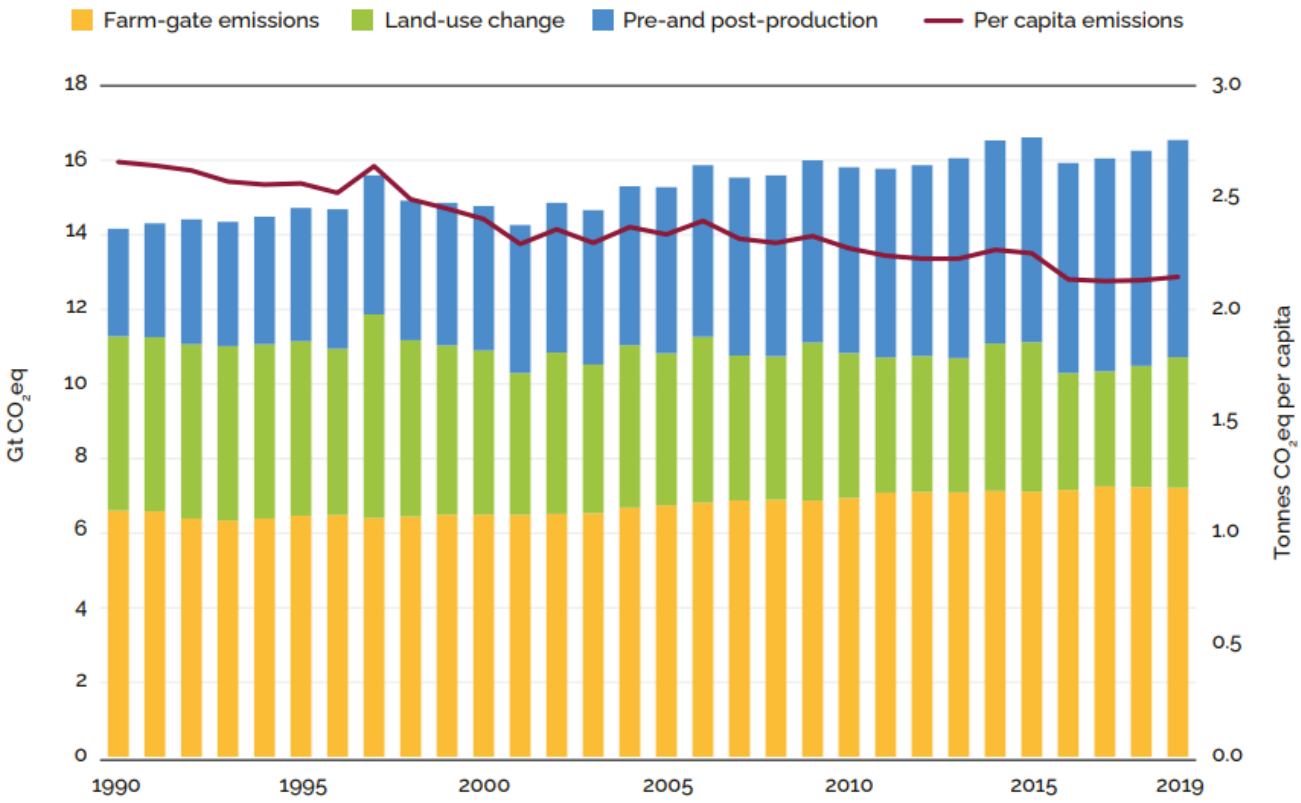
According to the latest report from the Intergovernmental Panel on Climate Change (IPCC 2022), climate change has caused an increase in the frequency and intensity of extreme weather and climate events, impacting the growth rate of global agricultural productivity, and exposing millions of people to food insecurity. One-half of the world's population already experiences severe water scarcity for at least part of the year due to both climatic and non-climatic factors. In the medium and long term, global warming will negatively affect the physical availability of water and increase water-related risks in all regions of the world.

Soil health is also challenged. The United Nations Food and Agriculture Organization (FAO 2021) estimates that soil degradation currently affects around 1,660 million hectares, impacting 34 percent of global agricultural soils. If this trend is not corrected, climate change and production techniques that are not environmentally friendly will hinder or eliminate food production in some regions.

In 2019, global anthropogenic emissions reached 54 billion tons of CO_2 equivalent. About 17 billion tons of CO_2eq., or 31 percent of the total, came from agrifood systems. Overall, agrifood systems generated 21 percent of CO_2, 53 percent of methane, and 78 percent of nitrous oxide emissions. Emissions from agricultural land accounted for the largest component of this, at approximately 7 billion tons of CO_2eq., followed by upstream and downstream processes in the value chain (6 billion tons) and change in land use (4 billion tons).

Although worldwide emissions from agrifood systems increased by 16 percent between 1990 and 2019, their proportion in total emissions fell from 40 percent to 31 percent. Likewise, per capita emissions fell from 2.7 to 2.1 tons of CO_2eq. per person (FAO 2021).

Figure 1.1: Global GHG emissions from agrifood systems by lifecycle stage and per capita, 1990–2019



Source: FAO 2021.
Note: $GtCO_2$eq = Gigatons of CO_2 equivalent.

It is important to note that previous data on emissions from the agrifood sector are based on a lifecycle analysis, an exercise not conducted for other economic sectors.

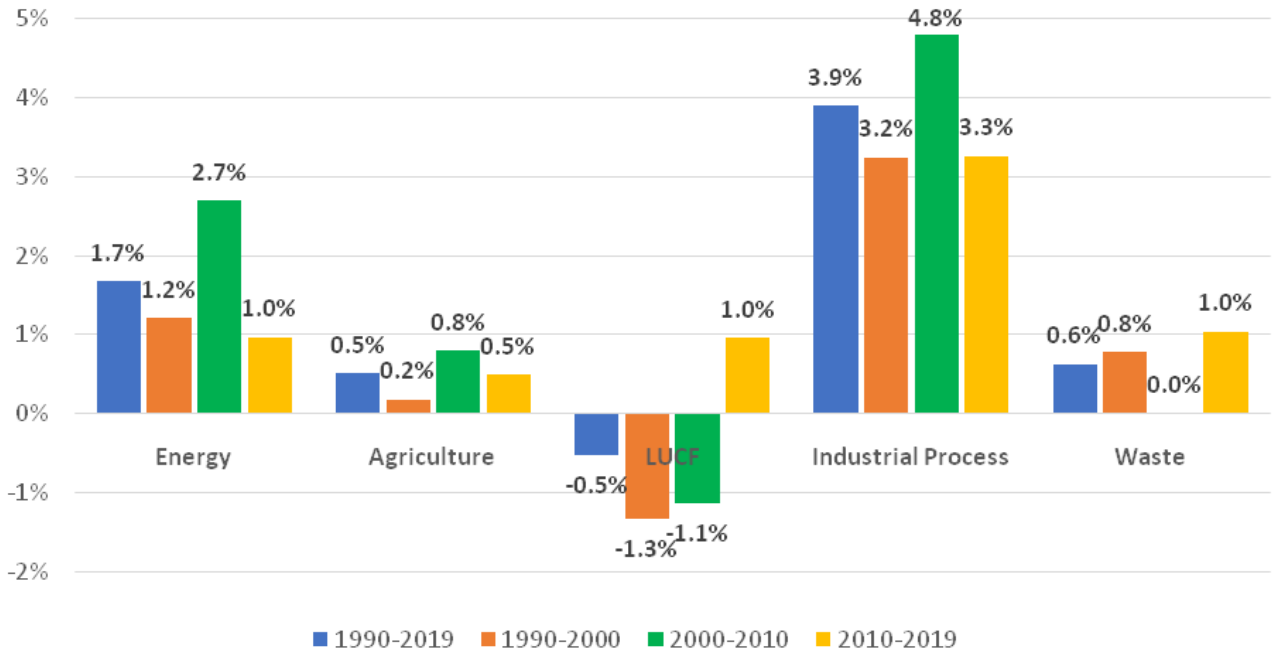
Looking at sectoral greenhouse gas (GHG) emissions' evolution as reported by countries to the United Nations Framework Convention on Climate Change (UNFCCC), agriculture sector emissions have not increased significantly in the last 30 years. In fact, between 1990 and 2019, agricultural emissions grew 15.8 percent (measured in $MtCO_2$eq.), while emissions from land-

use change and forestry (LUCF) fell 14.1 percent during the same period. In the meantime, emissions from industrial processes, energy, and waste grew 203 percent, 62.0 percent, and 19.9 percent, respectively, so the relative share of agriculture and LUCF in total GHG emissions has dropped in the last three decades.

Agriculture's share of global GHG emissions fell from 15.4 percent in 1990 to 11.6 percent in 2019. Likewise, the share of LUCF fell from 5.9 percent to 3.3 percent over the same period, while the energy and industrial processes sectors increased their respective shares from 71.5 percent to 75.6 percent and from 3.1 percent to 6.1 percent between 1990 and 2019.

While the agriculture sector emissions exhibited a downward trend in the last decade, the land use change sector reversed its downward trend, increasing its emissions by 1.0 percent per year during that period, which calls for a greater focus on the subject. However, the industrial processes (3.3 percent per year) and energy (1.0 percent per year) sectors continued to account for most of the annual growth in emissions between 2010 and 2019.

Figure 1.2: Evolution of global GHG emissions by sector* ($MtCO_2eq.$), 1990–2019



Source: Author based on CAIT data 2022.
Note: *Cumulative annual growth. $MtCO_2eq$ = metric tons of CO_2 equivalent.

Thus, even with global food production growth rates exceeding 83 percent between 1990 and 2019,[2] agriculture and LUCF increased their GHG emissions by only 7.5.[3] This marked improvement in agricultural productivity and in the use of more environmentally sustainable production systems made it possible to improve environmental efficiency, substantially reducing emissions per unit of product (Smith, Bustamante, and Ahammad 2014; Viglizzo 2021). Obviously, this

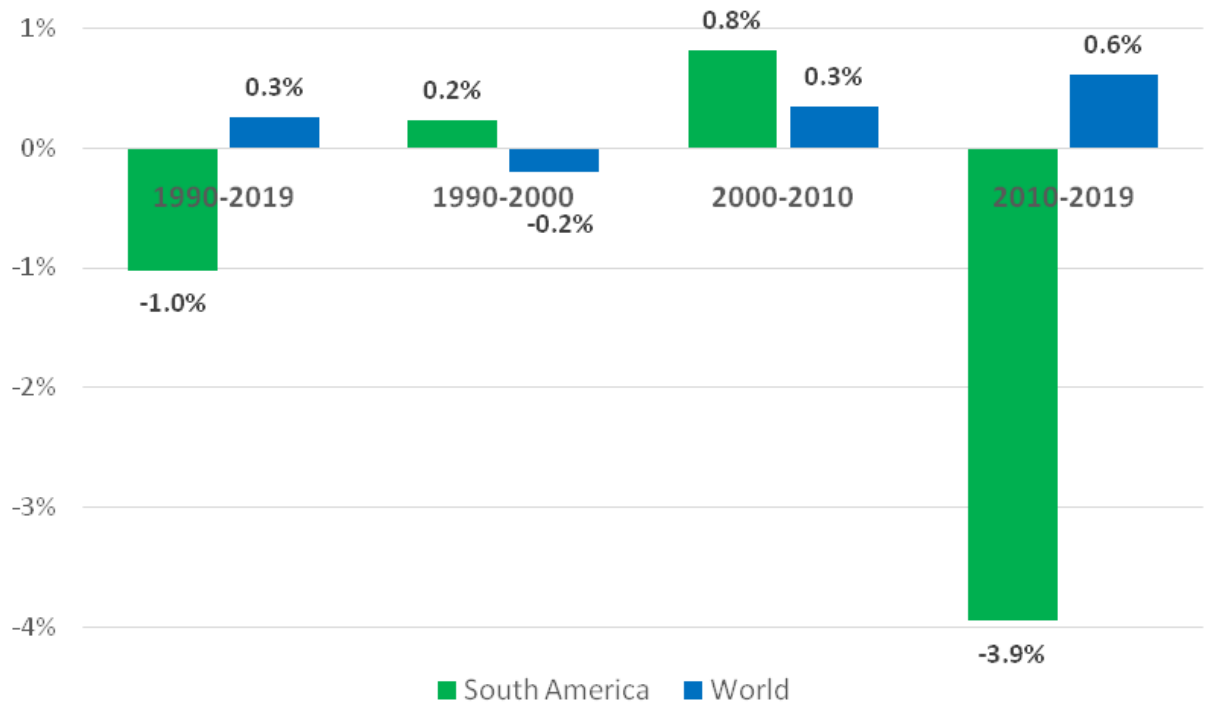
[2] Gross Production Index. See FAOSTATS https://www.fao.org/faostat/en/#data

[3] World food production has doubled since 1960, while land use only increased 10–15 percent in that period (OECD 2021).

performance does not exempt agrifood systems from continuing to improve existing sustainability indicators and accelerating the use of environmentally friendly production systems, but it does reveal their substantive advances.

In this regard, South America's indicators are interesting. The share of the region's emissions in agriculture and LUCF fell by 1 percent annually accumulated since 1990, while global emissions from these two sectors rose by 0.3 percent per year in the same period. Remarkably, this was achieved with growth rates of agricultural production 30 percent higher than the world average (108 percent versus 83 percent between 1990 and 2019).

Figure 1.3: Evolution of agriculture and LUCF sector GHG emissions* ($MtCO_2eq.$), 1990–2019



Source: Author based on CAIT data 2022.
Note: *Cumulative annual growth. $MtCO_2eq$ = metric tons of CO_2 equivalent.

In view of these figures, the region's commitment to fighting climate change is undeniable, especially since as Non-Annex I members,[4] its countries have no quantitative mitigation obligations within the framework of the Conference of the Parties (COP) (but must report periodically on the state of their emissions and implement domestic policies designed to reduce their emissions and adapt to climate change). Nevertheless, the region must make every effort to honor its environmental commitments, including compliance with its quantitative emission targets.

In particular, South American countries must focus on controlling illegal deforestation. Significant progress has been made, but it is still the target of external criticism. Since 1990, emissions from

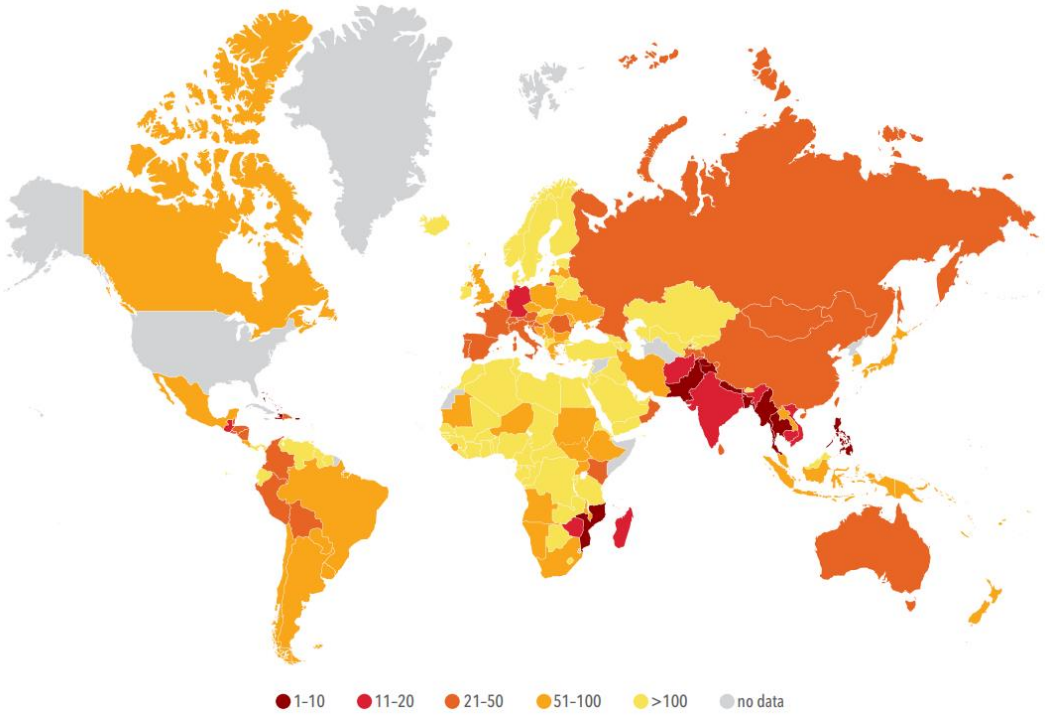
[4] See list of Non-Annex I countries at http://unfccc.int/parties_and_observers/parties/non_annex_i/items/2833.php.

land use change and deforestation in the region have reduced by more than 50 percent (versus 13 percent globally). Yet this progress is insufficient, since the region still accounts for slightly more than 40 percent of global LUCF emissions.

CLIMATE RISK, FOOD PRODUCTION, AND ENVIRONMENTAL POLICIES

Without a doubt, climate change will continue to put pressure on food production, especially affecting regions with more vulnerable ecosystems and a smaller endowment of renewable natural resources.

Figure 1.4: Map of the Global Climate Risk Index, 2000–2019



Source: Global Climate Risk Index 2021.

Efforts to reduce the impact on the environment encourage prompt adaptation and mitigation measures to combat climate change. However, bad policies can exacerbate vulnerabilities, and increase risks and existing inequalities. The same IPCC finds growing evidence of the application of bad adaptive policies. Promoting policies for sustainable development requires inclusive and flexible planning. Given the rush to respond to climate change, the temptation to offer unambiguous and individual tools is high. Even laudable goals can lead to the wrong tools. For example, several countries are beginning to impose barriers to trade for environmental reasons without a solid scientific basis. In particular, these new barriers do not take into account the differential impacts on the environment of different food production systems around the world. These responses are not only inefficient from an environmental point of view, but also threaten

food security since they lead to a reduction in global food production. For example, Beckman et al. (2020) estimated the global impact of implementation of the Farm to Fork (F2F) and Biodiversity Strategies in the European Union (EU). Even in their most conservative scenario, with application of the policies only in EU countries with no restrictions on international trade, an additional 22 million people will suffer food insecurity by 2030. This could rise to 185 million new hungry people if the policy was replicated globally.

Due to the recent increase in global food insecurity indices, any environmental sustainability strategy in agrifood systems must take into account the various trade-offs between environmental, productive, economic, and social results. It is not possible to define a single strategy for environmental sustainability of global food systems; rather, strategies must mutate and adapt to different agroecological, lifecycle, cultural, and economic conditions. Piñeiro et al. (2020) showed that even incentives to promote sustainable practices in agriculture require adaptation to the conditions where they are applied.

Food systems undoubtedly contribute significantly to GHG emissions; reducing them requires more efficient value chains and a reduction in losses and waste. Promoting the development of climate-resilient and productive agrifood systems will require joint efforts (see Chapter 4), enabled by environmentally friendlier production systems and a sufficient endowment of renewable natural resources, which are not evenly distributed around the world.

The IPCC (2022) confirms that several effective adaptation options can reduce climate impacts in different sociocultural, economic, and geographical contexts, although some lack economic viability. Efforts in research, innovation, and technology transfer to generate new basic knowledge to improve productivity, reduce environmental impacts, and increase food systems' resilience worldwide should be a priority.

Inequities in the endowment of resources and the production techniques applied mean that removing unjustified barriers to agrifood trade to facilitate the flow of food surpluses from regions of greater environmental efficiency can reduce the total environmental impact of global food systems. In turn, increasing investment and implementing new green financial mechanisms in these regions will allow more sustainable food production, increasing its availability and improving global food security indicators.

According to the International Food Policy Research Institute (IFPRI 2022), up to US$350 billion per year will be needed to meet climate targets related to agrifood systems. Currently, only about US$20 billion of the globally available green funds are directed to agriculture, forestry, and other land uses (AFOLU) (4.0 percent of total global climate funds). The total funding needed could be obtained from a reprioritization of existing agricultural subsidies (repurposing), which total an estimated US$620 billion annually (Gautam et al. 2022). Thus, it is possible to reform those agricultural support policies that create negative environmental effects (OECD 2021). Since these types of subsidies tend to increase GHG emissions, their redirection toward research and adoption of sustainable technologies and practices should be promoted (FAO, IFAD, UNICEF,

WFP, and WHO 2022).[5] Furthermore, given existing differential environmental impacts of agri-food systems around the world, relocation of those same economic resources to countries with the best environmental performance would be the optimal solution (Martin et al. 2022).

THE ROLE OF SOUTH AMERICA'S AGRIFOOD SYSTEM IN GLOBAL ENVIRONMENTAL SUSTAINABILITY

Food systems in Latin America and the Caribbean (LAC) region are crucial to global food security, and LAC is quickly becoming the world's largest net agrifood exporting region. Currently, LAC represents 36 percent of the world's net food exports, covering more than one-third of the global food deficit, and this share is projected to grow in the future. However, South American countries themselves, account for more than 85 percent of this regional surplus (OECD-FAO 2022).

South America is also a relevant player in the global supply of renewable energy from biomass. The region accounts for 26.6 percent of world ethanol production and 17.6 percent of biodiesel. The South America share of global biofuel production is expected to continue growing until 2031, 6.5 percent higher for ethanol and 7.3 percent higher for biodiesel (OECD-FAO 2022).

Thanks to these levels of production, South American countries contribute significantly to the mitigation of climate change, reducing GHG emissions by cutting production of fossil fuels—by 27 percent in Brazil for gasoline and 11 percent for diesel, and by 12.5 percent for diesel in Argentina.

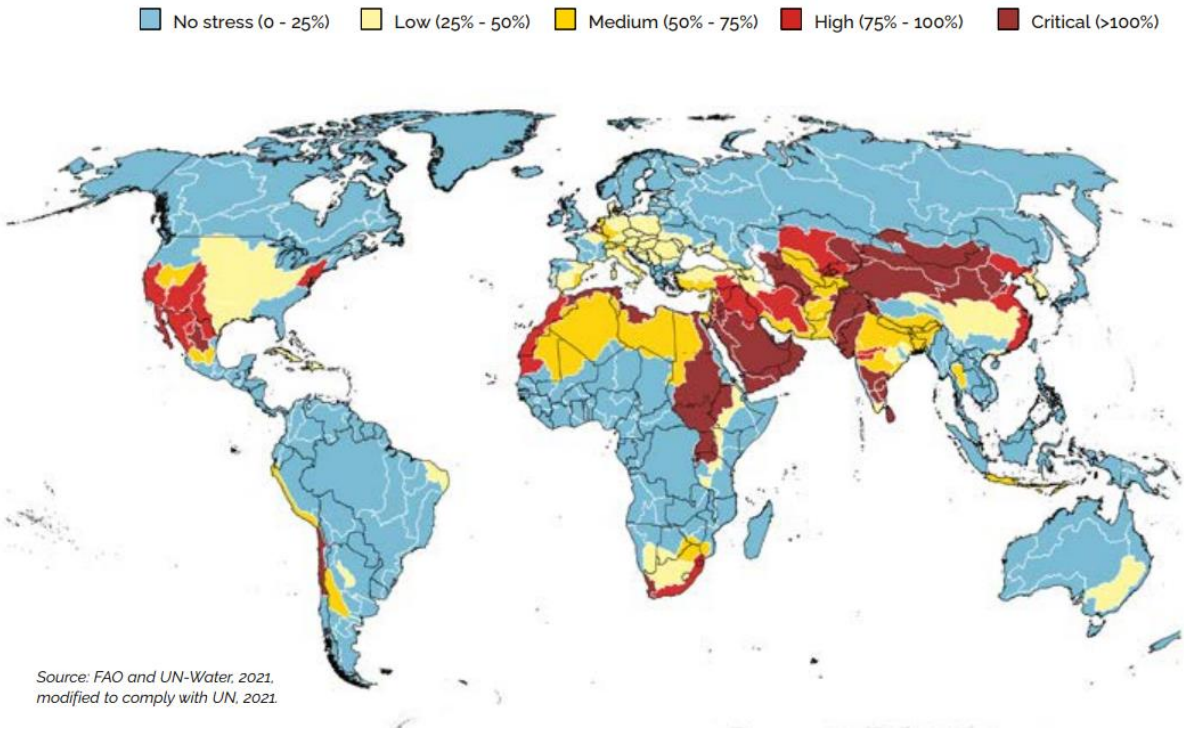
Even with significant levels of internal use of fuel, South America has large export surpluses. Currently, only Argentina and Brazil, account for 21.3 percent of world trade in ethanol and 21.1 percent of biodiesel. As with production, the preponderance of South America countries in the global trade of ethanol and biodiesel will continue to increase, accounting for 24.4 percent and 22.0 percent of global exports, respectively, by 2031 (OECD-FAO 2022).

This substantial presence in global agrifood markets is achieved through a strategy of sustainable intensification of production (it´s especially appreciable in the Southern Cone countries of Brazil, Argentina, Paraguay, and Uruguay), which links the endowment of natural resources with technological innovation and competitive business models to achieve continuous productivity improvements with good indicators of environmental sustainability.

In this sense, South America has 31 percent of the world's renewable water endowment, but uses less than 2 percent of this for agriculture, well below the world average for water extraction (above 7 percent). Hence its levels of water stress are very low relative to other regions (FAO 2021).

[5] Also see IFPRI 2020, Chapter 2.

Figure 1.5: Water stress level of all sectors by main basin, 2018



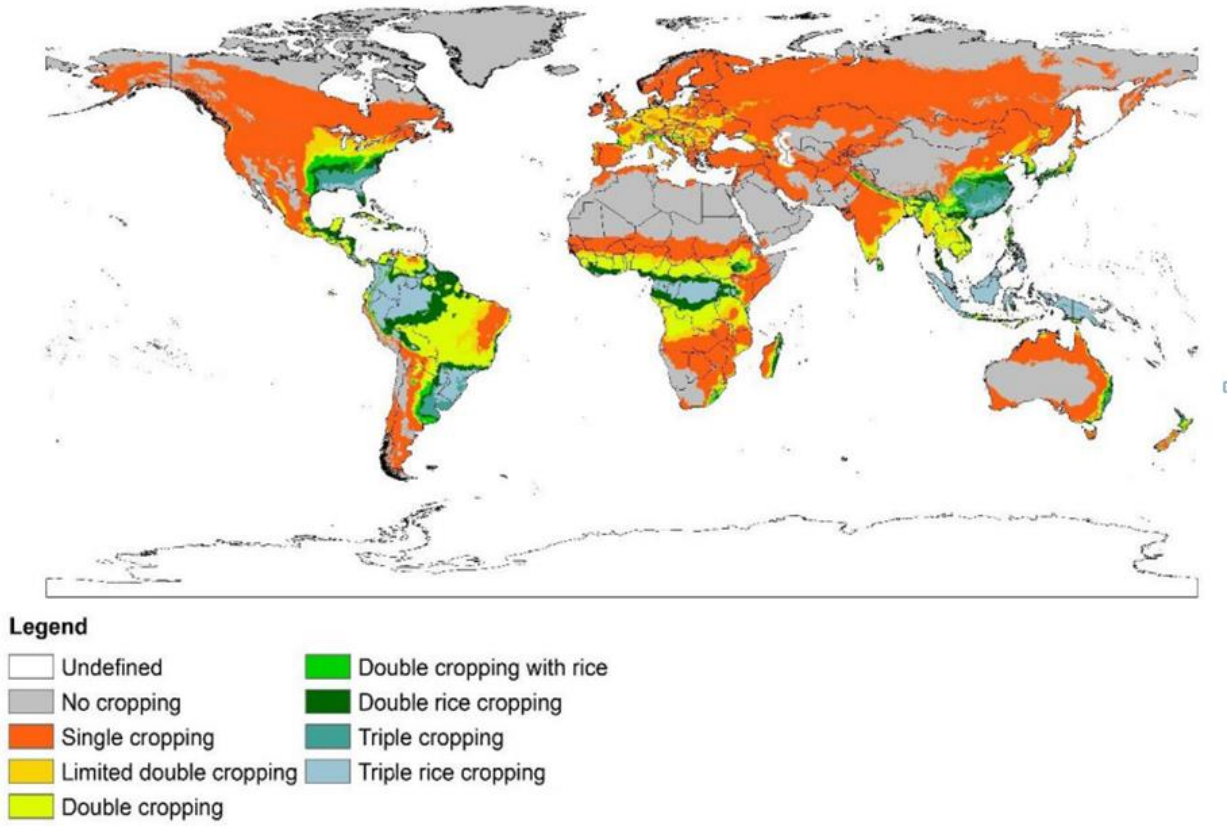
Source: FAO 2022.

South America has more than 20 percent of the land surface suitable for sustainable agricultural production worldwide (FAO 2011).[6] At the same time, a large proportion of the region's area is projected to be used for multicropping under rainfed production systems in the future (FAO 2021).[7]

[6] Understood as land with high agroecological potential that is neither forested nor protected, and with a population density of less than 25 per hectare.

[7] In areas where growing periods are long enough to allow more than one crop to grow during the same year or season, yields from a single crop do not reflect the full potential of the total time and space available per unit of land area for rainfed production.

Figure 1.6: Multicropping regions for rainfed agriculture by 2080



Source: FAO 2021.

Along with these differentials in the endowment and use of natural resources for sustainable food production, the application of sustainable agricultural practices also differs, which allow projecting low emission rates per unit of product compared to other regions of the planet. Only some regions of the world have managed to increase productivity through a sustainable intensification strategy. The use of conservation technologies can do much to improve the environmental sustainability of food systems.[8]

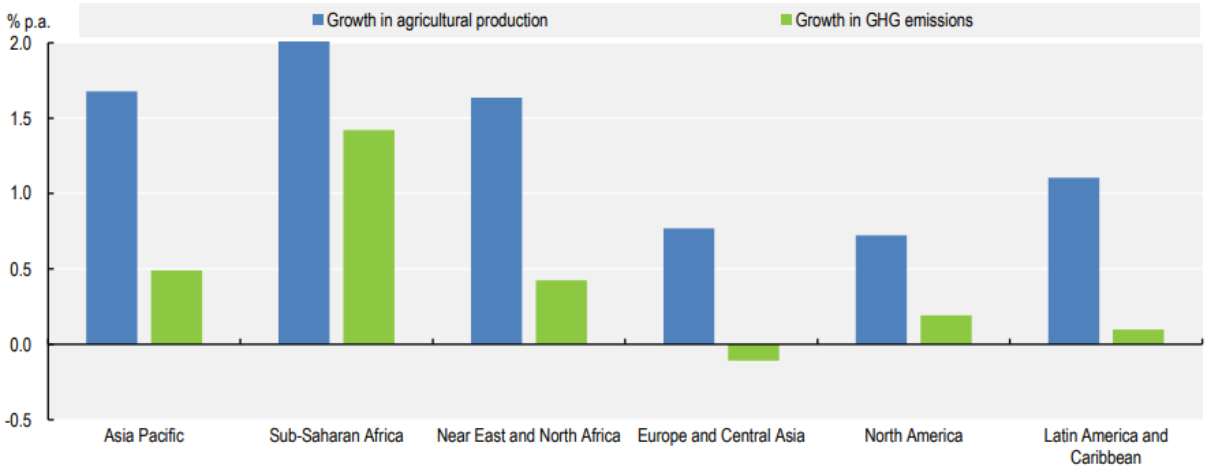
South America is projected to be one of the most sustainable regions for food production. OECD-FAO (2022) estimates that GHG emissions from food production in the region will grow by an accumulated annual 0.16 percent, well below the 0.41 percent evolution of global emissions. Only Europe and Central Asia are projected to perform better, with a drop in agricultural emissions.

This reveals very good indicators in terms of efficiency. While Europe and Central Asia propose a reduction in emissions of 0.14 percent per year for each percentage point of increase in agricultural production by 2030, emissions in LAC will grow only 0.08 percent per year, almost

[8]For example, less than 10 percent of the total world crop production is under the "zero tillage management strategy," and only five countries (United States, Brazil, Argentina, Canada, and Australia) represent 92 percent of the total (FAO 2011).

neutral.[9] All other regions will more than triple their emissions for each percentage point of production growth, reflecting the greater environmental efficiency of LAC's agrifood systems.

Figure 1.7: Annual change in agricultural production and direct GHG emissions, 2022–2031



Source: OECD-FAO 2022.

Note: Projected annual growth in direct GHG emissions from agriculture together with annual growth in the estimated net value of production of covered crop and livestock products (measured in constant 2014–16 US$).

Even more relevant is that the region has great environmental efficiency with very low levels of estimated producer support (PSE).[10] As revealed by the Inter-American Development Bank's (IDB) Agrimonitor,[11] in 2020 the PSE was less than 5 percent in all four countries surveyed in the region (Argentina, Brazil, Chile, and Uruguay). Only Colombia has a PSE level higher than 10.1 percent, quite similar to the United States' PSE of 11.6 percent, although still far from the EU's 19.2 percent.

