2023 - 2024

THE OUTLOOK FOR AGRICULTURE AND RURAL DEVELOPMENT IN THE AMERICAS

A Perspective on Latin America and the Caribbean

UNITED NATIONS
ECLAC
75 years Working for a productive, inclusive and sustainable future

Food and Agriculture Organization of the United Nations

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ABBREVIATIONS AND ACRONYMS

2030 Agenda. 2030 Agenda for Sustainable Development. 29, 36, 40, 88, 108

AAES. Sugar Association of El Salvador. 104

ABC. Brazilian Cooperation Agency. 30, 31, 100

ABS. Access and benefit-sharing. 59, 61

ACR. Guatemala's Renewable Fuels Association. 104

ACSOJA. Argentine Soybean Chain Association. 104

AECID. Spanish Agency for International Development Cooperation. 30, 65

AFS. Agrifood Systems. 2-5, 23, 25, 26, 33, 34, 36, 38-43, 64, 69, 74, 76, 79-85, 88, 92, 103, 105, 107-114

AHFS. Agricultural Health and Food Safety. 76

AI. Artificial Intelligence. 105

AICA. Sugar Producers of the Central American Isthmus. 104

ALADI. Latin-American Integration Association. 33, 34, 97, 99, 100

ALUR. Alcohols of Uruguay. 104

AMIS. Agricultural Market Information System. 3, 24

AMR. Antimicrobial Resistance. 69, 73, 74

APAG. Association of Alcohol Producers of Guatemala. 104

APHIS. Animal and Plant Health Inspection Service. 95

APLA. Local Alcohol Productive Arrangement. 104

APROBIO. Association of Biofuel Producers of Brazil. 104

ASF. African Swine Fever. 75

ASLAC. Latin American and the Caribbean Soil Partnership. 50

Avanzar2030. Avanzar2030. 109,110

AVE. *Ad Valorem* Equivalents. 96

AZUCALPA. Sugar and Alcohol Association of Panama. 104

BADEHOG. Household Survey Database. 81, 83

BIOCAP. Paraguayan Chamber of Biofuels and Renewable Energies. 104

BIODESARROLLAR. Argentine National Biodevelopment Program. 58

BIOMAÍZ. Corn Bioethanol Chamber of Argentina. 104

BIRA. Bridgetown Initiative for the Reform of Global Financial Architecture. 35

BSI. Black Sea Grain Initiative. 23-25

BSXXI. Biofabrica Siglo XXI. 60

C-MASC. Carbon Management and Sequestration Center. 50

CAA. Argentine Sugar Center. 104

CAAP. Paraguayan Sugar and Alcohol Center. 104

CABEI. Central American Bank for Economic Integration. 42,46

CAC. Central American Agricultural Council. 31, 35, 45, 95

CACM. Central American Common Market. 99

CAHFSA. Caribbean Agricultural Health and Food Safety Agency. 74

CAN. Andean Community. 33, 68, 74, 77, 95, 97, 99

CARBIO. Argentine Biofuel Chamber. 104

CARDI. Caribbean Agricultural Research & Development Institute. 51

CARIBVET. Caribbean Animal Health Network. 74

CARICOM. Caribbean Community. 33, 35, 97, 99

CAS. Southern Agricultural Council. 74

CATIE. Tropical Agricultural Research and Higher Education Center. 31, 51

CATN. Central American Trade Network. 99

CBAG. Bio-inputs Commission for Agricultural Use. 62

CC. Climate Change. 23, 31, 35, 39, 43-49, 52-54, 66, 69, 81-88, 107, 109

CCAD. Commission for Environment and Development. 35

CCG. Center for Genomic Sciences. 60

CBD. Convention on Biological Diversity. 48, 49

CELAC. Community of Latin American and Caribbean States. 29, 33, 34, 80, 83

CELAC-FSN Plan. CELAC Plan on Food Security, Nutrition, and Eradication of Hunger. 4, 34

Ceres2030. Sustainable Solutions to End Hunger. 109

CGEE. Center for Strategic Studies and Management. 64

CGIAR. Consortium of International Agricultural Research Centres. 35

CIARA-CEC. Oil Industry Chamber of Argentina-Cereal Exporters Center. 104

CIAT. International Center for Tropical Agriculture. 31, 45

CINVESTAV. Center for Research and Advanced Studies of the National Polytechnic Institute. 60

CMC. Coordination and Monitoring Commission. 30

CNIAA. National Chamber of the Sugar and Alcohol Industry. 104

CNPA. National Committee of Sugar Producers. 104

CODIA. Conference of Ibero-American Water Directors. 51

CPCI. Permanent Committee on Cadastre in Ibero-America. 87

COMTRADE. United Nations Commodity Trade Statistics Database. 20, 91, 92, 93

COP26. 26th Conference of the Parties to the United Nations Framework Convention on Climate Change. 112

COP27. 27th Conference of the Parties to the United Nations Framework Convention on Climate Change. 4, 35, 69

COSAVE. Plant Health Committee of the Southern Cone. 48, 49, 105

COTASA. Andean Technical Committee for Agricultural Health. 77

COVID-19. Severe acute respiratory syndrome-related coronavirus. 10-13, 18, 20, 21, 35, 54, 55, 66, 67, 79, 80, 82, 87, 91, 93

CPBIO. Pan-American Liquid Biofuels Coalition. 104

DALYs. Disability Adjusted Life Years. 70-72, 74

DPA. Diammonium phosphate. 16, 17, 91

EAP. Economically Active Population. 81

ECLAC. Economic Commission for Latin America and the Caribbean. 5, 10, 21, 31, 34, 45, 51, 52, 55, 81, 82, 83, 94, 109

EIDM. Evidence-informed decision-making. 109

El Niño. El Niño–Southern Oscillation (ENSO). 3, 14, 15, 18

EU. European Union. 35, 69, 77, 78, 92

FAO. Food and Agriculture Organization. 5, 13, 25, 31, 32, 34, 35, 43, 45, 48, 49, 52, 64, 68, 77, 87, 88, 94, 95, 99, 100

FAPDA. Food and Agriculture Policy Decision Analysis. 3, 24

FAS. Foreign Agricultural Service. 95

FBD. Foodborne Disease. 71, 74-76

FECALAC. Central American Dairy Federation. 96

FEDEBIOCOMBUSTIBLES. National Federation of Biofuels of Colombia. 104

FF. Family Farming. 5, 16, 23, 30, 31, 46, 76, 83-88, 100, 110

FILAC. Fund for the Development of Indigenous Peoples of Latin America and the Caribbean. 85

Foc TR4. *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4. 47, 52

FSN. Food Security and Nutrition. 4, 34

FSS. United Nations Food Systems Summit. 5, 23, 33, 50, 69, 75, 76, 109, 110

GAP. Good Agricultural Practices. 39, 50

GCF. Green Climate Fund. 46

GDP. Gross Domestic Product. 2, 10, 11, 18-21, 73, 92, 112

GEF. Global Environment Facility. 42

GFANZ. Glasgow Financial Alliance for Net Zero. 113

GF-TADs. Global Framework for the Progressive Control of Transboundary Animal Diseases. 74

GHG. Greenhouse Gases. 5, 23, 39, 40, 46, 53, 82, 104, 112

GIZ. German Society for International Cooperation. 52

GIEWS. Global Information and Early Warning System on Food and Agriculture. 3, 24

GMC. Common Market Group. 30

HLB. Huanglongbing. 49

HPAI. Highly Pathogenic Avian Influenza. 72

ICA. International Cooperative Alliance. 88

ICT. Information and Communication Technologies. 63

IDB. Inter-American Development Bank. 64, 105, 107, 108

IFAD. International Fund for Agricultural Development. 30, 35

IFPRI. International Food Policy Research Institute. 24, 109

IIB. Institute for Biomedical Research. 60

IICA. Inter-American Institute for Cooperation on Agriculture. 5, 30-35, 39, 45, 50, 52, 63-65, 68-76, 87, 89, 94, 96, 99, 100, 104-109

ILC. International Land Coalition. 87

IMF. International Monetary Fund. 28, 112

INCRA. National Institute of Colonization and Agrarian Reform. 49

IPN. National Polytechnic Institute. 60

IPM. Integrated Pest Management. 42

ISO 9001:2015. Quality Management Systems. 60

ISO 14001:2015. ISO 14001:2015: Environmental Management Systems. 60

ISO 45001:2018. ISO 45001:2018: Occupational Health and Safety Management Systems. 60

ITPGRFA. International Treaty on Plant Genetic Resources for Food and Agriculture. 59

LAC. Latin American and the Caribbean. 2-5, 10-26, 28-34, 36, 43-47, 49, 51, 54, 55, 60, 63, 64, 65, 72, 75, 79-88, 91-102, 106, 108, 110-112

LAICA. Sugar Cane Industry Association. 104

La Niña. La Niña phenomenon. 3, 14, 18

LANGEBIO. National Laboratory of Genomics for Biodiversity. 60

LARC37. 37th Regional FAO Conference for Latin America and Caribbean. 94

MAGyP. Ministry of Agriculture, Livestock, and Fisheries of Argentina. 58

MAIZAR. Argentine Corn and Sorghum Association. 104

MCTI. Ministry of Science, Technology, and Innovation (Brazil). 64

MC12. 12th WTO Ministerial Conference. 93

MC13. 13th WTO Ministerial Conference. 93

MDB. Multilateral Development Banks. 112

MERCOSUR. Southern Common Market. 30-34, 61, 87, 97

MIOA. Market Information Organization of the Americas. 24

MSMEs. Micro, Small, and Medium-sized Enterprises. 42, 43, 100

NDC. Nationally Determined Contributions. 40, 43, 45, 53

NP. Nagoya Protocol. 59

OECD. Organisation for Economic Co-operation and Development. 112

OHHLEP. One Health High-Level Expert Panel. 68, 73

OIRSA. International Regional Organization for Plant and Animal Health. 68, 74

OPSAa. Observatory of Public Policies for Agrifood Systems. 3, 24, 31, 65, 87, 103

OWOH. One World, One Health. 67

PACA. Central American Agricultural Policy. 34

PAHO. Pan American Health Organization. 71, 73, 76, 77

PANAFTOSA/SPV. Pan American Center for Foot-and-Mouth Disease and Veterinary Public Health. 70, 71

PARLATINO. Latin American Parliament. 88

PERUCAÑA. Peruvian Association of Agro-industrial Companies of Sugar and Related Products. 104

PLACA. Platform of Latin America and the Caribbean for Climate Action on Agriculture. 29, 52

PNB. National Bio-inputs Program. 58

PROBIAAR. Program for Argentine Agricultural and Livestock Bioinputs. 58

PROCI. Cooperative Agricultural Research Programs. 51

PSIR. Regional Comprehensive Social Policy. 34

PTA. Preferential Trade Agreements. 98

PVC. Permanent Veterinary Committee of the Southern Cone. 68, 74, 77

RB. Rizobacter. 60

REAF. Specialized Meeting on Family Farming. 4, 29, 30, 87

REAF-MERCOSUR. MERCOSUR Specialized Meeting on Family Farming. 4, 29, 30, 87

REDACOOP. Network of Agricultural Cooperatives of the Americas. 88

REDIPRA. Meeting of Rabies Program Directors in the Americas. 70, 77

RedParques. Latin American Technical Cooperation Network on National Parks, other Protected Areas, Wild Flora and Fauna. 87

RICRP. Inter-American Network on Cadastre and Property Registration. 87

RIMSA. Inter-American Meeting of Ministers on Health and Agriculture. 76, 77

RTCA. Central American Technical Regulation. 96

RPPO. Regional Plant Protection Organizations. 95

SAF. Sustainable Aviation Fuels. 104

Sapuvet. Network of Veterinary Public Health. 77

SDG. Sustainable Development Goals. 5, 23, 48, 50, 51, 64, 80, 83, 108

SDR. Special Drawing Rights. 112

SECAC. Central American Agricultural Council. 96, 99, 100

SEEA. System of Environmental Economic Accounting. 64

SICA. Central American Integration System. 29, 31, 33-35, 45, 99

SICTA. Central American Integration System for Agricultural Technology. 51

SIECA. Secretariat for Central American Economic Integration. 95, 97-99, 100

SIMMAGRO. Regional System of Intelligence and Monitoring of Agricultural Markets. 24, 29

SIRVERA. Regional Information System for the Epidemiological Surveillance of Rabies. 71

SIWI. Stockholm International Water Institute. 51

SME. Small and Medium-sized Enterprise. 58, 113

SNA. System of National Accounts. 64

STI. Science, Technology and Innovation. 112

TDM. Trade Data Monitor. 19, 91

Tenure Facility. International Land and Forest Tenure Facility. 87

UN. United Nations. 23, 51, 82

UNALA. Association of Latin American Sugar Producers. 104

UNAM. National Autonomous University of Mexico. 60

UNCTAD. United Nations Conference on Trade and Development. 55

UNDP. United Nations Development Programme. 42, 64

UNEM. National Corn Ethanol Union. 104

UNEP. United Nations Environment Programme. 46, 68, 87

UNESCO. United Nations Educational, Scientific and Cultural Organization. 64

UNICA. Brazilian Sugarcane Industry Association. 104

UNICEF. United Nations International Children's Emergency Fund. 67

UNSIC. United Nations System Influenza Coordination. 67

USDA. United States Department of Agriculture. 63, 95, 109

USFDA. United States Food and Drug Administration. 63

USGC. United States Grains Council. 104

VGGT. Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests. 87

WB. World Bank. 28, 67, 70

WCS. Wildlife Conservation Society. 67

WHO. World Health Organization. 67-75, 77

WOAH. World Organisation for Animal Health. 67, 68, 73, 77, 95, 101

WTO. World Trade Organization. 93, 94, 96, 98, 101, 102

WWF. World Wide Fund for Nature. 44

A CALL TO CAPITALIZE ON REGIONAL COOPERATION OPPORTUNITIES

STRENGTHENING REGIONAL COOPERATION TO FOSTER SUSTAINABLE, INCLUSIVE AGRIFOOD SYSTEMS THAT ARE MORE RESILIENT TO CRISES

1.

José Manuel Salazar-Xirinachs
Executive Secretary | Economic Commission for Latin America and the Caribbean (ECLAC)
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43.2 million people in **LAC** – 6.5% of the population – suffer from hunger.

201 million people in **LAC** (32.1% of the population), are living in poverty.

In 2022, 21.2% of rural dwellers experienced extreme poverty, compared to 10.9% of the urban population.

The average growth achieved during the 2014-2023 decade was 0.8% – less than half of that recorded during the external debt crisis (2.0%).

In June 2023, **headline inflation** in **LAC** (18 countries) was 4.2%, which fell from a peak of 8.4% in June 2022.

The annualized **food** inflation rate, which had reached 11.3% in January 2023, dropped to 6.1%, in June of that year.

In this tenth edition of "The Outlook for Agriculture and Rural Development in the Americas: A Perspective on Latin America and the Caribbean", we underscore the key importance of regional cooperation in addressing the challenges and opportunities resulting from converging crises. Within this context, strengthening regional cooperation not only fosters more sustainable, inclusive and resilient agrifood systems, but also bolsters collaborative actions in areas in which collective action, both at the national level and between countries, is the only way to make a significant difference.

The food, energy and financial crisis is pushing more and more people towards extreme poverty and hunger, which have reached levels last observed in 2005 – a setback of more than 15 years.

At the global level, Latin America and the Caribbean (LAC) was the region most affected by rising food insecurity levels during the 2020-2021 biennium, as a result of the decrease in purchasing power and increase in poverty in recent years. Poverty and **extreme poverty** are also more prevalent in rural areas than in urban areas.

As a result of these crises, LAC's total GDP during the 2014-2023 decade will grow even less than it did during the so-called "lost decade" of the 1980s. In 2022, economic activity in LAC grew at a rate of 3.7%, which is just slightly more than half the rate recorded in 2021 (6.7%). In line with what is happening elsewhere in the world, the region's economic slowdown is expected to deepen in 2023, with a regional growth rate of 1.7%.

On the other hand, inflation, which began to accelerate in mid-2020, has emerged as a major challenge, both globally and in LAC. Although it appears to be slowing, it is expected to remain at relatively high rates in 2023. **Food** inflation, in turn, has increased much faster than headline inflation since mid-2020, but has experienced a steeper decline in the first half of 2023.

Amid these crises, agrifood systems (AFS) have proven their resilience, while also revealing challenges and considerable risks that must be addressed. At the same time, the crises also afford opportunities to carry out a more solid reconstruction process and to advance towards reducing adverse impacts and preventing future crises. This will result in more robust and adaptable AFS in the future.

AFS have proven to be much more resilient than other economic sectors, as demonstrated by the agriculture sector's growth rates compared to overall economic growth rates. During the 2020 crisis, the agricultural GDP experienced a moderate increase of 0.4%, while the total GDP fell by 6.5%. During the economic recovery period in 2021, the growth of the agricultural GDP began to accelerate, but to a lesser degree than the total GDP (1.6 % versus 6.9%).

In the field of international trade, LAC's agrifood exports grew at rates 2.6 and 1.7 times greater than global exports in 2020 and 2022, respectively. In recent years, the nominal agrifood trade balance of LAC (17 countries) has experienced significant increases compared to the previous year: 4.3% in 2020, 16.6% in 2021 and 22.3% in 2022. The trade balance rose from USD 155.6 billion in 2019 to USD 231.4 billion in 2022.

Regional agriculture has undoubtedly played an important role in market stabilization; otherwise, the negative impacts of the crisis could have been much graver. This strategic and stabilizing role is partly explained by the fact that regional agriculture accounts for approximately 22% of merchandise exports, around 5% of the GDP and employs 15% of the population. Furthermore, LAC is the world's major

net food exporting region, with the potential to feed millions of people each year.

Among the most significant challenges that affect AFS at the global level are disruptions in the food supply caused by military conflicts, such as the ongoing war between Russia and Ukraine. An additional challenge is the need to sustainably feed an ever-growing population, while also addressing the effects of the climate crisis.

The crises continue impacting AFS in various ways. First, there has been a noticeable increase in international food prices, which, to a greater or lesser extent, is reflected in local prices. This, in turn, contributes to poverty and food insecurity, with the most severe impact on vulnerable households.

Second, the rising cost of fertilizers since 2021 has gained momentum since the start of the war between Russia and Ukraine, which, coupled with rising fuel prices, has also triggered hikes in food production costs.

On the other hand, climate factors have been affecting regional AFS with greater intensity in recent years. An unprecedented three-year La Niña phase has impacted production in several areas of South America, particularly Argentina. Although the transition to the El Niño phenomenon starting this year could benefit yields in some production areas, it also has the potential to intensify the incidence of extreme weather events.

Reducing the level of uncertainty in international markets can be achieved through relatively simple actions. On the one hand, it is important to avoid restricting international trade in food and fertilizers, as well as to improve transparency by publishing key information on production, supply and prices, which will facilitate the strategic planning of production and supply. To that end, it will be necessary to expand or improve the implementation of tools that issue early warnings for specific or general events that affect AFS. Some examples include the Global Information and Early Warning System on Food and Agriculture (GIEWS), the Agricultural Market Information System (AMIS), among others, or systems for monitoring policies, such as the Food and Agriculture Policy Decision Analysis (FAPDA) and the Observatory of Public Policies for Agrifood Systems (OPSAa).

Regional cooperation is particularly relevant in the context of current challenges and opportunities generated by the confluence of crises. Collaboration among countries will be crucial to capitalize on new opportunities for sustainable and inclusive development, as well as to enhance the resilience of AFS.

Regional cooperation not only facilitates the management of shared resources between countries, but also allows for reconciling differing or conflicting interests. This, in turn, allows for addressing internal inequalities and promoting regional priorities in global agendas. It also facilitates the implementation of collaborative actions in areas in which only collective action can achieve a significant impact, while strengthening regional integration mechanisms.

In LAC, there are outstanding examples of shared solutions and progress with respect to transformative agendas that respect the region's uniqueness. This dual process involves two key actions: first, positioning the region on global agendas based on an internal reflection process; and second, advancing towards a domestic agenda to address the specific challenges facing LAC. Various forms of cooperation, such as triangular cooperation, South-South cooperation and North-South

16 **LAC** countries are net agricultural exporters and 16 are net importers; more than 80% of the population lives in net exporting countries.

The crisis situation must be viewed as an opportunity to transition towards more sustainable modes of production, with greater efficiency in synthetic fertilizer use.

In 2022, climate issues negatively impacted agricultural value-added, with Paraguay, Argentina, Costa Rica, Uruguay and Brazil experiencing the sharpest decline.

The "Home of Sustainable Agriculture in the Americas" was one of five pavilions at **COP27** that gave visibility to agriculture and food (see Box **3.2.2**).

MERCOSUR's REAF is an example of the ways in which regional cooperation and integration in **LAC** can drive a transformative agenda.

CELAC's Plan on Food Security, Nutrition, and Eradication of Hunger (CELAC FSN Plan) guides the region's collective efforts to overcome hunger and combat poverty (see section **3.2**).

cooperation, have played a key role in improving rural conditions in LAC and identifying collective solutions to foster the sustainability of AFS and overcome productive, economic, environmental and social gaps.

However, strengthening regional cooperation and integration mechanisms requires sound governance. This involves improving current integration and institutional mechanisms to better guide decisions, coordinate efforts and position regional priorities in global forums, thereby bolstering LAC's influence within the international community. The only way to achieve more efficient, transparent and contextualized regional cooperation is to focus on LAC's role in the world and to build on previous experiences, maximizing the impact of practices and solutions that already exist in the region.

The tenth edition of this report, corresponding to the 2023-2024 biennium, presents a series of measures aimed at strengthening regional cooperation to drive sustainable production, the development of the bioeconomy, the implementation of the One Health approach and the promotion of more sustainable and inclusive agrifood systems, while also making strides in consolidating regional agrifood trade.

The report identifies regional cooperation modalities, instruments and actions that focus on key strategic areas (see chapter 4), namely:

a. **Sustainable agricultural production in the context of global environmental change**. Regional cooperation in this area can be geared towards fostering innovative and sustainable agricultural approaches, practices and technologies. This includes topics such as the restoration of production landscapes, integrated land and water management, water erosion, land tenure and climate action, among others.

b. **Development of the bioeconomy as a strategy for diversifying production and adding value in agriculture.** In this area, regional cooperation can focus on building capacities in the public and private sectors to address trade and regulatory barriers, fostering coordination with universities and science, technology and innovation institutions, as well as establishing clusters, working groups and networks specializing in bioeconomy issues throughout the region.

c. **Application of the One Health approach,** which, despite the collaboration of international agencies and the support of the academic sector, will require greater regional coordination, policies and public-private partnerships to expand its application at the regional, national and territorial levels, and to fully capitalize on its benefits.

d. **Social and economic inclusion with gender equality in the agriculture and rural sector**, with a view to fostering innovative policies and informed dialogues to drive progress in this area. Solutions should be geared towards overcoming challenges with respect to equal conditions for all people, equitable access to resources and services, equitable participation in digital environments and the elimination of social and gender gaps.

e. **Strengthening agrifood trade in LAC as an engine for economic development, food security and regional and global sustainability.** Joint actions, technical improvement and experience sharing will be instrumental in restoring the multilateral trading system, increasing intraregional trade and enabling the region to make better use of existing opportunities and trade agreements.

This report also explores actions with the potential to enable or accelerate AFS transformation, which include the following (refer to section 4.6):

a. **The energy transition,** which is the reduction of greenhouse gas emissions (GHGs) in all sectors of the economy, offers a promising outlook for the sustainable development of AFS. One of the cornerstones of this transition is the decarbonization of the transport sector – a scenario in which liquid biofuels emerge as key stakeholders in the search for environmentally sustainable and economically viable alternatives. The agriculture sector, which is the major provider of raw materials for the sustainable production of these biofuels, plays a fundamental role in the process of transitioning towards the consumption of cleaner energies.

b. **Digital technologies** will be a determining factor in the shift towards more sustainable AFS, as they facilitate more informed and precise management of various agrifood processes. Thus, they can assist in boosting production, through the increasingly efficient use of inputs and natural resources and even the provision of ecosystem services. Digital technologies could also prove indispensable in expanding the application of sustainable practices in the sector.

c. **Knowledge platforms** will play a key role in fostering regional cooperation in AFS in various areas, from scientific research and community practices to technological trends and government regulations. These platforms facilitate informed decision-making and a comprehensive understanding of the environmental, economic and social challenges facing AFS.

It is important to acknowledge the fact that funding will be required to implement proposed actions to drive the sustainable and inclusive development of AFS in LAC, including those that involve collaboration between countries as well as those that each country can implement individually.

To determine the funding required, it is necessary to estimate costs involved, which, in turn, requires a clear definition of key actions in terms of quantifiable objectives, specific tools or instruments to achieve them (including technologies) and adequate institutional arrangements. This cost estimation exercise can be carried out individually for each key action (e.g., support for family farming), as well as for comprehensive programs for the sustainable and inclusive development of AFS that involve several initiatives (refer to section 4.6.4).

Lastly, regional institutions and agencies play a fundamental role in driving and enhancing the effectiveness and efficiency of regional cooperation, as well as in fostering collective actions. In this regard, ECLAC, FAO and IICA are valuable resources at the service of countries in the region and subregional entities, making available their technical capacities and facilitating access to a wide range of resources, specialized knowledge and key capacities to achieve national development objectives such as the Sustainable Development Goals.

In this capacity as catalysts, ECLAC, FAO and IICA encourage collaborative solutions; share best practices; foster dialogue, consensus building and the sharing of information and resources; and support the implementation of national or regional strategies and policies. Together with other regional agencies, these institutions lay the foundation for greater cooperation and the development of more sustainable, inclusive and resilient AFS in the Americas.

The region has a considerable trade deficit with respect to bioeconomy diversification and value-added (bioenergy, biofertilizers, biocosmetics, etc.) (see section **4.2.3**).

To consolidate agrifood trade, countries' capacity to analyze multilateral standards that hinder trade must be strengthened, and their participation in the approval and prioritization of future standards at the national, regional and global levels must be enhanced.

The Food Systems Summit, held in 2021 within the framework of the Decade of Action to meet the **Sustainable Development Goals (SDGs)**, identified actions to foster more resilient and sustainable agrifood systems. Advancing in this direction will drive progress in meeting the 17 **SDG**s.

LAC's total average expenditure in agriculture between 2015 and 2019 was USD 25 billion, which starkly contrasts with the estimated USD 60 billion per year that must be invested (**OECD and FAO, 2022**).

AGRIFOOD SYSTEMS
RESILIENT TO THE CONVERGING CRISES

IN RECENT YEARS, LAC HAS BEEN HIT BY MULTIPLE CRISES

1. The food crisis
2. The financial crisis
3. The energy crisis

0.8 % ↑ Average growth in GDP in **LAC** in the last decade (**2014- 2023**)

A rate that is

2.0 % ↑ Less than the average growth in GDP in LAC during the "lost decade" (**1980-1989**)

THE CRISES HAVE PRODUCED **CONSIDERABLE CHALLENGES** FOR THE REGION

82 million people in **LAC** are experiencing **EXTREME POVERTY**

43.2 million people (16%) in **LAC** are suffering from **HUNGER**

6.1% annualized **food INFLATION** in LAC (as at June 2023) vs. 4.2% **overall inflation** in LAC

Impacts of more **EXTREME & FREQUENT** climate events

Increases in **PRODUCTION & LOGISTICS** costs for food

However, the AFS of LAC have demonstrated **RESILIENCE** during these CRISES

0.4% ↑ Growth in agricultural GDP in LAC during 2020 vs a 6.5% decline in overall GDP

The growth in regional agrifood exports was **2.6** times more than the overall growth worldwide **x 2.6**

STRENGTHENING REGIONAL COOPERATION

WHY IS REGIONAL COOPERATION IMPORTANT?