Undoubtedly, these low levels of producer support leave a wide margin to improve the productive and environmental performance of South America's agrifood systems through public policy. These indicators are presented as an opportunity to channel green funds and other economic and financial tools available in other regions toward the agrifood systems of South American countries. The starting point is auspicious, since this region is the largest contributor, current and projected future, to mitigating the world food deficit and to the global demand for biofuels. Most importantly, this contribution is made with less environmental impact and resource use than in most of the world, with very low levels of producer support.

This success is due to the region's long experimentation with innovations and policy approaches to improve environmental efficiency in food production. The sustainable intensification model

[9] The OECD-FAO databases do not allow disaggregating data at the country level in this case.

[10] The Producer Support Estimate (PSE) is the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farmgate level, arising from policy measures that support agriculture, regardless of their nature, objectives, or impacts on farm production or income. PSE% indicates the percentage of producers' revenue due to the support provided by agricultural policies, or in other words, the PSE as a share of gross farm receipts (including support).

[11] See https://agrimonitor.iadb.org/results-by-indicator?tab=agriculture

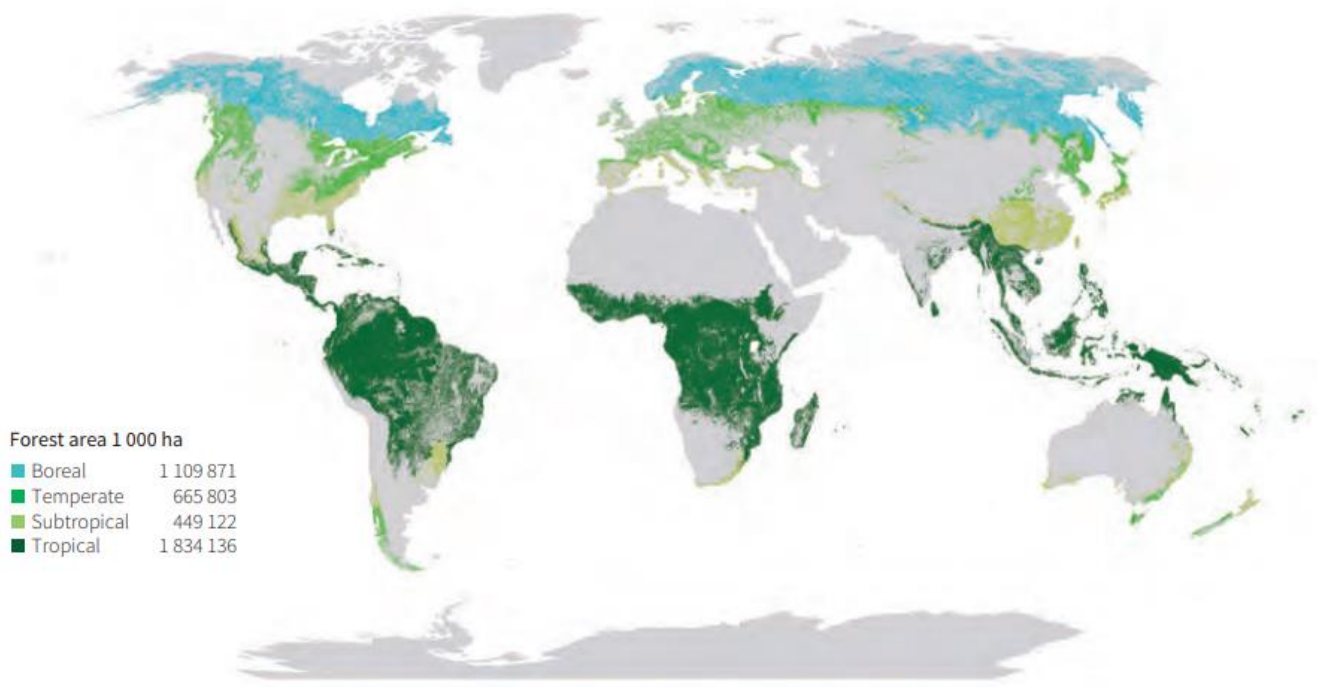
includes precision agriculture, intercropping, green manures/cover crops, no-till, organic inputs, silvopasture, integrated pest management, improved pastures, stress-tolerant crops, and adequate management of grazing, fertilizer, and water use.

LAND USE AND DEFORESTATION: CHALLENGES AND OPPORTUNITIES FOR SOUTH AMERICA

Controlling illegal deforestation is the main sustainability challenge for regional agrifood systems. However, LAC has not only one of the largest forest areas on Earth, but its forest cover comprises almost 50 percent of its land area, much higher than the world average (30 percent, or just over 4,000 million hectares). Only the Small Island Developing States (SIDS) region has a higher proportion of forest area.

As with other natural resources, forests are not distributed equally among the world's regions. Europe accounts for 25 percent of the world's forest area,[12] followed by South America (21 percent), North and Central America (19 percent), Africa (16 percent), Asia (15 percent excluding the Russian Federation), and Oceania (5 percent).

Figure 1.8: Global distribution of forests by climatic domain



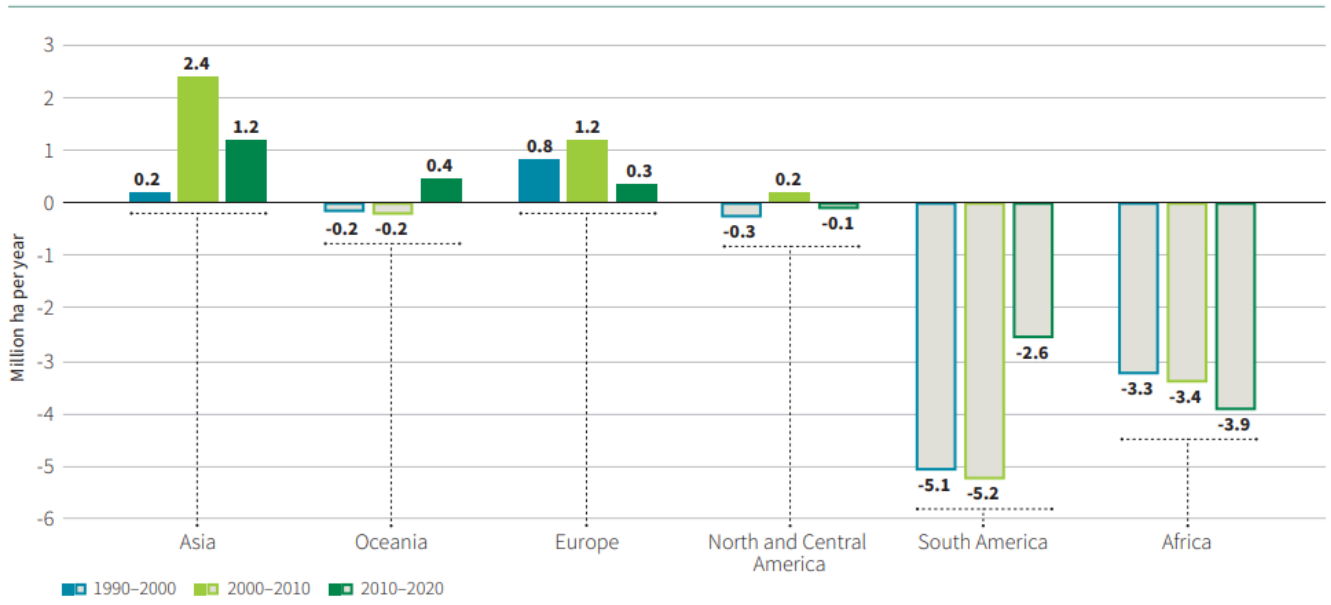
Source: FAO 2020.

[12] Actually, 80 percent is in the territory of the Russian Federation, mostly in its Asian territory. Europe only has 5 percent of a total of 202 million hectares.

Taking into account expansion of the forest through regeneration and afforestation, net annual loss of forest cover between 2010 and 2020 is estimated to be 4.7 million hectares/year compared to 5.2 million between 2000 and 2010 and 7.8 million between 1990 and 2000 (FAO 2020).

An estimated 420 million hectares of forest have been lost worldwide through deforestation since 1990, but the rate of forest loss has declined substantially. In the most recent five-year period (2015–2020), the annual rate of deforestation was estimated at 10 million hectares, 20 percent lower than the previous five-year period. In this last period, South America managed to reduce its annual deforestation rate by one-half.

Figure 1.9: Annual forest area net change, by decade and region, 1990–2020

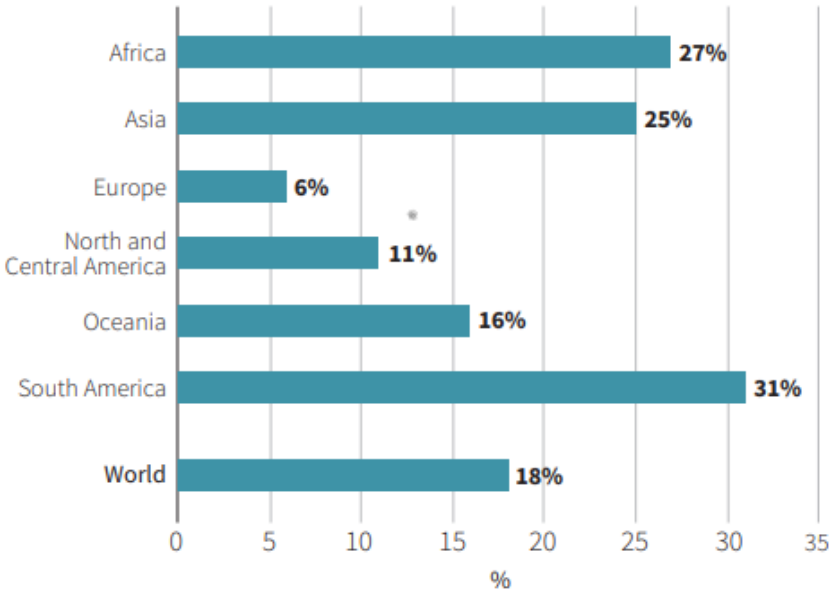


Source: FAO 2021.

Undoubtedly, combating illegal deforestation is one of the main challenges for the region. An estimated 726 million hectares of forest are in protected areas worldwide. South America has the highest share of its forest cover under protection (31 percent). Excluding the Russian Federation, Europe only has 39 million hectares under environmental protection regimes, with one of the smallest proportions in the world of forested territory under protection (20 percent).[13] North America has 69 million hectares under protection (only 10 percent of its forested area).

[13] This figure rises to 57 million hectares if the Russian Federation is included, but would only cover 6 percent of total forest area.

Figure 1.10: Proportion of forest in protected areas by region, 2020



Source: FAO 2021.

The area of forest under long-term management plans is increasing in all regions. Globally, this area has grown by 233 million hectares since 2000, reaching 2.05 billion hectares in 2020. Plantation forests cover about 131 million hectares, or 3 percent of the global forest area. Again, the highest share of plantation forest is in South America, where this forest type represents 2 percent of total forest area.

At the same time, it is estimated that the total forest mass information of the world is 557 m^3 billion. Growing stock per unit area is highest in the tropics, led by South America with 33 percent of the world total. The average growing stock per unit area is higher in naturally regenerating forest (140 m^3 per hectare) than in planted forest (110 m^3 per hectares). More than 96 percent of the growing stock in South America comes from the natural regeneration of forests. This region also has the highest biomass stock per hectare, which has been increasing since 1990 to exceed 230 tons per hectare, 50 percent higher than the world average.

This forest capital means that the region possesses 21 percent of the global carbon stock in forest soils (forests, wood, and soils). Only Europe surpasses it at 25 percent (although the Russian Federation alone accounts for 21 percent of this). South America also has almost 33 percent of the global accumulated carbon in living biomass. Therefore, the region not only has the largest forest area on the planet, the largest stock of biomass per hectare, and the best indicators of growing stock, it also protects the largest proportion of forest area.

This does not justify the high levels of illegal deforestation still existing in South American region but does show its commitment to environmental sustainability. It should also be noted that within the framework of land use laws that allow the protection of vast forested areas, a margin exists for the legal reduction of forests in some parts of South America. Reducing legal deforestation

in these areas will require the right incentives. Trade barriers or inefficient production schemes with little adaptability to LAC countries will be ineffective tool at minimizing legal logging.

Some 257 million hectares of forests in South America are under different environmental protection schemes. The region has made significant progress in the development of tools and instruments to guarantee that exported agrifood products are not produced on land that underwent illegal deforestation 2021). FAO (2020) in its forest report recognizes a high application of existing standards, certification schemes, and traceability systems in the Southern Cone Countries to detect illegal deforestation and prevent the commercialization of forest products.

Within this framework, developed countries must recognize efforts in South America to protect forests. At the same time, the developed countries must become more aware of and respect local land use planning laws, which in some cases leads to legally allowing a relative loss of forest area in some countries of South America. Ignoring this information could undermine the development potential of these countries.

Undoubtedly, border barriers to protect against illegal deforestation are inefficient, not only because they have not been able to reduce deforestation, but because they are unaware of local regulations and threaten the development possibilities of less advanced countries. Even worse, if these policies were to succeed, they could undermine global food security. South American countries have proven instruments to guarantee zero illegal deforestation incorporated. Recognizing their territorial regulations and requiring the use of existing traceability schemes seems to be the most appropriate policy.

Even more, reducing legal deforestation will require economic and financial incentives that reward farmers for the ecosystem services of the forests found on their farms. Many countries advancing with trade measures and others border barriers are, in turn, the ones that allocate the greatest economic resources to subsidize their producers. From a global point of view, directing some resources to generate compensation for ecosystem services outside their borders would be more efficient.

GLOBAL RESPONSES TO GLOBAL CHALLENGES: THE IMPORTANCE OF TRADE

Ensuring world food security and tackling the global challenges imposed by climate change are two sides of the same coin. They require joint action at a global level in search of greater efficiency. Promotion and intensification of technologies that increase agricultural productivity and reduce environmental impacts is one of the central elements. Reducing loss[14] and waste[15] and streamlining supply and production chains can also be very useful. However, this will not be

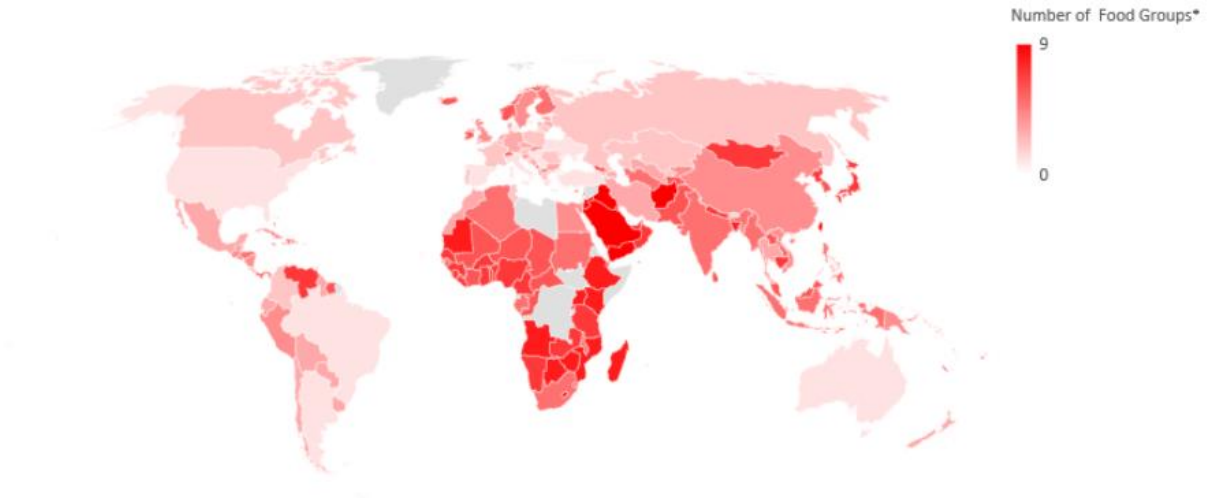
[14] Reaches up to 14 percent of global production (FAO 2019).

[15] Buzby, Wells, and Hyman (2014) estimated food losses of up to 31 percent of the total supply at the retail and consumer level in the United States in 2010.

enough to balance food deficits and achieve environmental efficiency. Only trade can offset the growing imbalances between countries.

Today, more than 20 percent of the calories consumed worldwide come from traded products. It is foreseeable that the relevance of trade will increase in the immediate future, since many countries' demand is increasing not only to cover their food deficits, but also to achieve more diversified diets (FAO 2018).

Figure 1.11: Number of food groups with insufficient local production, adjusted for food loss and waste



Source: Laborde, Piñeiro, and Swinnen 2022.

Given the observed regional imbalances in the endowment of natural resources for sustainable food production, trade can improve global environmental indicators. This is particularly important for countries with limited resources, which are highly dependent on food imports for food security and because imports help reduce overexploitation and degradation of resources, particularly soil and water.

Despite these positives attributes agrifood and bioenergy trade has faced restrictions, often exacerbated by crises, such as the COVID-19 pandemic. Undoubtedly, the Russia-Ukraine war has generated greater pressure in food and energy markets, where some exporting countries have applied export restrictions (Laborde and Mamun 2022).[16]

However, trade restrictions are not motivated by food safety issues alone; more and more frequently, new border barriers associated with environmental issues are observed, mostly without solid scientific foundation. The imposition of unilateral environmental standards and various border requirements, with limited visions of sustainability, is putting pressure on national agrifood systems and endangering global food security (see Chapter 5).

[16] IFPRI's live tracker. https://www.ifpri.org/project/covid-19-food-trade-policy-tracker

Some countries and blocs are advancing rapidly with initiatives that contain partial visions and only respond to national interests, undermining global needs. It is the responsibility of governments to design these policies carefully, based on science and balancing the objectives of GHG mitigation, care for natural resources, world food security, and farmers' livelihoods, particularly in developing countries (OECD 2021).

The application of sustainable production technologies and promotion of good agricultural practices are critical to achieving these objectives. It is essential to provide technical and financial support to producers to allow them to visualize sustainability and profitability as complementary interests (Piñeiro et al. 2020). This is especially relevant in developing countries, where international demands are putting excessive pressure on farmers' livelihoods.

Improving public-private coordination mechanisms is essential to achieve better indicators of environmental sustainability in food production. On the one hand, national research and innovation systems must be strengthened and realigned with the new demands (Trigo and Elverdin 2019). On the other, incentives must be generated to encourage more environmentally efficient production systems and practices. Policy design should not lose sight of the potential trade-offs between caring for the environment, the impact on productivity, and economic and social sustainability.

Environmental standards are presented as an opportunity to improve traceability and transparency in the agro-industrial value chain. The proliferation of environmental certification schemes, seals, and labels, [17] both public and private and with the most diverse interests, has made the situation more complex and confused producers and consumers.

Although most are still voluntary, many verification schemes of certain environmental sustainability standards in agricultural production serve as market access barriers (Papendieck and Elverdin 2021). Although some offer differentiated prices for certified products, the variety of seals for each market, their high economic costs of implementation, and the technical difficulties that new processes entail, together with an unattractive rate of return, discourage many producers.

Trade is critical to achieving global food security and mitigating the environmental impact of agrifood systems. For this, there must be tools that promote trade incentives for the most environmentally efficient agrifood systems, avoiding discrimination and the imposition of unjustified barriers to trade (see Chapter 4).

Expanding the penetration of more sustainable agricultural technologies and techniques through trade and implementing environmental standards will require progress in the simplification and harmonization of those schemes with a proven impact on the environment. Including this issue on the international debate agenda is a priority. In this sense, the scope of the G-20 and the World Trade Organization (WTO) would seem to be the most appropriate.

[17] More than 500 labels were created between 1970 and 2012 (OECD 2021).

CONCLUSIONS

The production and supply of agrifood products comprises a complex and changing network of actors and sectors that encompasses multiple dimensions and faces simultaneous challenges. A transversal and integrated vision of the global agrifood system would create awareness about synergies and trade-offs across the different dimensions and challenges (OECD 2021).

Old and new demands have generated increasing political and social pressure on agrifood systems. In a framework dominated by the need to generate rapid actions to mitigate climate change and by the concern that the fight against hunger in the world is being lost, all countries have the responsibility to design transparent policies that integrate the impacts on the world food supply, pursue greater global environmental efficiency, and improve the livelihoods of small farmers. Any policy should keep in mind the potential trade-offs between these simultaneous challenges.

To further complicate the situation, it is not efficient to globally impose inflexible precepts specified for certain productive systems or agroecological regions. Agrifood systems present great heterogeneity around the world, particularly in primary production, the main focus of intervention in the value chain of agrifood systems.

This complexity reveals the impossibility of generalizing or speculating on potential trade-offs and requires policymakers to make decisions based on scientific evidence, avoiding hypothetical impacts and unjustified social pressure. The urgency of environmental and food security issues requires honest discussions, with solid scientific support and under the principle of common but differentiated responsibilities.

Scientific advances have made it possible to gain environmental efficiency in agricultural systems. But they have also made it possible to better understand the lifecycles of anthropogenic emissions and, over the years, to reduce some of the previously estimated emission indices in the agriculture sector (as reflected in the updated emission factors calculated in the IPCC Guidelines of 2006 and 2019).[18]

Despite having better sustainability indicators than most other regions, South American still needs to improve the performance of its agrifood systems. The private sector, governments, and civil society are committed to this. But at the same time, the rest of the world's countries must recognize the environmental efficiency of their own production systems.

Development of the global food system has not been globally coordinated, and many countries have developed unilateral public initiatives that involve changes in policies related to food production and consumption. In many cases, these policies have been driven by social demands, which are not always properly justified. More accurate information remains to be generated in

[18] For example, in Argentina, the update of the nitrous oxide emission factors of the IPCC Guidelines 2019 reduces the calculation of emissions of this gas by 46 percent relative to the 2006 methodology (Said, Beltrán, and Amábile 2022). It is worth clarifying that the sources of nitrogen emissions used for the calculation were: (1) synthetic fertilizer, (2) crop residues, (3) mineralization from soil organic matter, (4) urine and dung from grazing animals, and (5) organic fertilizer.

the midst of growing gaps between public perception and existing evidence. [19] Faced with these new demands, and as policy proposals become more complex, domestic policies must be transparent, based on science, nondiscriminatory, open to trade, and aware of potential trade-offs.

Trade policy instruments are no exception. International trade plays a leading role in achieving food security, and to promote natural resource efficiency and conservation and environmental sustainability from a global perspective. As South America plays a preponderant role in this regard, the region must advocate for fair and fluid trade in agrifood products, free of unjustified barriers.

Any implementation of trade-related mitigation measures will be insufficient if not associated with financial support. Technical and technological progress has substantially reduced the impact of agricultural production on the environment in terms of unit of product. A lot of room remains to continue progressing on this path. Although this depends on the fact that more green funds could be channeled to global food system. The magnitude and speed of this transformation will depend on the amount of these funds and whether they are allocated to the regions that have demonstrated greater efficiency in terms of increased production and environmental sustainability.

Differences in policy approaches around the world clearly respond to disagreements about the real impacts on the environment, as well as to the divergent interests and relative importance that each country gives to different dimensions of its agrifood system. But policymakers should be cautious: since climate change has cross-border effects, its implications and solutions must be global.

As expressed by Lamy et al. (2022), no forum has the express purpose of discussing the sustainability of agrifood production with a holistic vision of its impact on the environment, ecosystems, and the use of natural resources. Contrary to what the world requires, food security, climate change mitigation, and the impacts on the livelihoods of small farm producers are subject to partial and incomplete national solutions. The need for greater public-private cooperation to provide a joint and balanced response between countries is increasingly urgent.

[19] For example, while 88 percent of scientists agree that genetically modified foods are safe to eat, only 37 percent of the broader US public thinks so (OECD 2021).

Box 1.1: Main challenges and proposals

- Political efforts in South America must be directed at counteracting unwarranted criticism. In particular, South American countries must seek to consolidate common strategies in international forums.
- Given the importance of agrifood trade for development of the region, South American countries need to demand greater transparency. Inclusion of trade issues in the environmental agenda, and vice versa, should be a priority. Harmonization of certification schemes, nontariff barriers, and other unjustified trade obstacles must be included.
- The region must continue advancing its strategy of sustainable intensification by channeling funds to continue improving the environmental efficiency of regional agrifood systems. In particular, farmers need to be financially compensated for the ecosystem services they provide.
- To continue generating scientific information that justifies the relative advantages of South American agrifood systems, the region must work on calculation methodologies alternative to those of the IPCC. Development of a specific work program with regional organizations such as the Inter-American Institute for Cooperation on Agriculture (IICA), the Alliance of Bioversity International (CIAT), and FONTAGRO should be put on the agenda.
- Finally, efforts to eradicate illegal deforestation are still needed. Better monitoring and traceability systems are necessary to demonstrate zero deforestation incorporated in commercialized products. At same time, South American countries must work together so that their territorial regulations on forests are respected globally.

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CHAPTER 2:

CHALLENGES OF AGRIFOOD SYSTEMS AND THEIR IMPACT ON FOOD TRADE: AN ANALYSIS OF THE NUTRITIONAL QUALITY OF DIETS IN SOUTHERN CONE COUNTRIES

Nieves Pascuzzi

INTRODUCTION

Food production is a complex and varied set of activities, both agricultural and nonagricultural, involving an increasing number of sectors and actors that influence the way food is produced, processed, distributed, and consumed. New dimensions are being considered when food is produced, traded, and exported. The impact of agrifood systems on the environment and the well-being of farmers stand out, as well as concerns about the safety and nutritional quality of food. Many of these new concerns are being explicitly included in regional trade agreements (RTAs).

Food safety has long been a concern in food production chains, and the issue was elevated during the COVID-19 pandemic, when new requirements and restrictions were imposed to guarantee people's health. At the same time, concern about the nutritional quality of food and its relationship with noncommunicable diseases (NCDs) is rising.

New trends in global agrifood systems—and in particular in South America's Southern Cone countries[20] plus Colombia, Peru and Ecuador—are emerging as well. The speed and magnitude of changes in demand for international food trade especially challenge developing countries that sell their agrifood surpluses in external markets.

This chapter focuses on agrifood systems from a comprehensive point of view that encompasses not only supply (food supply chain) and demand (food environment and consumer behavior), but also the links between nutritional quality and population health as well as with international trade.

Higher consumption of processed food has resulted in high levels of overweight and obesity in most of these countries studied. Consequently, their governments have enforced regulations related to public health without considering the impact on production and trade. A global approach is needed to ensure an adequate balance between health and trade for present and future generations.

[20] Southern Cone Countries includes Argentina, Brazil, Uruguay, Paraguay and Chile.

The global interdependence of agrifood systems requires countries to work together. Cross-sectoral nutritional strategies should be designed and implemented from global to local level and vice versa. At a global scale, multilateral organizations should prioritize attention on this interdependence, given the role of international food trade in global food security.

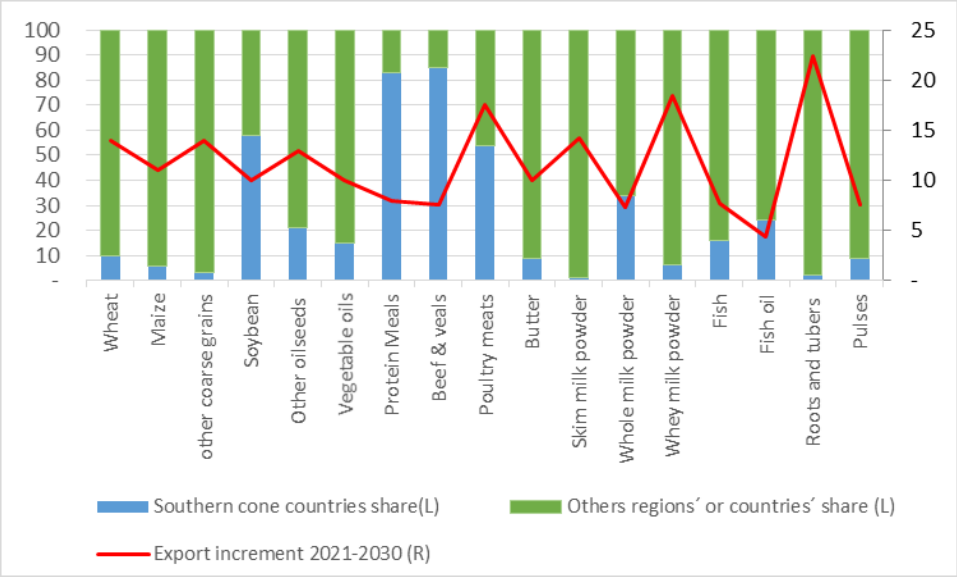
AGRIFOOD SYSTEMS: FOOD SAFETY AND NUTRITIONAL QUALITY

LAC AGRIFOOD SUBSYSTEM: SUPPLY

One-fifth (20 percent) of all food consumed worldwide is imported (Piñeiro et al. 2021). In the last two decades, the Latin American and the Caribbean (LAC) region has contributed almost 40 percent of all net food exports, becoming a main provider of food to the rest of the world, mainly to countries and regions with a net food deficit. According to the OECD-FAO Agricultural Outlook 2021–2030 (OECD-FAO 2021), expansion in production will allow LAC to remain an important global exporter of maize, soybean, beef, poultry, fish meal, fish oil, sugar, and ethanol until 2030. It will provide 30 percent of total exports for the next 10 years, 70 percent of which is accounted for by Southern Cone countries, mainly Brazil, Argentina, and Chile.

The Southern Cone countries will have an important role in global food trade, significantly contributing to achieving food security and nutrition, mainly in Asia Pacific, Africa, and LAC. World food exports are projected to increase by 11.5 percent by 2030, considering all food products analyzed in the OECD-FAO Agricultural Outlook. During the period from 2021-2030, the Southern Cone countries' contribution to exports will range from 10 percent (for maize, wheat, vegetable oils, fish), to 20–35 percent (other oilseeds, whole milk powder, fish oil), to higher than 50 percent (soybean, protein meals, beef and veal, fish and poultry meat) (Figure 2.1).

Figure 2.1: Increments in food exports and Southern Cone countries' contribution, average over 2021–2030 (%)



Source: OECD-FAO 2021, OECD Agriculture statistics (database).

When the agrifood system, food trade, and healthy foods are examined jointly, the focus should be primarily on the food and beverage industry, and mainly on processed and ultra-processed foods (see definition in Box 2.1). This chapter analyzes this link, along with its economic and social relevance and given changes in domestic demand and international trade over recent years. We study Southern Cone countries plus Colombia, Ecuador and Peru

The chapter uses information provided by TradeMap for products categorized at the four- and six-digit level to analyze net trade balances (exports minus imports) from 2017 to 2021. LAC countries have both net surplus and net deficit balances. Surplus trade balances are mainly seen in Southern Cone countries plus Colombia, Ecuador and Peru that are net exporters, while deficits are mostly explained by Central American countries' imports of raw materials as well as processed and ultra-processed foods.

A similar situation is seen when focusing on specific products of Argentina, Brazil, Paraguay, Uruguay, Chile, Colombia, Ecuador and Peru (Table 2.1). Food products with a positive net trade balance are mainly prepared and preserved meat and fish as well as vegetables and fruits, aggregated to the four-digit level. Products disaggregated to the six-digit level are mainly sugar confectionary, sweet biscuits, and soft drinks, which have high consumption rates in destination countries. Argentina and Brazil are the main contributors to positive trade balances, as are Colombia and Peru, to a lesser extent.

Unlike raw materials or foodstuffs with lower added value, which are mainly exported to Asia Pacific and Africa, other trade remains within the region. South America is the main destination

for Southern Cone countries' food product exports, followed by Central America and the United States of America.

Table 2.1: Trade balance in Southern Cone countries plus Colombia, Ecuador, and Peru (thousand US$), 2017–2020

Product group and NCM	2017	2018	2019	2020	2021
Prepared or preserved meats (16.02)	1,083,745	971,842	950,012	961,028	1,159,882
Prepared or preserved fish (16.04)	868,545	975,651	960,062	903,109	1,023,523
Vegetables, fruits, nuts (20.01)	150,459	161,737	161,439	170,795	183,453
Confectionary sugar (17.04.90)	155,158	138,546	130,087	139,104	158,320
Jams, fruit jellies, marmalades (20.07)	179,015	174,023	176,179	155,194	153,292
Sausages and similar meat products (16.01)	85,160	74,651	87,791	90,164	151,308
Tomatoes (20.02)	9,624	-1,329	58,977	52,442	56,491
Sweet biscuits (19.05.31)	21,012	9,324	12,327	20,578	19,340
Non-alcoholic beverages (22.02.90)	7,327	n/d	n/d	n/d	n/d
Soups and broths (21.04)	-3,204	2,122	113	8,238	16,670
Extracts of meats, fish, and crustaceans (16.03)	22,729	26,411	27,110	26,934	14,911
Waters with added sugar (22.02.10)	-141,258	-136,819	10,838	9,781	**3,407**
Waters without added sugar (22.01)	-5,247	-5,243	-3,206	-2,795	-2,201
Prepared foods made from cereals (19.04)	71,845	-1,035	-4,669	-7,317	-2,464
Rusks (19.05.40)	275	-596	-1,693	-1,733	-2,912
Chewing gum (17.04.10)	-9,171	-8,844	-7,093	-4,942	-6,541
Ice cream (21.05)	-17,362	-22,496	-21,488	-16,334	-12,781
Breads, pastries, cakes (19.05)	20,633	-36,308	-27,643	17,912	-37,321
Breads, pastries, cakes excluding crisp breads etc. (19.05.90)	-19,550	-51,960	-54,113	-14,955	-50,740
Pasta (19.02)	-30,020	-38,194	-49,130	-43,411	-68,948

Food preparation products (21.06)	138,828	-3,022	16,758	73,124	-77,392
Sauces (21.03)	-85,674	-98,727	-119,576	-126,594	-161,043
Chocolate and other cocoa products (18.06)	-106,442	-114,304	-149,326	-144,231	-223,514

Source: TradeMap.
Note: NCM = Nomenclador Comun del Mercosur (Mercosur Common Nomenclature); n/d = no data.