Regional cooperation is essential in ensuring agrifood systems that are **sustainable, inclusive and resilient.**

- Facilitate the implementation of collaborative actions in areas in which a significant impact can only be made through collective action
- Contribute to positioning the region in global agendas
- Foster technical strengthening and experience sharing
- Facilitate informed and evidence-based decision-making
- Facilitate the mobilization of technical and financial resources
- Assist in revitalizing the multilateral trade system and increasing intraregional trade

To this end, there are actions at the national and regional level that can FOSTER or ACCELERATE AFS transformation

- **Digitalization**
- **Energy transition**
- **Financing**
- **Knowledge Platforms**

THE FOLLOWING STRATEGIC AREAS REPRESENT AN OPPORTUNITY FOR REGIONAL COOPERATION:

- **SUSTAINABLE AGRICULTURAL PRODUCTION** within the context of global climate change
- **BIOECONOMY:** Production diversification and value addition in agriculture
- Pragmatism in **ONE HEALTH:** opportunities & challenges
- **SOCIAL & ECONOMIC INCLUSION COUPLED WITH GENDER EQUALITY**
- **AGRIFOOD TRADE as an engine for development**

EXAMPLE OF POSITIONING IN GLOBAL AGENDAS

*The **"Home of Sustainable Agriculture of the Americas"** was one of the pavilions at COP27 that highlighted the role of agriculture and food.*

60 Events

34 Participating countries of the Americas, represented by their ministries of Agriculture, private sector, farmers, academics and experts.

GLOBAL AND REGIONAL CONTEXT

The food, energy and financial crises are pushing more people into extreme poverty and hunger, a setback of more than 15 years back to 2005 levels.

2.1 IMPACTS OF SUCCESSIVE CRISES ON THE PROSPECTS FOR ECONOMIC GROWTH AND INFLATION

Reflecting what is happening in the rest of the world, the slowdown in LAC GDP is expected to deepen in 2023, with a regional growth rate of 1.2% according to ECLAC estimate.[a]

Estimates reveal that a return of headline inflation to target is unlikely before 2025 (**IMF, 2023a**).

In the 2014-2023 decade, ALC will experience GDP growth even lower than that of the so-called "lost decade" of the 1980s: the average growth of 0.9% represents less than half of the 2.0% registered during the external debt crisis (ECLAC, 2022a).

The fight against inflation and the war in Ukraine, as well as the restrictions due to the COVID-19 pandemic, especially in China, had a negative effect on world economic activity in 2022. Global GDP growth in 2022 was 3.5%, 1.2 percentage points lower than what was forecast before the Russian invasion of Ukraine. In 2023, world growth will be even lower, at an estimated rate of 3.0%, which is expected to remain at 2024 (IMF, 2023a). The reopening and recovery of the Chinese economy have not been able to offset the decline in growth in advanced economies, especially in the euro area and the United Kingdom: advanced economies would grow 1.5% in 2023, while emerging and developing countries would do so at 4.0% (IMF, 2023a) (**figure 2.1**).

In the case of Latin America and the Caribbean (LAC), economic activity closed 2022 with a growth rate of 3.7%, just over half the rate of 6.7% registered in 2021.

All subregions would register lower growth in 2023: South America would grow 0.6% (against 3.8% in 2022); Central America and Mexico would grow 2.0% (3.5% in 2022), and the Caribbean (not including Guyana) would grow 3.5% (5.8% in 2022).

Both global production and inflation estimates have been revised upwards in the first quarter of 2023, suggesting stronger-than-expected demand. This is reflected in more persistent inflation rates. Global headline inflation is expected to fall from 8.7% in 2022 to 6.8% in 2023 due to lower commodity prices, but core inflation is likely to decline more slowly.

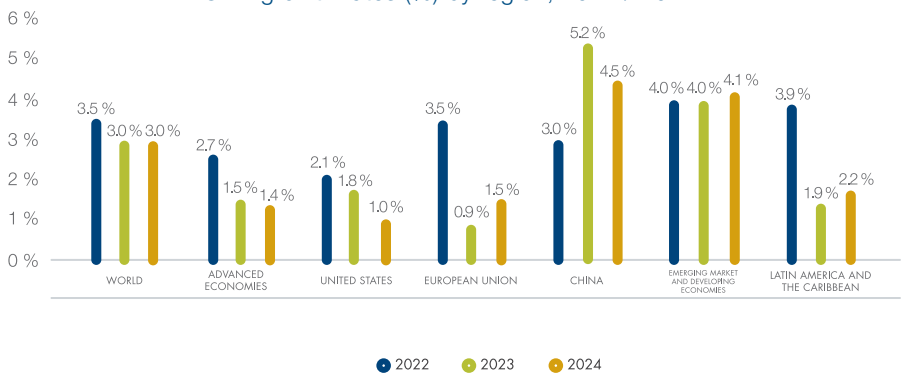
In advanced economies, headline inflation is estimated to reach 4.7% in 2023, compared to 7.3% in 2022. In emerging and developing economies, headline inflation will remain high in 2023: 8.6% in average, against 9.8% in 2022 (IMF, 2023a). In both cases, core inflation, which excludes energy and other items with highly volatile prices, is adjusting more slowly. This is due to significant increases in the prices of services, higher margins in some sectors and cost pressures due to adjustments in labor markets (OECD, 2023).

In LAC, the acceleration of inflation that began in mid-2020 appears to be easing, although rates are expected to remain relatively high in 2023. On the other hand, regional food inflation has accelerated more than general inflation since mid-2020 but has fallen more rapidly in the first half of 2023: in January, 12-month food inflation had reached 11.3% and in June it dropped to 6.1% (**figure 2.2**).

[a] www.eclac.org/

Figure 2.1

GDP growth rates (%) by region, 2022 / 2024*



Source: Own elaboration based on data from IMF (2023a). *2023 and 2024 rates are estimates.

International prices

In recent months, the international prices of raw materials in general, and of food and energy in particular, have been adjusted downwards and, towards the end of 2023, this trend is expected to continue (ECLAC, 2022a; IMF, 2023b; OECD, 2023; EIU, 2023). One of the supply factors that had contributed significantly to inflationary pressures since the end of 2020, i.e. disruptions in global supply chains, have eased in recent months, contributing to lower inflation. Even so, the prices of food and some basic products will remain above the levels registered in 2021 (OECD, 2023; EIU, 2023). It is estimated that, in 2023, energy goods will be more than 40% above the level observed in 2021, and food, 11% above (ECLAC, 2022a).

Interest rates

In response to persistent inflation, global monetary policy has been the most synchronized in several decades, with the largest simultaneous increase in interest rates since at least 1970 (ECLAC, 2022a). Another measure to combat inflation adopted by the main central banks has been the reduction, since the beginning of 2022, of their balance sheets and, therefore, of global liquidity. In 2020, to respond to the emergency represented by the COVID-19 pandemic, growth in the money supply had reached unprecedented levels in some of the major economies, such as the United States, the Euro area, and the United Kingdom. But since 2022 that trend has been reversed.

The restrictive monetary policies in developed economies have had an impact on credit markets globally, with a tightening of financial conditions, an increase in volatility and capital outflows from emerging markets, and an appreciation of the dollar (ECLAC, 2022a; OECD, 2023; EIU, 2023).

The sharp tightening of monetary policy in the last year is also beginning to have negative spillover effects on the financial sector. After a prolonged period of moderate inflation and extremely low interest rates, the rapid tightening of monetary policy has caused considerable losses in long-term fixed income assets, with negative effects on the sustainability of financial institutions and markets (IMF, 2023a).

Public debt

At the start of the war in Ukraine, most economies had high levels of debt due to fiscal support measures taken in response to the COVID-19 pandemic. Even so, most developed and emerging economies, including several in LAC,

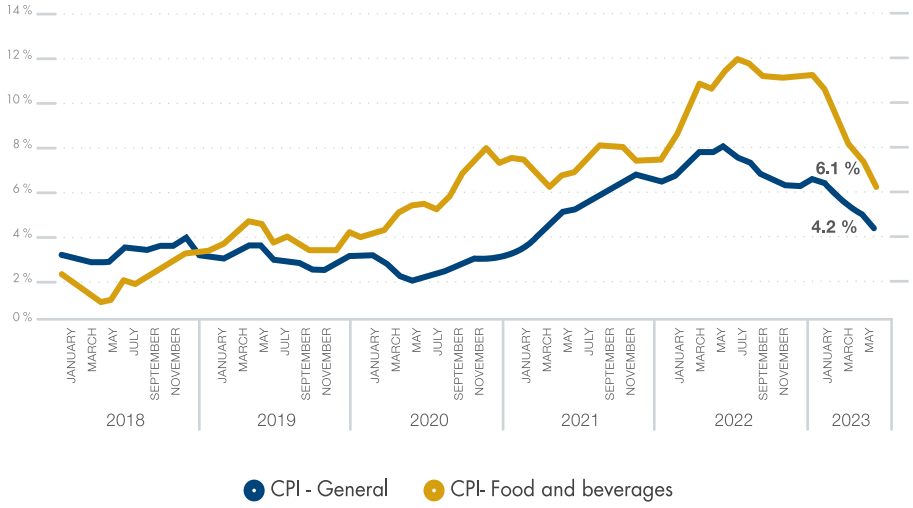
In an average of 18 **LAC** countries, 12-month headline inflation fell from a peak of 8.4 %, reached in June 2022 (the highest inflation level since 2005), to 4.2 % in June 2023.

In the fight against inflation, the global monetary policy response has been a synchronized increase in interest rates.

The instability of financial institutions and markets is evident after the recent collapse of three banks in the US and the doubts that have arisen in the European banking system.

Between 2020 and 2022, emerging and developing economies have accumulated debt at a rate unprecedented in more than half a century (**ECLAC, 2022a**).

Figure 2.2:
LAC (18 countries), General Consumer and Food Price Index, January 2018 to June 2023



Source: Own elaboration based on official data.

The recent acceleration in the accumulation of public debt is a consequence of fiscal support measures due to the COVID-19 pandemic and energy and food subsidies against inflation, as well as the increase in interest rates worldwide.

The biggest challenge for LAC is to keep inflation under control and at the same time generate the fiscal and monetary space to implement policies that favor the still incomplete post-pandemic economic recovery.

With the phasing out of the COVID-19 emergency programs, public expenditure, especially primary expenditure, decreased slightly in 2022 compared to 2021, and is expected to decline further in 2023.

expanded or maintained economic support for vulnerable sectors and households in 2022.

In LAC, the main measures adopted that had an impact on public expenditure were food and energy subsidies, but in most cases these have been offset by the progressive withdrawal of previous emergency support programs related to the pandemic (ECLAC, 2022a).

On the other hand, interest payments have increased in accordance with the deterioration of macrofinancial conditions, currency depreciation and increases in monetary policy rates.

Restrictive monetary policies

As the decline in inflation is expected to be slow in 2023 and 2024, with price levels remaining high in historical terms (IMF, 2023a; ECLAC, 2022a; OECD, 2023; EIU, 2023), no drastic changes should be seen in monetary policy, neither at the level of the central economies nor in LAC. The region must consider the adverse effects of restrictive monetary policies on variables such as investment, consumption, exchange rates, household purchasing power, employment, and inequality in income distribution. Such effects restrict the opportunities for economic recovery.

Restrictive monetary policies have a differentiated impact on developed and developing countries, with more unfavorable effects on the latter group. In LAC, high debt levels, associated with tighter credit conditions and increased financial risk, limit possible fiscal policy responses in the current context of multiple crises.

2.2 IMPACTS OF MULTIPLE CRISES ON AGRIFOOD MARKETS

The differential impact of the war in Ukraine has been the intensification of the increase in commodity prices. Those prices had already been rising since mid-2020 due to supply chain disruptions triggered by the **COVID-19** pandemic and, subsequently, an increase in demand during the consumption recovery phase. Given the productive and commercial specialization of the countries involved in the conflict, the price indices for food, energy and fertilizers were the most affected, reaching levels around all-time highs. Such increases worsened indicators of food insecurity and poverty both globally and in **LAC**.

The FAO Food Price Index, measured in real terms, reached its highest level in the series, beginning in 1990, in March 2022 (156.3 points). After 12 continuous months of decline, in April 2023 the index rose slightly, then fell in May and June, to rise again in July to 119.2 points, 1.3% above the previous month but 23.7% below the peak level of March 2022 (**figure 2.3**).

It is interesting to note that three of the four episodes of sharp increases in food prices have taken place in the last fifteen years. In the most recent spike, food prices have been affected by rising fuel and fertilizer prices. Logistics costs in **LAC** account for an average of 50% of the final price of food (World Bank, 2009) and it is estimated that the rise in these costs accounted for half of the increase in food prices in 2022 (UNCTAD, 2022).

In a large food-producing country like Brazil, fertilizers and fuels responded in 2017, the year of the last Brazilian Agricultural Census, for about 40% of the production costs of annual crops such as corn and soybeans. Rising prices for these inputs, which have doubled and sometimes even tripled in the past three years, have surely increased their share of total costs.

The value of the FAO Price Index in July 2023 is lower than the 2021 average (125.1 points), but 15.5 points higher than the 2010-19 decade average (figure 2.3).

The United States, the European Union and other Western allies joined forces in support of Ukraine after Russia invasion. They have also shown a greater alignment against China. The risk is that this union deepens political polarization at a global level (EIU, 2023).

Figure 2.3:
FAO Food Price Index, 2014-2016=100, real monthly value, January 1990 to July 2023

Source: Own elaboration based on www.fao.org, consulted on August 24th, 2023.

Edwin Chávez, a farmer in La Esperanza, Honduras, experienced an increase in the cost of his quintal of fertilizer from USD 20 to USD 40 since September 2021.

The globalization of markets for food and agricultural products implies a growing interdependence between what happens in a producing area or country and food markets. Ukraine and Russia are the origin of less than 3% of LAC wheat imports (even less in the case of other grains), but their markets are interconnected through international prices. Thus, even in countries that are net cereal exporters such as Argentina or Brazil, domestic prices have been affected by the rise in international grain prices as a result of the war in Ukraine. This reinforces the idea that in the fight against food inflation, individual actions, such as export restrictions, are ineffective and a more cooperative approach is needed.

Coordinated actions are needed to strengthen food markets and reduce sources of uncertainty regarding global supply.

2.2.1 Uncertainty about the global food supply remains high but the supply response has been favorable

Global food systems currently face challenges such as disruptions to food supplies from the war in Ukraine, the need to sustainably feed a growing population, and the effects of the climate crisis.

Uncertainty over global food supply persists amid continued risks to grain exports from Russia and Ukraine, as well as weather risks.

There is a 60% chance that El Niño will start to show its effects as early as mid-2023, after three consecutive years of La Niña (**AMIS, 2023a**).

Before the start of the war, Russia and Ukraine together accounted for about a third of the world trade in wheat, a fifth in maize and half in sunflower oil. Despite the reduction in agricultural production in Ukraine by about a third, and in wheat by 40% in the last season, and the logistical difficulties in getting Russia's cereal exports onto the market, global supply has not been affected thanks to the increase in production from other suppliers.

World production, trade and the stock/use ratio of wheat would rise in 2023 (figure 2.4).

Favorable weather conditions in some producing areas have helped third countries to increase the supply of basic grains. This has prevented, for now, international prices from continuing to rise (AMIS, 2023b). However, given the limited stocks, and their role as a buffer against short-term variations in production, agricultural markets could experience greater volatility in the coming months. Such volatility could be exacerbated by the imminent arrival of the El Niño, a climate pattern that includes the unusual warming of surface waters in the eastern Pacific Ocean and an increasing trend in extreme weather events.[1]

According to the latest forecasts, the ratio of world cereal stocks to use in 2022/23 would be 29.5 percent, compared to 30.7 percent in 2021/22 (FAO, 2023).

Meanwhile, other events, such as the decision taken by the Russian Federation to terminate the implementation of the Black Sea Grain Initiative (Box 2.4.1), continue to inject uncertainty into the markets.

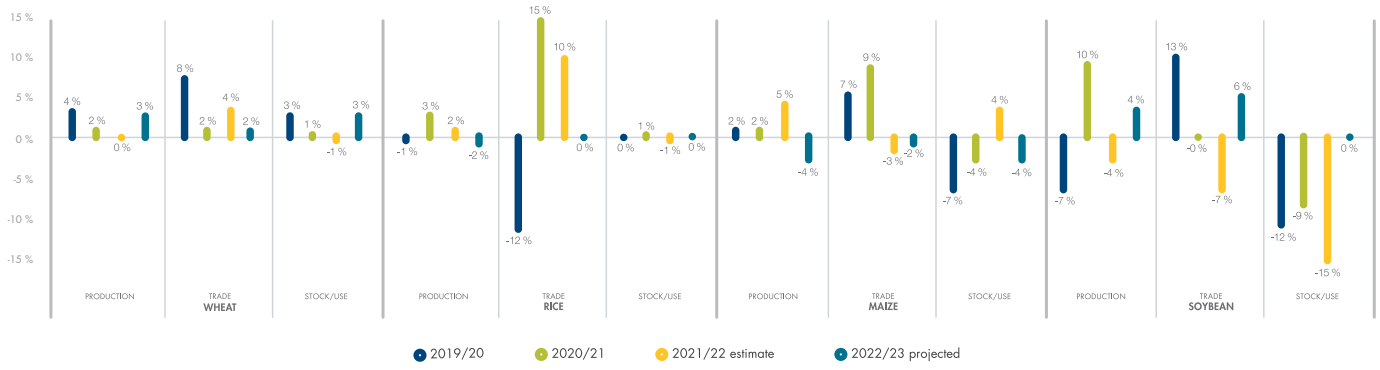
Regarding the near-term outlook for world cereal markets, early signs point to a strong wheat production in 2023, which could reach the second highest level after the all-time high in 2022 (FAO, 2023; AMIS, 2023a). Spurred by high prices, farmers increased the cultivated area in North America and, assuming normal weather conditions, wheat production is forecast to increase in the subregion, offsetting declines in Europe, South America and North Africa.

In the southern hemisphere, the outlook for maize production is also favourable: in response to a strong export demand, a record production is anticipated in Brazil. However, the increase will not be enough to offset the fall in production in Ukraine and the rest of Europe, and a significant drop in world production, trade and the stock/use ratio of maize is therefore expected in 2023 (figure 2.4).

[1]El Niño is estimated to affect crop yields on more than a quarter of the world's agricultural land. The trend in previous El Niño episodes has been a slight increase in global average yields for soybeans, and a decrease in maize, rice, and wheat. Maize is usually the most affected among these grains (**AMIS, 2023a**).

Figure 2.4:

Growth rate of global wheat, corn, rice and soybean production, trade and stock/use ratio, 2019-2023, in percentages



Source: Own elaboration based on Agricultural Market Information System (AMIS), consulted on June 19, 2023.

In rice, production estimates in India have been revised upwards, but even so, world production and the stock/use ratio of rice should decline in 2023 (figure 2.4). The arrival of El Niño, especially if its effects start to show early, raises concerns about possible impacts on rice production in South and Southeast Asia.

World cereal stocks ending in 2023 are forecast to decline by 1.2 percent from their opening levels, reaching 844 million tonnes, driven by anticipated drawdowns in world stocks of coarse grains and rice, which would offset the increase in wheat stocks (FAO, 2023).

In soybeans, the even lower forecasts for Argentina and Paraguay in the midst of a prolonged drought are offset by a record harvest of 288.1 million tons of grains in Brazil, 9.6% higher than the production of 2022. This would lead to an increase in world production, trade and the stock/use ratio of the oilseed in 2023, after the sharp reduction in these indicators in 2022 (figure 2.4).

Regarding the stock/use levels, in the four grains analyzed, the current levels are below the average and the median of the last 10 years (up to 3 percentage points in the case of rice), but above the values of the last 20 years.

In the last seven months, rice prices have increased, in some countries by more than 25%.

The current stock-use ratio of the main grains is also above the levels reached during the 2007-08 and 2010-11 price peaks.

A combination of favorable weather in some producing areas and a strong supply response has prevented market prices from reaching in 2023 the high levels of early 2022 (AMIS, 2023b).

LAC imports about 85% of the fertilizers used regionally and the fertilizer intensity has been growing at faster rates in the region than in the rest of the world. No other region in the world depends so much on fertilizer imports, and especially no other region that produces and exports so much food.

In July 2022, between 30% and 39% more grain was needed in Argentina to buy the same volume of fertilizers as the previous year[a].

The devaluation of several LAC currencies during 2022 intensified the increase in prices per ton of fertilizer in local currencies.

In Brazil, according to the latest Agricultural Census, almost half of farmers with more than 500 hectares used synthetic fertilizers in 2017, compared to 14% among producers with up to 1 hectare.

2.2.2 Fears of a war-induced fertilizer shortage are easing

Russia is the world's largest exporter of nitrogenous fertilizers, the second largest supplier of potassium and the third largest supplier of phosphorous fertilizers (ECLAC, FAO, WFP, 2022). In the first weeks of the war, between March and April 2022, fears about a possible shortage of fertilizers caused their prices to skyrocket, reaching their highest levels in several years. It is important to note that the upward trend in fertilizer prices is prior to the outbreak of the war and responds to the increase in natural gas prices, the main input in its production. Accompanying the prices of energy inputs, the prices of fertilizers began their last cycle of rise in mid-2020 (**figure 2.5**).

Since their peak in mid-2022, price increases of most fertilizers have moderated but prices remain at high levels compared to 2020. Considering nitrogenous fertilizers (ammonia and urea), potash and **diammonium phosphate (DPA)**, the annual average increase in international prices was 96% in May 2022. As of May 2023, prices had fallen by 52%. This recent drop responds to the weakening of demand and further reductions in natural gas prices in Europe, which encouraged production in the region. Price declines are most significant for nitrogenous fertilizers, which are highly dependent on natural gas (AMIS, 2023b).

Fertilizers, as well as food, have been excluded from the sanctions imposed on Russia and Belarus by the international community. But even if the sanctions do not directly target the food and fertilizer sectors, they can make trade more difficult. For example, restrictions on banking operations or on companies doing business in those sectors have an indirect impact on trade by increasing transaction and logistics costs (such as insurance). On the other hand, since 2021, Russia has directly restricted trade in fertilizers and agricultural products through export taxes, license requirements, and bans (Glauber and Laborde, 2022a).

Given the high dependence of agriculture in **LAC** on imported fertilizers, the import bill has risen considerably since 2021 while volumes in some cases have been reduced. As of December 2022, the value of regional imports of fertilizers (18 countries) had risen 48.7% in twelve months, while the volume of imports had fallen by 14.8%[2]. This suggests that producers currently face restrictions to continue with the usual fertilization rate.

The import unit values of fertilizers had increased on average 128.2% over 12 months in June 2022 and 76.1% in December 2022. These figures account for the fall in international prices in the second semester of 2022 but also the fact that prices are still high.

The impact of fertilizer and energy price increases was mitigated by subsidy policies, but in some countries producers had to reduce the level of fertilization and other tasks in the field.

Despite the recent drop in fertilizer prices, they remain high, which represents a real risk of excluding family farmers from access to this important input. The agricultural sector in **LAC** is made up of more than 18 million farms, of which around 81% are family farms (Salcedo and Guzmán, 2014).

[2]Own elaboration based on data from OPSAa/IICA
[a]https://opsaa.iica.int

The current situation, beyond the crisis component, should be seen as an opportunity to transition towards a more sustainable agricultural production, lowering the synthetic fertilizer intensity and increasing the efficiency in its use. In LAC, the fertilizer crisis has created opportunities to progress in some areas, such as:

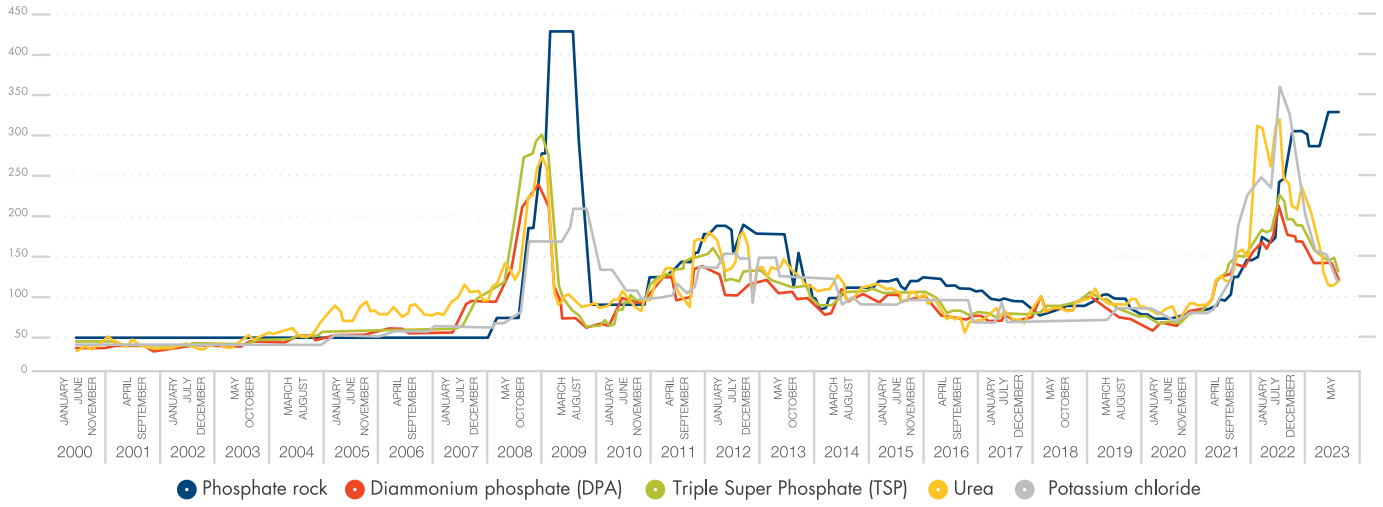
- Further research and adoption of biological nitrogen fixation techniques. Countries in the region such as Argentina, Brazil and Uruguay have more than 80 years of research on the subject and are taking advantage of the accumulated expertise to promote innovations and develop markets for products in this area.
- The expansion of precision technologies in agriculture that allow the use of the appropriate amounts of fertilizers at the right times and places.

Monitoring the transition towards a less fertilizer-intensive agriculture through the appropriate incentives and conditionalities and supporting the most vulnerable farmers will be essential so that the current crisis does not have a negative impact on agricultural productivity and food security.

In response to the rise in fertilizer prices, farmers in LAC have adopted strategies such as planting varieties that require less fertilization, changing the production practices to increase the efficiency of fertilizers or reducing their use. (**ECLAC, FAO, WFP, 2022**).