Significant commercial exchange occurs among the countries of the region, with a high integration of food and beverages companies in different countries. Taking into consideration the most consumed foods in the region's countries (cookies, sweets, and soft drinks), the main net export destinations for the Southern Cone countries (SCC) along with Colombia, Ecuador and Peru, are in South America accounting for an average of 74%, 44% and 96%, respectively. The remaining exports are to Central American and African countries and, to a lesser extent, EU countries such as Spain, Italy, and Austria. The USA is the second destination for sweets.

Table 2.2: Trade balance (%) showing positive net surplus of main demanded products by destination in 2021

Cookies	SA	CAC	USA	Africa	Other countries
Peru	58	27	-	-	15
Brazil	69	-	7	16	8
Argentina	96	4			

Sweets	SA	CAC	USA	Africa	Other countries
Colombia	35	19	16	19	10
Brazil	32	-	38	19	10
Argentina	67	-	33	-	1

Soft drinks	SA	CAC	USA	Africa	Other countries
Argentina	96	4			

Source: TradeMap.
Note: SA = South America; CAC = Central American countries USA = United States of America.

It is important to note that the scale of these exports and imports is significantly lower than that of raw materials (Table 2.1), but the food and beverage industry is extremely important for the development, foreign exchange generation, and employment of the countries under analysis (Table 2.3). For example, in Argentina the food and beverage industry accounts for 26 percent

of industrial gross domestic product (GDP), 43 percent of total exports, and 28 percent of total industrial employment; the country has 14,528 food and beverages companies, of which 97 percent are small- and medium-size firms (Fundación FADA 2020, 2020, 2021). In Brazil, the industry accounts for 10.6 percent of GDP, 24.2 percent of industrial employment, 18.2 percent of total exports, and 64 percent of the trade balance. In turn, the food industry recorded an increase in production volume of 1.8 percent, amounting to 250 million tons. Brazil has nearly 38,000 food and beverage companies, of which 75 percent are micro companies. Large companies represent 1.6 percent of the total (600 corporations) (Brazilian Food Industry Association 2020). In Chile, the food and beverage industry accounts for 14 percent of GDP and 25 percent of total exports (Chile Alimentos 2020). Ninety Chilean food products are among the top 10 food exports worldwide. One out four companies are related to the industry and one out six people are employed by it. Therefore, it is important to consider this industry's relevance in adding value to the exports of these countries when developing policies on healthy food.

Table 2.3: Economic and social relevance of the food and beverage industry by country

Indicator	Argentina	Brazil	Chile	Paraguay	Uruguay
GDP	26%*	11%*	14%	30%	25%
Export	43%	18%	25%	65%	78%
Employment	28%*	24%*	1 out of 6	n/d	17%
Companies	14,528	38,000	1 out of 4	n/d	1,686**

Source: FADA, ABIA, Chile Alimentos Ministry of Livestock, Agriculture and Fisheries of Uruguay (MGAP) and Central Bank of Paraguay (BCRP).
Note: * = % of industrial GDP and employment. ** = export companies. n/d = no data. Peru, Colombia, and Ecuador are not included since no information is available.

The Southern Cone countries' food and beverage industries are important not only for local populations but also globally; the trade of processed and ultra-processed food comprises multinational and transnational companies with a presence in many countries. For example, the market for two leading types of ultra-processed products—carbonated soft drinks and sweet or savory snacks—is highly concentrated, with more than two-thirds of all sales captured by two companies. Therefore, it is reasonable to envision a global policy that brings together the food system, trade, and healthy food.

In recent years, sales of ultra-processed products increased mainly in middle-income countries of the global south (Asia, Africa, Eastern Europe, and Latin America), with the biggest change occurring between 2000 and 2013, while sales in the more fully industrialized and high-income countries of the global north slowed down (although their consumption is still the highest worldwide). During this period, more than one-half of sales of ultra-processed products were in the expanding markets of the global south.

The Southern Cone countries will be of great importance for global food trade, with crucial contributions to food deficit regions. Likewise, the food and beverage industry plays a major role not only in the way food is produced, stored, traded, labeled, advertised, and sold but also in its

ability to influence outcomes related to healthy food. Recent years have witnessed a higher integration of industries at regional and global level due to their interrelation and concentration. Consumers are increasingly calling for changes to the food system in general and to the production of processed and ultra-processed foods (Box 2.1) in particular, which could impact food trade. Therefore, a global effort is needed to guarantee access to and affordability of healthier food.

Box 2.1: Definition of processed and ultra-processed products

Processed and ultra processed food and drink products are defined according to the NOVA food classification system. NOVA classifies all foods and drinks into four groups according to the nature, extent, and purpose of the processing they undergo before being purchased or acquired: (group 1) unprocessed or minimally processed foods; (group 2) processed culinary ingredients; (group 3) processed foods; and (group 4) ultra processed food and drink products.

Processed food and drinks are made by adding salt, oil, sugar, or other substances from group 2 to group 1 foods. Processes include various preservation or cooking methods, and with breads and cheeses such as canned or bottled vegetables or legumes (pulses) preserved in brine; whole fruit preserved in syrup; tinned fish preserved in oil; some types of processed animal foods such as ham, bacon, pastrami, and smoked fish; most freshly baked breads; and simple cheeses to which salt is added. Constituted meat products; powdered and packaged 'instant' soups, noodles and desserts; baby formula; and many other types of products. In addition, these products contain levels of free sugar, fat, saturated fat, and sodium higher than the Pan American Health Organization (PAHO) Nutrient model recommendations.

Ultra-processed food and drink products are industrial formulations manufactured from substances derived from foods or synthesized from other organic sources. In their current forms, they are inventions of modern industrial food science and technology. Most of these products contain little or no whole food. They are ready-to-consume or ready-to heat, and thus require little or no culinary preparation, for example: carbonated soft drinks; sweet, fatty, or salty packaged snacks; candies (confectionery); cookies (biscuits), pastries, cakes, and cake mixes; margarine and other spreads; sweetened breakfast 'cereals' and fruit yoghurt and 'energy' drinks; preprepared meat, cheese, pasta, and pizza dishes; poultry and fish 'nuggets' and 'sticks'; sausages, other reconstituted meat products; powdered and packaged 'instant' soups, noodles, and desserts; and baby formula. As with processed food and drinks, these products contain levels of free sugar, fat, saturated fat, and sodium higher than PAHO Nutrient model recommendations.

Source: FAO 2019.

LAC AGRIFOOD SUBSYSTEM: DEMAND

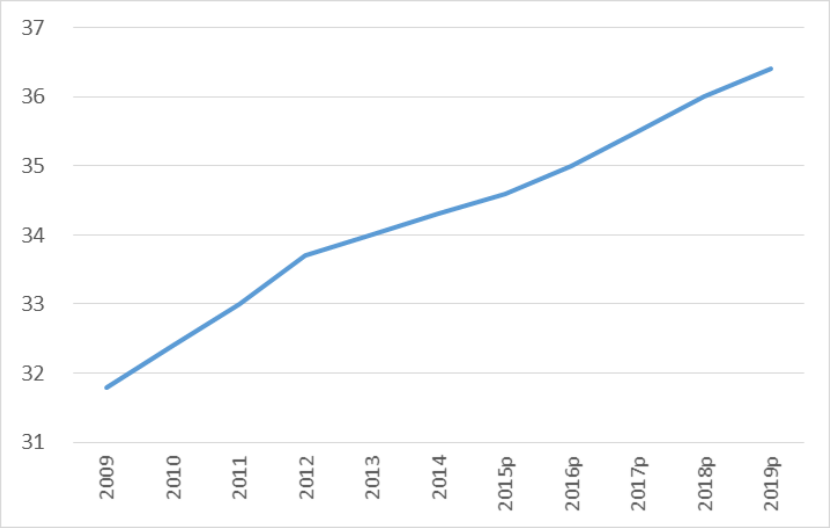
Between 2000 and 2013, consumption of processed food jumped by 48 percent in Latin America (PAHO 2015). Economic growth and social and cultural changes regarding food consumption and cooking habits drove the shift toward higher consumption of foods with a high content of

trans fatty acids, sugar, and sodium, and away from products with high nutritional quality such as vegetables, fruits, whole grains and cereals, dairy foods, and animal- and plant-based proteins.

From 2009 to 2014, overall sales of packaged food and drinks were essentially unchanged, while sales of ultra-processed products increased by 8.3 percent, from 408 to 441 kcal per capita/day. From 2015 to 2019, sales of ultra-processed products were projected to grow another 7.8 percent per capita/day, almost four times higher than the forecasted increment for the overall sales of packaged food and drinks (PAHO 2019).

A balanced diet should comprise 65 percent of high nutritional quality food, 20 percent of medium nutritional quality food, and 15 percent of low nutritional quality food, according to the Food and Agriculture Organization's (FAO) food-based dietary guidelines.[21] However, according to Pan American Health Organization (PAHO) research, processed/ultra-processed food's share of overall packaged food and soft drinks increased from one-third to one-fourth over 10 years (2009–2019) in the region (Figure 2.2). Thus, low nutritional quality food is consumed at more than twice the recommended levels, while consumption of high nutritional quality food is one-half of that recommended. Carbonated soft drinks and biscuits accounted for an average 40 percent of daily calories consumed in some Southern Cone countries plus Colombia and Peru between 2009 and 2014 (Figure 2.3).

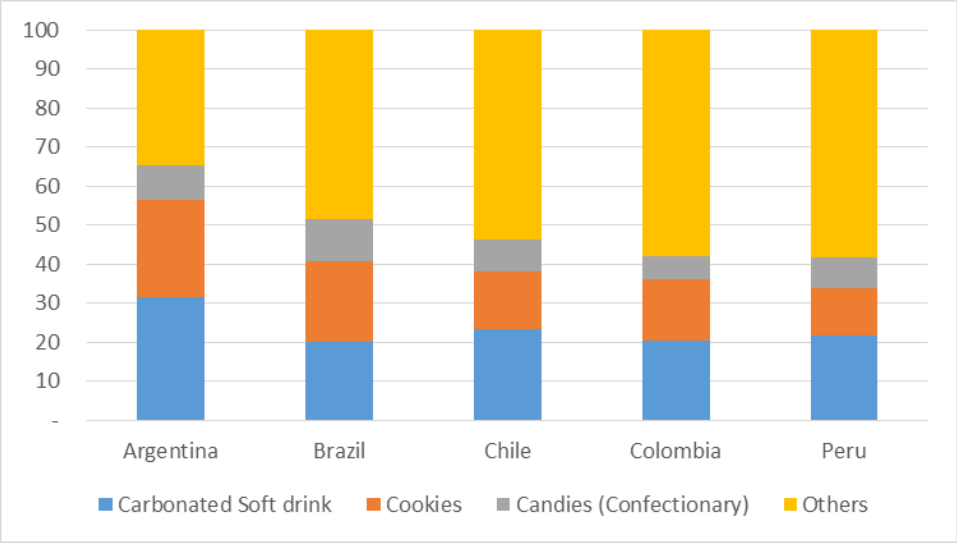
Figure 2.2: Share of ultra-processed packaged food and drink products (%), 2009–2019



Source: 2016 Euromonitor nutrition database.
Note: p = predicted.

[21] https://www.fao.org/nutrition/education/food-based-dietary-guidelines

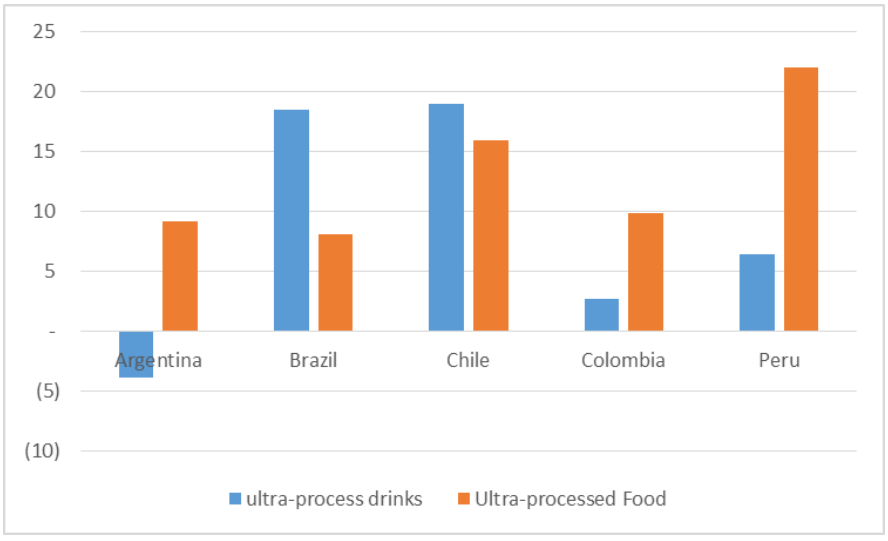
Figure 2.3: Share of leading ultra-processed products contributing to dietary energy—kcal per capita per day—in 3 Southern Cone countries plus Colombia and Peru (%)



Source: 2016 Euromonitor nutrition database.

Per capita sales of ultra-processed food and beverage products increased unequally in these five Southern Cone countries plus Colombia and Peru over the period 2009–2014 (Figure 2.4), ranging from -4 percent (Argentina) to 8 percent (Brazil), to 19 percent (Chile), and to 22 percent (Peru). Per capita sales of ultra-processed beverage products fell by 3.9 percent in Argentina and by 17.1 percent in Venezuela. Argentina had the highest rate of per capita consumption for ultra-processed drinks in 2013 and has since fallen below Mexico and Chile to the third highest rate.[22]

Figure 2.4: Growth in retail per capita sales of ultra-processed food and beverage products in 3 Southern Cone countries plus Colombia and Peru, 2009–2014 average (%)



Source: PAHO 2019.

[22] Latin American countries represented are Argentina, Brazil, Chile, Colombia, Mexico, and Peru.

PAHO (2019) reports that in seven Latin American countries, ultra-processed products have excessive amounts of fat, saturated fat, sugar, or salt, and nearly 75 percent contain at least two of these in excess according to the PAHO Nutrient Profile Model (PAHO 2018) (Table 2.4). According to PAHO, out of 89 ultra-processed products included in the analysis, 55 percent, 40 percent, 55 percent, and 63 percent exceeded the recommended levels of free sugars, total fat, saturated fat, and sodium, respectively.

Thus, over the last two decades, economic growth together with urbanization, social, and culinary changes resulted in a shift toward more unbalanced diets. Children under five and teenagers—who consume 40 percent more carbonated sugar drinks, twice as much baked goods, and three times as much candy than adults—are most heavily impacted. This trend will continue if cross-sectoral nutritional strategies from global to local level are not developed soon.

Table 2.4: Criteria for excess free sugar, fat, saturated fat, and sodium

Free sugar	Total fat	Saturated fat	Sodium
10% or more of total energy from free sugar	30% or more of total energy from total fat	10% or more of total energy from saturated fat	1 mg or more of sodium per 1 kcal

Source: PAHO Nutrient Profile Model (PAHO 2016).

LINKAGES BETWEEN AGRIFOOD SYSTEM AND HEALTHY FOOD: CONCEPTUAL FRAMEWORK OF FOOD SYSTEMS FOR DIETS AND NUTRITION

According to the conceptual framework of food systems for diets and nutrition established by the High-Level Panel of Experts in 2017 (HLPE 2018), three concepts connect the agrifood system (supply and demand) and quality nutritional food (Figure 2.5):

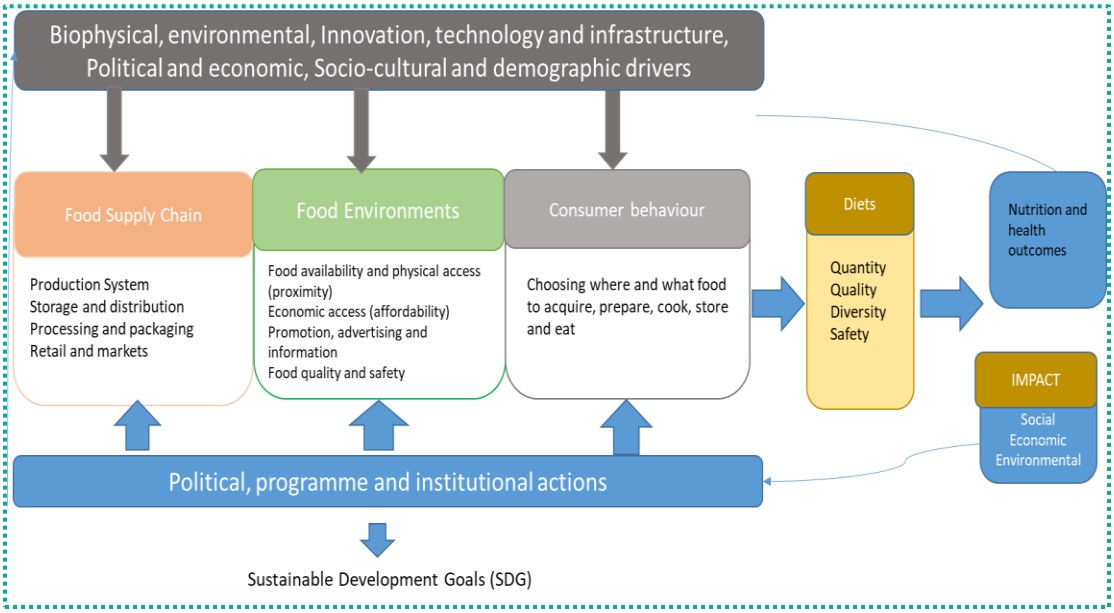
- Food supply chain: involves all steps and stakeholders from farm to fork to make food affordable and available.

- Food environment: refers to the physical, economic, political, and sociocultural context in which consumers engage with the food system to make their decisions about acquiring, preparing, and consuming food.

- Consumer behavior: reflects all choices and decisions made by consumers, at the household or individual level, when interacting with the food supply chain and food environment.

Food systems have many drivers—biophysical, environmental, innovation, technology and infrastructure, political, economic, sociocultural, and demographic. The interaction of the three concepts and these drivers generate the availability and affordability of food, and consumers' choices impact their nutrition and health outcomes. Acknowledging this, governments aim to take actions to improve food systems, provide safe food, and produce more healthy populations.

Figure 2.5: Conceptual framework of food systems for diets and nutrition



Source: Adapted from HLPE 2018.

The increased consumption of ultra-processed food over the last 20 years has led to a higher incidence of overweight and obesity (defined in Table 2.5), with significant economic, social, and health consequences worldwide. According to the most recent data available from WHO, the prevalence of overweight and obesity in adults increased by around 17 percentage points, from 42.7 percent to 59.5 percent, between 1990 and 2016, or the equivalent of 262 million people in LAC.

Table 2.5: Definition of overweight and obesity in adults and children

Indicator	Adults	Children < 5 years of age	Children aged 5–19
Overweight	BMI greater than or equal to 25	Weight-for-height greater than 2 standard deviations above WHO Child Growth Standards median	BMI-for-age greater than 1 standard deviation above the WHO Growth Reference median
Obesity	BMI greater than or equal to 30	Weight-for-height greater than 3 standard deviations above the WHO Child Growth Standards median	BMI-for-age greater than 2 standard deviations above the WHO Growth Reference median

Source: WHO 2021.
Note: Body mass index (BMI)* is defined as a person's weight in kilograms divided by the square of his/her height in meters (kg/m^2).

In LAC, one out of four adults suffers from obesity. South America has the highest levels of adult obesity: Argentina, Uruguay, and Chile have rates of 28.1 percent, 28.0 percent, and 27.9 percent, respectively. During the period from 2000 to 2016, Paraguay and Brazil had the highest increases in their rates, reaching 65 percent and 52 percent, respectively (Table 2.6). Overweight in children also increased between 2000 and 2020, higher than the world average, affecting 7.5 percent of children under five years of age in 2020. South America has the greatest prevalence of overweight children (8.2 percent) (Table 2.7).

Table 2.6: Prevalence of obesity among adults in LAC by subregion (%), 2000–2016

Region	2000	2005	2010	2014	2015	2016
World	8.7	9.9	11.2	12.5	12.8	13.1
Latin America and the Caribbean	16.6	18.9	21.2	23.2	23.7	24.2
Caribbean	15.2	17.8	20.8	23.4	24.0	24.7
Mesoamerica[23]	19.1	21.6	24.1	26.2	26.7	27.3
South America	15.8	18.0	20.2	22.1	22.5	23.0

Source: IFAD, PAHO, WFP and UNICEF. 2021. Latin America and the Caribbean – Regional Overview of Food Security and Nutrition 2021: Statistics and trends. Santiago, FAO.

Table 2.7: Prevalence of overweight among children under five in LAC by subregion (%), 2000–2020

Region	2000	2005	2010	2015	2020
World	5.4	5.7	5.6	5.6	5.7
Latin America and the Caribbean	6.8	7.1	7.2	7.4	7.5
Caribbean	5.8	6.1	6.3	6.5	6.6
Mesoamerica	6.7	6.8	6.7	6.4	6.3
South America	7.0	7.3	7.6	7.9	8.2

Source: IFAD, WFP FAO, PAHO, and UNICEF. 2021. Latin America and the Caribbean – Regional Overview of Food Security and Nutrition 2021: Statistics and trends. Santiago, FAO.

If this trend continues, LAC and each of its subregions will not be on track to achieve Sustainable Development Goal (SDG) 2 to maintain overweight in children under five years at below 3 percent in 2030. These trends will not be reversed unless agrifood systems, mainly the food and beverage industry, make healthier foods with high-quality nutrient content available and affordable. According to Laborde et al. (2021), the share of people who could not afford even one-half of the cost of a healthy diet[24] increased from 43 percent pre-COVID-19 (2020) to 50 percent during COVID-19; the share of people who 12 percent to 17 percent could not afford one-half of a nutrient-adequate diet increased from during the same period.

[23] Mesoamerica: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama.
[24] https://www.who.int/news-room/fact-sheets/detail/healthy-diet

NATIONAL AND GLOBAL POLICY AND TRADE

An unhealthy diet is one of the four main risk factors for the development of NCDs, along with insufficient physical activity, tobacco use, and harmful consumption of alcohol. The upward trend in overweight and obesity and its impact on social, economic, and environmental issues is of concern to governments. Therefore, governments must design and implement policies and regulations to promote healthy food as a change driver for agrifood systems within a global context, taking into account international food trade.

In recent decades, important changes have occurred in the roles and responsibilities of states, Intergovernmental organizations (IGOs) and rights holders (HLPE 2018), and the private sector in the governance of food security and nutrition at local, national, regional, and global scales.

At a local scale, regulations are focused first on healthy food, mainly by (1) increasing and promoting the consumption of high nutritional quality food such as fruits and vegetables, (2) improving good manufacturing practices, (3) increasing macro- and micronutrients, and (4) reducing critical nutrients such as free sugar, sodium, and fat in processed and ultra-processed food.

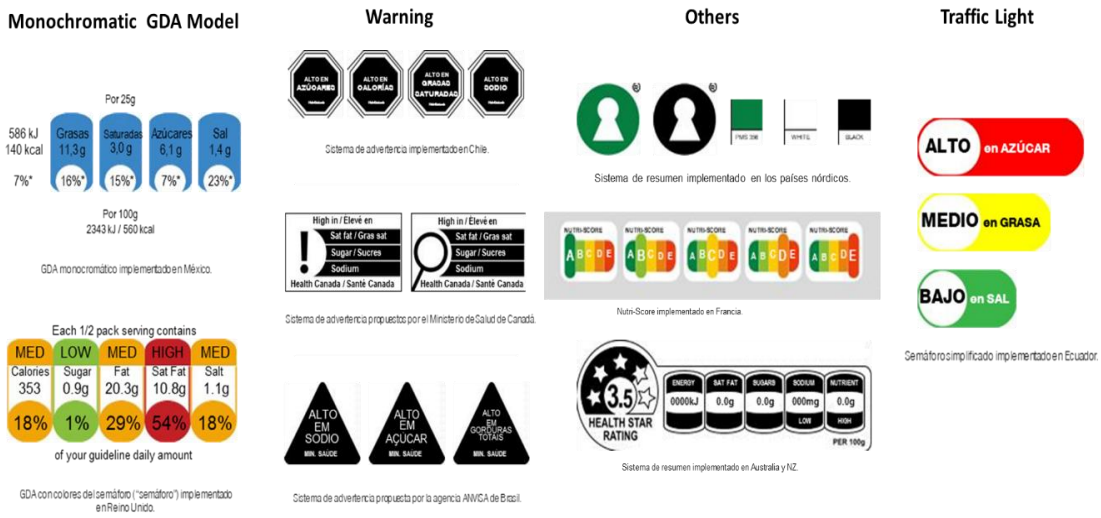
The second focus is on the food environment, such as improving physical and economic access to a healthy and sustainable diet or strengthening consumer information and education to enable healthier food choices through education, dietary guidance, and regulation of promotion and advertising.

The third focus is on regulations, programs, and institutional actions aimed at encouraging synergy between stakeholders (food supply chain, government, academia, NGOs, consumers, interministerial, interstate) to update and systematize information, and use information and communication technology (ICT) for monitoring objectives and ensuring accountability.

Regionally and globally, government regulations related to consumer behavior, such as mandatory labeling of processed and ultra-processed foods, are slowly spreading as a specific public policy. A debate has taken place on nutrition labeling[25] and how the Nutrient Profile Model (NPM) (CEPEA 2017) can provide general guidance to assist in the development of front-of-package nutrition labeling (FOP) (Figure 2.6). Different government organizations, NGOs, and UN agencies recommend the adoption of an NPM, but more than 100 models exist. FOP is a form of supplementary nutrition information used to facilitate consumers' understanding of the nutritional value of a food product consistent with the national dietary guidance.

[25] Nutrition labeling is a description intended to inform consumers of the nutritional properties of a food. Nutrition labeling consists of two components: a nutrient declaration and supplementary nutrition information. Nutrient declaration means a standardized statement or listing of the nutrient content of a food. A Supplementary nutrition information means any representation that states, suggests, or implies that a food has particular nutritional properties including but not limited to the energy value and to the content of protein, fat, and carbohydrates, as well as to the content of vitamins and minerals (CODEX Alimentarius).

Figure 2.6: Front-of-package labeling systems



Source: Developed by authors based on countries' regulations and available information.

Interpreting a nutritional table, located on the back or side of a product, requires mathematical and nutritional knowledge to evaluate the contents and to compare products in the same or a different category. Consumers spend a minimal amount of cognitive effort and time in decision-making, particularly for repeated food purchases. Therefore, the goal of FOP nutrition labels is to provide nutrition information in a more understandable format, but their true effects remain unclear, as does which label works best to change perceptions and behaviors. It is thus necessary to agree on more homogeneous criteria to bring useful information to enable consumers to make the best choice.

In the last 10 years, enforcement of mandatory FOP labeling was the response of Southern Cone countries' governments to address the sharp increase in overweight and obesity, mainly in children under five years of age. Chile was the first country in the region to implement an FOP warning label as a rapid response to this problem. It did so in a step-by-step process that included regulating advertising aimed at children as well as prohibiting "hook" products in educational establishments.

Mercosur countries implemented the nutritional declaration table and claims through Mercosur joint standards between 2003 and 2006. As FOP labeling standards were independently approved by each country, they were not standardized, and diverse labeling obligations were imposed on food processing companies. Most of the Southern Cone countries under analysis chose an FOP warning label system (Table 2.8), although Ecuador implemented the more informative traffic light system. They did so due to government concerns about the declining nutritional quality of their population's diets, prioritizing public health over economic concerns.

According to Arrua et al. (2017), consumers need less time to identify products with a high critical nutrient label when a warning system is used (1422ms[26]-warning versus 1784ms-traffic-lights versus 2187ms-DGA). Likewise, these authors studied the most effective FOP system in terms of goal-directed attention; they found that FOP warnings improve consumers' ability to identify unhealthy products and highlighted their advantages over the traffic-light system and the Guideline Daily Amount.

Regulations were implemented in stages given the cost imposed on the food and beverage industry and to provide the industry time to adapt its processes to the new schemes. In some cases, the implementation deadline was postponed due to complexities that arose when the regulations entered into force.

Only three countries' systems refer to an NPM: Argentina, Uruguay, and Brazil. Only Chile and Argentina's laws include an advertising regulation for children and teenagers and prohibit sales of products with a high content of critical nutrients. Argentina set a mandatory declaration for sugar, caffeine, and sweeteners (only for children), a positive step unique from other countries' regulations, but its implementation is still in progress.

Chile and Uruguay carried out customer surveys that showed acceptance of the regulations (mainly of mothers) and demonstrated their influence on decision-making for products with fewer labels. However, in Uruguay, after two years more than 40 percent of products did not comply with the labeling rules according to the Uruguayan Noncommunicable Diseases Alliance (Alianza ENT) survey; at the same time the government relaxed the limits for critical nutrients (Decree 246/2020).[27]

Chile's experience with a step-by-step implementation was successful. The measure promoted a reformulation of foods that ended up improving the existing supply in the market and favored access to products with fewer labels (warning logos), or without labels at all. An interdisciplinary meta-analysis of 114 articles on the impact of FOP labels on outcomes such as consumers' ability to identify healthier options, product perceptions, purchase behavior, and consumption shows generally positive results (Ikonen et al. 2019). Nonetheless, although FOP labels help consumers identify healthier products, their ability to shift consumers toward healthier choices is more limited.

Having multiple labeling options linked to an NPM and how they adapt to consumers' understanding and choices are important issues. The possibility of standardizing the nutrition declaration and FOP labeling in regions where products are traded should be evaluated to avoid unnecessary costs for food trade and to prevent the new dimensions of demand from becoming barriers to international trade.

The food and beverage industry in the countries under study strongly resisted labeling because it was considered an obstacle to trade that would negatively affect the economy through loss of

[26] Refers to response times (in ms): participants' ability to identify a label with high content of a key nutrient was evaluated using response times in thousandths of seconds.

[27] https://www.elobservador.com.uy/nota/mas-del-40-de-alimentos-no-cumplen-con-etiquetado-frontal-segun-relevamiento-20211222131916

international competitiveness, increased manufacturing costs due to product reformulation, and possibly loss of jobs (INSP and UNICEF 2021). But governments moved forward with FOP regulation anyway. A better answer to real problems lies in better trade – a fairer and more equitable globalization that brings marginalized people and countries into the economic mainstream, while helping to decouple human wellbeing from environmental impact. Keeping the flow of goods (Martin and Laborde 2018) in particular food products, within and across countries, as undisrupted as possible is key.

Table 2.8: FOP labeling systems in Southern Cone countries under study

Country	Regulation	Approval/ Studied	Entry in force	Issuance of regulation deadlines	FOP System	Symbol	Profile Nutritional Model	Advertising targeted to children	Educational establishments	Others	Post results
Chile	Act 20869 Act 20606	2012 2016	2016/2018/ 2019	24 months 36 months 12 months	Warning	Black & white octagons	Not reference	Prohibited for children under 14	YES		3 research work
Uruguay	Decree 272 Decree 246	2018 2020	Jun-19/ Mar-20	18 months 120 days additional	Warning	Black & white octagons	MNP-PAHO flexibility	Not mandatory	NO		2 research work Government relaxed the limits for critical nutrients
Brazil	Resolution	2014	2020	24 months 12 months for products traded 36 days for beverages	Warning	Magnifying glass	Mix, based on MNP-PAHO	Not mandatory	NO	Mandatory sugar declaration	No data
Argentina	Act 27642	2021	in process	Two stages: 9 months & 15 months for SMEs 18 months & 24 months for SMEs	Warning	Black & white octagons	MNP-PAHO	Prohibited for children under 12	YES	Mandatory Sugar declaration and Mandatory Contents of caffeine & sweeteners declaration	No data
Ecuador	Regulation 5103"	2014	2014	Not reference	Traffic-light	Traffic-light	Not reference	Not mandatory	NO		No data
Peru	Act 30021	2013	2020	60 & 120 (Art. 8a &10) days	Warning	Black & white octagons	Not reference	Not mandatory	NO	Mandatory declaration to avoid excess consumption	No data
Colombia	Act 167 Act 347 Resolution 810 Act 2120	2018 2021 2021 2021	In process	18 months	Warning	Circular labeling	To be defined	Not mandatory	NO		No data

Source: Developed by authors based on countries' regulations and available information.