Figure 2.5

Fertilizer price indices, 2010 = 100, based on nominal monthly prices in dollars, by type of fertilizer, January 2000 to June 2023



Source: Own elaboration based on data from World Bank Commodity Price Data (The Pink Sheet), consulted on July 19, 2023.

2.3 RISKS AND OPPORTUNITIES FOR REGIONAL FOOD SYSTEMS

With only 8% of the world population, LAC accounted for around 12.5% of all infections and 26% of deaths from COVID-19 as of December 2022.

The increase in the incidence of poverty and food insecurity in the region is one of the consequences of the multiple recent crises. **LAC** had been one of the regions most affected by the COVID-19 pandemic when, at the beginning of 2022, the start of the War in Ukraine intensified the vulnerability of regional **food systems** through several channels:

- The sharp increase in international food prices, and the pass-through to local prices, has negatively affected poverty and food security, impacting low-income households the most;
- The increase in fertilizer prices since 2021, which has accelerated since the start of the war, added to the higher price of fuels, increasing the costs of producing food.

Climatic factors are also affecting, with greater intensity in recent years, regional **food systems**. An unprecedented third consecutive year of **La Niña** during the 2022-23 season impacted production in several areas of South America, especially Argentina.

The drought affected soybean and corn production, as well as livestock production, especially in Argentina and Uruguay. With 54% progress in the soybean harvest in Argentina, as of May 2023, a reduction of 56% was estimated for this season, with the lowest level of yields in the last 15 years (Bolsa de Comercio de Rosario, 2023). In turn, corn is estimated to have a 40% lower harvest this season. The transition towards **El Niño**, starting this year, although could be positive for yields in some producing areas, has also the potential to intensify the occurrence of extreme weather events.

The 2022 wheat harvest in Argentina was 44% lower than the previous one and, as of May 2023, the soils in the province of Buenos Aires presented the driest conditions in the last 30 years.

2.3.1 Food price increases improved regional agrifood trade balance

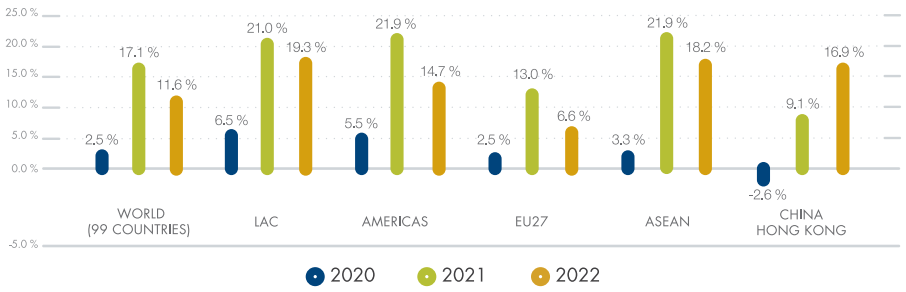
In the current cycle of rising prices (2020-22), the annual growth of regional agrifood exports exceeded the world average growth as well as that of other regions.

LAC presents an important contrast in terms of its position in **food systems**. On the one hand, as will be seen in the following section, the region has been one of the most affected by the increase in food insecurity as a consequence of the multiple crises and the restrictions to access a healthy diet. But, on the other hand, the region is the world's leading food exporter and the regional trade balance has improved as a result of the increase in international prices in recent years.

In LAC there are 16 net agricultural exporting countries and 16 net importing countries, but more than 80% of the population lives in countries that are net exporters. Furthermore, regional growth has historically been correlated with commodity prices. In the first rising price cycle of the new millennium (2000-2011), LAC's GDP per capita grew by slightly more than 2% and in the downward cycle (2012-2020) the variation was negative (-0.45%). In the current rising price cycle (2020-22), the annual growth of regional agrifood exports exceeded the world average and that of other regions (**figure 2.6**), despite the **COVID-19** pandemic

Figure 2.6

World and main regions, Agrifood exports by origin, 2020-2022
(USD in CIF values)



Source: OPSAa (IICA) with TDM data as of April 4th, 2023.
Notes: Estimates based on imports from 99 countries in the world with continuous data from 2019 to 2022, therefore the data can be interpreted as exports from each region in CIF values.

Agriculture in LAC represents 22% of exports, around 5% of GDP and 15% of employment. The region is the world's leading net food exporter, with the potential to feed some two billion people each year.

restrictions and the disruptions of the war in Ukraine.

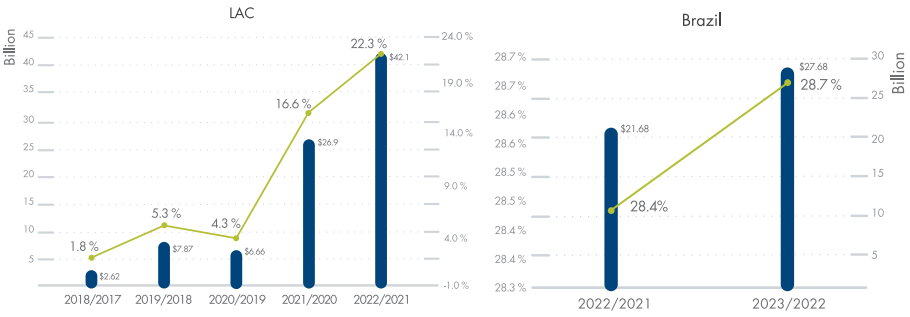
In the current context of multiple crises, the response capacity of the regional agriculture played an important role as a market stabilizer. Otherwise, the global impacts on poverty and food insecurity would possibly have been much worse. Agrifood regional exports grew 2.6 times more than world exports in 2020 and 1.7 times more in 2022. Among the subregions, Mercosur stands out, whose exports in 2020 grew 3.1 times more than the world average, followed by the Andean region and Central America (1.3 times more). The Caribbean was the only subregion with an increase in agrifood exports below the world average in the period 2020-2022. However, these increases were concentrated in a few products and did not translate into increases in average real wages in the agricultural sector.

The nominal agrifood trade balance of LAC (17 countries) increased 4.3%, 16.6% and 22.3%, compared

LAC agrifood trade balance went from USD 155.6 billion in 2019 to USD 231.4 billion in 2022 (figure 2.7)

Figure 2.7

LAC (17 countries) and Brazil, Annual variation in the agrifood trade balance
(in billion USD and percentages)



Source: OPSAa/IICA (nd), based on TDM data consulted on April 5, 2023
Notes: 17 countries with data available as of December 2022.

In recent years, LAC nominal agrifood trade balance (17 countries) experienced increases, compared to the previous year, of 4.3%, 16.6% and 22.3%, respectively, in 2020, 2021 and 2022, going from 155.6 billion dollars in 2019 to 231.4 billion USD in 2022.

Oilseeds accounted for almost 66% of the growth of the Brazilian agrifood trade balance in 2022 (19.2 percentage points), followed by meat (4.6 percentage points) (figure 2.7).

to the previous year, in 2020, 2021 and 2022, respectively (figure 2.7).

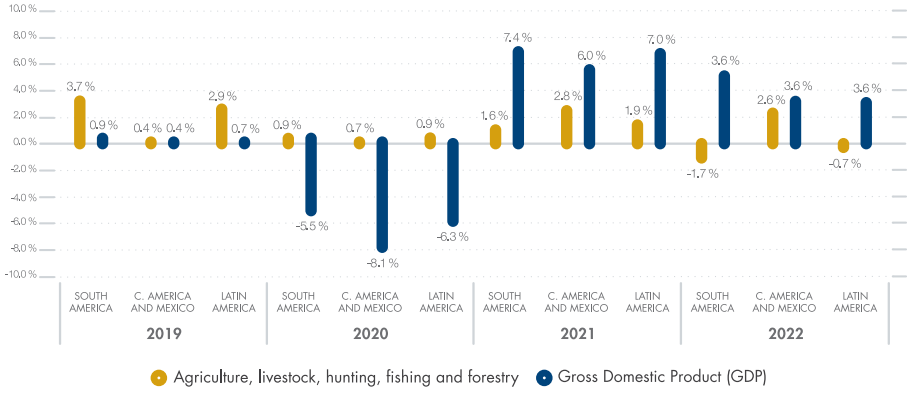
Fourteen of the 17 countries with available information improved their agrifood trade balance in 2021 (Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Peru, Dominican Republic and Uruguay). The three that worsened their agrifood trade balance were Belize, Mexico, and Paraguay.

Brazil's trade balance alone experienced an annual increase of USD 21.7 billion in 2022, compared to 2021, and USD 27.7 billion in 2023, compared to 2022 (January-

Throughout the world, and also in LAC, **food systems** managed to maintain their production capacity and level of exports even during the most critical stage of the COVID-19 pandemic (ECLAC, FAO, WFP,., 2022).

Figure 2.8

LAC (14 countriesa), Annual variation in agricultural value added and in total GDP, 2019 to 2022 (%)

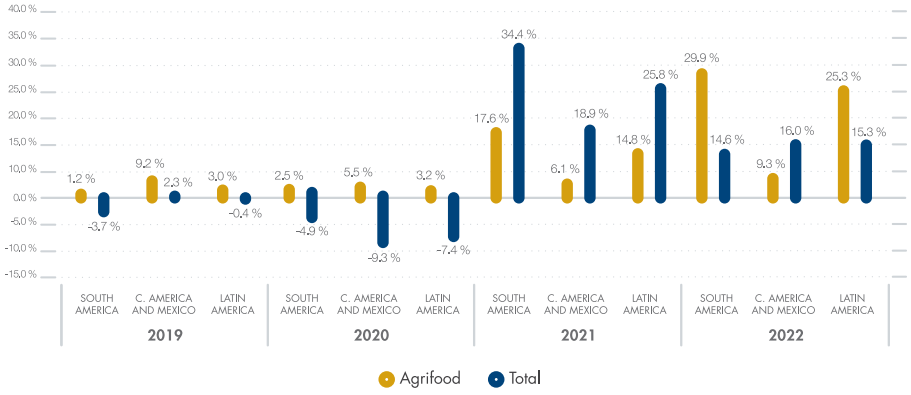


Source: Own elaboration based on official information from each country. ᵃArgentina, Bolivia, Brazil, Chile, El Salvador, Guatemala, Mexico, Nicaragua, Paraguay, Dominican Republic and Uruguay.

In 2022, agrifood exports experienced higher growth than total merchandise trade: 25.3% against 15.3%

Figure 2.9

LAC (11 countriesa), Annual variation in the value of agrifood and total exports, 2019 to 2022 (%)



Source: Own elaboration based on COMTRADE data. ᵃArgentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Mexico, Nicaragua, Panama, Paraguay, Peru, and Uruguay

February). This equates to annual percentage increases of 28.4% and 28.7% in 2022 and 2023, respectively (figure 2.7).

Agriculture and food production were more resilient than other sectors in terms of the value of production and trade during the 2020 crisis. Agricultural production fell less than total regional GDP and in several LAC countries the sector even managed to increase its added value despite the restrictions imposed by the COVID-19 pandemic (figure 2.8).

In 2021, with the rebound in economic activity after the most critical phase of the pandemic, agricultural value growth rate accelerated, but less than that of regional GDP, whose raise corresponded to the largest annual increase in recent decades.

In 2022, especially in the last quarter, weather problems had a negative impact on regional agricultural value, especially in South America. The strongest falls occurred in Paraguay, Argentina, Costa Rica, Uruguay, and Brazil.

Regarding international trade, the COVID-19 pandemic and the war in Ukraine have negatively impacted regional exports, but food systems performed better. During the first year of the pandemic (cumulative January-December 2020), regional agrifood exports had an increase of 3.2% compared to 2019, while total merchandise exports registered a fall of 7.4% (figure 2.9). In 2021, agrifood exports growth reached almost 15%, while total exports increased by 26%. In 2022, sectoral exports again had a higher growth than total merchandise trade: 25.3% against 15.3%.

In the first quarter of 2023, agri-food exports have been slowing down as a reflection of the drop in production of important export products, such as Argentinean wheat and soybeans and Uruguayan meat.

2.3.2 Rising food prices have increased food insecurity

The increase in food prices has improved LAC's agrifood trade balance but, on the other hand, has made the region one of the most affected by the increase in food insecurity. Between 2020 and 2022, food inflation contributed to the increase in poverty and extreme poverty in LAC. ECLAC estimates that 201 million people (32.1% of the regional population) live in poverty, with 82 million (13.1%) in extreme poverty: 56 million in urban areas and 26 million in rural areas (figure 2.10).

In 2022 (data from 16 countries), the incidence of extreme poverty in LAC was 21.9% in rural areas, an increase of 0.7 percentage points compared to 2021, while in urban areas it was 11%, an increase of 0.1 percentage points.

Inflation, particularly food inflation, is regressive, that is, it hits lower-income households the hardest, as they spend a higher proportion of their income on food. For this reason, in LAC the inflation that affects the poorest households (first quintile of income distribution) is 1.4 percentage points higher than that corresponding to the richest households (fifth quintile). In the first quintile, food accounts for two thirds of inflation (ECLAC et al., 2022).

The rise in food prices has negative effects on both the amount consumed and the nutritional quality of food, and this has been reflected in worsening levels of food insecurity in the world and in the region.

Even before the war in Ukraine, the goal of eradicating hunger and malnutrition by 2030 was not being met. From 2014 to 2019, the number of people suffering from hunger and severe or moderate food insecurity was already increasing. In 2020, those indicators experienced a strong rebound due to the COVID-19 pandemic. The rise persisted into 2021 as rising prices and economic

26 million people in rural areas live in extreme poverty (figure 2.10).