FRONT-OF-PACKAGE LABELING COST:

The WHO conducted a questionnaire related to implementation of FOP labeling in different countries and the private sector's position regarding such labels. The survey also asked about the costs generated in the food and beverage industry for the different types of labeling required in the countries they trade with. The survey revealed that initial labeling costs are a one-time investment related to changing the printing plates used to print the new labels. These initial costs are spread over the implementation period, as companies operating in different countries or exporting abroad already have to comply with different regulatory requirements.

If the timelines for implementing a mandatory change are too short, companies may be left with stocks of labels and packaging (complete or at an intermediate stage) and finished products that do not meet the new requirements. The associated cancellation costs for these items can be significant. FOP labeling stickers can be a temporary solution to comply with new regulations when a significant amount of a product with a long expiration date has already been manufactured. New products would carry the new label, printed using the new label printing plate with the nutritional warning embedded in the label/packaging.

A 2010 analysis commissioned by the United Kingdom's Department for Environment, Food and Rural Affairs (2010) showed that companies constantly relabel their products: mandatory changes due to new legislation account for 16 percent of relabeling on average (Table 2.9). Other reasons for relabeling are product reformulation and relaunching; on average, this accounts for 9 percent and 19 percent of the cost of relabeling, respectively. For large companies, both drivers together reach almost 40 percent. Some of the labeling investment costs already used for product promotion are simply redirected to meet public health and regulatory requirements. Product packaging is often updated and reprinted frequently. Even smaller companies change their labels often for promotional and advertising purposes; new regulations accounted for 31 percent and 15 percent for micro and small companies, respectively, as a driver for relabeling to meet changing consumer demand.

Table 2.9: Reasons for product label changes (%)

Item	Average share (%)
Voluntary redesign	27
Product reformulation	9
Product relaunch	19
Implementation of new regulation	16
Other	29

Source: Developed by authors based on countries' regulations and available information.

It is important to bear in mind that despite frequent labeling changes, companies need time to position products in the market and have to take this dynamic process into account when setting

up new FOP labeling. In most of the seven countries studied (Argentina, Brazil, Chile, Colombia, Ecuador, Peru and Uruguay), the FOP label is a warning that seems to simplify the cost analysis, but the limits for critical nutrients differ across countries. Addressing this topic becomes even more complex for products intended for the United States, which has a completely different labeling system.

PROPOSAL

A new global labeling system, developed by an international agreement, should: be easy for private firms to implement; have the best possible design; and avoid imposing additional difficulty on trade in processed and ultra-processed foods. The global labeling system should serve as a guideline for all countries. To achieve this, the following actions are proposed:

► The Codex Alimentarius managed by FAO/WHO has the best capacity to lead the implementation of a process to harmonize the labeling system and propose a global food label. These organizations could be a bridge to facilitate international trade due to Codex standards and assist in the resolution of trade disputes before the WTO. Other UN organizations, such as the High Level Panel of Experts (HLPE) and the United Nations Forum on Sustainability Standards (UNFPSS), should also be consulted, together with other actors involved in the field. Moreover, the Latin American Alliance of Food and Beverage Industry Associations (ALIAB), which represents the Latin American chambers of food and beverage industries, has been part of Codex since 2022.

► Linking a nutritional declaration with FOP labeling is key, together with more comprehensive back-of-package labeling and claims for consumers. A QR tool could be quickly incorporated by companies that are integrated at regional and global level in line with the proposal of GS1 group and National Institute for Industrial Technology (INTI).[28] GS1 group has a global solution that allows retailers and marketplaces to verify the identity of a product by consulting the GS1 global registration platform. Many multinational food and beverage companies are part of this platform, which could be a way to unify criteria and thus reduce costs in the implementation of labeling.

► The WTO has much to contribute to the discussions currently taking place at the intersection of trade and nutrition, and could incorporate the food labeling system as a trade issue. WTO General Director Ngozi Okonjo-Iweala refers to continued interest in advocating for strengthening the multilateral response to climate change and makes reference to the treatment of climate change in trade negotiations. The UN incorporated this subject as a main area of work in the follow-up activities from the UNFSS in line with the Voluntary Guidelines on Food Systems and Nutrition (Box 2.2) adopted by the Committee on World Food Security (CFS) on February 10, 2021, at its 47th plenary session (CFS 2021).

► The lack of updated public market information, the low frequency of surveys and studies, and the lack of systematized, centralized, and coordinated information on nutrition by the public,

[28] TecnoFidta.INTI-GS1.09.20.2018

private, and academic sectors make it difficult to compare available data/research. Thus updated, dynamic, and open databases for consultations on sales of processed and ultra-processed foods and on overweight and obesity, mainly in children under five years of age, should be developed.

► These recommendations should not be undertaken in isolation but as a set of actions that link agrifood systems, trade, and healthy food in a coordinated and cross-sectoral manner at local, regional, and global level to solve the problem of overweight and obesity faced around the world.

Box 2.2: CFS Voluntary Guidelines on Food Systems and Nutrition—Zero Draft

These guidelines are intended to promote coherence in policies and reduce fragmentation across relevant sectors such as health, agriculture, education, environment, gender, social protection, trade, and employment, which all impact food systems and nutrition. The guidelines acknowledge how important interventions within and between food systems are to improve their capacity to deliver healthy diets and produce positive results in all three dimensions of sustainable development. They include a comprehensive series of recommendations to enhance transparent and responsible governance, sustainability of food supply chains, healthy diet access, food security, nutrition education, gender equality, and resilient food systems in humanitarian settings.

The CFS Voluntary Guidelines on Food Systems and Nutrition (VGFSyN) are the latest policy guidance tool produced by the Committee on World Food Security (CFS) to address malnutrition in all its forms from a holistic food systems perspective. They recognize the interlinkages of food systems with other systems like health and social protection, and the need to break down silos in how we address this complexity. The goal of the VGFSyN is to support the development of coherent, coordinated, multisectoral national policies, laws, programs, and investment plans for safe and healthy diets through sustainable food systems.

These guidelines, which are the result of a five-year inclusive stakeholder consultation and negotiation process based on scientific evidence from the CFS High Level Panel of Experts, provide a concrete tool for governments, UN agencies, civil society, the private sector, financial institutions, and other development actors to provide guidance on policies and interventions to deal with malnutrition in all its forms in a holistic "food systems" approach.

Source: CFS 2021.

CONCLUSION

Agrifood is a complex and changing system that must adapt to new dimensions of demand and to ongoing changes in consumer behavior. Dietary patterns interact with agrifood systems, not only as an outcome of existing agrifood systems, but also as a driver of change for future food supply chains. These challenges require policymakers to leverage changes in the world's food systems to achieve the SDGs by 2030.

The Southern Cone countries will be of great importance for global food trade and their contribution to food deficit regions will be crucial. Likewise, the food and beverage industry has a major role not only in the way food is produced, stored, traded, labeled, advertised, and sold but also in its ability to face challenges related to healthy food. In recent years, there has been a higher integration of industries at regional and global levels due to their interrelation and concentration across regions and countries. Consumers are demanding changes in the food system in general and in the production of processed and ultra-processed foods in particular, which could impact food trade. Therefore, work must be done at the global level to guarantee access to and affordability of healthy food.

Nutritious food must be integrated as an explicit objective in national policies, programs, and budgets. Cross-sectoral nutritional strategies should be designed and implemented at different levels, from global to local. The main challenge is to achieve development and balance in agrifood systems, both locally and globally, linked to the new dimensions of demand, taking into account the different ecosystems and countries in which these systems are developed and how these changes will affect trade as well as economic and political relationships between countries.

The health risks posed by consumption of processed and ultra-processed products cannot be mitigated simply by reducing overall consumption. Regulations at local, regional, and global scales are required. Global interdependence and the importance of achieving an adequate balance between supply chains, trade, and healthy diets point to the importance of countries working together. Multilateral organizations should adopt cooperation as a priority, taking into account the role of international food trade in global food security, healthy food, and nutrition.

Developing and agreeing on a global labeling system emerges as a credible proposal. Such a system should be implemented via an international agreement that is easy to implement for private firms, has the best possible design, and does not represent additional difficulty for the trade of processed and ultra-processed foods.

The food and beverage industries in Southern Cone countries are important not only for local populations but also globally. The trade of processed and ultra-processed food comprises multinational and transnational companies with a presence in many countries. Therefore, a global policy that brings together the agrifood system, trade, and healthy food has credibility.

Governments and international organizations (WTO, FAO, WHO) should promote the development of new market opportunities to protect and increase the production, availability, affordability, and consumption of unprocessed and minimally processed foods, and fresh, handmade

meals. Yet this promotion has to encourage a balance between agrifood systems, trade, and the new dimensions of demand. The COVID-19 pandemic serves as a timely reminder of the fragility of the global food system and the urgency of fostering international coordination of a global strategic framework for food security and nutrition to reach SDGs 2 and 12 by 2030.

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CHAPTER 3:

TRADE AGREEMENTS AND ENVIRONMENT IN LATIN AMERICA'S SOUTHERN CONE

Eduardo Bianchi

INTRODUCTION

Over the last decades, Regional Trade Agreements (RTAs) have allowed groups of countries to negotiate rules and commitments that go beyond what was possible multilaterally at the time. In turn, some of these rules have paved the way for agreement in the World Trade Organization (WTO). Services, intellectual property, environment, investment, and competition policies are all issues raised in regional negotiations and later developed into agreements or topics of discussion in the WTO.

This chapter briefly examines the environmental provisions in RTAs and looks at the presence of environmental agreements in RTAs in Latin America's Southern Cone countries (Argentina, Brazil, Chile, Paraguay and Uruguay). It then analyzes the environmental provisions of (1) the RTA between Chile and Canada and (2) the trade agreement between the European Union (EU) and Mercosur.

ENVIRONMENTAL PROVISIONS IN RTAS

RTAs negotiated by developed countries include some type of environmental provisions, although their scope and depth vary significantly. Canada, the EU, and the United States have the most comprehensive environmental provisions in RTAs. Among Latin American countries, Chile's efforts to include environmental provisions in its trade agreements are particularly noteworthy. Despite these developments, the number of RTAs including significant environmental provisions remains small, especially among developing countries, for example those in the Southern Cone of Latin America.

So far, the most ambitious agreements, from an environmental point of view, include a comprehensive environmental chapter or are accompanied by an environmental side agreement. Many RTAs include provisions on the environment in the body of the agreement, in paragraphs dealing mainly with environmental cooperation, or in detailed chapters dealing with a broad range of environmental issues. Some RTAs deal with general environmental issues in the body of the agreement, while specific aspects—mainly environmental cooperation—are spelled out in more detail in a side agreement.

Environmental cooperation mechanisms are typically found in many RTAs. These range from broad arrangements to cooperation in one specific area of special interest to the Parties. The areas of cooperation in different RTAs vary significantly and depend on a range of factors; for example, on whether the trade partners have comparable levels of development or not (in which case, cooperation often focuses on capacity building), or whether they have common borders.

The obligation for Parties to enforce their own environmental laws is included, for example, in agreements involving the United States and Canada. These agreements generally also include provisions on procedural guarantees in environmental matters, as well as different types of enforcement and dispute settlement mechanisms. Some RTAs refer more generally to Parties' commitment to maintain high levels of environmental protection. Other agreements also strive for harmonization. Most RTAs contain clauses reiterating the compatibility between Parties' trade obligations and their right to adopt or maintain environmental regulations and standards.

The reasons for including provisions on environment in RTAs vary. For some countries, a primary reason is to contribute to the overarching goal of sustainable development. Ensuring a level playing field among Parties in the agreement is another key driver. Another motivation is to enhance cooperation in environmental matters of shared interest. Finally, some countries consider that including environmental issues in trade agreements provides an opportunity to pursue environmental objectives in a more efficient and rapid way than, for example, through multilateral environmental agreements.

One major difficulty encountered by some developing countries is the need to negotiate environmental chapters in RTAs while their own national environmental management system is in its initial stages. Other difficulties are linked to the relative weight of environmental issues on the agendas of different governments, the level of negotiators' expertise on environmental issues, and available resources to adequately implement commitments under the agreement. Environmental cooperation arrangements can help address some of these difficulties.

In spite of the obstacles to including environmental issues in trade agreements, and the difficulties encountered by some developing countries when negotiating them, a number of developing countries have accepted the inclusion of strong environmental commitments in trade agreements signed with developed countries. However, at present, few trade agreements between developing countries include a reference to the environment. Transparency and exchanges of experience are important to ensure that progress on environmental matters in RTAs eventually supports the multilateral trading system.

Dealing with environmental issues in RTAs is not a one-off exercise. It requires preparation, coordination among trade and environmental officials, setting of priorities, and reconciliation of conflicting views. Once a text is agreed on, continuous efforts are needed to ensure effective integration of trade and environmental issues throughout the life of the agreement. For developing countries, this effort often requires financial support and capacity building, either from the developed country trade partner or from other institutions, such as development agencies.

With the current proliferation of RTAs, and the variety of environmental arrangements they contain, some countries face the increasingly complex problem of managing various levels of environmental commitments and different types of environmental cooperation programs under a range of RTAs.

There are four primary reasons (or policy drivers) for governments to deal with environmental issues in RTAs: to contribute to the overarching goal of sustainable development; to ensure a level playing field among Parties; to enhance cooperation in environmental matters of shared interest; or to pursue an international environmental agenda.

The types of environmental provisions considered in RTAs are:

- A reference in the Preamble.
- General and specific exceptions based on GATT (General Agreement on Tariffs and Trade) Article XX or GATS Article XIV for protection of human, animal, and plant life.
- A commitment to uphold environmental law, and not weaken it to attract trade or investment.
- More substantive environmental provisions, such as environmental cooperation public participation, dispute settlement, coverage of specific environmental issues, specific provisions on Multilateral Environmental Agreements (MEAs), an implementation mechanism, and associated ex ante impact assessments.

Canada, the United States, and the EU all include a range of substantive provisions in most of their RTAs, in line with their political mandates.

Canada's policy's main focus is to ensure that Parties to an agreement will maintain high levels of environmental protection and effectively enforce their environment laws, and not relax them to attract trade or investment. Additional aims are strengthening the capacity, integrity, and transparency of national environmental systems, promoting sustainable development, protecting a Party's right to regulate in the public interest, and providing opportunity to engage strategically on key environmental issues.

The EU's legal mandate for inclusion of environmental provisions in its RTAs is provided in the EU Treaty, which defines sustainable development as an overarching principle that guides the EU's internal and external actions. In addition, Article 11 of the EU Treaty explicitly states that environmental protection requirements must be integrated into the definition and implementation of EU policies and activities, in particular with a view to promoting sustainable development.

The EU Sustainable Development Strategy includes the aim of actively promoting sustainable development worldwide, to ensure that the EU's internal and external policies are consistent with global sustainable development and international commitments. Additionally, the EU conducts Sustainability Impact Assessments (SIAs) of all its RTA negotiations, covering environmental impacts in its trading partners and globally as well as in the EU.

As for the RTAS of Latin America's Southern Cone countries, Chile's efforts to include environmental provisions in its trade agreements are noteworthy particularly its RTAs with Colombia, Turkey, Malaysia, and Panama, which include substantive environmental provisions.

Chile, Colombia, and Perú's free trade agreements (FTAs) with Canada, the United States, and the EU include environmental provisions. No environmental topics are included in FTAs with other countries or regions. Ecuador has an environmental agreement in its FTA with the EU but does not have FTAs with the United States and Canada. Bolivia does not have FTAs with Canada, the United States, or the EU. In Mercosur countries, the FTA negotiated with the EU has a side environmental agreement. These countries have no FTAs with the United States or Canada.

CANADA-CHILE FREE TRADE AGREEMENT

The Canada-Chile Free Trade Agreement (CCFTA) went into force in July 1997. The CCFTA was Canada's first FTA with a South American country. Since then, Canada and Chile have taken multiple steps to broaden and modernize the agreement. This includes several updates to the tariff phase-out periods for select products (in 1999, 2001, and 2004) to accelerate the elimination of tariffs between Canada and Chile, as well as updates to the applicable rules of origin for products. In 2008, a new government procurement chapter came into force, and in 2010, Canada and Chile signed a Note of Interpretation on Indirect Expropriation. In 2013, a new financial services chapter and updates to the government procurement, dispute settlement, and customs procedures entered into force. On February 5, 2019, a new CCFTA entered into force. Its Amending Agreements modernized the existing CCFTA to better support an open and inclusive rules-based trading environment.

For the first time, a Canadian FTA includes a stand-alone chapter on trade and gender. This progress is matched by steps forward in other sections of the agreement, with new chapters on sanitary and phytosanitary measures (SPS) and technical barriers to trade, as well as improvements to the existing investment chapter (bringing it in line with some of Canada's most recent trade agreements) and technical amendments to the existing government procurement chapter.

The CCFTA includes a side environmental agreement that was not changed in the 2019 update. In its preamble, both governments recognize the importance of the conservation, protection, and enhancement of the environment in their territories and the essential role of cooperation in these areas in achieving sustainable development for the wellbeing of present and future generations. They also reaffirm the sovereign right of States to exploit their own resources pursuant to their own environmental and development policies and their responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction. Both governments share a commitment to pursue policies that promote sustainable development and agree that sound environmental management is an essential element of sustainable development. They also emphasize the importance of the environmental goals and objectives of the CCFTA, including enhanced levels of environmental protection and the importance of public participation in conserving, protecting, and enhancing the environment.

They reaffirm the Stockholm Declaration on the Human Environment of 1972 and the Rio Declaration on Environment and Development of 1992 and also their tradition of environmental cooperation, expressing their desire to support and build on international environmental agreements and existing policies and laws, to promote cooperation between them.

Thus, the objectives of the environmental agreement are to:

1. Foster the protection and improvement of the environment in the territories of the Parties for the wellbeing of present and future generations;

2. Promote sustainable development based on cooperation and mutually supportive environmental and economic policies;

3. Increase cooperation between the Parties to better conserve, protect, and enhance the environment, including wild flora and fauna;

4. Support the environmental goals and objectives of the CCFTA;

5. Avoid creating trade distortions or new trade barriers;

6. Strengthen cooperation on the development and improvement of environmental laws, regulations, procedures, policies, and practices;

7. Enhance compliance with, and enforcement of, environmental laws and regulations;

8. Promote transparency and public participation in the development of environmental laws, regulations, and policies;

9. Promote economically efficient and effective environmental measures; and

10. Promote pollution prevention policies and practices.

Article 2 refers to the general commitments of both Parties, including that each country shall: periodically prepare and make publicly available reports on the state of the environment; develop and review environmental emergency preparedness measures; promote education in environmental matters, including environmental law; further scientific research and technology development in respect of environmental matters; assess, as appropriate, environmental impacts; and promote the use of economic instruments for the efficient achievement of environmental goals.

Each Party shall consider prohibiting the export to the territory of the other Party of a pesticide or toxic substance whose use is prohibited within the Party's territory. When a Party adopts a measure prohibiting or severely restricting the use of a pesticide or toxic substance in its territory, it shall notify the other Party of the measure, either directly or through an appropriate international organization.

Also, recognizing the right of each Party to establish its own levels of domestic environmental protection and environmental development policies and priorities, and to adopt or modify accordingly its environmental laws and regulations, each Party shall ensure that its laws and regulations

provide for high levels of environmental protection and shall strive to continue to improve those laws and regulations.

Each Party shall ensure that its laws, regulations, procedures, and administrative rulings of general application respecting any matter covered by this Agreement are promptly published or otherwise made available in such a manner as to enable interested persons and the other Party to become acquainted with them.

The agreement also refers to government enforcement action. Thus, with the aim of achieving high levels of environmental protection and compliance with its environmental laws and regulations, each Party shall effectively enforce its environmental laws and regulations through appropriate governmental action. In this sense, each Party shall ensure that judicial, quasi-judicial, or administrative enforcement proceedings are available under its law to sanction or remedy violations of its environmental laws and regulations. Article 6 ensures that interested persons may request the Party's competent authorities to investigate alleged violations of its environmental laws and regulations and shall give such requests due consideration in accordance with the law. In the same sense, Article 7 provides that administrative, quasi-judicial, and judicial proceedings are fair, open, and equitable.

The agreement establishes the Canada-Chile Commission for Environmental Cooperation. The Commission shall comprise a Council, a Joint Submission Committee, and a Joint Public Advisory Committee. The Commission shall be assisted by the National Secretariat of each Party. The Council is the governing body of the Commission and serves as a forum for the discussion of environmental matters within the scope of the Agreement. The Council may consider, and develop recommendations regarding, for example, the comparability of techniques and methodologies for data gathering and analysis, data management, and electronic data communications on matters covered by the Agreement; pollution prevention techniques and strategies; approaches and common indicators for reporting on the state of the environment; the use of economic instruments for the pursuit of domestic and internationally agreed environmental objectives; and scientific research and technology development in respect of environmental matters. The Council shall also strengthen cooperation on the development and continuing improvement of environmental laws and regulations.

Article 11 mandates that each Party shall establish a National Secretariat and notify the other Party of its location. Each Party shall designate an Executive Secretary for its National Secretariat, who shall be responsible for its administration and management. The National Secretariats shall provide technical, administrative, and operational support to the Council and to committees and groups established by the Council, and such other support as the Council may direct. The National Secretariats shall jointly submit for the approval of the Council the annual program of work and budget of the Commission, including provisions for proposed cooperative activities and for the National Secretariats to respond to contingencies. The annual program of work shall identify how its implementation shall be financed and clearly define how it shall be implemented, including identification of institutions, agencies, individuals, and/or cooperative arrangements whereby it shall be implemented. In developing the annual program of work, the

National Secretariats shall consider issues arising from factual records previously prepared, or under preparation, by the Commission. The National Secretariats shall, as appropriate, provide the public with information on where they may receive technical advice and expertise with respect to environmental matters.

The National Secretariats shall jointly prepare an annual report of the Commission in accordance with instructions from the Council. The final report shall be released publicly. The report shall cover, for example, activities and expenses of the Commission during the previous year; the approved program and budget of the Commission for the subsequent year and the actions taken by each Party in connection with its obligations under the Agreement.

Article 16 establishes a Joint Public Advisory Committee of six members. The Joint Public Advisory Committee may provide advice to the Council on any matter within the scope of this Agreement. The Joint Public Advisory Committee may provide relevant technical, scientific, or other information to the National Secretariats.

Article 17 constitutes National Advisory Committees, comprising members of its public, including representatives of nongovernmental organizations and persons, to advise it on the implementation and further elaboration of this Agreement, while Article 18 establishes that each Party may convene a governmental committee, which may comprise or include representatives of national and provincial governments, to advise it on the implementation and further elaboration of the Agreement.

The Agreement also establishes a Consultation and Resolution of Disputes System, with the conformation of a panel when there is not a mutually satisfactory resolution of the matter at the consultation stage. The panel shall present to the Parties a final report, including any separate opinions on matters not unanimously agreed. If, in its final report, a panel determines that there has been a persistent pattern of failure by the Party complained against to effectively enforce its environmental law, the Parties may agree on a mutually satisfactory action plan, which normally shall conform with the determinations and recommendations of the panel.

EU-MERCOSUR TRADE AGREEMENT

On June 28, 2019, the EU and Mercosur member countries Argentina, Brazil, Paraguay, and Uruguay concluded longstanding negotiations on a trade agreement. The agreement seeks to: increase bilateral trade and investment and lower tariff and nontariff trade barriers, notably for small- and medium-sized enterprises; create more stable and predictable rules for trade and investment through better and stronger rules, for example, in the area of intellectual property rights (including geographical indications), food safety standards, competition, and good regulatory practices; and promote joint values such as sustainable development, by strengthening worker’s rights, fighting climate change, increasing environmental protection, encouraging companies to act responsibly, and upholding high food safety standards. The agreement has not yet entered into force.

In terms of environmental rules, the agreement has a chapter called “Trade and Sustainable Development.” Article 1 defines the objectives and scope of this chapter: to enhance the integration of sustainable development in the Parties' trade and investment relationship, notably by establishing principles and actions concerning labor and environmental aspects of sustainable development of specific relevance in a trade and investment context.

The Parties recall: the Agenda 21 and the Rio Declaration on Environment and Development of 1992; the Johannesburg Declaration on Sustainable Development and the Johannesburg Plan of Implementation on Sustainable Development of 2002; the Ministerial Declaration of the United Nations Economic and Social Council on Creating an environment at the national and international levels conducive to generating full and productive employment and decent work for all, and its impact on sustainable development of 2006; the Declaration on Social Justice for a Fair Globalisation of 2008 of the International Labour Organization (ILO); and the Outcome Document of the UN Conference on Sustainable Development of 2012 entitled "The Future We Want" and the document “Transforming our World: the 2030 Agenda for Sustainable Development,” adopted in 2015.

The Parties recognize that the economic, social, and environmental dimensions are interdependent and mutually reinforcing dimensions of sustainable development and reaffirm their commitment to promoting the development of international trade in such a way as to contribute to the objective of sustainable development, for the welfare of present and future generations. Consistently, the Parties shall promote sustainable development through:

1. The development of trade and economic relations in a manner that contributes to the objective of achieving the Sustainable Development Goals (SDGs) and supports their environmental standards and objectives in a context of trade relations that are free, open, transparent, and respectful of multilateral agreements to which they are Party.

2. The respect of their multilateral commitments in the field of the environment.

3. Enhanced cooperation and understanding of their respective environmental trade-related policies and measures, taking into account the different national realities, capacities, needs, and levels of development and respecting national policies and priorities.

Recognizing the differences in their levels of development, the Parties agree that this chapter embodies a cooperative approach based on common values and interests.

In Article 2 the Parties recognize the right of each Party to determine its sustainable development policies and priorities, to establish the levels of domestic environmental protection it deems appropriate, and to adopt or modify its law and policies. Each Party shall strive to improve its relevant laws and policies so as to ensure high and effective levels of environmental protection. A Party should not weaken the levels of protection afforded in domestic environmental law with the intention of encouraging trade or investment.

In Article 5 the Parties recognize that the environment is one of the three dimensions of sustainable development (economic, social, and environmental) and that these should be addressed.

Additionally, the Parties recognize the contribution that trade could make to sustainable development.

The Parties recognize the importance of the United Nations Environment Assembly (UNEA) of the United Nations Environment Programme (UNEP) and multilateral environment agreements as a response of the international community to global or regional environmental challenges and stress the need to enhance the mutual supportiveness between trade and environment policies.

Each Party reaffirms its commitments to promote and effectively implement multilateral environmental agreements (MEAs), protocols, and their amendments to which it is a party.

The Parties recognize the importance of pursuing the ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC) to address the urgent threat of climate change and the role of trade to this end. Thus, each Party shall effectively implement the UNFCCC and the Paris Agreement and consistently with Article 2 of the Paris Agreement, promote the positive contribution of trade to a pathway toward low greenhouse gas (GHG) emissions and climate-resilient development and to increasing the ability to adapt to the adverse impacts of climate change in a manner that does not threaten food production.

The Parties recognize the importance of the conservation and sustainable use of biological diversity consistent with the Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the International Treaty on Plant Genetic Resources for Food and Agriculture, and the decisions adopted thereunder and the role that trade can play in contributing to the objectives of these agreements.

The Parties shall also exchange information on initiatives and good practices on trade in natural resource-based products with the aim of conserving biological diversity and shall cooperate, as appropriate, bilaterally, regionally, and in international fora on issues covered by this Article.

The Parties recognize the importance of sustainable forest management and the role of trade in pursuing this objective and of forest restoration for conservation and sustainable use. Each Party shall:

1. Encourage trade in products from sustainably managed forests harvested in accordance with the law of the country of harvest;

2. Promote, as appropriate and with their prior informed consent, the inclusion of forest-based local communities and indigenous peoples in sustainable supply chains of timber and nontimber forest products, as a means of enhancing their livelihoods and of promoting the conservation and sustainable use of forests; and

3. Implement measures to combat illegal logging and related trade.

The Parties recognize the importance of conserving and sustainably managing marine biological resources and marine ecosystems as well as of promoting responsible and sustainable aquaculture, and the role of trade in pursuing these objectives and their shared commitment to achieving SDG 14 of the 2030 Agenda for Sustainable Development, particularly SDGs 14.4 and 14.6.

When establishing or implementing measures aimed at protecting the environmental conditions that may affect trade or investment, each Party shall ensure that the scientific and technical evidence on which they are based is from recognized technical and scientific bodies and that the measures are based on relevant international standards, guidelines, or recommendations where they exist.

In cases when scientific evidence or information is insufficient or inconclusive and there is a risk of serious environmental degradation or to occupational health and safety in its territory, a Party may adopt measures based on the precautionary principle. Such measures shall be based upon available pertinent information and subject to periodic review. The Party adopting the measure shall seek to obtain new or additional scientific information necessary for a more conclusive assessment and shall review the measure as appropriate.

When a measure adopted in accordance with the above paragraph has an impact on trade or investment, a Party may request to the Party adopting the measure to provide information indicating that scientific knowledge is insufficient or inconclusive in relation to the matter at stake and that the measure adopted is consistent with its own level of protection, and may request discussion of the matter in the Trade and Sustainable Development (TSD) Sub-Committee. Such measures shall not be applied in a manner that would constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.

The Parties recognize the importance of responsible management of supply chains through responsible business conduct and corporate social responsibility practices based on internationally agreed guidance.

The Parties establish a TSD Sub-Committee that shall comprise senior officials, or their delegates, from each Party. Its functions are to facilitate and monitor the effective implementation of this chapter, including cooperation activities. The TSD Sub-Committee shall publish a report after each of its meetings. Each Party shall designate a Contact Point within its administration to facilitate communication and coordination between the Parties on any matter relating to implementation of this chapter.

The agreement has also a dispute resolution system with a consultation stage and the confirmation of a panel of experts if a mutually satisfactory resolution of the matter is not achieved. The panel of experts shall interpret the provisions of this chapter in accordance with the customary rules of interpretation of public international law.

CONCLUSION

This chapter analyzed the existence of environmental provisions in RTAs with a focus on those signed by Latin America’s Southern Cone countries and Chile. It is clear that developed countries’ RTAs have environmental provisions or a side environmental agreement. Developing countries lag behind in this sense, as illustrated in Latin America’s Southern Cone countries and Chile, whose environmental agreements are in RTAs signed with Canada, the United States,

and the EU, but absent from RTAs with other countries or regions. An exception is Chile, which has environmental provisions in RTAs with other countries and regions.

The chapter also analyzed in more detail the environmental agreements between Chile and Canada and between Mercosur and the EU. This last agreement has a vision of "sustainable development," although many of its elements can also be found in the agreement between Mercosur and the EU. Both agreements have an institutional framework and a dispute settlement system, and both recognize the importance of international environmental agreements.

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CHAPTER 4:

INTERNATIONAL GOVERNANCE ON ENVIRONMENTAL TRACEABILITY AND CERTIFICATION REQUIREMENTS OF AGRIFOOD

Sabine Papendieck

INTRODUCTION TO FOOD ENVIRONMENTAL STANDARDS

THE REASON FOR ENVIRONMENTAL STANDARDS IN AGRIFOOD PRODUCTS: ENVIRONMENTAL LEAKAGE

The world is facing growing environmental pressures, including air and water pollution, soil degradation, deforestation, biodiversity loss, and, more frequently, extreme weather-related events that negatively affect human development. In turn, climate change is compromising food security and supply chain resilience, with related natural disasters driving up food prices. Under the free market system, increasing productivity has been emphasized as the way to meet rising global demand for food due to a growing population.

Creating food systems that are able to feed the growing global population is clearly critical, but it is not enough to feed people—these systems must be sustainable as well. The methods of food production are recognized as a major contributor to global warming. In 2018, worldwide total agricultural and related land use emissions reached 9.3 billion tons of carbon dioxide equivalent (Gt CO_2eq). Crop and livestock activities within the farmgate generated more than one-half of this total (5.3 Gt CO_2eq), with land use and land use change activities responsible for nearly 4 Gt CO_2eq. These components were 4.6 and 5.0 Gt CO_2eq, respectively, in 2000. During the 2000s, emissions from within the farmgate and those from land use both increased, and then trends in these two components began diverging. Emissions from crops and livestock activities grew over the entire 2000–2018 period and were 14 percent larger in 2018 than in 2000. Conversely, emissions from land use and land use change decreased over this period, consistent with observed decreases in deforestation. As a result, combined farmgate and land emissions due to agriculture were about 4 percent lower in 2018 than in 2000. In 2018, agriculture and related land use emissions accounted for 17 percent of global greenhouse gas (GHG) emissions from all sectors, down from 24 percent in the 2000s (FAO 2020).

Climate and food systems are in a reciprocal relationship, which means climate shocks impact food systems, and vice versa. Consequently, there is significant and growing recognition of the need to rapidly transform food systems to reduce their environmental impact as an essential aspect of climate action. Moving toward sustainability in agriculture and food systems from farm to fork, has become an ever more urgent topic of international debate of corporate and government/regulators and due to final consumers' concerns.

Two-thirds of the average company's environmental footprint lies with suppliers ("scope 3" - encompasses emissions that are not produced by the company itself and are not the result of activities from assets owned or controlled by them but by those that it's indirectly responsible for up and down its value chain). Thus, building a future-proof and sustainable worldwide food system will require collaboration along value chains to reduce environmental impacts with an end-to-end traceability system to ensure accountability. This seeks to avoid environmental leakage in the upstream supply chain based on less demanding local regulations to the detriment of climate action. There is a need to understand and manage environmental impact through every part of the business into relevant and transferable product-level data with value-chain partners in a new sustainable ecosystem.

With targeted and well-designed public and private environmental requirements or standards that respond to the implementation of more environmentally friendly good practices under independent certifications, food systems can promote and demonstrate sustainable development, improve their competitiveness, and differentiate their product offerings. Features of the current market context are continued growth and expanding coverage of environmental standards in food products.

GENERAL DESCRIPTION OF THE STANDARD UNIVERSE APPLICABLE TO AGRIFOOD PRODUCTS (PRODUCTS AND MARKETS)

According to the sixth edition of the *State of Sustainable Markets*,[29] sustainability standards continued overall to expand their land coverage for agriculture and forestry in 2020.

The global economy was hit hard by the COVID-19 pandemic, with global disposable income decreasing and lockdown restrictions. Overall consumption of nonessential, higher-priced products and services, including items covered by certified sustainability standards, has reduced, although consumers are more aware of sustainable options. Buyers, traders, manufacturers, and retailers are using sustainability standards to show consumers and governments that their supply chains comply with safeguarding requirements. These trends vary by geography and commodity market. Developed countries have greater prospects for expanding sustainable consumption, due either to environmental awareness or to stricter environmental regulations related to National Determined Contributions (NDCs) and Zero Emission Targets in the Paris

29 https://digital.intracen.org/state-sustainable-markets-2021/state-of-sustainable-markets-2021/

Agreement. In low- and middle-income countries, the biggest barriers are higher costs and a lack of legal requirements and policies on sustainability issues.

The number of voluntary sustainability standards in the International Trade Centre's (ITC) Standards Map[30] has continued to grow; around 320 are currently active worldwide, and about 455 ecolabels (according to Ecolabel Index[31]) exist in 199 countries, covering 25 industry sectors. The ITC covers 160 standards specifically in agriculture, 111 of which apply to South America.

Growth in the number of certified products is driven by strong demand for products that are certified according to sustainability standards and is primarily initiated by large retailers and new public regulations. According to the Ecolabel Index mentioned in the previous paragraph, the most frequently covered products are agricultural products, followed by processed food. Sustainability standards now apply to millions of farms, plantations, and factories worldwide.

The overall market trends are:

- Slower but continued growth.
- Increased coverage of agricultural land (2015–2019, +30.9 percent; 2018–2019, +1.8 percent); certified area for agricultural commodities grew by at least one-third from 2015–2019.
- Dominance of single-sector standards (those certifying one commodity) in some sectors.
- Europe and North America drive demand; growth in other regions is not at the same pace.

DIFFERENTIATION BETWEEN PUBLIC AND PRIVATE STANDARDS

Public standards are those developed by states in accordance with their multilateral commitments, specifically in this case with the General Agreement on Tariffs and Trade (GATT)/World Trade Organization (WTO) rules. They can be voluntary or mandatory; the latter become market access conditions. Noncompliance with multilateral trade rules in the implementation of public standards opens the possibility of lawsuits before the WTO Dispute Settlement Body.

Private standards are exempt from the multilateral legal framework and are applied as contractual conditions between parties. As conditions of sale, they become conditions of access to the markets, without any demand mechanism in the face of commercial discrimination conditions.

Today, private commitments in value chains are imposed in international contracts between individuals, although the rise of the Paris Agreement and the commitments of parties reveal a growth in public standards.

30 https://standardsmap.org/es/identify?themes=
31 https://www.ecolabelindex.com/

EU REGULATION DESCRIPTION

Growing commitments within the Paris Agreement to address the global climate challenge in the short to medium term have led the European Union (EU) to position itself at the forefront of the regulatory scene.

In November 2019, the European Parliament declared a climate and environmental emergency in the EU, which triggered the Commission to present the European Green Deal in December of the same year. Its objective is to become the first climate-neutral continent by 2050. Consequently, in March 2020 the Commission proposed that this commitment become binding through the sanction of a European Climate Law, which was specified in June 2021. In addition to neutrality by 2050, this new legislation commits to a 55 percent reduction in emissions by 2030, called “FIT for 55.” Reportedly an objective for 2040 will be established at the EU level no later than a period of six months from the first global balance contemplated in Article 14 of the Paris Agreement. The Climate Law also includes measures to monitor progress and adjust community actions accordingly based on existing systems, such as the governance process for Member States' national energy and climate plans, regular reports of the European Environment Agency, and the latest scientific evidence on climate change and its impacts. Progress will be reviewed every five years, in accordance with the global stocktaking exercise under the Paris Agreement.

The European Green Deal includes a set of strategies that directly and indirectly affect agrifood systems, specifically in the production and marketing of food: the Biodiversity Strategy with its Forestation Strategy 2030; the Plan of Circular Economy; the Zero Pollution Objective; the Blue Economy Strategy; the Methane Strategy; and the Farm to Fork Strategy, which includes the Organic Action Plan, the Animal Welfare Plan, the Sustainable Use of Pesticides and Food Labeling, and the More Sustainable Transport Plan. All have implications on both the domestic provision of food (which is why it impacts the new Common Agricultural Policy 2023–2027) and the external supply of food. Because of this, a Border Carbon Adjustment Mechanism is also considered, although to date the mechanism has not yet been directly incorporated for food and feed.

In all these initiatives, the EU’s objective is to produce a multiplier effect from its climate action on a global scale, turning its commitments into global standards. Consequently, these conditions will not only be accessing requirements to the European market but to most world markets given the multiplier effects produced in globally integrated supply chains (often called the *"Brussels effect”).* Table 4.1 includes key points to consider in the environmental requirements that would impact food if the EU’s proposed regulatory process is developed.

Table 4.1: The EU's proposed environmental product requirements

Key points	Requirement description
Antimicrobials	Reduction of antimicrobial use
Animal welfare	Verifiable animal welfare
Biodiversity	Incorporation of biodiversity corridors in areas under agricultural production
Biodiversity	Species Protection IUCN Red List
Biodiversity	Protected species protection
Emissions	Implementation of the calculation of the Carbon Balance products complete life cycle; reduction in net emissions
Emissions	Reduction of methane emissions
Energy	Incorporation of renewable energies
Labeling	Environmental performance labeling by product with digital links
Fertilizers	Reduction in the use of chemical fertilizers (mainly phosphorous and nitrogen); incorporation of pest control through active biological substances/organic compounds
Forestation	Zero incorporated deforestation
Forestation	Sustainable use of timber resources
Forestation	Due diligence—documentary record, traceability and risk assessment plan, and risk mitigation plan
Logistics	Implement logistics of high environmental efficiency
Nutrients	Management plans to avoid loss of nutrients in the soil
Packaging	Industrial and final consumer waste reduction plan
Packaging	Use of recyclable inputs (such as paper, metal, plastic, and glass)
Packaging	Reduction of plastic and microplastic use
Pesticides	Reduction of chemical pesticides
Pesticides	Reduction of most dangerous pesticides
Sustainability	Implementation of verifiable/certifiable private and public standards
Waste	Industrial waste efficiency plan

All these impacts must be addressed at a particular level. It does not fulfill the requirement to present average values or default values without accreditations or documentary evidence.

Consequently, self-calculation must be encouraged. That is the reason why a work from a chain approach including the provision of all their inputs (scope 3) is a baseline condition.

WTO REGULATORY FRAMEWORKS FOR ENVIRONMENTAL TRADE-RELATED STANDARDS

Environmental standards applied to products are incorporated into the regulatory process at the multilateral level within the WTO framework.

In 1995 the members made sustainable development an explicit guiding principle for the newly created organization, incorporating it in the first paragraph of the Marrakesh Agreement, which states that “sustainable development and the protection of the environment are central objectives of the multilateral trading system.” Recalling the joint UN-WTO initiative Healthier Environments through Trade, the Nairobi Ministerial Declaration, and the 2030 Agenda for Sustainable Development in 2015 that emphasizes the role trade plays in promoting sustainable development, WTO members acknowledged that trade and environment are mutually supportive. This issue is addressed in the WTO Committee on Trade and Environment (CTE), established in 1994, and in other WTO regular Committees or Bodies where environment issues arise, such as the Negotiating Group on Rules (fisheries subsidies), the Technical Barriers to Trade and Application of Sanitary and Phytosanitary Measures, and the Committee on Agriculture and Committee on Trade and Development. Additionally, the WTO Secretariat constantly collaborates with UN environmental entities to ensure mutual supportiveness between trade and environmental policies.

The CTE was created to identify the relationship between trade measures and environmental measures, to promote sustainable development, and to make appropriate recommendations on whether any modifications of the provisions of the multilateral trading system are required, compatible with the open, equitable, and nondiscriminatory nature of the system. The CTE also serves as a forum where UN Environment and the secretariats of several multilateral environmental agreements (MEAs) regularly brief WTO members on their work.

At the Doha Ministerial Conference in 2001, WTO members recognized that under WTO rules no WTO member should be prevented from taking measures for the protection of the environment at levels it considers appropriate as long as such measures are not applied in a manner that would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail (that is, a disguised restriction on international trade).

As a general clause, WTO members are free to adopt environmental policies, such as environmental requirements and taxes, at the level they choose, even if they significantly restrict trade, as long as they do not introduce unjustifiable or arbitrary discrimination or disguised protectionism as an excuse to protect domestic producers. As clarified by environment-related disputes at the WTO, environmental trade-related measures have to be (1) coherent, (2) fit-for-purpose, (3) mindful and holistic, and (4) flexible to reduce the distortionary effects of nontariff measures

(NTMs) and to provide the stability and predictability needed for international trade to play its full role for the achievement of sustainable development.

The WTO's legal framework always tries to strike a very delicate balance between the interests of (1) protecting legitimate values such as human animal and plant health and the environment and (2) maintaining open markets. To preserve this balance, WTO members adopting NTMs need to ensure that they are: nondiscriminatory; no more trade-restrictive than necessary measures to achieve their objective; based on scientific studies or international standards; and administered through efficient administrative procedures (GATT Article XX). Additionally, it is important to provide developing country exporters affected by the measure with technical and financial assistance to comply with its requirements, including conformity assessment and development of international standards. Thus, the WTO, together with other international agencies (FAO, WHO, OIE, and the World Bank), established the Standards and Trade Development Facility (STDF) to ensure that environment and trade are mutually supportive, and to promote the use of trade to deliver on the environmental and resilience agenda.

In Doha WTO members agreed on three negotiating topics: defining the relationship between the WTO and MEAs; eliminating trade barriers on environmental goods and services; and clarifying and improving WTO disciplines on fisheries subsidies, considering this sector's importance to developing countries.

At the WTO's 10th Ministerial Conference held in Nairobi in 2015, WTO members delivered a major part of this target by adopting the WTO Ministerial Decision on Export Competition. This decision eliminates agricultural export subsidies and sets out new rules for export credits, international food aid, and exporting state trading enterprises.

In Buenos Aires, at the WTO's Eleventh Ministerial Conference held in December 2017, ministers agreed to continue to engage constructively in fisheries subsidies negotiations and to set themselves a goal for the conclusion of these negotiations by the next Ministerial Conference.

In November 2020 53 members sponsored a structured discussion on trade and environmental sustainability (TESSD) to complement the existing work of the CTE and other relevant WTO committees and bodies. At the first meeting, which took place virtually on March 5, 2021, Brazil, Ecuador, El Salvador, and Paraguay introduced a written proposal highlighting the key role of the agriculture sector in achieving sustainable development and calling on TESSD participants to look at the environmental impacts of agricultural subsidies, along with the role of environment-related standards and regulations on agricultural trade. The Ministerial Statement underscoring the need for inclusive approaches that reflect the circumstances of the diversity of the WTO's membership and their specific development needs, adopted in December 2021, sets out future work in areas such as trade and climate change, trade in environmental goods and services, circular economy, and sustainable supply chains. Specifically, the parties agreed to identify and compile best practices, and to explore opportunities for voluntary actions and partnerships to ensure that trade and trade policies are supportive of and contribute to: (1) achieving a more

resource-efficient circular economy; (2) promoting sustainable supply chains and addressing the challenges and opportunities arising from the use of sustainability standards and any related measures, in particular for developing members; and (3) promoting and facilitating access to environmental goods and services, including encouraging the global uptake of new and emerging low-emission and other climate-friendly technologies.

As of October 2023, 75 WTO members[32] participate in the TESSD, from all regions (Latin America: Chile, Colombia, Ecuador, and Uruguay) and at all levels of development: least developed, developing, and developed countries. Ambassador Nadia Theodore (Canada) and Ambassador Gloria Abraham Peralta (Costa Rica) jointly coordinate this initiative, which is open to all WTO members.

Based on the TESSD Work Plan 2022 (INF/TE/SSD/W/17/Rev.1), informal working groups were created to allow for more in-depth discussions and make progress toward tangible outcomes on: trade-related climate measures; environmental goods and services; economy-circularity; and subsidies. These working groups held informal meetings in May 2022. The World Bank made a special presentation on “Measuring and comparing carbon pricing and the pricing of embodied and transport emissions” that emphasized (1) that private sustainability certificates are a widely used instrument for proving better-than-average production standards, and (2) that governments are using private certification companies for cross-border rule enforcement. Sustainability certificates often include more requirements than just low-carbon production, causing a chain of very important efforts to achieve the necessary certifications. Therefore, it is necessary to subsidize certification in developing countries. At the same meeting, the United Nations Industrial Development Organization (UNIDO)—a specialized UN agency that promotes industrial development for poverty reduction, inclusive globalization, and environmental sustainability—presented its positions regarding “Supporting industrial decarbonization in developing countries.”

32 TESDD Members: Albania; Australia; Austria; Bahrain, Kingdom of; Belgium; Bulgaria; Cabo Verde; Canada; Chad; Chile; China; Colombia; Costa Rica; Croatia; Cyprus; Czech Republic; Denmark; Ecuador; Estonia; European Union; Fiji; Finland; France; the Gambia; Germany; Greece; Honduras; Hong Kong, China; Hungary; Iceland; Ireland; Israel; Italy; Japan; Kazakhstan; Korea, Republic of; Latvia; Liechtenstein; Lithuania; Luxembourg; Macao, China; Maldives; Malta; Mexico; Moldova, Republic of; Montenegro; Netherlands; New Zealand; North Macedonia; Norway; Panama; Poland; Portugal; Romania; Russian Federation; Saudi Arabia, Kingdom of; Senegal; Singapore; Slovak Republic; Slovenia; Spain; Suriname; Sweden; Switzerland; Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu; Tajikistan; Turkey; Ukraine; United Kingdom; United States; Uruguay; Vanuatu.

ANALYSIS OF SINGLE SECTOR AND MULTIPLE COMMODITY STANDARDS THAT APPLY TO THE SOUTHERN CONE'S MAIN EXPORT PRODUCTS

GENERAL METHODOLOGICAL DESCRIPTIONS OF ENVIRONMENTAL STANDARDS: POTENTIAL IMPACT CATEGORIES, LIFECYCLE ASSESSMENT, SCOPE, AND FUNCTIONAL UNITS

The environmental standards applied to products are based on a lifecycle assessment (LCA). The LCA, a standardized method (ISO 14.044) of calculating the potential environmental impact of a product, has three different scopes:

- Cradle to gate,
- Cradle to grave, and
- Cradle to cradle, considering a circular economy.

Consequently, successive production stages must be considered in the LCA: raw materials, processing, transport, retail/use, and waste. This method requires a chain approach since the upstream impact affects the result of each subsequent stage. For example, emissions generated by the production and logistics of an input used in a field must be considered, in addition to emissions that this input generates due to its use in the field. Selection of inputs is thus a strategic point when addressing environmental impacts.

The definition of a functional unit (FU) is essential for building and modelling a product system in an LCA. An FU is a quantified description of the function of a product that serves as the reference basis for all calculations regarding impact assessment.

To carry out an LCA one must define the product to measure, its scope, and its impact category (CO_2, water, etc.). Next, the activity data must be collected and converted to potential impacts. The result must be interpreted to compare it with the emissions of a like product and to identify how the production process can be improved.

ENVIRONMENTAL POTENTIAL IMPACT CATEGORIES

When considering environmental standards, different categories of potential impact exist. The environmental footprint developed by the EU currently includes more than 14 impact categories. When analyzing an environmental requirement, the first step is to identify the category of potential impact.

Table 4.2: Environmental impact categories

Impact category / Indicator	Unit	Description
Climate change – total, fossil, biogenic and land use	kg CO_2-eq	Indicator of potential global warming due to emissions of greenhouse gases to air. Divided into 3 subcategories based on the emission source: (1) fossil resources, (2) bio-based resources, and (3) land use change.
Ozone depletion	kg CFC-11-eq	Indicator of emissions to air that cause the destruction of the stratospheric ozone layer.
Acidification	kg mol H+	Indicator of the potential acidification of soils and water due to the release of gases such as nitrogen oxides and sulphur oxides.
Eutrophication – freshwater	kg PO_4-eq	Indicator of the enrichment of the freshwater ecosystem with nutritional elements due to the emission of nitrogen- or phosphor-containing compounds.
Eutrophication – marine	Kg N-eq	Indicator of the enrichment of the marine ecosystem with nutritional elements due to the emission of nitrogen-containing compounds.
Eutrophication – terrestrial	mol N-eq	Indicator of the enrichment of the terrestrial ecosystem with nutritional elements due to the emission of nitrogen-containing compounds.
Photochemical ozone formation	kg NMVOC-eq	Indicator of emissions of gases that affect the creation of photochemical ozone in the lower atmosphere (smog) catalyzed by sunlight.
Depletion of abiotic resources – minerals and metals	kg Sb-eq	Indicator of the depletion of natural no fossil resources.
Depletion of abiotic resources – fossil fuels	MJ, net calorific value	Indicator of the depletion of natural fossil fuel resources.
Human toxicity – cancer, non-cancer	CTUh	Impact on humans of toxic substances emitted to the environment. Divided into noncancer- and cancer-related toxic substances.
Ecotoxicity (freshwater)	CTUe	Impact on freshwater organisms of toxic substances emitted to the environment.
Water use	m3 world eq. deprived	Indicator of the relative amount of water used, based on regionalized water scarcity factors.
Land use	Dimensionless	Measure of the changes in soil quality (biotic production, erosion resistance, mechanical filtration).
Ionizing radiation, human health	kBq U-235	Damage to human health and ecosystems linked to the emissions of radionuclides.
Particulate matter emissions	Disease incidence	Indicator of the potential incidence of disease due to particulate matter emissions.

Source: European Commission – Product Environmental Footprint.

ANALYSIS OF STANDARDS APPLICABLE TO THE SOUTHERN CONE'S MAIN EXPORT PRODUCTS

The following section analyzes 11 standards that are applied to food and feed produced in South America. Table 4.3 contains a brief description of each one, the products affected, its impact categories/principles or pillars, the methodology used, the chain of custody or traceability system proposed, and the impact data available at the regional level.

The standards surveyed cover both the production level and the value chain, understanding that calculation of the impact must accompany the product. In many cases, two different standards are presented.

Although the impact categories covered are mostly triple impact (environmental, social, and economic), a wide dispersion or specificity in each product emerges. For example, for wood products, non-deforestation is essential, while in matters of fishing, health and nonpollution are essential.

All present a chain of custody of the certified matter to maintain certifiable traceability; in some cases, this is strict, with 100 percent segregation; in others, more lax diligence processes allow the use of mass balance.

As a primary supplier of food and bioenergy, Latin America participates heavily in the impact measurements made by each standard. Thus, this practice is not falling into disuse, but has been reinforced post-pandemic as a condition of sale.

ANALYSIS OF IMPLEMENTATION OF ENVIRONMENTAL REQUIREMENTS BY LOCAL EXPORTERS IN COLOMBIA, ARGENTINA, BRAZIL AND CHILE

The existence of environmental standards with an impact on market access has led main local production chains to implement impact calculations and work on continuous improvement on baselines through good environmental practices. Table 4.4 describes six programs implemented in Colombia, Argentina, Brazil, and Chile.

Table 4.3: Standards applicable to the Southern Cone's main export products

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification– Chain of Custody**	Data–Southern Cone
Rainforest Alliance  **UTZ Certification (Now Part of the Rainforest Alliance)**  	Coffee Cocoa Tea Bananas Others: Flowers, palm oil, fruits, spices, nuts, no timber products	**2020 Sustainable Agriculture Standard: Farm Requirements** ** Small farms/Large farms/Group management/Individual certification differentiation **2020 Sustainable Agriculture Standard: Supply Chain Requirements**	**Rural Livelihood** -Income and shared responsibility **Human rights** - Social and work conditions **Farming** -Planting and rotation/Integrated Pest Management (IPM)/Genetically modified organism (GMO)/Soil fertility/Agrochemicals management/Harvest and postharvest practices **Environment** - Biodiversity and forestry/Zero deforestation/Water/Waste/Energy/Greenhouse gas reduction	**Smart Meters** -After supplying information about their set-up, producers receive the requirements that are applicable to them. All requirements in the document could potentially be applied, but the context within which a company is operating will determine the extent to which this is the case. In line with the Rainforest Alliance's Continuous Improvement approach to the 2020 Certification Program, many of the innovations in the standard will use a **'stepwise' approach** to	**IT Platform** -New IT-based tools will progressively be made available to farmers, certificate holders, and supply chain actors to better track and manage sustainability performance against the requirements of the Sustainable Agriculture Standard. **Mass Balance** **Geospatial analysis** is used to support and monitor the performance against key requirements of the Sustainable Agriculture Standard. **Farm Intelligence App -**A digital tool to ensure producers have access to credible data that supports decision-making on management and continuous farm improvement.	**Tea** -Argentina, Ecuador In 2020, the estimated certified volume increased by 10% compared to last year. In 2020, the number of farmers grew slightly by 2% compared to 2019, driven by increases in Latin America and Asia Pacific. Most certified tea was sold from producers in Kenya, Argentina, and Malawi. The global sales increase is reflected in Latin America (+37% -60.987 MT). On regional level, certified tea from Africa had the highest production market share (91%), followed by Latin America (89%) and Asia Pacific (11%). Latin America has the highest share of certified sales, with 84% of certified production sold as Rainforest Alliance Certified. **Cocoa** -Costa Rica, Dominican Republic, Ecuador, Peru In 2020, the number of workers increased. Ecuador is responsible for the increase in Latin America (+96%). The global decrease in sales is felt in Africa and Latin America (-9% and -3%, respectively). Most certified cocoa was sold by Latin America producers from Ecuador (7%). In 2020, the number of supply chain actors within the program increased by 41%. All regions

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification–Chain of Custody**	Data–Southern Cone
				sustainability, which introduces requirements gradually over time.		show an increase. A decrease in estimated certified volume is shown in all regions; Africa (-27%), Latin America (-18%), Asia and Pacific (-7%). **Bananas** -Belize, Brazil, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Suriname In 2020, estimated production area increased by 2% over 2019, predominantly in Latin America, mainly due to gains in Guatemala (+15%) and Ecuador (+12%). In 2020, the number of farmers decreased by 3% over 2019, primarily due to a decrease in Latin America. In 2020, the estimated certified volume increased by 2% compared to 2019, with the largest absolute increases in Latin America. The top 3 producing countries are Colombia, Costa Rica, and Guatemala. **Coffee** -Brazil, Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Peru In 2020, the estimated certified volume increased by 15% compared to 2019, with most increases (in MT) coming from Latin America. Africa saw 24% growth, while estimated volume in Asia Pacific decreased by 4%. The top 3 producing countries are Brazil, Colombia, and

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification–Chain of Custody**	Data–Southern Cone
						Ethiopia. The global Rainforest Alliance coffee sales remained stable, with a slight increase of 2%. Most Rainforest Alliance Certified coffee was sold from producers in Brazil (42% of global sales), Colombia (20%), and Guatemala (7%).
4C	Coffee	4C certification applies high standards on economic, social, and environmental conditions for coffee production and processing to establish sustainable, trustworthy, and fair coffee supply chains. 4C Compliant Coffee is coffee that has been produced in accordance with the **4C Code of Conduct**, a set of baseline sustainable practices and principles for the production of green coffee beans. Compliance can be demonstrated through the 4C Certification System and the 4C Certificates that are subsequently issued.	**Economic dimension**: Business management, Capacity and skill development, Access to services and market information, Traceability **Social Dimension**: Human and labor rights, Working conditions **Environmental Dimension**: Biodiversity and High Carbon Stock (HCS) areas, Use of pesticides, Soil, Water, Waste, Energy	The 4C Code of Conduct applies to any type of producing entity (4C Units) based in any coffee-producing country that wishes to produce and sell coffee as 4C compliant. The 4C Unit concept is inclusive and covers any type of production facility and/or process (a group of small-scale farmers, a cooperative or a farmers' association, a collecting station, a mill, a local trader, an export organization, or even a roaster).	**Mass segregation** (1.4.1)	Vietnam, Brazil, and Colombia are the top 4C-certified countries. Countries with the largest number of 4C-certified producers per region: Latin America: Colombia 101,383, Mexico 12,378, Peru 8,905

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification– Chain of Custody**	Data–Southern Cone
				There are two prerequisites to qualify as a 4C Unit: (1) Be able to produce and supply a minimum of one container of green coffee (20 tons) and (2) Have a person or a group of people (Managing Entity or ME) who can ensure the implementation of the 4C Code of Conduct.		
Better Cotton 	Cotton	Better Cotton is the world's leading sustainability initiative for cotton. A critical component of the Better Cotton Standard System is the **Better Cotton Principles and Criteria (P&C)**, which lay out the global definition of Better Cotton through seven guiding principles.	**Crop protection practices** **Water stewardship** **Soil health** **Biodiversity and land use** **Fiber quality** **Decent work and gender equality** **Effective management system**	Better Cotton Initiative (BCI) distinguishes between three categories of farmers (smallholders, medium farms, and large farms) in recognition of the differences in production methods and workforces they use. BCI distinguishes between Core	From the farmers who grow Better Cotton to the companies that source it, the Better Cotton Chain of Custody (CoC) is the documentation and evidence of Better Cotton as it moves through the supply chain. It ensures that the volume of Better Cotton claimed by Better Cotton Retailer and Brand Members does not exceed the volume of Better Cotton produced by licensed Better Cotton Farmers in any given time. The Better Cotton CoC Guidelines incorporate two different chain of custody models: **product segregation between the farm and gin and mass balance beyond the gin.**	Brazil (ABR) - Brazil is one of the world's largest cotton producers, with primarily large, mechanized farms. The Associação Brasileira dos Produtores de Algodão (ABRAPA) became a Better Cotton Implementing Partner in 2010. In 2014 ABRAPA became a Strategic Partner after completing a thorough benchmarking process that aligned ABRAPA's own sustainable cotton program, the Algodão Brasileira Responsável (or ABR programme), with the Better Cotton Standard. This means that cotton farmers growing cotton in a way that respects the ABR programme

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification– Chain of Custody**	Data–Southern Cone
				and Improvement Indicators. Underpinning the Principles & Criteria is the fundamental premise that producing Better Cotton respects national and other applicable law. Cotton producers should always abide by national legislation, unless that legislation sets standards that are below the referenced internationally recognized standards and conventions, in which case, the international standards prevail. However, where national legislation sets higher requirements on a specific issue than these standards, national		can sell their cotton as Better Cotton. 360 licensed farmers 2,334,000 tons Better Cotton 1,235,000 hectares harvested In a tropical climate with intense pest pressure, Brazilian farmers face a real challenge in reducing their use of pesticides to protect their crops. The boll weevil pest presents a particular threat to healthy cotton crops. Over the past few years, as the Brazilian government has introduced more stringent labor rights regulations, ABRAPA has modified its own sustainable cotton standard to reflect the legal updates.

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification– Chain of Custody**	Data–Southern Cone
				legislation applies.		
RTRS 	Soy / Biofuels Corn	The RTRS (Round Table on Responsible Soy Association) is a nonprofit organization promoting the growth of production, trade, and use of responsible soy. It works through cooperation with those in, and related to, the soy value chain, from production to consumption. It is a global platform for multistakeholder dialogue on responsible soy. It is in charge of the development, implementation, and verification of a global certification standard. The RTRS Standard for Responsible Corn Production is complementary to the RTRS Standard for Soy Production and can be implemented for RTRS-certified soybean producers. It provides for	**Legal compliance and good business practices** **Responsible labor conditions** **Responsible community relations** **Environmental responsibility (pollution, waste, GHG, biodiversity)** **Good agricultural practices** **Ensures zero deforestation and zero conversion soy production.** **Non-GMO chain of custody**	The RTRS Standard for Responsible Soy Production is a holistic certification scheme including five principles and 108 mandatory and progressive compliance indicators. RTRS Certification for Responsible Soy Production is valid for 5 years with mandatory annual surveillance audits.	The RTRS Chain of Custody (CoC) Standard describes the requirements for the different traceability systems an organization can implement to keep control of RTRS-certified material inventories, either soybean or soy byproducts. It can be applied across the entire supply chain and is mandatory for organizations wishing to receive, process, and trade RTRS soy. **Country Material Balance, Mass Balance and Segregation** **Marketplace platform**: Once certified against the RTRS Standard for Responsible Soy Production, the producer is granted credits equivalent to the volume of certified soy production (1 ton of RTRS-certified soy is equivalent to 1 credit). The same applies for the new RTRS Standard for Responsible Corn Production. Organizations willing to support responsible soy and corn production and supply and/or to balance the impact of soy and corn used in their products can acquire RTRS credits.	**Soy**: Brazil, Argentina, Paraguay, and Uruguay

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification– Chain of Custody**	Data–Southern Cone
		compliance with 14 more indicators additional to the 108 mandatory and progressive compliance indicators.				
Pro Terra	Food Feed	The ProTerra Standard has a long-standing history and experience in promoting sustainability in the food and feed supply chain and segregated non-GMO materials. **The ProTerra Standard version 4.1** The ProTerra Certification is applicable to distinct levels of operation across the food and feed production chains: • Level I: Agricultural production • Level II: Transport, storage, traders, and dealers • Level III: Industrial processing The ProTerra Standard distinguishes between core and noncore	**Human rights and good labor practices** such as workplace safety, equal opportunities, and particular attention to preventing child and forced labor. **Good agricultural practice**s, regarding soil fertility, water management, and continuous efforts to reduce the use of fertilizers and pesticides; **Deforestation, biodiversity, high conservation values.** Special focus through rigorous **non-GMO requirements.**	The ProTerra Certification Standard is organized in principles, criteria, and indicators. The 10 ProTerra Standard principles are: 1: Compliance with law, international conventions, and the ProTerra Standard 2: Human rights and responsible labor policies and practices 3: Responsible relations with workers and community 4: Biodiversity conservation, effective environmental management and environmental services 5: No use of	Traceability enables the market to have a full view over a product's journey, making it possible to identify if and where GMOs were used. The economic operator shall have, and shall consistently employ, standard operating procedures for maintaining full segregation for each lot of ProTerra-certified product from GMO materials from the point of receipt to the point of transfer to the next economic operator in the supply chain. Procedures and records may include, depending on the operation level: • Sampling plan for immunologically-based screening using strip tests; • Sampling plan for analyses; • Strip test procedure; • Strip test records; • Analysis reports; • Procedures for flushing or cleaning for product change in nondedicated sites.	ProTerra started as a non-GMO soy standard in Brazil and today is a global standard present in 42 countries, including Latin America.

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification– Chain of Custody**	Data–Southern Cone
		indicators. To be ProTerra-certified, organizations have to meet 80% of all indicators, in which all core indicators are included.		GMOs 6: Pollution and waste management 7: Water management 8: Greenhouse gases and energy management 9: Adoption of good agricultural practices 10: Traceability and Chain of Custody organizations become ProTerra-certified by demonstrating adherence to each principle, criteria, and indicator of the Standard that are relevant to their business.		
ISCC/ISCC Plus	Food Industrial applications Feed Energy	ISCC is a globally applicable sustainability certification system and covers all sustainable feedstocks, including agricultural and forestry biomass, circular and bio-based materials, and renewables.	**Ecological sustainability** Protection of land with high biodiversity value or high carbon stock Deforestation-free supply chains Environmentally responsible	ISCC EU has successfully passed the preliminary assessment of the European Commission for formal recognition under the Renewable Energy	Traceability throughout the supply chain enables each player to source sustainable products from any certificate holder. All relevant elements of the supply chain must obtain a certificate to handle sustainable materials. For final products processed from agricultural feedstocks or crop residues, the first two relevant elements of the supply chain are the farm or plantation	Presence in all Latin American countries. ISCC Plus: Guatemala, Colombia, and Honduras are the top certified countries.