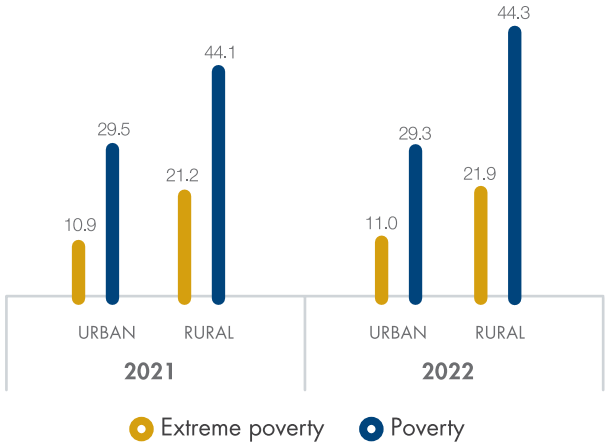
In most LAC countries, a higher incidence and more pronounced increase in extreme poverty is observed in rural areas compared to urban areas.

Food inflation restricts the population's access to a healthy diet and increases food insecurity and hunger.

Since 2015 the rise in the number of undernourished people in the world has offset virtually all the progress made over the previous decade, pushing the world back to the levels of hunger that prevailed in 2005.

Figure 2.10

LAC (16 countries), incidence of poverty and extreme poverty in rural and urban areas, 2021 and 2022, in percentages



Source: Own elaboration based on estimates calculated based on ECLAC, Household Surveys Database (BADEHOG).

In LAC, 43.2 million people (6.5% of the population) suffer from hunger.

At the moment, there are no signs of global food supply problems.

slowdowns continued to affect **food systems** around the world.

The most recent figures (FAO et al., 2023) indicate that the number of people suffering from hunger in the world has increased by 122 million people since the start of the pandemic and now stands at 735 million. At the same time, it is estimated that, globally, some 2 billion people suffer from obesity. Between 2020 and 2021, undernourishment and food insecurity increased more in LAC than in the rest of the world but in 2022 both indicators showed a drop (**figure 2.11**).

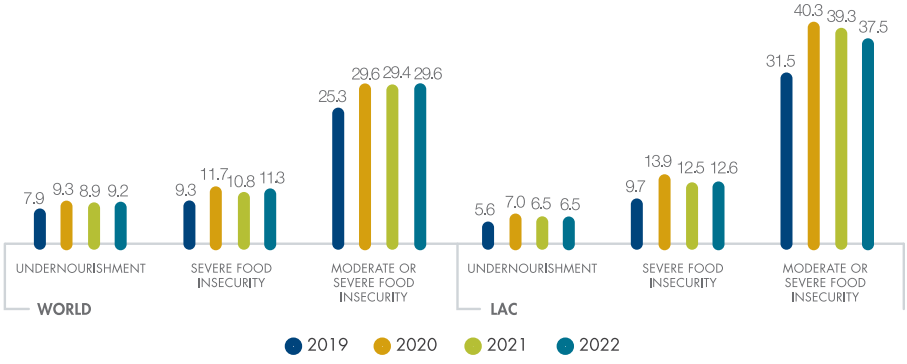
The global increase in food insecurity is more an issue of access to food than of food supply.

Global food availability corresponds to approximately 3,000 kilocalories (kcal) per person per day, exceeding that

Emergency measures implemented by LAC governments since 2020, such as income transfers and subsidies for food, fuel and basic services, have helped mitigate the increase in poverty and extreme poverty (**ECLAC, 2022a; ECLAC et al., 2022**).

Figure 2.11

World and LAC, Prevalence of undernourishment and moderate or severe food insecurity, in percentages



Source: Own elaboration based on **(FAO et al., 2023).**

average in high- and upper-middle-income countries. However, even if the supply is sufficient, the increase in prices and the fall in income have limited the access of segments of the population to a healthy and nutritious diet, capable of also slowing down the increase in obesity.

Between 2011 and 2020, international food prices tended to fall, and even so, the incidence of hunger increased in LAC due to lower economic growth and an increase in poverty. Estimates for the coming years indicate a high probability that food prices will remain higher than in the pre-pandemic period, while the region will continue to experience low growth.

Achieving the Zero Hunger goal may become increasingly difficult if LAC experiences low growth while food prices remain high.

2.4 SUSTAINABLE AND RESILIENT AGRIFOOD SYSTEMS AS A RESPONSE TO CRISES

In 2021, UN Secretary-General Antonio Guterres convened a Food Systems Summit (UN-FSS) as part of the Decade of Action to achieve the Sustainable Development Goals (SDGs) by 2030. The Summit launched a series of actions to move towards more resilient, fair, and sustainable food systems. Various studies prepared as a basis for reaching agreements at the Summit showed that moving in this direction makes it possible to achieve progress in all the SDGs, each of them dependent to a greater or lesser extent on the progress achieved in food systems.

To transform food systems, it is necessary to increase investment and address the gaps in regional economies while also addressing inflation and reducing public debt. To achieve this, policy actions should focus on revitalizing regional food supply and improving the functioning of agrifood markets to help contain food inflation.

Strengthening these areas requires a combination of policies at the national level, on the one hand, and coordination and cooperation actions between countries, on the other.

To improve regional food supplies, overcome food and energy insecurity, support low-income countries in debt repayment, and effectively address greenhouse gas (GHGs) mitigation and climate change adaptation, it is necessary to enhance collaboration both within and between regions on an international level.

Listed below are some possible actions for regional economies in those areas.

Agreements to avoid trade restrictions and other market-distorting mechanisms

It is crucial to maintain the exemption of agricultural products and fertilizers from the sanctions imposed on Russia by the global community. Additionally, supporting the revival of the BSI can aid in the release of food and fertilizer reserves situated in areas of conflict. The BSI has been a successful case of emergency response to crises with global impacts and its reactivation must be a priority in the fight against food insecurity (box 2.4.1).

International coordination to avoid speculative behavior and herd behavior in the markets

The food systems face the challenge of ensuring fairness for both farmers and consumers. Affordable food should not result in low prices for farmers, especially those from family farms. However, high prices can also pose a threat to food security.

Greater regional and international cooperation is needed to boost regional food markets.

Direct GHGs emissions from agriculture are expected to increase by 6% over the next decade, a rate lower than the expansion of agricultural production due to increases in productivity (OECD and FAO, 2022).

The Black Sea Grains Initiative (BSI) was key in reducing the price of food and agricultural production inputs (box 2.4.1).

GIEWS is one of the main sources of information on food production and food security at the national, regional, and global levels.

AMIS provides a unique platform for policy dialogue and coordination among its members (including the Russian Federation and Ukraine).

It is necessary to strengthen the operation of SIMMAGRO and to expand its application to other LAC countries, which would contribute to the transparency of regional markets.

Not restricting international trade in food and fertilizers and improving transparency by publishing key information (production, stocks, prices) are relatively simple actions that help reduce uncertainty in international markets. These actions also facilitate the strategic planning of production and inventories. Currently, there are methodologies and tools to generate early warnings for specific or generalized events that affect the AFS. Some of the tools available to LAC countries in this area are listed below:

- **FAO's Global Information and Early Warning System on Food and Agriculture (GIEWS)**[3] monitors and reports on food supply and demand around the world. The system provides comprehensive information on agricultural markets and supports national and regional initiatives to create and improve early warning systems.

- The Group of Twenty (G-20) **Agricultural Market Information System (AMIS)**[4] provides objective, timely, and up-to-date market assessments that enable informed policy decisions.

- **The Regional System of Intelligence and Monitoring of Agricultural Markets (SIMMAGRO)**[5] is a virtual platform for Central America connected to existing national systems. Its objective is to facilitate access to standardized statistical information on wholesale prices, foreign trade, and production of 40 agricultural products of vital interest at the subregional level.

- **The Market Information Organization of the Americas (MIOA)**[6] is a cooperation network made up of government institutions whose main functions and objectives are the collection, processing, analysis, and dissemination of information related to markets and agricultural products.

Equally important are the systems that keep countries informed about the policies that are being implemented in the agricultural sector and in food markets. Some of those tools are listed below:

- FAO's **Food and Agricultural Policy Decision Analysis (FAPDA)**[7] initiative promotes evidence-based decision-making by collecting and disseminating information on policy decisions and frameworks through a free access web tool.

- IICA's **Observatory of Public Policies for Agri-Food Systems (OPSAa)**[8] is a digital platform at the service of the countries of the Americas to promote the generation of public policies for the transformation of hemispheric food systems. Among other things, the OPSAa presents case studies and good practices in the management of public policies, regulatory frameworks, and investment and public expenditure initiatives for food systems in LAC.

- **The Food and Fertilizer Export Restrictions Tracker**[9], developed by IFPRI, assesses the level of food export restrictions worldwide. The outcomes are expressed as

[3] https://www.fao.org/giews/en/
[4] https://www.amis-outlook.org/amis-about/en/
[5] https://www.simmagro.sieca.int/public//home
[6] https://www.mioa.org/en/
[7] https://www.fao.org/in-action/fapda/fapda-home/en/
[8] https://opsaa.iica.int/

a percentage of the imported calories from each country that are impacted by trade restrictions.

Alongside the suggested policy measures to enhance agrifood systems (AFS), the upcoming sections will examine how regional collaboration can advance the interests of LAC nations in various global agendas. We will also explore how to implement cooperative strategies in areas where only collective efforts can bring about significant change.

Several strategic themes will be addressed, including:

- How strategic governance, knowledge management, and capacity building can facilitate a faster and more effective transition towards sustainable agricultural production in the context of global environmental change;

- How regional cooperation can strengthen public capacities to

Box 2.4.1.
Black Sea Grains Initiative: A successful case of emergency response cooperation

Given the impact on global food security as a result of the war in Ukraine, on July 22, 2022, the United Nations negotiated two initiatives: the memorandum of understanding between the organization and the Russian Federation to facilitate exports of food and fertilizers to global markets and the Black Sea Grain Agreement, signed by the organization with the Russian Federation, Turkey, and Ukraine with the aim of resuming food and fertilizer exports from three Ukrainian Black Sea ports to the rest of the world.

In the month following the agreement's signing, the FAO International Food Price Index saw a decrease due to lower prices for all cereals included in the index. The index has continued to fall consistently until recently, and the same can be said for fertilizers.

Shipments from the agreement ports peaked in March 2023, with export volumes equal to more than half of Ukraine's pre-war grain exports (November 2021) (figure 2.12).

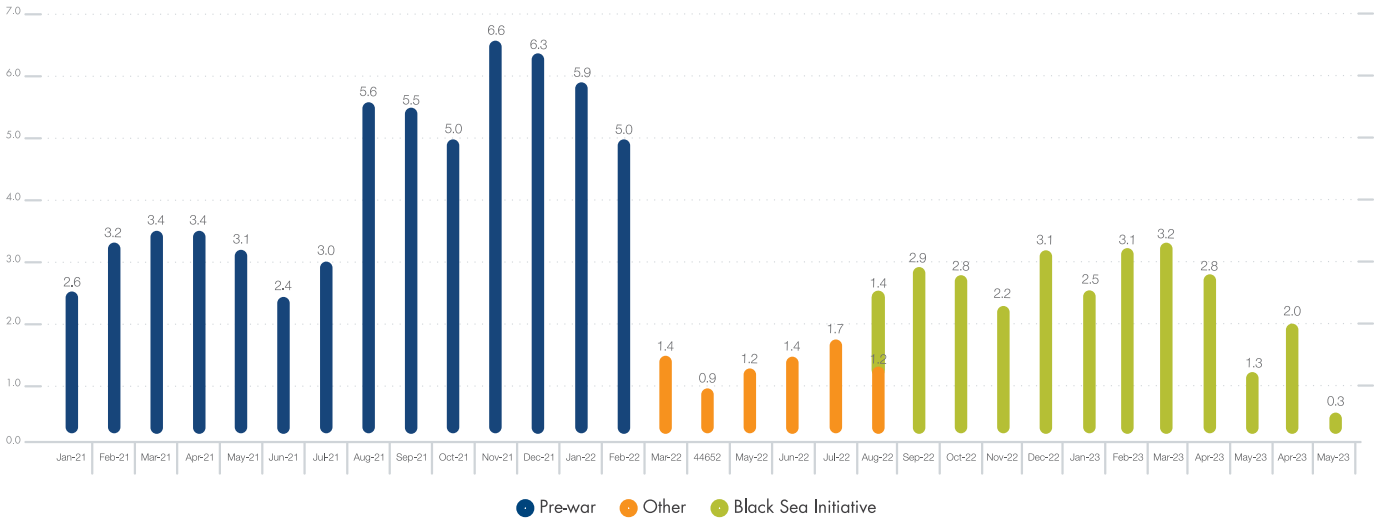
In July 2023, following the decision taken by the Russian Federation to terminate the implementation of the Black Sea Grain Initiative and the subsequent damage to Ukraine's port infrastructure, international wheat prices rose by 1.6 percent, marking their first month-on-month increase in nine months.

The FAO Cereal Price Index reacted to the signing of the agreement with a fall of 19.1 points (11.5%) in July 2022.

[9] https://www.foodsecurityportal.org/tools/COVID-19-food-trade-policy-tracker

Figure 2.12

Grain exports from Ukraine, 2021-2023 (Million metric tons)



Source: Own elaboration based on (Glauber and Laborde, 2022b) and Black Sea Grain Initiative Joint Coordination Center.

From August 2022 to mid-July 2023, 32,900 metric tons were exported from the ports of the agreement, consisting mainly of corn (51%), wheat (27%) and sunflower (11%).

promote an environment conducive to innovation and the development of the bioeconomy;

- How to deepen regional coordination to implement the One Health approach in territories and reap its benefits;
- In terms of opportunities, we will examine how regional cooperation can promote innovative policies and informed dialogue, leading to progress towards social and economic inclusion in LAC food systems and rural areas;
- We will also address the actions that can help consolidate the region's agrifood trade as a driver for economic development, food security, and regional and global sustainability;
- Finally, we will explore the options for collaboration in areas of opportunity such as energy transition, digitization, and financing as drivers of sustainable and inclusive development of AFS.