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification–Chain of Custody**	Data–Southern Cone
			production to protect soil, water, and air **Social sustainability** Safe working conditions Compliance with human, labor, and land rights **Compliance with laws and international treaties** **Monitoring of greenhouse gas (GHG) emissions** Methods to calculate GHG emissions Monitoring of GHG reduction Compulsory for EU biofuels market **Good management practices** In addition to the core requirements, interested parties can choose from a set of voluntary add-ons, such as: Water, energy, No GMO, GHG.	Directive (RED) II. ISCC Plus is a voluntary certification standard for nonregulated markets.	and the first gathering point, also known as country elevator. For final products derived from alternative raw materials, such as wastes or residues, the first two relevant elements of the supply chain are the point of origin and the collecting point.	

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification– Chain of Custody**	Data–Southern Cone
Bonsucro	Sugarcane	Bonsucro is the leading global sustainability platform and standard for sugarcane. **3.0 The global sugarcane platform** (2016 onwards)	Environmental indicators: **Greenhouse gas emissions, Water use, Fertilizers, Agrochemicals, Yields** Social indicators: Accident rate, Working hours, Wages	There are two types of Bonsucro certification: one on the production end of the supply chain and one on the trading side. The "**Bonsucro Production Standard**" contains principles and criteria for achieving sustainable production of sugarcane and all sugarcane-derived products in respect of economic, social, and environmental dimensions. The "**Bonsucro Mass Balance Chain of Custody Standard**" contains a set of technical and administrative requirements for enabling the tracking of claims on the sustainable	The Chain of Custody (CoC) Standard concerns the supply of a product including all stages from the feedstock production up to consumption. It is proof of sourcing and trading responsibly – it provides assurance that claims of compliance can be tracked along the supply chain. The Standard describes the requirements to ensure the traceability of Bonsucro-compliant claims by implementing **a mass balance supply chain model. Bonsucro follows a mass balance approach for tracing Bonsucro-certified claims in the supply chain, ensuring that at every point in the supply chain, volumes of Bonsucro-certified outputs match volumes of Bonsucro-certified inputs.** Any organization that wishes to make a claim regarding Bonsucro-certified material shall hold a valid CoC certificate.	Brazil: 72 certified mills, 55 members, 4,809,662.71 tons (certified sugar volume), 83 organizations with Chain of Custody certificate Americas without Brazil: 25 certified mills, 68 members, 867,013.89 tons (certified sugar volume), 40 organizations with Chain of Custody certificate Membership growth in 2020 - Latin America: 44%

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification–Chain of Custody**	Data–Southern Cone
				production of Bonsucro sugarcane and all sugarcane-derived products along the entire supply chain, from fields to mill including transportation, through to production (for example, conversion, processing, manufacturing, transformation), to warehousing, transportation and trade, to the use of sugarcane and all sugarcane derived products. Full compliance with the 16 core indicators (plus Principle for certification against Bonsucro EU) is required, plus a minimum of 80 % of all the indicators must be satisfied. To be considered		

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification– Chain of Custody**	Data–Southern Cone
				satisfied, an indicator that applies to mill and farm must be met by both entities.		
FSC 	Wood - Timber	FSC is an international organization that provides a system for voluntary accreditation and independent third-party certification. This system allows certificate holders to market their products and services as the result of environmentally appropriate, socially beneficial, and economically viable forest management. FSC also sets standards for the development and approval of FSC Stewardship Standards, which are based on the FSC Principles and Criteria. In addition, FSC sets standards for the accreditation of conformity assessment bodies	Principle 1: Compliance with Laws Principle 2: Workers' Rights and Employment Conditions Principle 3: Indigenous Peoples' Rights Principle 4: Community Relations Principle 5: Benefits from the Forest Principle 6: Environmental Values and Impacts Principle 7: Management Planning Principle 8: Monitoring and Assessment Principle 9: High Conservation Values Principle 10: Implementation of Management Activities	Controlled wood is material from acceptable sources that can be mixed with FSC-certified material in products that carry the FSC Mix label. The controlled wood requirements identify **five categories of unacceptable sources for wood, which is not allowed to be mixed with FSC-certified material. These are: Illegally harvested wood Wood harvested in violation of traditional and human rights Wood**	FSC chain of custody certification verifies that FSC-certified material has been identified and separated from ineligible and unacceptable material as it makes its way along the supply chain from the forest to the market. FSC chain of custody certification covers a variety of situations and entities, ensuring that many organizations can demonstrate their commitment to FSC's requirements. This means that not only can single organizations be certified, but so can groups of independent organizations and organizations with multiple sites. An option even exists for certification of individual projects rather than organizations.	Brazil, Peru, Bolivia, Chile

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification– Chain of Custody**	Data–Southern Cone
		(also known as certification bodies) that certify compliance with FSC's standards. Based on these standards, FSC provides a system for certification for organizations seeking to market their products as FSC-certified.		**harvested in forests in which high conservation values (HCVs) are threatened by management activities** **Wood harvested in forests being converted to plantations or nonforest use** **Wood from forests in which genetically-modified trees are planted**		
PEFC	Wood - Timber	PEFC, the Programme for the Endorsement of Forest Certification, is a leading global alliance of national forest certification systems. **PEFC sustainable forest management certification** enables forest owners to provide assurances that they manage their forests in line with challenging	Criterion 1: Maintenance or appropriate enhancement of forest resources and their contribution to the global carbon cycle Criterion 2: Maintenance of forest ecosystem health and vitality Criterion 3: Maintenance and encouragement of productive functions of	It is PEFC's fundamental belief that forest certification needs to be local; this is why we choose to work with national organizations to advance responsibility for forestry. As an umbrella organization, PEFC endorses regional or	PEFC's chain of custody establishes the link from the forest to the market, tracking forest- and tree-based products from sustainable sources to the final product. In addition, this standard includes management requirements, including on health, safety, and labor issues. Three methods are used to implement the PEFC chain of custody: **the physical separation method, the percentage method, and the credit method**. Depending on the nature of material flows and processes, the organization shall choose the appropriate method.	With over 330 million hectares of certified forest, PEFC is the largest forest certification system in the world. Forest areas per country (hectares): Brazil 4,706,347 Brazilian Forest Certification Programme (CERFLOR) Chile 1,937,679 Chile Forest Certification Corporation (CERTFOR) Uruguay 602,485 PEFC Uruguay Argentina 352,640 Argentina Argentine Forest Certification System (CERFOAR)

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification– Chain of Custody**	Data–Southern Cone
		environmental, social, and economic requirements – balancing people, planet, and profit. It is a benchmark standard.	forests (wood and nonwood) Criterion 4: Maintenance, conservation, and appropriate enhancement of biological diversity in forest ecosystems Criterion 5: Maintenance or appropriate enhancement of protective functions in forest management (notably soil and water) Criterion 6: Maintenance or appropriate enhancement of socioeconomic functions and conditions	national forest certification systems that have been developed through multi-stakeholder processes and tailored to local priorities and conditions. While regional and national systems are developed locally, they need to be recognized internationally. To ensure consistency with international requirements, all regional and national forest certification systems undergo rigorous third-party assessment against PEFC's unique Sustainability Benchmarks before they can achieve endorsement.	For all material used as input for a PEFC product group, except recycled material, the organization shall exercise due diligence in line with the **PEFC Due Diligence System (DDS)** for the avoidance of material from controversial sources.	

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification–Chain of Custody**	Data–Southern Cone
BAP	Finfish Crustaceans Mollusks Echinoderms Medusozoans	Best Aquaculture Practices (BAP) is the only third-party aquaculture certification program that encompasses the entire production chain, including the processing plant, farm, hatchery, and feed mill. **Seafood Processing Standard** **BAP Farm Standard Mollusk Farms** **Hatchery Standard** **Finfish, Crustacean, & Mollusk Hatcheries & Nurseries** **Feed Mills** **Salmon Farms** **Biosecurity Area Management**	The full scope of the Seafood Processing Standard includes: • Food Safety Management and Related Requirements • Social Responsibility Requirements • Environmental Management Requirements • Animal Welfare Requirements • Effluent and Water Management Requirements	**BAP** is a seafood-specific certification program that addresses the four key areas of sustainability—environmental, social, food safety, and animal health and welfare—at each step of the aquaculture production chain. All requirements in the Standard shall be addressed.	The facility shall develop, maintain, and document appropriate traceability procedures and systems to include identification of batches of raw material, ingredients, in-process products, rework, outsourced processing, packaging, additives, and final product throughout the production process and any outsourced product, ingredient, or service. The facility shall operate a traceability recordkeeping process that provides timely, organized, accurate entries, performed and overseen by a designated trained person or traceability team responsible for collecting data, ensuring it is complete and accurate, and that traceability requirements are met. The facility shall document the total quantity of incoming raw material for each species and the total quantity of finished product produced per species and product form. The facility shall conduct a mass balance on this data based on the expected percentage processing yield by species and product form. The quantities and mass balance results shall be provided to the auditor for verification.	Certified producers in Chile, Brazil, Peru, Colombia, and Venezuela
MSC	Fish Shellfish	The MSC partners with sustainable fisheries across the globe, from large-scale industrial fisheries to small artisanal	**Sustainable fish stocks** **Minimizing environmental impact** **Effective**	The MSC Fisheries Standard is used to assess if a fishery is well-managed and	The MSC Chain of Custody Standard ensures that products from MSC-certified fisheries are traceable and separated from uncertified products.	Since MSC was founded in 1997, fisheries responsible for around 14% of marine catch have been certified to the MSC Fisheries Standard. More than 46,200 sites,

Standard	Products	General description	Impact categories/Indicators/Principles	Methodology	**Traceability Certification–Chain of Custody**	Data–Southern Cone
		fisheries, to drive the market for sustainable seafood.	**fisheries management**	sustainable. Certification to the MSC Fisheries Standard is voluntary. It is open to all fisheries that catch marine or freshwater organisms in the wild. This includes most types of fish and shellfish. The Seaweed Standard contributes to the health of the world's aquatic ecosystems by promoting environmentally sustainable and socially responsible use of seaweed resources.		including supermarket chains, restaurants, fishmongers, and hotels are now certified to sell seafood with the blue MSC label.

Table 4.4: Case studies of environmental standards – Colombia, Argentina, Brazil, and Chile producers

Cases	Country	Products	Environmental impact categories	General description	Traceability certification	Implementation data
FNC Rainforest Cauca - Federación Nacional de Cafeteros de Colombia - Fondo Nacional del Café	Colombia	Coffee	**Farming** - Planting and rotation/IPM/GMOs/Soil fertility/Agrochemicals management/Harvest and post-harvest practices **Environment** - Biodiversity and forestry/Zero deforestation/Water/Waste/Energy/Greenhouse gas reduction	Cauca is a leading department in the production of high-quality coffee. It is the 4th largest coffee producer nationwide in Colombia and the first in number of coffee families, with more than 90,000 families in 34 municipalities responsible for cultivating 93,000 hectares of Arabica coffee of the Castillo, Colombia, Caturra, Típica, Borbón, and Tabí varieties.	UTZ - Rainforest Alliance	Colombia UTZ Global Sales 2020: US$80,160 +46%
Argentine Carbon Neutral Program	Argentina	Food, feed, and bioenergy Oilseed Corn and sorghum Wheat Dairy (under development)	CO_2eq Good environmental practices	PACN is a private voluntary adhesion program developed to promote the consolidation of a sustainable brand for Argentine products from the food, beverage, and bioenergy export sectors. It comprises the main commerce and cereal stock exchange of Argentina. The program is implemented through roundtables hosted on a voluntary basis. Roundtables are formed by producers, groups and associations, companies, and	The development of sectoral manuals validated locally through the roundtables' commitment will allow any national producer or businessman to achieve—upon implementation—a successful environmental certification awarded by the certifying entities registered with the database of the program. In turn, the program has developed a communication seals system as a sustainability mark distinguishing 3 levels of Argentine food, beverages, and bioenergy: membership,	49% of Argentina's total exports in 2021 under the 3 manuals developed (61% of agro-industrial exports)

Cases	Country	Products	Environmental impact categories	General description	Traceability certification	Implementation data
				sectoral chambers from each of the productive value chain links, hence ensuring full national geographic representation. Each sectoral roundtable works toward the: * Identification of main export products with actual or potential carbon balance requirements * Identification of the functional units related to those products * Selection of the internationally accepted methodology to analyze and calculate carbon balance (GHG Protocol, ISO – International Organization for Standarization, Standard PAS British Standard Institution) * Methodological development of case studies to generate: Transparent and open calculator, based on the actual agronomical local practices, local data, and default data when locally accepted are not available; the Carbon Footprint Calculation Manual, developed to follow the	carbon balance, and carbon neutrality regarding the product's carbon performance.	

Cases	Country	Products	Environmental impact categories	General description	Traceability certification	Implementation data
				defined international methodological standard to access a future possible independent certification (globally accepted); the Environmental Best Practices Manual, to follow and implement actions toward emission reduction best practices aligned to UN´s Sustainable Development Goals and Global Reporting Initiative standards for performance evaluation and communication * Cross-sector validation of the constructed models to enhance practical tools applicable to all-size companies in the respective sector		
Embrapa - Carbon Neutral Beef	Brazil	Beef (silvopastoral)	CO_2eq	"Carbon Neutral Beef" (CNB) is a parameterized and auditable concept brand that aims to attest beef produced in integrated silvopastoral (livestock-forestry) or agrosilvopastoral (crop-livestock-forestry) systems, through the use of specific protocols that make the certification process possible. Its main goal is to	In the case of CNB meat, the norms for its production were established by Embrapa and, therefore, its certification must be carried out by a third party, that is, one that is not involved with the product to be certified. CNB meat can be certified by companies accredited to public or private bodies, at the federal, state, or municipal level, legally authorized by	Mafrig - Carne Viva

Cases	Country	Products	Environmental impact categories	General description	Traceability certification	Implementation data
				ensure that the animals that originated the product had their enteric methane emissions compensated during the production process by growing trees in the system. Besides that, the certification ensures that the animals were in a thermally comfortable environment through the presence of shade, with high welfare level, precepts that strengthen the brand.	Embrapa to grant the CNB seal.	
ABRAPA - Algodão Brasileiro Responsável (ABR)	Brazil	Cotton	Water Soil Biomass	The Responsible Brazilian Cotton (ABR) program is the synthesis of the union of cotton growers in favor of more sustainable cotton production in Brazil. The ABR proposes to: * Promote the progressive evolution of good social, environmental, and economic practices to build a good image for Brazilian cotton and gain space in the growing market for responsible cotton. * Continuously improve the sustainable management of production units, as they raise the level of compliance in relation to sustainability	The ABR certification and Better Cotton Initiative (BCI) licensing process is centered on the ABR program, as defined by benchmarking. By incorporating the BCI's minimum production criteria—mandatory compliance—the ABR meets the BCI requirements for granting the Better Cotton marketing license.	The ABR is currently developed in eight states: Maranhao, Mato Grosso, Goias, Bahía, Minas Gerais, Mato Grosso do Sul, Sao Paulo, and Piaui

Cases	Country	Products	Environmental impact categories	General description	Traceability certification	Implementation data
				criteria and the ABR program. * Disseminate the pillars of sustainability among associates, aligning the sector with the issues that guide governments, entities, and society as a whole.		
Sonapesca	Chile	Fishery	Sustainable fish stocks Minimizing environmental impact Effective fisheries management	Sonapesca has been developing a series of initiatives for the sustainability of marine resources. In 2018 it certified, under the Marine Stewardship Council (MSC), the fishing del jurel program, which recognizes sustainable fishing at a global level, leading to more certified fishing in Latin America. This work is added to the success obtained by the industrial fishing of 3 tyoes of shrimps from the north central and south-central zones of Chile, the Southern Merluza from the south zone, in addition to krill from the Antarctic zone, under this same standard. Sonapesca is a leader in the region with respect to MSC sustainability certifications.	MCS	

Cases	Country	Products	Environmental impact categories	General description	Traceability certification	Implementation data
Florverde 	Colombia	Any fresh-cut flowers or foliage	Water Soil Waste Biodiversity Energy CO_2eq	Florverde® Sustainable Flowers' history began in 1996 when the Association of Colombian Flower Exporters (Asocolflores) created a code of conduct for the flower sector, which led to the creation of Florverde® standards in 2002. During 2011, Florverde® underwent a strategic review and was renamed Florverde® Sustainable Flowers. The new name and identity not only reflect the desire to better communicate the benefits and positive impact of the standards, but also to reflect changes in the standards and its supporting structure – with greater transparency and improved impact assessment. Recognition with: FlorEcuador and Rainforest Alliance.	Certification is awarded by third-party certification bodies, such as Icontec and NaturaCert. The certification process includes reviewing farm documentation, inspecting farms, interviewing workers, and reviewing lab test results.	

These standards have allowed regional food suppliers to position themselves with added environmental value in different markets, in some cases even maintaining market access as well as building loyalty as sustainable suppliers in supply chains. They have also been used as a management tool to make the production process more efficient, and to access associated benefits, both commercial and financial, that were not being captured previously.

REGULATION PROPOSED TO IMPROVE INTERNATIONAL GOVERNANCE ON AGRIFOOD TRADE-RELATED ENVIRONMENTAL STANDARDS

TARIFF ELIMINATION FOR ENVIRONMENTALLY EFFICIENT AGRICULTURAL GOODS

Most food production depends on the rational management of ecosystem services and biodiversity. Keeping ecosystems healthy is the best way to ensure that agriculture is productive and sustainable. Protection and improvement of ecosystem services requires active contributions from producers, although they are not the only beneficiaries. Existing markets do not value ecosystem services because they are seen as public goods with positive externalities rather than as valuable products that could become unavailable if not properly managed. Thus, the benefits that producers obtain from management of ecosystem services are typically not directly proportional to the time and resources invested in the creation of ecological infrastructure. Consequently, **incentives** are needed in both the short and long term to encourage widespread adoption of sustainable production.

Maintaining access to markets using public standards or closing contracts via private standards are considered as the first incentive from a commercial point of view. Carbon credits are another incentive, considering the additionality, timing, and regulatory considerations needed by this type of carbon credit project, as well as the need to avoid double counting. The costs of sustainability must be shared equitably across the supply chain, and a balance between low conservation costs and high conservation benefits must be sought. If these two conditions are not met, sustainable production will not take place.

Additional incentives that favor implementation of environmental standards in food production are critical. One proposal is a trading system that applies tariff preferences to environmentally efficient agricultural products (EEAGs), like the Environmental Good Agreement (EGA). The characteristics of the new system should:

- Be generalized: Without discrimination of origin - nondiscriminatory treatment.
- Be preferential: Reduction/elimination of import tariffs – schedule to be defined.
- Have a fixed list of agricultural goods: Tariff chapters included: goods included in the WTO Agreement on Agriculture Annex I - the definition covers not only basic agricultural products

such as wheat, milk, and live animals, but also products derived from them, such as bread, butter, and meat, as well as all processed agricultural products such as chocolate and sausages. It also includes wines, spirits and tobacco products, fibers such as cotton, wool, and silk, and raw hides of animals intended to produce leather.

- Be environmentally efficient: Environmental goods are preferable when they are produced in ways that have a lower impact on the environment, as demonstrated by certification of an environmental standard.

- Consider a nonrestrictive nontariff treatment: Do not apply additional nontariff barriers at the border to prevent or limit the entry of products that will have zero or lower tariffs.

HARMONIZATION OF SUSTAINABILITY STANDARDS IN AN OVERLAPPING CONTEXT

A multiplicity of sustainability standards currently respond to different impact categories, scopes, custody chains, and certification schemes, and food production coexists with overlapping standards. These additional implementation efforts and costs are detrimental to their widespread adoption.

Although private environmental standards to date are outside the scope of application of multilateral agreements (grey zone or loopholes of the WTO) and public standards must be transparently adjusted to the principles of the WTO, a benchmarking or recognition process of all of them should be encouraged multilaterally to facilitate harmonization. To avert market fragmentation and trade protectionism, public and private players need to develop viable business models and strengthen national and international regulatory frameworks.

Once harmonized, based on science as formally established by the WTO, the development of the harmonized standards must include the involvement of the entire supply chain, and not be only defined at the end of it in the market access to the consumer market. In this development is important to recognize local legislation as a basic condition and promote their equivalence. In turn, it is essential that the recognition scheme driven at the multilateral level contains provisions for green technology transfer, generation of local capacity, technical assistance, and financial support to implement new standards and their consequent certifications, following the same logic established in the Trade Facilitation Agreement (TFA).

Although this is a commercial requirement of an environmental nature, it must be based on the principle of “common but differentiated responsibilities” to prioritize the different stages of development of the productive origins and their responsibility over the historical development of climate change. Although the requirement falls on domestic producers, it also applies to producers who export products to these markets without considering the differentiated responsibilities over climate change and the different stages of development. This is a principle protected by the multilateral framework.

If there is no local development of data, the origins must overcome this type of environmental requirements through default values that in many cases do not conform to local practices and penalize them in their impact results. The growing regulatory development of requirements at destinations exclude the origins experience and do not recognize their developments. At the same time, due to ignorance in many cases, destinations are classified as having high environmental risk, which deepens the requirements and certifications. This classification by origin or default characterization should not be thriven in the framework of multilateral trade harmonization to promote the individual responsible sustainable production.

It is a complex matter insofar as it requires not only considering the regulatory scaffolding at the commercial level within the WTO, but also the environmental framework within the United Nations Convention. It should be encouraged that the two systems, environment and trade, work synergistically without becoming environment a green barrier to trade. Trade is a tool to achieve sustainable development. If we don't harmonize sustainability standards, we are facing the risk of generating “environmental” trade frictions and commercial unpredictability for agriculture and agrifood businesses already strained by recent crises.

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CHAPTER 5:

A BALANCED TRANSFORMATION OF AGRIFOOD SYSTEMS: WHAT IS AT STAKE FOR GLOBAL FOOD SECURITY OBJECTIVES?

AGUSTÍN TEJEDA RODRÍGUEZ AND NELSON ILLESCAS

INTRODUCTION

Adding to the challenge of ensuring global food security, other global and environmental issues have emerged in recent decades: continuing global warming, the deterioration of natural resources such as water and soil; the loss of biodiversity; and the increase of epizootics that affect large geographical areas.

It is thus imperative to promote efficient and balanced development of national food systems and the global food system, so that they acquire a series of attributes related to: (1) the capacity to produce the quantity and variety of food necessary to meet global demand at reasonable and stable prices over time; (2) the environmental sustainability of production systems, so that they do not contribute to further deterioration of agricultural natural resources and increased global warming; (3) the safety of the food produced, preventing the spread of diseases transmissible to humans (zoonoses); (4) the nutritional quality of these foods; and (5) the economic and social sustainability of the economic agents involved in the production process (Piñeiro et al. 2021).

The difficulty lies in the fact that since multiple objectives exist, balanced development of the global food system must solve the tradeoffs that arise between those attributes, while considering the circumstances of each region and country. In particular, the world must meet all these new demands without affecting the contribution of food systems to global food security, which must continue to be a top priority, especially given the setbacks observed in hunger indicators because of the COVID-19 pandemic and the food crisis precipitated by the Russia-Ukraine war.

The international community has begun to take actions that allow us to understand and address present and future challenges and their linkage to food systems, such as the Food Systems Summit organized by the United Nations in 2021. There is an increasing perception of the need to establish international agreements that provide answers to these new concerns on both consumption patterns and food production processes.

But while multilateral negotiations progress at a slow pace, increasing unilateral public initiatives, mainly adopted by developed countries, involve changes in policies related to food production and consumption, with possible impacts on the rest of the countries and the world through international trade. As shown in previous chapters, such policies will affect agricultural trade over the next decade. They could impose additional costs on agricultural producers and food producing enterprises and affect trade flows, potentially negatively impacting food security and livelihoods globally.

International trade plays a very important role in meeting the global objectives mentioned here. According to OECD-FAO (2022), the share of food imports in global calorie availability increased from 19 percent in 2009–2011 to 22 percent in 2019–2021 and is projected to remain stable over the next decade. In this context, a transparent and predictable international trading system will be critical to mitigate emerging regional imbalances and support sustainable global development, particularly to meet the Sustainable Development Goals (SDGs) (Gadhok et al. 2020). Furthermore, the existence of fluid and barrier-free trade will contribute to environmental sustainability by providing guarantees and making possible the transformation of food systems in those regions that do not have the necessary natural resources, or have deteriorated them, or are implementing production systems harmful to the environment.

Countries with low population density, slow population growth, greater endowment of natural resources, and productive systems with better environmental performance will have the greatest possibilities for increasing their production and exports. In particular, the net exporting countries of the Southern Cone are expected to respond to the growing global import needs, reinforcing their position as the main net suppliers of food, thanks to a dynamic, innovative production and business model with high incorporation of technology.

Given this prospect, some relevant questions arise: What is the state of world food security and what are the main challenges under the current scenario? What is the role of Southern Cone countries? How do the new demands and concerns impact their food systems? What kind of transformations will be necessary in their food systems to acquire or maintain the aforementioned attributes? What tradeoffs are at stake? What will be the effects of the initiatives currently promoted by developed countries? What consequences will they have on global food security and the Southern Cone countries' contribution to it?

WORLD FOOD SECURITY UNDER THREAT

The long decline in world hunger that began in 2005 came to a halt in 2014, and the number of people experiencing undernourishment has slowly increased ever since. Moreover, progress in reducing child stunting has slowed significantly, and adult overweight and obesity continue to increase in rich and poor countries alike.

Several major drivers are behind these trends. Among them are conflicts, the growing frequency and intensity of extreme climate events, and economic slowdowns and downturns, which are

exacerbated by the underlying causes of poverty and very high and persistent levels of inequality.

The COVID-19 pandemic and related containment measures have made it significantly more challenging to achieve the goal of ending world hunger and malnutrition in all its forms by 2030. In 2020, the world witnessed an unprecedented setback in its hunger eradication efforts. The State of Food Security and Nutrition in the World of the FAO of 2022 (SOFI) shows that despite hopes that the world would emerge quickly from the crisis and food security would begin to recover from the pandemic, world hunger rose further in 2021. The increase in global hunger reflects exacerbated inequalities across and within countries due to an unequal pattern of economic recovery among countries and unrecovered income losses among those most affected by the pandemic. Food prices also increased in the past year due to bottlenecks in supply chains, soaring transport costs, and other disruptions caused by the pandemic.

FAO et al. (2022) estimated that between 702 million and 828 million people were affected by hunger in 2021. The prevalence of undernourishment rose at a slower pace in 2021 to 9.8 percent, after it jumped from 8.0 percent to 9.3 percent from 2019 to 2020. That number has grown by about 150 million since the outbreak of the pandemic – 103 million more undernourished people between 2019 and 2020 and 46 million more in 2021. In regional terms, the numbers show persistent disparities, with Africa bearing the heaviest burden. One in five people in Africa (20.2 percent of the population) was facing hunger in 2021, compared to 9.1 percent in Asia, 8.6 percent in Latin America and the Caribbean (LAC), 5.8 percent in Oceania, and less than 2.5 percent in North America and Europe. In LAC, the Caribbean presents the highest proportion of the population affected by hunger (slightly over 16 percent), compared with about 8 percent in Central America and South America.

Toward 2031, the United Nations Food and Agriculture Organization (FAO) projects a scenario of recovery, with a drop in undernourishment of 108 million people. Despite this favorable trend, the number suggests that nearly 670 million people will still be undernourished in 2030, 8 percent of the world population, the same as in 2015 when the 2030 Agenda was launched. The figures imply 78 million more people are undernourished than if the pandemic had not occurred, illustrating that the pandemic has had persistent effects on global food security, with greater inequality in access to food the main explanation for the difference.

It is important to point out that these figures do not consider the disruptive consequences of the recent Russian invasion of Ukraine in an already tight global food market. The war will have multiple implications for global agricultural markets, casting a shadow over the state of food security and nutrition for many countries in the near future.

In short, food security is threatened by disruptive factors—such as the pandemic, geopolitical conflicts, and climate change—that have heightened the challenge of achieving the Zero Hunger target by 2030. As FAO's report shows, the distance to reach many of the SDG 2 targets is growing wider each year, while the time to 2030 is narrowing. To end hunger and malnutrition in all its forms, the transformation toward more resilient, efficient, inclusive, and sustainable food systems must be the top priority for world food security.

TRADE AS A KEY ENABLER FOR FOOD SYSTEMS TRANSFORMATION

THE IMPORTANCE OF TRADE FOR FOOD SECURITY

In a scenario of growing populations, the global food system has been able to increase production and outpace population growth to meet a rising demand for food also associated with increased average per capita income, especially in emerging countries. This remarkable feat has been possible due to significant growth in productivity, especially in the most relevant crops in world trade, resulting from technological innovations coming from the global public-private research and development (R&D) system.

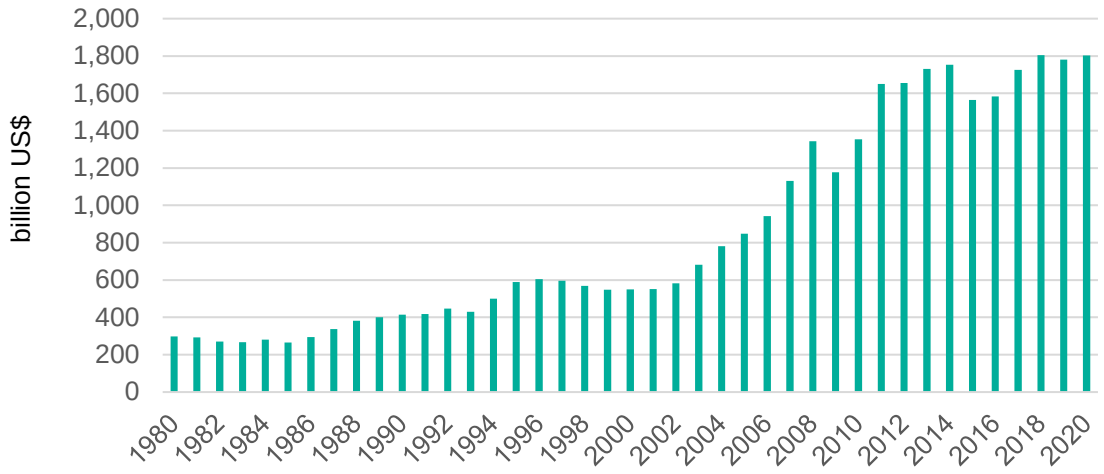
Food systems have undergone major transformations over the past 70 years due to: improved crop production and management techniques; developments in genetics and agrochemicals, with strategic contributions from biotechnology and genomics, microbiology, and other basic sciences; information and communication technologies (ICTs); and changes in transportation, packaging, and processing of primary products.

This evolution of food systems was favored by improved global trade regulations, providing for more open markets with rules agreed on by multiple parties. Trade plays a crucial role in food systems: it compensates for geographical differences between production and consumption; it serves as a stabilizer of international prices in the face of frequent weather events that affect production in regions around the world in different ways; and it promotes from a global perspective natural resource efficiency and conservation.

World trade in agri-food products has grown extraordinarily over the last 20 years (Figure 5.1). In the last two decades, the value of world imports of these products grew by 224 percent, reaching US$1.8 trillion in 2020.

This growth can be explained by different factors that have modified the way in which agro-industrial products are produced, consumed, and traded, among them: population growth and associated demographic changes; increased incomes and improvements in income distribution, especially in developing countries; urbanization; the greater participation of women in the labor market; logistical changes; the emergence of new ICTs; and sociocultural and lifestyle changes that have modified preferences and consumption patterns.

Figure 4.1: Evolution of agricultural trade value (billion US$), 1980–2020



Source: WTO Stats.

Most agricultural products have shown a significant increase in world imports: those linked to oilseed and cereals, vegetable oils and protein meals, and meats have led the increases. Thus, imports as a percentage of world consumption have increased for many agricultural products in recent decades (Table 1).

Table 5.1: Global import penetration by commodity (imports as % of consumption)

Commodity	1999–2001	2009–2011	2019–2021	Imports (000 Mtn[33]) 2019–2021
Cereals	12%	13%	17%	476,327
Wheat	17%	21%	25%	197,707
Barley	12%	14%	22%	33,193
Sorghum	12%	11%	18%	10,908
Corn	12%	11%	15%	181,146
Rice Milled	6%	8%	10%	50,374
Dairy Products	11%	11%	14%	5,668
Dairy Milk Nonfat Dry	27%	29%	39%	1,503
Dairy Dry Whole Milk Powder	28%	29%	36%	1,314
Dairy Cheese	7%	7%	11%	2,242
Dairy Butter	6%	4%	6%	609
Protein Meals	27%	29%	25%	87,036
Meal Palm Kernel	74%	78%	76%	7,253
Meal Sunflower Seed	24%	36%	34%	6,906

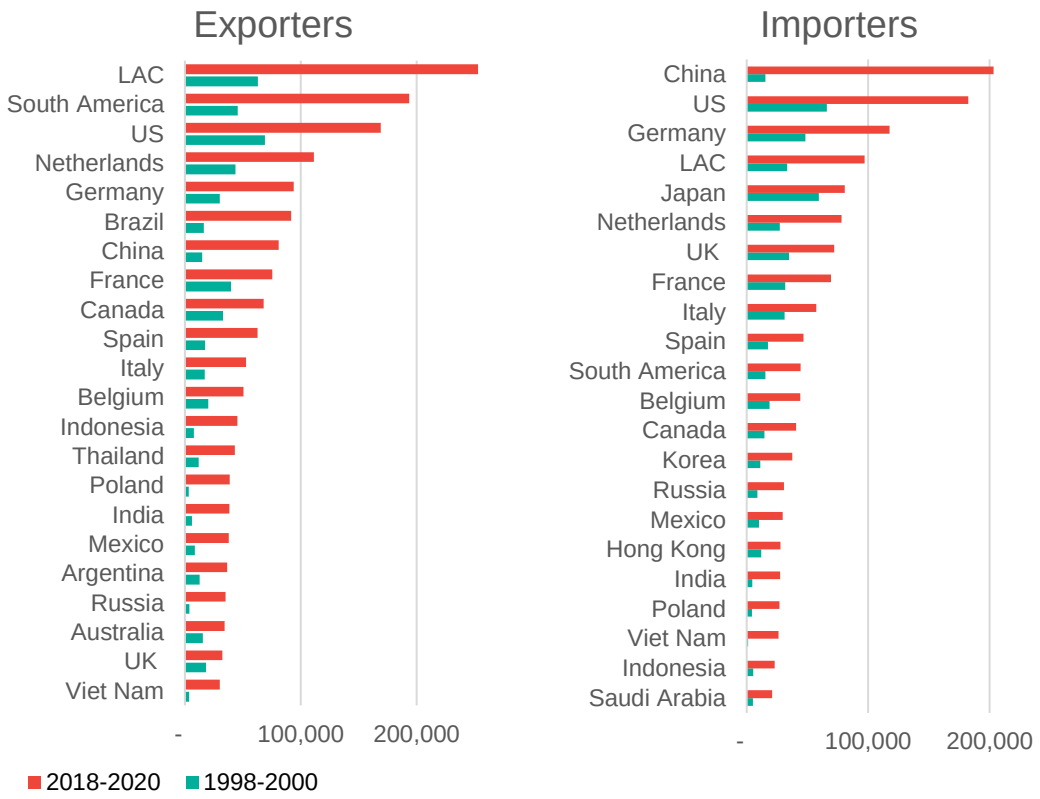
[33] Thousands of metric tons

Commodity	1999–2001	2009–2011	2019–2021	Imports (000 Mtn[33]) 2019–**20**21
Meal Soybean	32%	32%	26%	64,166
Meal Rapeseed	9%	16%	19%	7,763
Meats	7%	8%	12%	32,105
Meat Beef and Veal	11%	11%	17%	9,847
Meat Swine	4%	6%	11%	11,451
Meat Chicken	8%	10%	11%	10,807
Oilseeds	21%	24%	30%	185,929
Oilseed Soybean	31%	36%	44%	162,350
Oilseed Rapeseed	15%	19%	21%	15,517
Oilseed Peanut	5%	6%	8%	4,163
Oilseed Sunflower Seed	7%	4%	5%	2,750
Vegetable Oils	34%	41%	39%	81,513
Oil Palm	69%	77%	64%	47,648
Oil Coconut	59%	53%	55%	1,993
Oil Sunflower seed	25%	39%	51%	9,228
Oil Olive	17%	25%	38%	1,162
Oil Palm Kernel	43%	46%	36%	3,103
Oil Rapeseed	8%	16%	21%	6,014
Oil Soybean	26%	21%	20%	11,879

Source: PSD-USDA.

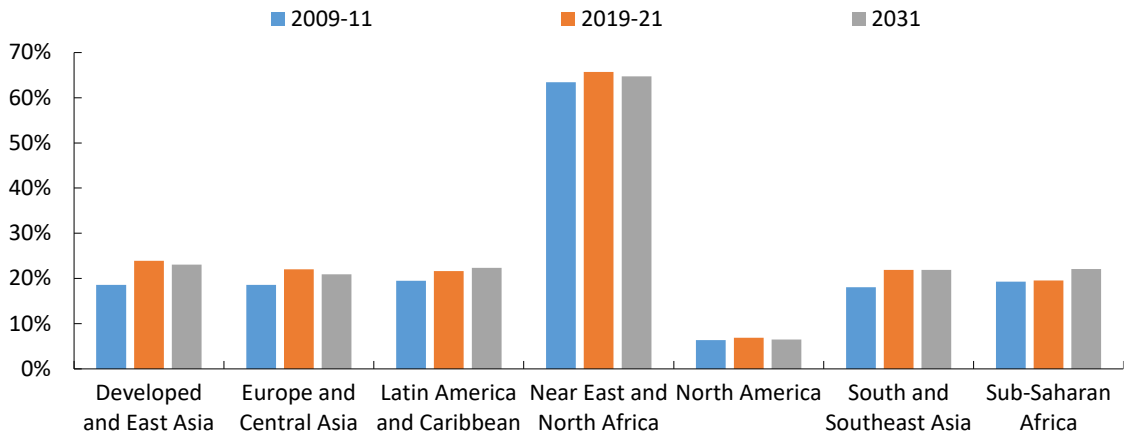
Trade patterns have shifted over the past 25 years as well. Developing countries have become increasingly important suppliers and consumers in world markets, and now account for about 40 percent of world food trade (Glauber, 2022). China explained most of this transformation, becoming the main world importer, going from representing 3 percent to 12 percent of global purchases in 2020. On the exports side, the growth of the South American countries stands out, especially Brazil.

Figure 5.2: Major players in world agricultural trade (million US$)



The main trends behind trade growth in agro-industrial products during the previous two decades will continue to drive international demand. Figure 5.3 shows that at present and over the next decade, many regions and countries lack the natural resources needed to produce, in an environmentally sustainable manner and at reasonable costs, the amount of food required to meet projected future consumption needs. This is the case in some Asian and Middle East countries, due to population growth and increased per capita food consumption resulting from higher incomes. The same happens in some African countries, which face supply constraints due to various logistical, cultural, and technological restrictions.

Figure 5.3: Imports as a percentage of total calories availability for selected regions



Therefore, agricultural trade will gain relevance in ensuring global food security and nutrition, by connecting producers with an increasingly diversified demand from consumers around the world (OECD-FAO, 2022).

The improved performance and growth of world trade and the increased productivity of agriculture over the last 70 years led to more efficient use of the available natural resources worldwide. As a result, world supply increased and food prices declined significantly as a long-term trend (Figure 5.4). This not only caused an increase in food supply for the growing world population, but also resulted in better access and lower food prices, in constant currency, for consumers.

Nevertheless, despite progress in trade liberalization at multilateral and regional levels during the last three decades, and the consequent growth in agricultural trade, significant trade barriers remain in the form of: (1) tariff border measures that affect market access (including export restrictions and export taxes); (2) domestic subsidies that distort production and trade; and (3) export subsidies, including export credits and other concessional sales.

In addition, there is a growing trend in the adoption of nontariff barriers (NTBs), such as sanitary and phytosanitary (SPS) restrictions, regulations on product packaging, and more recently, public and private standards that impose labeling and product certification requirements based on health and environmental concerns.

In this context, a more transparent and predictable international trading system is critical to mitigate emerging regional imbalances and support sustainable global development, particularly with regards to meeting the SDGs (Gadhok et al. 2020).

LONG-TERM CHALLENGES AND THE ROLE OF INTERNATIONAL TRADE

Food systems and public policies should evolve to meet new, multiple, and interrelated objectives. The strategic importance of two fundamental factors in the future should be taken into account: (1) technological innovations required to meet the demand for higher productivity, preserving natural resources and in an environmentally friendly manner; and (2) smooth international trade flows, with improved trade rules to reduce unnecessary costs that increase prices to consumers in net importing countries, and to enable trade flows from countries with the greatest potential for supply growth based on environmentally friendly production systems to countries with the greatest limitations in achieving food self-sufficiency.

Significant imbalances currently exist between food production and consumption in many countries and regions and are projected to grow in the coming years, with many countries finding it difficult to sustain their production growth rate and either becoming net importers or increasing their current imports.

To ensure the supply of healthy and adequate diets to their populations, many countries will have to rely increasingly on imports from net exporting countries. Therefore, improving trade performance is a key component of the transformations that must be promoted for the future evolution of the global food system.

A more open trading system will contribute to food security, enabling the system to produce the necessary amount, variety, and nutritionally adequate food to meet world demand at reasonable and stable prices over time. Trade facilitates the specialization of producers and thus increases productivity and sustainability, streamlining technology and innovation transfer. In some cases, smooth trade helps to give poor farmers access to high-value markets and helps to make value chains more robust.

In addition, trade transparency and fluidity should facilitate compensation of short-term supply and consumption imbalances in some regions that result from the increasingly frequent climate variations, reducing price volatility. In this regard, improvements in infrastructure (transport and storage) and transparency in supply, demand, stocks, and prices can contribute to improving trade performance (OECD 2021).

Particularly, trade should contribute to the transformation of food systems in regions that lack the necessary natural resources, or have depleted them, or are implementing intensive and environmentally unfriendly production systems. Smooth and barrier-free trade will provide guarantees to countries that must transform their systems toward more sustainable and environmentally friendly production models.

There is a growing literature on the impact of trade on virtual flows of water and land. These resources, embedded in traded commodities, can be used to mitigate regional shortages. By purchasing food from regions with greater resource availability and sustainability, land and water are made available for other purposes in countries facing renewable natural resource

constraints. The unequal regional distribution of resources underlines the important role of trade in making better use of these resources globally. In other words, the global food system can become more productive and sustainable through trade, as it facilitates the flow of production from countries with higher productivity and a lower carbon footprint to those with lower productivity and poorer environmental performance.

Therefore, the challenge of transforming the global food system must include better performance of the global trading system to facilitate the aggregation of national food systems and subsystems within the framework of current or future multilateral agreements at the WTO.

At least three dimensions should be considered: (1) gradual trade liberalization for agrifood products; (2) elimination of unfair competition (subsidies); and (3) compliance with SPS requirements. In this regard, environmental, labor, SPS, food safety, and public health regulations should not be applied in a way that they become NTBs to trade. To this end, regulations must be based on scientific evidence.

Some existing and potential barriers to trade based on an agricultural protectionist rhetoric represent major threats to global food security and to the transformation of production systems promoted by the UN Food Systems Summit (UNFSS). New NTBs to import based on environmental standards that have no scientific basis must not be implemented, as they could lead to unnecessary restrictions on the future development of production systems.

Numerous measures can contribute in the short term to food security goals of specific countries, such as subsidies, export restrictions, and public procurement, among others. However, while such policies can help to achieve short-term improvements in food availability and reduce food prices, their potential negative impacts in the mid and long term, both nationally and globally, can significantly undermine any short-term gains.

Therefore, the global food system improvements proposed at the recent UNFSS should include impact analyses of policies related to the achievement of food security objectives at the national level, including potential global trade-offs. Identifying optimal policy interventions, the focus should be on long-term dynamics, which are those that enable sustainable development in most countries (FAO 2016).

Under the current scenario, with high agricultural prices, there is a risk that some countries may seek to insulate domestic markets by restricting exports. As observed in previous food crises, such as in 2007–08 and 2011–12, these beggar-thy-neighbor policies will result in putting more pressure on prices and imposing harmful effects on importing countries, particularly the most vulnerable.

Measures adopted to protect domestic consumers must be designed considering their consequences on global food security and third parties. Multilateral efforts to coordinate unilateral responses to high prices are especially required.

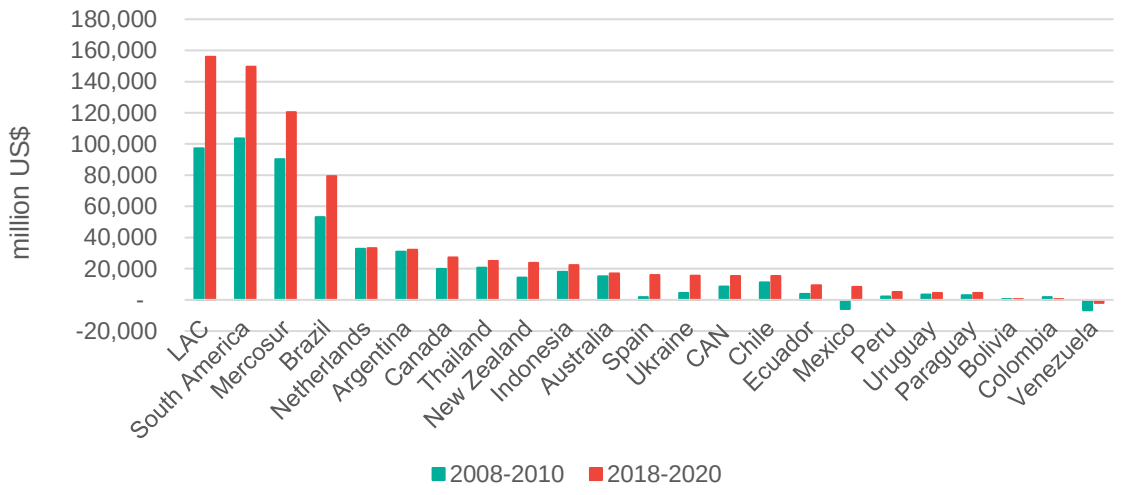
THE ROLE OF SOUTHERN CONE COUNTRIES

Over the last 20 years, exports of agricultural products from Latin American countries grew significantly. Accounting for 14 percent of worldwide agricultural exports in 2020, they currently play a leading role in global food security and nutrition.

LAC includes some of the main net food exporting countries, namely Argentina, Brazil, Chile, Costa Rica, Ecuador, Paraguay, and Uruguay, as per the index of per capita net food exports. LAC's agrifood trade surplus grew from US$35 billion in 2000 to almost US$156 billion in 2020.

In particular, the Southern Cone countries, led by Brazil and Argentina, have become the largest net food exporting region in the world, due to their natural resources endowments and efficient, dynamic, and environmentally friendly production systems.

Figure 5.5: Value of net exports by country/region (million US$)



Source: WTO Stats.
Note: CAN = Andean Community (Bolivia, Colombia, Ecuador, and Peru); Mercosur = Argentina, Brazil, Paraguay, and Uruguay.

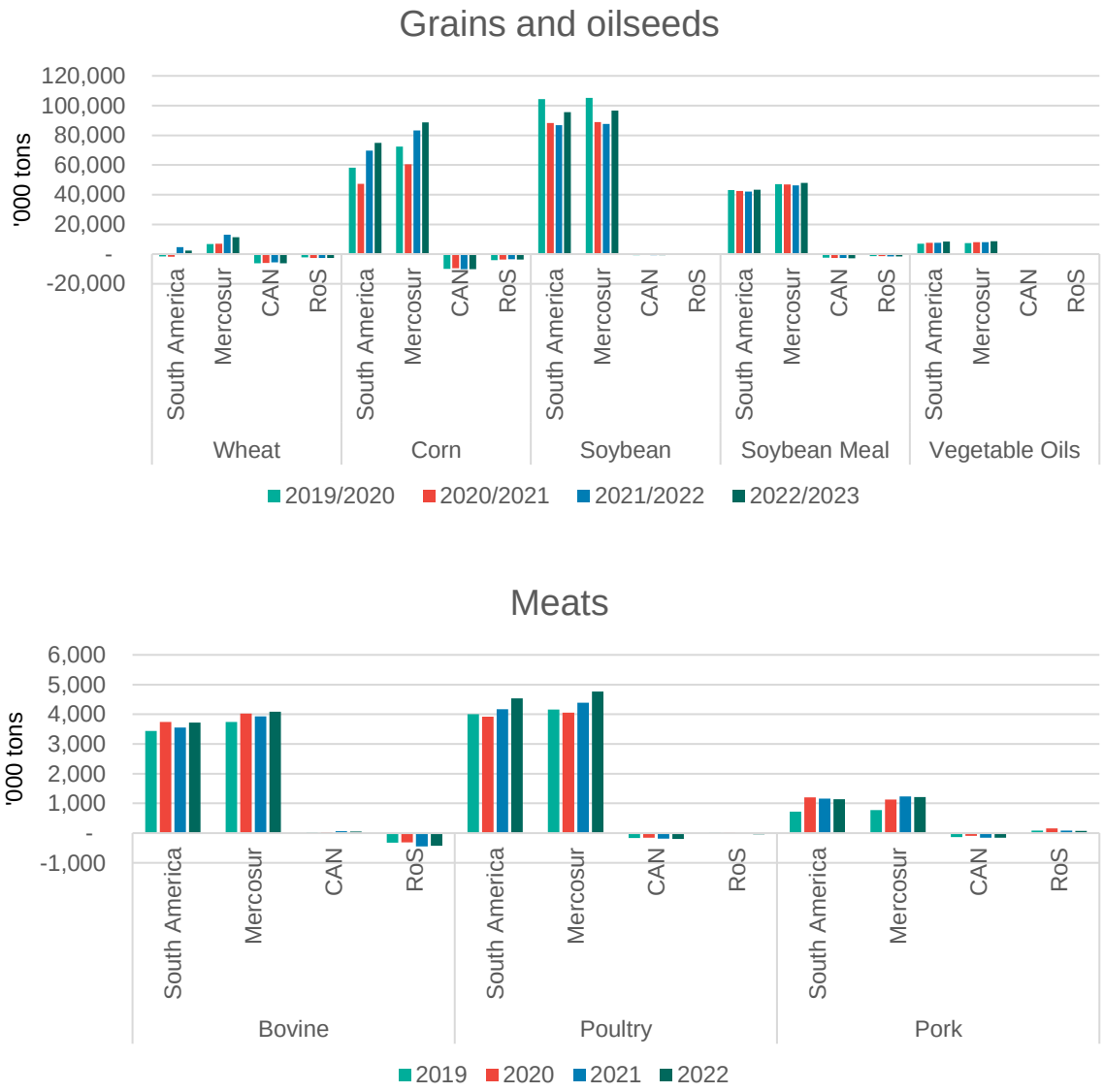
According to US Department of Agriculture (USDA) estimates for 2022, South America will account for 50 percent of world corn exports, around 70 percent of soybean meal and soybean oil exports, 60 percent of soybean exports, and 36 percent of bovine and poultry meat exports. It will also comprise an important share of dry whole milk powder (9 percent), pork meat (14 percent), sunflower seed oil (9 percent), and wheat (9 percent) trade (see Annex I).

Although the net quantities exported of the main agricultural products have increased, significant intraregional differences exist. The largest increase in exports of grains, meat, oils, and vegetable proteins is explained by the Mercosur countries,[34] while the Andean Community (CAN),[35]

[34] Mercosur refers to the founding members: Argentina, Brazil, Paraguay, and Uruguay.
[35] Member countries of the CAN are Bolivia, Colombia, Ecuador, and Peru.

along with Chile and Venezuela are net importers of most of these products. Brazil is one of the main net importers of wheat, mainly from Argentina and the other Mercosur members.

Figure 5.6: South America, volume of net exports by product ('000 tons)



Source: PSD-USDA.

Note: CAN = Andean Community (Bolivia, Colombia, Ecuador, and Peru); Mercosur = Argentina, Brazil, Paraguay, and Uruguay; RoS = Rest of South America.

The competitiveness of South American countries in agriculture can be assessed by analyzing their trade patterns through the Revealed Comparative Advantage (RCA) Index (Balassa 1965). This indicator measures a sector's trade specialization by calculating its share of exports relative to the world trade. If the quotient is greater than one, it can be inferred that the country has a comparative advantage in that sector and could be heavily affected by a policy that affects those exports.

Considering the years 2018 to 2020, the share of agriculture in total world trade is 7.9 percent. Thus, any country that has a higher agricultural export share than that figure reveals a relative comparative advantage. All South American countries exhibit an RCA index greater than the threshold (RCA=1) except for Suriname and Venezuela (Table 5.2).

In particular, the Mercosur founders' countries have the highest ranked RCA for agriculture. In Argentina, Paraguay, and Uruguay, the sector represents more than 65 percent of exports.

Table 5.2: Exports and RCA index (million US$, 2018–2020 average)

Exporter	Total exports	Exports agriculture	Share agr.	RCA
Argentina	49.082	33.710	69%	8.7
Paraguay	8.404	5.513	66%	8.3
Uruguay	7.343	4.762	65%	8.2
Brazil	219.986	84.379	38%	4.9
Ecuador	21.427	6.275	29%	3.7
Colombia	37.448	7.342	20%	2.5
Bolivia	8.245	1.425	17%	2.2
Chile	72.881	12.223	17%	2.1
Peru	44.301	7.183	16%	2.1
Guyana	3.032	439	14%	1.8
Suriname	2.462	62	3%	0.3
Venezuela	19.310	172	1%	0.1

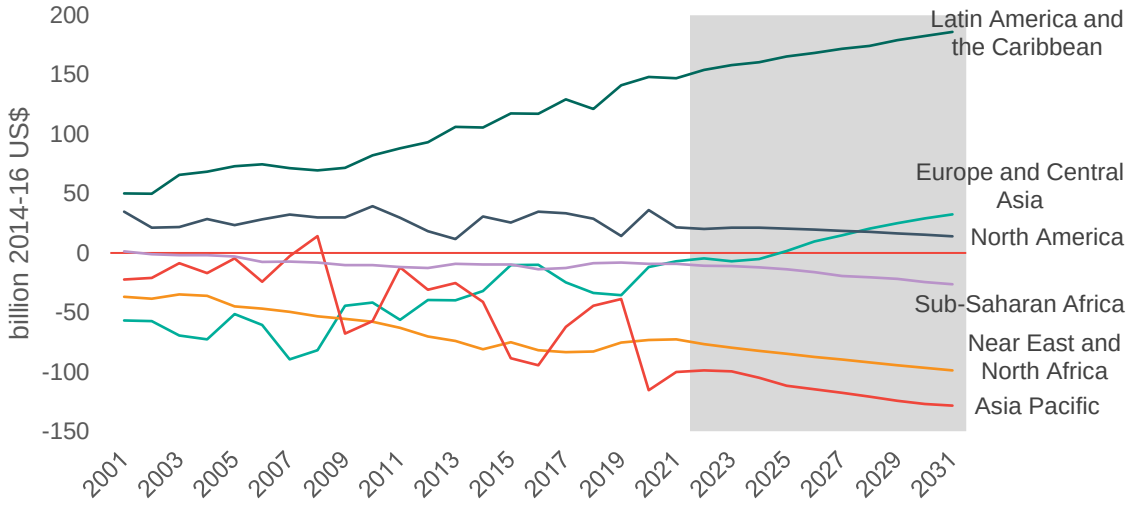
As noted, the difference between net exporting and importing regions is expected to intensify during the next decade. Countries with slow population growth, low population density, and favorable natural endowments tend to become exporters of agricultural products, while countries with rapid population growth, high population density, and less favorable natural endowments tend to become importers. LAC is expected to strengthen its position as the main net supplier of agro-industrial products.

Looking forward, agricultural production in the Southern Cone countries can grow significantly in the coming decades, based on environmentally friendly systems with very efficient carbon balances (in terms of emissions and carbon sequestration). For more than three decades, agriculture and livestock farming in the region has moved toward more productive and sustainable forms of production, with crop management systems that have reduced the use of fossil fuels, and with livestock farming capturing emissions through extensive grazing systems, as well as programs for reforestation of native forests and establishment of forests for timber and cellulose production, among others.

The application of modern technology allows not only using resources that have remained largely untapped so far (such as biomass, residues, and other organic waste), but also reduces the negative impacts of climate change on the environment, by introducing minimum tillage practices, efficient use of water, seeds resistant to pests and diseases, integrated pest management, and, more recently, precision agriculture.

Considering the current and future crucial importance of the Southern Cone countries in global food security as net food exporters, with food systems that three decades ago started transformation processes toward conservation practices with high productivity but low environmental impact ("sustainable intensification strategy"), its members should have a key role in the multilateral process to transform global agrifood systems.

Figure 5.7: Agricultural trade balances by region (billion 2014–16 US$), 2001–2031



Source: OECD-FAO 2022.

The possibility that the region can reach its potential, and strengthen its role in world food security, will surely depend on (1) the progress that can be achieved in international negotiations to reduce barriers to agricultural trade, as well as on (2) implementation of domestic and regional policies that promote production and exports and avoid export restrictions.

CURRENT APPROACHES TO SUSTAINABILITY

FROM THE STAGNATION OF THE MULTILATERAL FRAMEWORK TO THE BIASES OF UNILATERAL APPROACHES

According to Peña (2020), the ongoing transformations in world power and global economic competition are among the main challenges for adapting the agendas and methodologies of international trade negotiations. This adaptation is even more necessary given the perception of many countries, especially emerging or re-emerging protagonists, that existing institutions and rules reflect a world power order that has been surpassed.

For the agriculture sector, the **WTO** was the paramount international forum to discuss issues that affect the production and trade of commodities, food, and related products. International negotiations in agriculture focused on issues such as production and export subsidies, and market access such as tariffs and import quotas. But the stagnation of the Doha Round, the failure

to update the agenda, and the paralysis of the Dispute Settlement Body have led to the WTO's loss of relevance at the multilateral level. The result is that the trade and environment agenda is now being discussed in other **United Nations** contexts, such as the SDGs, the UN Framework Convention on Climate Change (UNFCCC), FAO, and even the recent UNFSS.

The 2030 Agenda for Sustainable Development, adopted by all UN Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 SDGs, which are an urgent call for action by all countries—developed and developing—in a global partnership. Several of the SDGs are related to agriculture.

The negotiations on climate change developed within the framework of the **UNFCCC** have also gained relevance. From the Tokyo Protocol to the Paris Agreement, provisions of these kinds of agreements are very relevant for agriculture. Agriculture, forestry, and land use directly account for 18.4 percent of greenhouse gas (GHG) emissions. The food system as a whole—including refrigeration, food processing, packaging, and transport—accounts for around one-quarter of GHG emissions. To achieve a significant reduction in emissions by 2030 and 2050, the sector must improve its performance without reducing, or even increasing, production levels in the future.

The agriculture sector is one of the few productive processes that can become a carbon sink. Therefore, it is essential to establish the correct incentives for the development of carbon markets, which mobilize the necessary funds so that the best current technologies are popularized and shared.

In 2019, the UN Secretary General, Antonio Guterres, announced the call for a **Food Systems Summit** (UNFSS) as part of the Decade of Action for the fulfillment of the SDGs by 2030. The UNFSS brought together world leaders, experts, farmers and producers, indigenous peoples, the private sector, and civil society, uniting participants in one of the most comprehensive attempts to date to align agrifood production and consumption with the SDGs. It featured nearly 300 pledges from hundreds of thousands of people from around the world and across all sectors, in the quest to accelerate action and transform food systems. During the meeting, progress was sought in the 17 SDGs through a food systems approach, taking advantage of the interconnection of food systems with global challenges such as malnutrition, climate change, poverty, and inequality.

The Rome-based agencies—**FAO, IFAD (International Fund for Agricultural Development),** and the **WFP (World Food Programme)**—will jointly lead a focal point that collaborates with and draws on other entities of the UN system to support the follow-up to the UNFSS.

And finally, there is the case of the Group of 20 (**G-20)**, in which agriculture became one of the main topics of the forum, especially during the Argentine presidency, due to the food crises caused by the price peaks of agricultural commodities in 2008 and 2011. Since its appearance on the international scene after the global financial crisis, the G-20 has devoted much time to dealing with these issues, especially as they relate to world food security and climate change. In recent meetings of the G-20 Agriculture Ministers, topics on the agenda have included price

volatility, financialization of markets, investments in agriculture, food waste and losses, sustainability of production, and barriers to trade, including export restrictions.

The agricultural question no longer depends only on one international forum—other international, regional, and even national spheres are added to the work of the WTO—but the subject matter has been broadened: the subject is now food systems, a more comprehensive concept.

While these negotiations have not shown significant progress, unilateral approaches have emerged in response to new challenges related to the food system. These can be divided between initiatives of a public[36] nature, promoted by governments, and those that come from the private sector, driven by consumer demand and business proposals. These will bring about changes in policies related to food production and consumption, with possible impacts on the rest of the countries and the world through international trade.

THE EUROPEAN UNION GREEN DEAL

A relevant case study is the objectives and regulations of the European Green Deal and the European Climate Law, which gave rise to the recent Farm to Fork Strategy (F2F). Among other measures, the Green Deal seeks to achieve a 50 percent reduction in the use and risk of chemical pesticides, a 50 percent reduction in soil nutrient losses, and a drop in fertilizer use of at least 20 percent. Furthermore, the EU plans to reduce by 50 percent the sales of antimicrobials for farmed animals and aquaculture, and to increase organic farming to up to 25 percent of total farmland. On top of these supply-side objectives are consumer-oriented measures, funding for research and innovation, and a stated objective to support other countries to work toward sustainability.

In 2021, the Wageningen University & Research published two papers analyzing the effects of the F2F policies on the EU livestock and crop sectors. Briefly, the analyses found that achieving the F2F objectives will result in considerable yield losses as a consequence of reducing fertilizer and pesticide use, and an increase of organic production. Other implications include the reduction in competitiveness of EU products and thus an increase in trade dependency, indirect land use effects (close to 7 million hectares), likely farm income loss, and a reduced EU contribution to the “Zero Hunger” SDG (Bremmer, J. et al (2021).; Jongeneel, R. et al (2021).)

A study published by Fundación Triptolemos (2021) remarks that although the EU is currently food self-sufficient, with agricultural production at 105 percent of agricultural demand, implementing the F2F Strategy will likely turn the small surplus into a deficit, which will necessitate the importation of agricultural products. They also analyze the negative effects on small-scale family farms in the EU, given that the additional costs and investments required by the F2F Strategy mean that only large-enough-scale farms will be able to cope with the additional financial burden of complying with F2F objectives.

[36] Countries such as the United States, China, Japan, and India or regions such as the EU that are carrying out environmental policies with a direct impact on their agricultural policies.

Thus, on a global scale, the F2F Strategy will have consequences for agricultural trade and global food security. These effects will be much more dramatic if the F2F objectives are spread to other countries, which is indeed a stated goal.

An interesting assessment of these effects was developed by Beckman et al. (2020), who analyzed the initiative by means of a computable general equilibrium model (GTAP-AEZ). The paper examines the global implications of F2F under multiple scenarios, ranging from adoption of F2F only in the EU to worldwide adoption of F2F standards and practices. Under the EU-only F2F initiative, they find that the nature of the proposed regulations is not neutral for European agricultural producers, measuring a decline in agricultural production of 12 percent in the EU. In turn, the reduced agricultural output leads to higher consumer prices (13 percent) and a decline in the EU's gross domestic product (GDP). Ultimately, all these disruptions translate to a loss of welfare, or consumer wellbeing, of US$95.9 billion. Most of this welfare loss (US$80.1 billion) is attributed to losses in allocative efficiency, as resources are shifted from productive sectors—such as the pesticide industry in the EU, the world's largest exporter of pesticides (WTO 2020)—to less productive sectors.

Under the "middle scenario," restrictions on agricultural inputs are placed on EU trade partners who depend on food and agricultural exports to the EU, and a restriction is placed on imports to the EU from regions that do not adopt the F2F Strategy. In this scenario, worldwide agricultural production declines by 4 percent, but this decline is not uniformly distributed among all participating countries. Ukraine, for example, is projected to suffer a 33 percent reduction in agricultural production with double-digit decreases in production for nearly all commodities. The middle scenario estimates that six regions that adopt the F2F Strategy will each experience increases in agricultural product prices of 50 percent or more. Worldwide agricultural trade falls by 9 percent, accompanied by a US$396 billion decline in global welfare.

Finally, the extreme scenario of global adoption in which all regions of the world comply with the F2F Strategy objectives finds the largest impacts on production, with dramatic agricultural price increases (double- and triple-digit increases in prices). Global agricultural trade is projected to decrease by 4 percent but is substantially less than the 9 percent decrease seen in the middle scenario. Global real GDP would fall by 1 percent, with a total welfare loss of US$1.1 trillion. Additionally, it is estimated that the prevalence of food insecurity will increase by 2.2 percentage points. The effects will be felt most strongly in Africa and the Middle East and North Africa, where the number of food insecure people will increase by 94 million and 10 million, respectively.

Overall, these results hint that even though it is possible that this policy set leads to environmental sustainability, it is not necessarily economically or socially sustainable. In fact, any strategy that risks provoking an increase in poverty would not be able to garner enough social and political support to be applied globally.