WHY IS REGIONAL COOPERATION NECESSARY FOR THE SUSTAINABLE AND INCLUSIVE DEVELOPMENT OF AGRIFOOD SYSTEMS?

Regional cooperation makes it possible to manage resources shared by different countries, accommodate conflicting or diverse interests, promote the priorities of the countries and the region on the relevant global agendas, and take cooperative measures in those areas in which only collective action can make a difference, while taking care to ensure a balance between unity and diversity.

3.1 COOPERATION AS A MECHANISM TO ACCELERATE THE TRANSFORMATION AGENDA

International cooperation has evolved towards more horizontal and supportive approaches that improve the level of efficiency of cooperation.

The meaning of international cooperation has evolved over time (see **Box 3.1.1**), moving towards more horizontal and supportive models that promote national development and greater efficiency in cooperation. One of the central concepts appears in Chapter IX ("International Economic and Social Cooperation") of the United Nations Charter, which highlights the role of cooperation in creating *"the conditions of stability and well-being necessary for peaceful and friendly relations among nations"* (**UN, 1945**, Chapter IX).

Another important framework was established by the United Nations Conference on Technical Cooperation among Developing Countries, in 1978, which approved the "Buenos Aires Action Plan to Promote and Realize Technical Cooperation among

Examples include regional conferences held in Panama (1826), Lima (1847), Santiago (1856) and Lima (1864), with the objectives of protecting independence and addressing military and defence issues, while also recognizing the importance of economic cooperation.

Box 3.1.1.

Cooperation in the Americas: a brief history

Throughout history, the countries in the Americas have engaged in regional interaction that has oscillated between dissent and cooperation. Regional Latin American conferences, beginning in Panama in 1826, sought to protect independence and address military, defence, and some economic cooperation issues.

The first conference of the Americas, the First Pan-American Congress, held in Washington D.C. in 1889, expanded the regional agenda, especially in terms of economic aspects. Although many ambitious initiatives did not materialize, these meetings laid the foundation for the creation of the Organization of American States (OAS) in 1948. During the 20th century, negotiations in the Americas led directly to the creation of global institutions such as the League of Nations, the World Bank, the **International Monetary Fund (IMF)** and the North Atlantic Treaty.

In the 21st century, regional cooperation has continued through financial institutions, trade agreements, regional integration mechanisms, and the promotion of democracy (see for example "A Long and Winding Road: the Creation of the Inter-American Development Bank" by **Díaz-Bonilla and del Campo (2010)** and **Dominguez (2007)** on the gradual design of regional institutions in **LAC**).

Developing Countries" that recognizes the role of cooperation among developing countries as a mechanism to overcome inequalities. More recently, development agendas linked to the Millennium Development Goals and, since 2015, the **2030 Agenda for Sustainable Development (2030 Agenda)** have highlighted the importance of cooperation **(UN, 1978; Ocampo, 2015)**.

In general, the discussion related to international cooperation distinguishes between developed ("North") and developing ("South") countries, and South-South Cooperation. However, both **North-South Cooperation** and **South-South Cooperation** are complementary and allow countries to have a range of alternatives adapted to their needs, which are organized based on different principles and objectives.

Traditionally, **LAC** has always been a space that actively participates in international cooperation in its different modalities. The various existing regional integration mechanisms have recognized the role of international cooperation, either through **North-South Cooperation** or other strategies under **South-South Cooperation**.

An example of the latter is the Special Declaration on International Cooperation of the **Community of Latin American and Caribbean States (CELAC)**, which seeks to "*Promote the development of regional cooperation based on the principles of solidarity, horizontality, complementarity, consensus, diversity, equity, flexibility, reciprocity, co-responsibility, mutual benefit, voluntary participation, alignment with national priorities, transparency, results and accountability in the use of public resources, multiplier effect, non-conditionality, prioritization of reduction of inequalities between countries and within countries, and of vulnerable groups, respect for national sovereignty, equal rights and non-interference in the internal affairs of nations, and respect for Laws and National Regulations*" (**CELAC, 2014a**, p.3).

Several examples exist in **LAC** of how regional cooperation can promote a transformation agenda, as well as the role of regional integration in this process. For example, **MERCOSUR's Specialized Meeting on Family Farming (REAF)**, shown in **Box 3.1.2**, is one of the cases that best shows how these two dimensions are incorporated.

In addition to initiatives that seek to mobilize cooperation resources, such as the Young Protagonists of Territorial Rural Development Programme in the **Central American Integration System (SICA)** Region, others serve to generate information on issues of interest in the region, as is the case of the Regional Agricultural Markets Intelligence and Monitoring System (**SIMMAGRO**) in **SICA** (see **section 2.4**). There are also regional initiatives that seek to guide technical efforts towards common objectives, such as the **Platform of Latin America and the Caribbean for Climate Action on Agriculture (PLACA)**.

South-South and Triangular Cooperation

Considering the recent history in **LAC**, it is possible to identify a trend towards the increasing importance of **South-South and Triangular Cooperation** in the construction of regional priorities, as well as its role in promoting the concept of horizontal solidarity that serves to strengthen regional and national capacities in order to *"help the governments of the region in their efforts to achieve sustainable development and inclusive growth for the benefit of our peoples"* (**CELAC, 2014a**, p.3).
South-South Cooperation is based on solidarity between developing nations and

In international cooperation, a distinction is made in terms of cooperation between developed and developing countries, and South-South cooperation. Both are complementary and must be adapted to the needs of the countries.

PLACA brings together representatives of the ministries of agriculture of Argentina, the Bahamas, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Haiti, Mexico, Panama, Paraguay, Peru, the Dominican Republic, and Uruguay to support national and regional strategies related to climate action in agriculture.

The inclusion agenda of the Young Protagonists of Territorial Rural Development Programme in the **SICA** Region calls for the creation of spaces for dialogue between rural youth and the institutional framework.

The **REAF** work agenda provides a clear guide for international cooperation, identifying the priorities of these countries and facilitating the mobilization of resources and the development of activities.

Other examples of **South-South Cooperation** are Mexico's support for the Mesoamerica Project through the Mexican Agency for International Development Cooperation, and the Latin American Parliament (Parlatino) that promotes the development of framework laws.

Box 3.1.2.

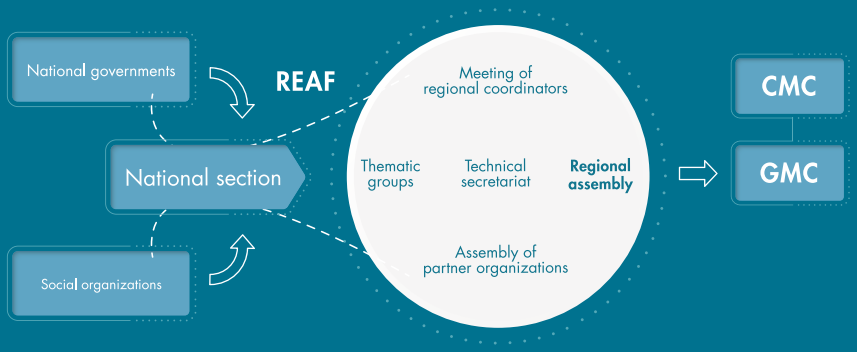
The case of REAF/MERCOSUR

REAF/MERCOSUR is the bloc's advisory body on Family Farming (FF), and its main function is to prepare recommendations to facilitate decision-making by the MERCOSUR management bodies related to the adoption of targeted FF policies. One of its innovative characteristics is that it constitutes a space for dialogue that promotes social participation, since the delegations are made up of representatives of governments and civil society.

The process carried out in this space is based on holding periodic meetings at the national and regional level, with the purpose of developing a work agenda that guides the actions of the national delegations to support FF in the region.

Figure 3.1:

The REAF dialogue process



Source: **(FAO, 2016b**, p.3); **Coordination and Monitoring Commission (CMC), Common Market Group (GMC)**

Based on this agenda, **REAF/MERCOSUR** has mobilized South-South Cooperation resources through the contribution of the countries to the Family Farming Fund, which was approved by the governments, as well as facilitating support provided by international cooperation agencies for specific programmes to strengthen the sector. Organizations such as **IFAD, IICA, FAO, AECID** and **ABC** have contributed resources to carry out studies, exchanges, seminars and training courses that have helped to build capacities in governments and social organizations for the implementation of targeted **FF** policies.

The main achievements of this process include the strengthening of public institutions in the FF sector, which has been achieved through the creation of secretariats, ministries, and institutes specialized in Family Farming, as well as

through advances in regulatory frameworks. An important example is the mutual recognition of FF registries in MERCOSUR, which has been achieved through decision 20/2014. This initiative has enabled progress in the characterization of the sector throughout the bloc, while promoting greater regional integration.

Box 3.1.3.

The Brazil-FAO Cooperation Programme in **LAC**

In 2008, the government of Brazil and **FAO** signed a trilateral **South-South Cooperation** framework agreement to advance a regional agenda to overcome poverty and eradicate hunger based on the successful experiences of public policies that seek to create prosperous and inclusive rural areas.

Since then, more than ten projects have been developed that mobilized an amount of more than USD 60 million, which allowed progress in work areas such as:

- Institutional strengthening to eradicate hunger by supporting the development of policies and regulatory and legal frameworks;
- Support for dialogue and governance mechanisms on the issues of hunger, poverty and climate change (councils, committees, etc.);
- Strengthening of Family Farming through targeted policies developed on the basis of dialogue and participation;
- Promotion and strengthening of school feeding programmes in the countries of the region;
- Development of guidelines for agro-environmental policies that strengthen fishing and aquaculture regulations; and
- Support for the implementation of guide lines that strengthen the management of land tenure.

Among the main results are the development of national school feeding policies, the creation of multi-stakeholder dialogue networks, and the strengthening of regional integration mechanisms in areas related to inclusive rural development. Similarly, this experience led to innovations in project management and cooperation initiatives by proposing shared governance mechanisms between the parties (**FAO and ABC/MRE, 2022**)

The Climate Adapted Sustainable Agriculture Strategy for the **SICA** Region 2018-2030 was formulated by member countries of the **Central American Agricultural Council (CAC**), with the support of **ECLAC, FAO, IICA, CATIE and CIAT (OPSAa/IICA, 2018)**.

must be guided by principles of respect for sovereignty, non-conditionality and mutual benefit. Considering a broader definition of the term, it also constitutes the *"exchange of key development solutions – knowledge, experiences and good practices, policies, technology and technical knowledge, and resources – among the countries of the Global South"* (FAO, 2014, p.1).

There is also the possibility that this cooperation could occur through international organizations, which also contribute their technical capacities. This *"adds value by allowing developing countries to access a greater quantity and variety of resources, specialized knowledge and capacities, which they consider necessary to achieve their national development objectives and the Sustainable Development Goals"* (UN, 2019, p.2).

There are different cases in the region where South-South and Triangular Cooperation has played a key role in the development of strategies that have allowed countries to develop concrete solutions to improve conditions in rural areas of the region. Box 3.1.3 shows how the Brazil-FAO Cooperation programme has been implemented in rural areas of LAC.

It is important to mention that South-South Cooperation can have different implementation modalities depending on the existing priorities and coordination between the countries, as well as between the different international organizations, which means there is no prescribed standard for its implementation.

Within the framework of an agenda for the sustainable and resilient transformation of agrifood systems, this modality of cooperation is even more relevant, since there is a history of cooperation in LAC that allows the development of innovative mechanisms to promote South-South Cooperation.

In addition, South-South Cooperation can help to strengthen regional cooperation and facilitate the sharing of knowledge and practices that exist in the region and that directly contribute to the construction of more inclusive agrifood systems. As discussed in the next section, this process must be connected to the construction of governance mechanisms that promote regional integration to coordinate efforts and optimize resources and impacts.

3.2 CREATING A GOVERNANCE SPACE IN THE REGION TO GUIDE AND STRENGTHEN COOPERATION

The Amazon biome spans eight countries and its conservation affects the entire planet, so only collective action can make a difference (**IDB, 2023**).

As mentioned in Chapter 2, the global context of multiple crises facing LAC requires advancing in a transformation agenda that recognizes the diversity of the region, but at the same time proposes collective actions that strengthen the existing regional integration mechanisms and institutional frameworks. Similarly, this agenda should emphasize building sustainability, reducing inequalities, and improving production systems (ECLAC, 2022b; FAO, 2021b).

The challenge of improving regional integration mechanisms in Latin

American and the Caribbean involves strengthening the countries' governance mechanisms, in order to allow better coordination of actions, guide decision-making and promote the priorities of the region in the relevant global spaces (**ECLAC, 2022b; OECD et al., 2019**).

This is essential to promote and coordinate regional cooperation related to the transformation of agri-food systems. Only through regional coordination that recognizes the role of **LAC** in the world, while incorporating the existing experiences and practices in the region, will it be possible to develop a more efficient and transparent regional cooperation strategy that better addresses the context in **LAC**, while taking advantage of existing solutions and good practices in the countries of the region.

Considering this discussion on the role of governance in terms of the existing regional integration experiences in **LAC** and, given the challenges facing the implementation of a transformation agenda for agrifood systems, it is necessary to understand how this process occurs. Regional integration in **LAC** is not linear and throughout its history it is possible to identify moments when the integration process shows different intensities, as well as different mechanisms and modalities (see **Table 3.1**). However, beginning in the 21st century, a process is observed that involves two main areas of action: positioning the region on global agendas based on a process of self-reflection, and advancing in its own agenda to address the specific challenges facing **LAC**.

Agriculture and the agrifood systems of LAC are a central component for the economic and social development of the countries of the region, as well as to ensure global food and environmental balances.