Table 5.3: Simulated impact of the Farm to Fork Strategy

	EU only			Global adoption		
	Argentina	Brazil	Rest of South America	Argentina	Brazil	Rest of South America
Production change (%)						
Rice	18.1%	-1.2%	-0.4%	241.6%	-15.1%	-15.2%
Wheat	7.0%	-3.0%	-1.8%	55.3%	-55.2%	-77.1%
Coarse grains	4.5%	1.3%	3.1%	0.1%	-14.4%	-4.0%
Fruits and vegetables	0.0%	-1.1%	0.3%	-13.9%	-19.4%	-4.6%
Oilseeds	-0.5%	-0.5%	3.4%	-51.6%	-44.6%	-60.0%
Sugar crops	0.3%	-2.3%	3.8%	-6.7%	-28.8%	6.4%
Milk	0.4%	-0.5%	0.5%	-12.5%	-23.7%	-14.8%
Beef	0.3%	0.7%	1.1%	-18.1%	-17.3%	-1.8%
Pork	-0.2%	4.0%	0.5%	-5.7%	-18.5%	-18.1%
Other meat	-0.3%	5.8%	0.1%	-9.8%	-17.9%	-14.5%
Welfare change (billion US$)	4.3	7.8	0.9	31.7	20.8	-6.6

Source: Beckman et al. 2020.

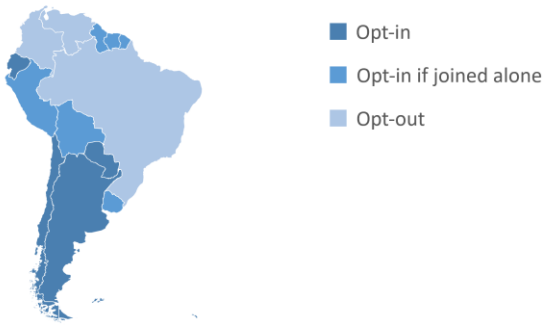
Given the natural, technical, and entrepreneurial advantages in the Southern Cone for sustainable food production, it is interesting to study the F2F's impact on its countries. According to Beckman (2021a), in the scenario in which only the EU implements the new policies, production can be increased in Argentina for cereals, with little impact on other products. In Brazil the increase is mostly in pork and poultry, with a minor impact on coarse grains. For the aggregate "Other South America," the main growth is in coarse grains, oilseeds, sugar, and beef. On the other hand, the global adoption scenario is negative for most products, the only exception being cereals in Argentina and sugar in Other South America.

The welfare measurement is positive for Argentina and Brazil in both scenarios, due to the increases in world prices for food products, improving the terms of trade for these countries. For Other South America, however, the effect is mildly positive in the EU-only scenario, and negative in the second. It is likely that Paraguay and Uruguay have positive welfare results as well, with the figures being offset by other countries. However, the aggregation level of the study does not allow for more details, which could be interesting for future work.

As a follow-up, Beckman et al. (2021b) developed a technique to access, via computable general equilibrium modelling, whether a country would participate in the framework established by the EU or would rather face the consequences of possible trade barriers. In that study, the exporting countries that do not apply the policies defined by the EU receive a 50 percent reduction in exports to the complying regions, a quantitative representation of the nontariff measures (NTMs) that would be imposed by the importers.

The authors find that in South America, Argentina, Chile, Ecuador, and Paraguay would opt to participate in the F2F Strategy (Figure 5.8). Bolivia, Guyana, Perú, Uruguay, and Suriname would opt in only if other countries did not participate. This is because if they join alone, they gain a relative advantage against other competitors, but would lose it if more countries followed. Finally, Brazil, Colombia, and Venezuela would not participate in any case.

Figure 5.8: Simulated participation in the Farm to Fork Strategy



Source: Beckman et al. 2021.

Even though quantitative simulations are always a stylized representation of the actual economic effects, the results provide some valuable insights. Perhaps the most obvious one is that policies applied in other countries should not merely copy the same strategies used by the EU. Because sustainability may require different measures in different countries, establishing common parameters is not an easy task.

For example, it is not reasonable to apply the same reduction in fertilizer use to a country that exceeds the extraction level and to one that does not apply enough to satisfy the fertilizer balance. Failing to consider these types of situations for each region and product would lead to trade measures that are not based on science. Even if this has not translated into actual import barriers yet, it could in the future.

Besides, many measures do not necessarily need to be applied for all production within each country. Exporter countries could decide to segregate production according to the requirements of each destination market, although this creates unnecessary costs.

Another point to consider is that the simulations assume that countries define their policies according to a measurement of their own economic welfare. In practice, this may not necessarily be the case. For example, it could be interesting to analyze a scenario in which Mercosur decides as a bloc, seeking a harmonized criteria for sustainability.

Richard et al. (2020) raises some interesting discussion topics. In a brief note they point out that the Beckman et al. (2020) modelling approach omitted the role of demand-side policies in the EU initiative, the reduction of food waste, and technical progress. It is reasonable to think that these effects would improve the outcome and reduce the negative impacts on food security.

This raises an additional discussion topic for policy engineering: if the supply-side restrictions are certain (that is, input quotas), but the ameliorating effects are uncertain (such as changes in consumption patterns or new technical developments), the overall result is higher uncertainty in food security. Thus, risk assessments should not be left out of policy assessments, which can be relevant for further studies.

Moreover, sustainability initiatives applied in exporting countries should consider that as some outcomes are uncertain, programs could be conditional on those outcomes. The aim would be to avoid committing to a fixed path in an unknown field.

PRIVATE STANDARDS

The existence of standards particularly in food and agricultural produce expanded rapidly over the last decades. These standards can result from public legislation, or where specific legislation is missing or has low compliance, it is becoming more common that companies and consumers turn to labels or private standards. Most Private Voluntary Standards (PVSs) are initiated, implemented, and maintained by retailers. While PVSs are not mandatory, once they become the industry standard reference, producers have little choice but to adopt them.

Generally, PVSs have arisen mostly in developed countries, which can originate basically for two reasons: (1) the need to provide certainty to consumers by private companies, which consider the set of public regulations inadequate or inefficient, or that control systems do not fulfill their function; or (2) a private company seeks to differentiate itself from its competitors by showing that it follows "higher" quality standards than the rest.

But concerns exist regarding the proliferation of heterogeneous, poorly harmonized private standards. Certification carried out by private companies costs much more than if done by governments, which, at most, only recover the cost. And certification must be renewed regularly, whether or not production conditions have changed.

Much of the demand for carbon standards stems from the fear that producers in developed countries will simply outsource their production to developing countries that are not burdened with emission caps. It is often assumed that imported food and agricultural goods will automatically have a higher carbon footprint due to greater transport emissions. This is often inaccurate, however, as developing countries often rely on less carbon-intensive methods of agriculture by using less fertilizer, mechanization, and energy for heating.

Regarding the WTO rules, especially in relation to Sanitary and Phytosanitary Measures (SPS) and Technical Barriers to Trade (TBT) Agreements, many Member States believe that setting standards for the products they purchase is a legitimate activity for the private sector. On the other hand, it is argued that under the SPS Agreement, importing states are responsible for the standards that form part of this Agreement set by the private sector. The main concern is that private standards do not meet WTO criteria, such as transparency and scientific justification of SPS measures (mainly safety) and that they restrict trade more than is necessary to protect health.

A frequent criticism regarding these types of measures is that they are not necessarily based on science. Another noteworthy aspect is the lack of a forum to raise the arbitrariness or illegality of these rules, what happens in the case of public rules.

In this regard coordination is fundamental. Unilateral measures could lead to a “beggar thy neighbor” policy that triggers a worse global balance. It is important to respond to new demands while preventing measures that could become new trade barriers that lead to unexpected and unintended results at a global level.

FINAL REMARKS

Food systems face several current issues, such as the disruptions and bottlenecks in supply chains associated with the COVID-19 pandemic and the Russia-Ukraine war, and economic slowdowns and downturns. They are also affected by long-term issues, such as climate change, natural resources deterioration, and nutritional problems faced by people around the world, in both developing and developed countries. All of these challenges have had negative effects on food security, the primary objective of food systems. In 2020, the world witnessed an unprecedented setback in its hunger eradication efforts, and the finish line seems to have moved. As the latest SOFI report shows, world hunger rose in 2021.

New demands related to environmental sustainability and health have added new objectives for food systems as well. Given the multiple and interrelated objectives, transformation toward a more resilient, efficient, inclusive, and sustainable global food system must solve numerous trade-offs, while simultaneously incorporating the unique circumstances of each region and country.

The overriding challenge is to address the new demands without affecting the contribution of food systems to global food security. It is crucial to reform the multilateral trade system to incorporate new topics and disciplines, and to coordinate national policy responses regarding food systems at the regional and global level. Today no global institutional framework exists whereby countries can agree on policies to guide the development of their food systems. In its absence, countries have developed unilateral public policies related to food production and consumption. Unquestionably, such policies will affect agricultural trade over the next decade. They could imply additional costs on agricultural producers and food producing enterprises and affect trade flows, potentially impacting negatively on food security and livelihoods around the globe.

Given the importance of international trade to achieve food security, and also to promote global natural resource efficiency and conservation and environmental sustainability, the first step must be to guarantee the existence of fluid and freer trade for agricultural products and their derivatives. Elimination of unnecessary barriers to trade will improve world food security and sustainability indicators, by promoting production and exports in those countries with greater endowment of natural resources and productive systems with better environmental performance, such as the Southern Cone countries.

ON DECISION-MAKING

As argued in the first section, food systems provide not only human nutrition, but also a main source of income for a significant percentage of the world's population. Thus, solutions for the identified problems require careful consideration before taking action. Rushed decisions may be dangerous, and the probability of rushing policy increases with the sense of urgency in today's public opinion.

Impact analysis—including technical, legal, social, and economic dimensions—is vital to determine whether decisions are consistent with policy objectives. But impact analysis alone is not sufficient to justify decision-making. A second line of work should seek to answer what the consequences are of applying a new set of rules if the assumptions behind the decisions are wrong. In other words, what are the implicit and explicit risks associated with policy decisions? Unforeseen risks can be minimized if all actors in the global food system take part in the debate. This requires establishing dialogue mechanisms with the public sector, private institutions such as think tanks, and civil society.

Main concerns

Some of the dimensions that should be considered for future in-depth assessments include:

► **Nutrition and poverty:** Efforts toward sustainability of food systems will be inconsistent if they risk worsening access to proper nutrition.

► **Sustainability:** Even all economic actors could agree on a definition of sustainability, the best way of achieving it would not be the same for all regions.

► **Trade:** Given that trade plays a very important role in ensuring food security and encouraging food production in places with lower environmental impact, it is a key factor to analyze.

► **Resilience:** Climate change can bring both higher yield variability as well as higher risk of catastrophic events. Future research can analyze whether proposed policies affect or improve the means available to deal with such problems.

► **Geopolitics:** This may be a decisive factor in the acceptance of any chosen strategy, or on compliance with an agreement, and policy decisions may influence the alliances countries are willing to make.

► **Complexity:** Future research must consider how the global food system's complexity can affect the chosen assumptions to properly interpret the findings of impact studies.

SOME PROPOSALS

Considering the foregoing, the proposals for policies are even more complex. Trade effectiveness and related policies to support the transformation of food systems in the long term depend not only on the type of policies used, but also on their design, enforcement, and implementation.

The following lists a preliminary set of trade-related topics and actions that can be integrated in future discussions from the perspective of the Southern Cone countries.

WTO regulations: New regulations or proposals must comply with the relevant WTO provisions.

Nontariff barriers (NTBs): NTBs should not be applied in a way that hampers normal trade flows. The rise in the number of these measures, which are often unjustified barriers to trade, affects global food security and the sustainability of production systems. After the COVID-19 pandemic, consumers are more concerned about SPS issues, and exhibit a growing interest in sustainability and climate change. Each country should commit to ensuring that NTBs are based on scientific evidence.

Transparency: Measures that affect the food system must be notified to the relevant WTO bodies to give greater predictability to trade. Stability, transparency, and consistent policy interventions (rather than ad hoc changes driven by short-term considerations) must be ensured to manage expectations and build trust with all players in the system.

Certifications: To provide adequate information to consumers about the way in which sustainable production is carried out, implementation of certifications adapted to the needs of each specific region should be promoted. In view of the proliferation of schemes and the growing importance of the private sector as developer of this type of standard, public-private partnerships are essential to allow greater coordination, even at the international level.

Trade facilitation: Adopting trade facilitation measures, including ratification of the relevant WTO Agreement, and promoting the reduction of unnecessary bureaucracies that hinder trade flows are essential. Initiatives such as the Single Window for Foreign Trade, Digital Certification of Origin, or electronic phytosanitary certification (e-Phyto) streamline procedures and reduce the time and costs associated with foreign trade.

Subsidies: Agricultural policies around the world tend to use very distorting measures, creating incentives for overproduction and excessive use of inputs in some countries. These policies are ineffective ways of improving global food security, and often have negative environmental side effects. Production support measures that generate distorting effects on trade should be avoided. As provided by WTO regulations, emergency measures should not be used as a disguised form of illegal aid.

Tariff measures: The reduction and progressive elimination of restrictive measures on import and export of food products should be promoted to facilitate the “matching" of supply and demand with low levels of uncertainty and costs. Trade not only allows food to flow from surplus to deficit regions but contributes to more efficient and sustainable use of the world's natural resources. Import and export duties on agricultural products create distortions that limit this key role of international agricultural trade.

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ANNEX I

Table A5.1: South American countries' share of world exports by commodity (%)

Commodity	Country	2000–2003	2010–2013	2020/21	2021/22	2022/23
Corn	**South America**	**21%**	**39%**	**35%**	**43%**	**50%**
	Brazil	6%	19%	11%	22%	26%
	Argentina	14%	17%	22%	20%	22%
	Paraguay	1%	2%	1%	1%	1%
	RoS	0%	0%	0%	0%	0%
Dry Whole Milk Powder	**South America**	**10%**	**10%**	**7%**	**7%**	**9%**
	Argentina	8%	9%	7%	7%	9%
	RoS	2%	1%	0%	0%	1%
Milk Nonfat Dry	South America	2%	1%	1%	1%	1%
	Argentina	2%	1%	1%	1%	1%
	RoS	0.1%	0.3%	0.04%	0.04%	0.04%
Meal Soybean	**South America**	**74%**	**72%**	**71%**	**72%**	**72%**
	Argentina	41%	44%	41%	41%	41%
	Brazil	30%	24%	24%	27%	26%
	Paraguay	2%	2%	3%	1%	3%
	Bolivia	2%	2%	3%	3%	2%
	RoS	0.1%	0.00%	0.01%	0.01%	0.01%
Bovine Meat	**South America**	**21%**	**29%**	**37%**	**36%**	**37%**
	Brazil	11%	19%	23%	20%	23%
	Argentina	5%	3%	7%	6%	6%
	Uruguay	3%	4%	4%	5%	4%
	Paraguay	1%	3%	3%	4%	3%
	RoS	0.1%	0.2%	1%	1%	1%
Poultry Meat	**South America**	**23%**	**40%**	**32%**	**34%**	**36%**
	Brazil	23%	37%	30%	32%	34%
	Argentina	0%	3%	1%	1%	1%
	Chile	0%	1%	1%	1%	1%
	RoS	0.00%	0.04%	0.00%	0.00%	0.00%
Pork Meat	**South America**	**12%**	**11%**	**12%**	**13%**	**14%**
	Brazil	11%	9%	9%	11%	12%

Commodity	Country	2000–2003	2010–2013	2020/21	2021/22	2022/23
	Chile	1%	2%	2%	2%	2%
	RoS	0.00%	0.02%	0.2%	0.2%	0.1%
Oil Palm	**South America**	**1%**	**1%**	**1%**	**2%**	**2%**
	Colombia	0%	0%	1%	1%	1%
	RoS	0.2%	1%	0.5%	0.5%	0.5%
Oil Soybean	**South America**	**73%**	**69%**	**68%**	**67%**	**69%**
	Argentina	44%	46%	49%	44%	45%
	Brazil	24%	17%	10%	17%	16%
	RoS	4%	6%	9%	6%	8%
Oil Sunflower Seed	**South America**	**49%**	**14%**	**8%**	**9%**	**9%**
	Argentina	47%	13%	7%	8%	8%
	RoS	2%	1%	0.4%	0.5%	1%
Soybean	**South America**	**48%**	**54%**	**58%**	**57%**	**61%**
	Brazil	30%	38%	50%	53%	53%
	Paraguay	4%	5%	4%	2%	4%
	Argentina	13%	9%	3%	1%	3%
	Uruguay	0,2%	3%	1%	1%	1%
	RoS	0.4%	0.3%	0.1%	0.1%	0.0%
Wheat	**South America**	**9%**	**9%**	**7%**	**10%**	**9%**
	Argentina	9%	6%	6%	8%	7%
	Brazil	0.00%	1%	0.5%	2%	1%
	Uruguay	0.02%	1%	0.3%	0.2%	0.2%
	Paraguay	0.1%	1%	0.2%	0.2%	0.2%
	RoS	0.1%	0.1%	0.05%	0.05%	0.1%

Source: PSD-USDA.
Note: RoS = Rest of South American countries.

CHAPTER 6:

SOME REFLECTIONS AND RECOMMENDATIONS

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INTRODUCTION

Although global food security improved significantly after 1980, a number of disruptive global events in recent years have reduced this progress in an alarming way, raising new concerns in society at large.

The United Nations Food Systems Summit (UNFSS) convened by the United Nations Secretariate in 2021 was an expression of these concerns and had a major impact on the world's approach to food production and its relationship to food security. The summit generated two major conceptual breakthroughs.

First, the summit resulted in general acknowledgment of the economic importance of the global food system, as a significant portion of the population derives its income from food related activities. Second, it recognized that agriculture, while essential, represents a relatively small portion of the overall value of the food system. Therefore, policy analysis and design should consider a wide range of economic actors beyond agriculture and should incorporate, in addition to productivity considerations, dimensions/attributes of food systems such as environmental impacts, food safety, and the nutritional quality of foods.

The UNFSS also represented an important advance in the establishment of institutional mechanisms to analyze and propose transformations in food systems. These mechanisms include the creation of a Hub in the UN Food and Agriculture Organization (FAO) to coordinate national-level activities, the involvement of UN National Coordinators in organizing proposals for transforming national food systems, and the formation of coalitions at the regional and global level to address specific challenges related to food systems transformation.

However, recent global events, such as the Russia-Ukraine war, have diverted the focus from the long-term and more structural issues related to global food security matters and the transformation of national food systems proposed in the World Food Summit. Furthermore, economic difficulties resulting from the pandemic and geopolitical conflicts have hindered progress in these areas and modified the international food trade environment, including increased use of trade barriers. In the medium term, the new geopolitical situation may lead to potential economic decoupling of major economies which, on one hand, emphasizes the importance of protecting food trade to strengthen global food security; on the other, this may lead to a renewed interest in

regional food systems, especially those that are significant exporters, such as the Southern Cone countries of the Latin America and Caribbean (LAC) region.

GLOBAL FOOD SECURITY AND THE SOUTHERN CONE COUNTRIES

From this perspective it is important to emphasize the enormous importance of the countries that comprise the Southern Cone of Latin America as food producers and net food exporters. As shown in Chapter 2, five countries (Argentina, Brazil, Chile, Paraguay, and Uruguay) have some of the most efficient and sustainable food production systems in the world, and provide over 40 percent of net food exports globally. Nonetheless, this role is being scrutinized and questioned on the basis of commercial interests of competing countries and as a consequence of the new environmental and nutritional concerns that have emerged worldwide.

These concerns and the new perspective brought about by the food systems concept have led to the emergence of a large number of new environmental and nutritional standards. The standards being imposed by governments, and by the private sector in response to new demands by consumers, are very complex and difficult to comply with, especially for developing countries that are food exporters, as shown in Chapters 2 and 4.

A first conclusion from the analysis included in this publication is that to protect the global food system and the required food supply, new environmental and nutritional standards should be developed and applied progressively and carefully, adjusting them to the transformational possibilities of developing countries that are major food exporters. In addition, international cooperation should be increased to help implement the needed changes to the production structures in these countries. Thus, it is necessary to improve the understanding of national food systems in countries that are major players in food trade and the ways in which they can make adjustments in their production and distribution practices to meet new proposed environmental, safety, and nutritional requirements.

As Chapter 3 illustrated, existing Regional Trade Agreements (RTA), in which LAC countries participate, partially incorporate environmental concerns, presenting both challenges and opportunities. Various types of environmental provisions found in RTAs include mechanisms for environmental cooperation, enforcement of environmental laws, procedural guarantees, and the compatibility of trade obligations and environmental regulations. The motivations for including environmental provisions in RTAs differ and encompass objectives such as promoting sustainable development and ensuring a level playing field among participating parties. Negotiating environmental chapters in RTAs poses challenges for developing countries, although some have accepted strong environmental commitments in agreements with developed nations. Transparency and sharing of experiences are seen as crucial for progress in addressing environmental concerns within RTAs. But managing different levels of environmental commitments across multiple RTAs can be complex.

In recent times, new and more stringent standards have been added to existing ones, putting new pressure on exporting countries, which consequently need to understand and adapt to these new circumstances. This situation is particularly relevant for Argentina, Brazil, Paraguay, and Uruguay, which are main food exporters and play an important role in global food trade and, through it, in global food security.

Chapters 1, 2, and 5 showed how national food systems in several Mercosur countries are not only highly efficient and internationally competitive economically, but they are also environmentally efficient and have high nutritional standards with dynamic, innovative, and technologically advanced production models.

From an environmental point of view, the first thing to point out is that emissions from agriculture have remained relatively stable over the past three decades, indicating improvements in productivity and the adoption of more sustainable production methods (recall Chapter 1). South America stands out as a region that has achieved declining emissions despite its higher agricultural production growth rates.

Recognizing these general attributes of production systems in the Southern Cone, this publication emphasizes some main characteristics of food systems in the region and suggests actions that could contribute to their development.

ENVIRONMENTAL CONCERNS

1. Although the region's production systems are largely sustainable, certain areas could be improved. Measures to mitigate environmental impact and tackle climate change should emphasize collaboration for the construction of efficient value chains, reduction in losses and waste, and investments in research, innovation, and technology transfer rather than in trade-distorting measures. Removing unjustified trade barriers and facilitating the flow of food from environmentally efficient regions is considered a key strategy for reducing the overall environmental impact of global food systems.

2. In addition, financial support is essential to meet climate targets related to agrifood systems. Chapter 5 suggests redirecting existing agricultural subsidies toward sustainable technologies and practices, as well as countries demonstrating better environmental performance, to obtain funding and mitigate negative environmental effects caused by subsidies.

3. Sustainable intensification approaches to food production that leverage natural resource endowment, technological innovation, and competitive business models should be promoted because they are effective means to achieve continuous productivity improvements while maintaining good environmental sustainability indicators.

In summary, the main arguments developed underscore the importance of sustainable practices, collaboration, trade, and supportive policies in achieving environmental efficiency and global food security. The book highlights the potential of the LAC region, particularly South America, in contributing to sustainable food production and mitigating climate change. Ultimately, a

concerted effort and holistic approach are needed to address these challenges and build a more resilient and sustainable food system.

FOOD SAFETY AND NUTRITIONAL CONCERNS

1. Empirical evidence suggests that consumption of processed and ultra-processed foods has been increasing in the region, leading to concerns about the impact on health, particularly in terms of overweight and obesity rates, and especially among children. To address these issues, governments must implement policies and regulations that promote healthier food options and improve the food environment. This includes measures to increase the consumption of nutritious food, improve manufacturing practices, reduce critical nutrients in processed foods, and provide consumer information and education through labeling and advertising regulations.

2. At the regional and global level, efforts have been made to implement regulations related to consumer behavior, such as front-of-package nutrition labeling. However, the effectiveness of such labeling and the need for standardized criteria and approaches are still areas of concern. Furthermore, serious concerns arise regarding the growing difficulties faced by the food and beverage industry in complying with labeling regulations and adapting to changing consumer demands, themes that are not subject to any effective international governance.

The main issue that emerges is the growing importance of public and private standards that affect the development of food systems and, in particular, food trade. The most developed standards refer to environmental, safety, and nutritional considerations, which together with economic efficiency are the main dimensions that need to be considered in the development of balanced food systems.

Overall, the expansion of environmental, safety, and nutritional standards in the agrifood industry—driven by consumer demand, regulatory requirements, and sustainability goals—needs to be considered in relation to the cost effectiveness and potential negative effects these standards may have on trade and on the global cost of food.

The European Union (EU) has been the most significant player in addressing the global challenge of climate action, proposing a complex regulatory process, including the European Green Deal and the European Climate Law. The EU aims to become the first climate-neutral continent by 2050 and has set specific emission reduction targets for 2030. The EU's environmental requirements include various measures such as reducing antimicrobial use, protecting animal welfare, incorporating biodiversity corridors, reducing greenhouse gas (GHG) and methane emissions, using renewable energies, implementing sustainability standards, and more. These requirements not only apply to the European market but also have implications for global markets as the EU seeks to set global standards through its climate action.

The World Trade Organization (WTO) is also incorporating environmental standards into its regulatory process. The WTO Committee on Trade and Environment addresses the relationship between trade and environmental measures. WTO members are allowed to adopt environmental policies as long as they meet certain criteria, such as nondiscrimination, scientific basis, and

avoidance of unjustifiable discrimination or protectionism. The WTO provides technical and financial assistance to developing countries to help them comply with environmental requirements. Ongoing discussions and negotiations within the WTO focus on trade and environmental sustainability, trade in environmental goods and services, circular economy, sustainable supply chains, and more.

The establishment of environmental standards for products is explored through the use of lifecycle assessment (LCA), which evaluates the potential environmental impact of a product throughout its lifecycle. For this it is important to select environmentally friendly inputs and to identify different impact categories that need to be considered when analyzing requirements.

The analysis suggests that one of the main challenges that humanity faces is identifying the most effective policies and standards for development of an efficient and balanced global food system able to sustainably ensure global food security. This includes resolving significant issues associated with developing efficient and balanced national food systems able to meet the growing demand for food while ensuring environmental sustainability, food safety, nutritional quality, and economic and social sustainability.

Some actions have been initiated by the international community, including the UN Food Systems Summit, to address these challenges. However, progress in multilateral negotiations is slow, and unilateral public initiatives adopted by developed countries are changing food production and consumption policies, potentially impacting trade flows, agricultural producers, and global food security. Because of this, international trade plays a crucial role in meeting global food objectives, and a transparent and predictable trading system will be key for sustainable global development. Smooth and barrier-free trade contributes to environmental sustainability and enables regions with limited resources to transform their food systems.

An important component of this process is good performance of the global trade system, including gradual trade liberalization, elimination of unfair competition, and compliance with regulations based on scientific evidence. This emphasizes the importance of policy interventions that consider long-term dynamics and coordination among countries to avoid harmful effects on global food security. Steps in this direction can be enacted by the various international forums and initiatives addressing sustainability in agriculture, such as the Sustainable Development Goals, UNFCCC, and FAO.

The research shown in this book highlights that the global food system plays a critical role in providing nutrition and income for a significant portion of the global population and that the Southern Cone countries play a very important role as global food suppliers. However, food production in the Southern Cone countries has been subject to criticism of and suspicion about its sustainability and safety and nutritional standards. In some cases, the criticism is justified, but many other critiques are not sustained by scientific evidence, as shown in this publication.

MAIN CRITICISMS, TRUST DEFICITS, AND KEY ASSESSMENTS

Transparency in Trade

Transparency in trade is crucial for building trust and ensuring fair practices in the food system. However, barriers to transparency still exist, such as nontariff measures and insufficient information about the origin, production methods, and environmental footprint of food products. Promoting transparency requires harmonizing trade barriers, implementing traceability systems, and enhancing information sharing among stakeholders.

Sustainable Intensification

Balancing the need for increased food production with environmental sustainability is a significant challenge in Southern Cone countries. Sustainable intensification practices—such as precision agriculture, agroecology, and efficient resource management—can enhance productivity while minimizing negative environmental impacts. Promoting adoption of these practices necessitates capacity building, technical assistance, financial incentives, and supportive policies and regulations.

Scientific Information Generation

Scientific information serves as the foundation for evidence-based policy and decision-making in the food system. However, more robust and context-specific scientific data are needed on production systems, environmental impacts, nutritional quality, and health outcomes. Generating scientific information through research collaborations, data collection initiatives, and knowledge-sharing platforms can provide a solid basis for designing effective policies and interventions.

Illegal Deforestation

Illegal deforestation poses a significant threat to the environmental sustainability of the Southern Cone food systems. It contributes to GHG emissions, biodiversity loss, and land degradation. Eradicating illegal deforestation requires a multifaceted approach, including strengthened law enforcement, land use planning, incentives for sustainable land management, and support for sustainable livelihoods for local communities. Collaboration among government agencies, civil society organizations, and the private sector is crucial for effective forest protection and restoration efforts.

CONSOLIDATING STRATEGIES: A FRAMEWORK FOR TRANSFORMATION

In transforming food systems, it is essential to consider various interconnected factors that influence their sustainability and resilience. These factors include geopolitics, the complexity of global food systems, and more specific subjects like nutrition and poverty, sustainability, trade, and resilience.

From a global perspective it is important to consider the geopolitical factors—including international relations, global governance structures, and trade dynamics—that influence the transformation of food systems. Collaboration among countries, regional cooperation, and multilateral efforts are essential for addressing shared challenges and aligning strategies to achieve common goals.

The complexity of global food systems necessitates a holistic perspective. Recognizing the interconnections between different components of the food system, such as production, processing, distribution, and consumption, allows for a comprehensive understanding of the challenges and opportunities for transformation. Emphasizing a systems-oriented approach helps identify leverage points for positive change and ensures that interventions consider the broader impacts on social, economic, and environmental dimensions.

Stakeholder engagement is a critical component of the transformation process. Inclusive participation of the public sector, private institutions, and civil society allows for a diversity of perspectives and ensures that decisions are informed by a wide range of expertise. Thus, collaborating with international organizations such as the UN and regional bodies can enhance coordination and knowledge exchange.

In addition, it is necessary to work on specific dimensions that respond to and accommodate the noted criticisms. Five take on special priority:

1. Sustainability is a fundamental pillar of transforming food systems. It involves adopting practices that minimize environmental impacts, conserve natural resources, and promote long-term ecological balance. Sustainable agriculture, responsible water management, and circular economy principles are key considerations in promoting sustainable food systems. Enhancing international governance on agrifood trade-related environmental standards involves various measures. Tariff elimination for Environmentally Efficient Agriculture Goods (EEAG) can incentivize sustainable production practices while ensuring market access and sharing sustainability costs across the supply chain. Nondiscriminatory treatment and preferential tariffs for EEAG, based on certification of environmentally efficient production, can create a level playing field. Harmonizing sustainability standards, using benchmarking and recognition processes, and establishing a multilateral recognition scheme can facilitate global coordination and technology transfer.

2. Development of a global labeling system is essential for enhancing transparency and providing consumers with accurate information. This system should be developed through an international agreement facilitated by organizations such as the Codex Alimentarius, FAO/WHO, the High-Level Panel of Experts, and the UN Forum on Sustainability Standards (UNFPSS). It should integrate nutritional declarations with front-of-package labeling, comprehensive back-of-package labeling, and claims for consumers. Standardizing labeling criteria through QR tools and the GS1 global registration platform can streamline implementation and reduce costs.

3. Trade plays a significant role in the Southern Cone countries' food systems. It is essential to balance trade liberalization with the protection of local food production, environmental sustainability, and social considerations. Harmonizing trade policies, ensuring fair competition, and

integrating environmental and social standards into trade agreements can help achieve a more equitable and sustainable trade framework.

4. Resilience is another crucial aspect of food systems transformation. Building resilience involves diversifying food sources, improving storage and distribution systems, and enhancing preparedness for shocks and crises. Investing in climate-smart agriculture, promoting agrobiodiversity, and strengthening local food systems all contribute to the resilience of the Southern Cone countries' food systems.

5. Impact analysis is crucial for informed decision-making. It involves assessing the technical, legal, social, and economic dimensions of proposed policies and interventions. Impact analysis helps identify potential risks, evaluate assumptions, and ensure that decisions are based on reliable evidence. Conducting comprehensive impact assessments can provide valuable insights into the potential outcomes of different policy options and guide the development of effective strategies.

In summary, transforming food systems in the Southern Cone requires a comprehensive and integrated approach that addresses the challenges of criticism and trust deficit, transparency in trade, sustainable intensification, scientific information generation, and illegal deforestation. Implementing a roadmap for transformation—which includes a global labeling system, enhanced international governance, impact analysis, and stakeholder engagement—can contribute to sustainable and resilient food systems. Taking into account holistic considerations, such as nutrition, sustainability, trade, resilience, geopolitics, and the complexity of global food systems, will ensure a comprehensive and cohesive approach to food system transformation in the Southern Cone. By embracing this approach, the region can work toward achieving the twin objectives of food security and sustainability, promoting health, trade, and environmental goals for the benefit of present and future generations.

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