Table 3.1:

Examples of regional integration mechanisms in LAC

Organization of America States (OAS)	Community of Latin American and Caribbean States (CELAC)
Organization of Eastern Caribbean States (OECS)	Central American Integration System (SICA)
Latin American and Caribbean Economic System (SELA)	Ibero-American General Secretariat (SEGIB)
Pacific Alliance	Caribbean Community (CARICOM)
Forum for the Progress and Integration of South America (PROSUR)	Organization of the Amazon Cooperation Treaty (OTCA)
Andean Community (CAN)	Latin American Integration Association (ALADI)
Union of South American Nations (UNASUR)	Southern Common Market (MERCOSUR)

Source: the authors

Ministers of agriculture of the Americas at the **United Nations Summit on Food Systems (FSS)** highlighted the crucial role of agriculture in the region for food security and ecosystem services (**IICA, 2021f**).

A concrete example within the framework of **the Community of Latin American and Caribbean States (CELAC)** is the **CELAC Plan for Food Security, Nutrition and the Eradication of Hunger 2025 (CELAC FSN Plan)**, which guides collective action in the region to overcome hunger and tackle poverty (see Box **3.2.1**).

One of the pillars of this most recent phase of Latin American and Caribbean integration is the creation of CELAC, which in its first declaration recognizes the importance of *"permanently grouping the 33 countries of the region in a mechanism of dialogue and cooperation, which becomes a forum for discussion and a political actor to advance in the process of political, economic, social and cultural integration, achieving the necessary balance between unity and diversity"* (CELAC, 2013, p.1).

The most recent summit of CELAC Heads of State and Government highlighted the need to advance a regional agenda that allows the region to overcome productive, economic, environmental and social gaps. The role that cooperation plays in this process was also recognized, from the perspective of the sharing of ideas and good practices, but also by promoting the sustainability of actions, be it through direct investment or tools that facilitate better targeting of public initiatives (CELAC, 2023).

This is directly related to the challenge of advancing in the transformation of agrifood systems and the need to generate common strategies through collective action and cooperation.

In addition, there are other cases in the region related to the need to advance in the construction of common solutions. For example, the Central American Agricultural Policy (PACA) and the Regional Comprehensive Social Policy (PSIR), developed within the framework of SICA, as well as regulatory frameworks, such as the resolutions and decisions of MERCOSUR, seek to guide decision-making and create mechanisms that facilitate the coordination of efforts to overcome common barriers to the development of the region.

The plan recognizes the role of cooperation in promoting alternatives and successful experiences that guide decision-making and contribute to achieving the expected results.

Box 3.2.1.

CELAC Plan for Food Security, Nutrition and Hunger Eradication 2025

The approval of the CELAC FSN Plan Plan represents an important step in the development of regional governance, which meant "*the consolidation of a long process of political discussion for the inclusion of food and nutrition security in the public agenda of LAC*".

The plan is comprised of four main pillars, each with specific lines of action that seek to "*promote a common agenda related to food security as one of the great challenges facing today's society, and the need to promote South-South Cooperation as a motor of actions aimed at eradicating hunger*" (CELAC, 2014b, p.8).

Within the framework of the VII Summit of Heads of States and Governments of CELAC, the countries have requested that **FAO, ECLAC, IICA and the Latin American Integration Association (ALADI)** review the plan considering the post-pandemic reality in the region and other international developments.

As previously mentioned, beyond this effort to build agendas that guide action, these integration mechanisms seek to create regional positions that contribute to global discussions (see Box 3.2.2). Recently, within the framework of the COP27 discussions, SICA, through its CAC and Commission for Environment and Development (CCAD), and facilitated by IICA[1], highlighted the *"commitment of our region to promote a more competitive, inclusive, sustainable, low-carbon agriculture adapted to the effects of climate change and climate variability"* (SICA, 2023, p.3).

Similarly, within the framework of the Caribbean Community (CARICOM), the Bridgetown Initiative for the Reform of Global Financial Architecture (BIRA) has been launched, which proposes a restructuring of the international financial system so that countries have more tools to face financial and social climate crises, especially considering

BIRA seeks to reduce the costs of climate mitigation and adaptation without increasing indebtedness. It proposes a Global Mitigation Fund and more concessional financing from multilateral banks (**Yue and Wang, 2022**).

Box 3.2.2.

Home of Sustainable Agriculture in the Americas: Pavilion at COP27

Within the framework of **COP27**, **IICA** organized the **Home of Sustainable Agriculture of the Americas** pavilion to show the key role of the agricultural sector in climate solutions and global food security, while also highlighting the contributions of producers and other actors in the sector to climate change adaptation and mitigation. The pavilion was located in the Sharm-El-Sheikh Convention Center, under the motto *"Feeding the world, caring for the planet"*.

This space hosted some 60 high-level events, including roundtables, launches and bilateral meetings with a hybrid format (face-to-face and virtual) on topics such as climate resilience, food and nutrition security, soil health, climate-smart production systems, nature-based solutions, sustainable livestock, climate-smart dairy production, the role of women and youth in climate-resilient agriculture, biofuels, technologies and productivity.

The **Home of Sustainable Agriculture of the Americas** served as a meeting place between the actors of the agricultural sector that participated in COP27: ministers of agriculture, representatives of the private sector, producers, academics, experts, and representatives of other public and private entities. There was also a photographic exhibition about the state of agriculture and climate change in the Americas, as well as a virtual reality tour of sustainable agriculture and robust data on the sector's contribution to climate action. More information at: **IICA** (**2022c**); **Witkowski** (**2022**)

Five pavilions highlighted agriculture and food at **COP27**: 1) "Sustainable Agriculture in the Americas", led by **IICA**; 2) "Food Systems", co-financed by the **European Union** (**EU**); 3) "Food and Agriculture" organized by **FAO**, the **Rockefeller Foundation** and **CGIAR**; 4) **IFAD**, and 5) "Food4Climate".

[1]Link to summit document https://iica.int/sites/default/files/2021-06/DR-02%20Transformation%20of%20Agrifood%20Systems.pdf

International cooperation is a mechanism to create the conditions of stability and well-being necessary for peaceful and friendly relations between nations (**UN, 1945**, Chapter IX).

the impacts caused by the COVID-19 pandemic and extreme weather events.

A regional transformation agenda: valuing the experience of LAC in promoting resilient and healthy agrifood systems

The above highlights the importance of facilitating and supporting mechanisms that allow the construction of common priorities in the region to guide public action. The central challenge is to link an agenda of solutions to the development of regional public goods that recognize the shared vision of countries in LAC based on the region's diversity.

In this regard, the 2030 Agenda represents an important framework by *"reorienting cooperation towards an integrated agenda that promotes economic development, social inclusion and environmental sustainability"* (Ocampo, 2015, p.10), and regional efforts related to its implementation include the construction of specific governance frameworks that promote regional cooperation.

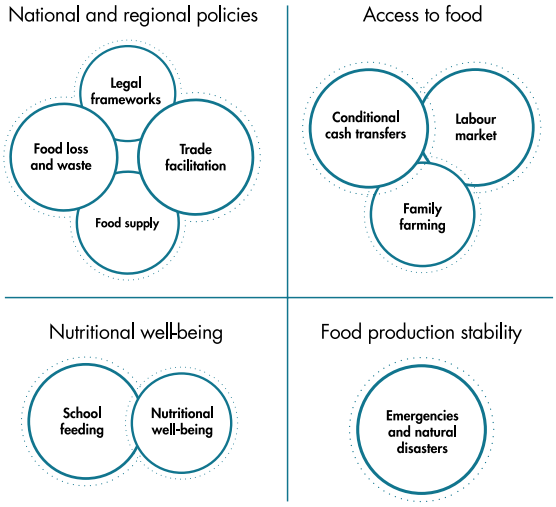
Thus, as discussed in this chapter, progress in the implementation of a transformation agenda for agrifood systems is related to the existing capacity to mobilize resources and exchange ideas and practices through cooperation between countries, which is facilitated through the process of regional integration.

Regional cooperation, especially South-South Cooperation, makes it possible to identify relevant local and regional experiences that can serve to develop concrete solutions for an inclusive transformation agenda. In this context, strengthening the political dialogue mechanisms that exist in the region, as well as regional integration processes, is a key task to promote more effective and efficient cooperation (UN, 2019, 2022).

In the following chapter, different regional initiatives are addressed in the areas of sustainable agricultural production, agri-food trade, health and social inclusion that directly facilitate the exchange of ideas, knowledge and existing practices in LAC, as well as deepening regional integration and cooperation.

Figure 3.2:

Simplified cooperation diagram of the Food Security pillars and lines of action



Source: Authors based on (**CELAC, 2014a**)

KEY REGIONAL COOPERATION ACTIONS FOR THE SUSTAINABLE AND INCLUSIVE DEVELOPMENT OF AGRIFOOD SYSTEMS

4

This chapter explores actions to strengthen regional cooperation in agrifood systems, capitalize on new opportunities for sustainable and inclusive development, and increase resilience to crises.

4.1 SUSTAINABLE AGRICULTURAL PRODUCTION IN A CONTEXT OF GLOBAL ENVIRONMENTAL CHANGE

Strengthening regional cooperation for sustainable production requires strategic governance, knowledge management, capacity building, the revitalization and preservation of local knowledge and traditions, diversified markets and gender mainstreaming approaches, while recognizing the differential impact of women in agrifood systems.

4.1.1. The multifunctionality of agroecosystems

Annual increases of around 1% in the yield of key crops such as maize, rice and wheat are insufficient to double food production by 2050 (FAO, 2022a).

Globally, approximately 14% of the economic value of the food produced is lost from post-harvest to retail sale, excluding this last stage (**FAO, 2019**)

Low agricultural productivity, inefficiencies in supply chains and climatic shocks increase the cost of healthy diets, which are unaffordable for 3 billion people (**FAO, 2022a**).

Agroecosystems play an integral role based on multifunctionality, since they simultaneously produce and maintain various goods and services. This implies ecological, economic and socio-cultural interrelationships (Bustamante-Zamudio et al., 2020). In addition to the tangible goods they provide, such as crops and animals, they also provide intangible services, such as habitat, ecological functions (nutrient cycling, biotic regulation, carbon sequestration, erosion control, environmental detoxification) and conservation of biodiversity (Sarandón and Flores, 2014). These agroecosystems also contribute significantly to livelihoods, since they generate 14.5 percent of jobs in the region (Morris et al., 2020) and provide income and foreign exchange through trade, as well as strengthening sociocultural roots in rural areas.

It is estimated that a 50 percent increase in food production will be necessary by 2050, due to population growth, changes in diet and greater use of biofuels (FAO, 2022a). Agriculture plays a key role by providing more than 80 percent of the calories in the human diet. In addition, it is estimated that 80 percent of the additional food demand in 2050 will come from plant products (FAO, 2022a). Therefore, improving efficiency in supply chains and reducing food losses and waste is critical to meeting these demands sustainably.

Moreover, forests not only provide wood, but also play a fundamental role in food production, income generation and watershed management. They offer ecosystem services such as carbon sequestration, biodiversity, mitigation of extreme events, and pollination for agriculture. Livestock production, for its part, contributes 18 percent of the world's food energy and 34 percent of the consumption of essential proteins and vitamins. Finally, aquatic products, such as fish, contribute valuable nutrients to a balanced diet (FAO, 2022a).

A challenge for agrifood systems is the diversification of food production and consumption. It is estimated that 75 percent of the food consumed comes from only 12 plant species and five animal species (FAO and IFA, 2004). According to Furman et al. (2021), only nine plant species (sugarcane, maize, rice, wheat, potatoes, soybeans, oil palm fruits, sugar beets and cassava) account for more than 66 percent of all crop production, and 53 percent of the global average daily calory intake, despite the fact that almost 400,000 vascular plant species have been identified, of which around 27,600 are edible (FAO, 2022a).

4.1.2. The challenges and opportunities of agrifood systems and sustainable production

Agrifood systems (AFS) face socioeconomic and environmental opportunities and challenges related to the production and demand of food, fiber and energy. The current demographic dynamics, along with increasing urbanization, have generated changes in the demand for food, which are expected to increase in the future.

However, lack of innovation, research and capacity development, as well as insufficient public investment in agrifood systems, are key factors that affect the operation of these systems (FAO, 2021c). In many agricultural research institutes, salaries and associated expenses account for the majority of agricultural R&D costs, creating a significant imbalance and limiting the resources available for viable research programmes (Stads et al., 2016).

In addition, market concentration and inefficient intermediation in value chains represent challenges for the resilience and equity of agrifood systems, as well as for consumer decision-making on the nutritional quality, safety, and environmental sustainability of food products (FAO, 2021c).

Challenges related to climate change (CC), extreme events, scarcity, and degradation of natural resources, including water, biodiversity, and soil, are altering agrifood systems. These

17% of food production is wasted during the retail and consumption stages: **11%** in households; **5%** in food services and **2%** in retail (**UNEP, 2021**).

Deforestation, largely caused by extensive agricultural production, contributes significantly to the loss of biodiversity; since 1990, a net area of 178 million ha of forests has been lost (**FAO and UNEP, 2020**).

The health of the soil and its fertility affect the nutrient content of crops (FAO, 2015): between **30% and 50%** of nitrogen **and 15%** of phosphorus is lost; and only **50% to 60%** of the potassium applied is used (**Hungria da Cunha, 2022**).

Box 4.1.1.
Living Soils Initiative

The Living Soils of the Americas Initiative led by IICA, is an example of regional and interdisciplinary technical cooperation, approved by the 34 member countries of the institute. The initiative aims to strengthen regional knowledge and guide regional actions that promote the effects of the adoption of Good Agricultural Practices (GAP) on carbon sequestration in soils, with the aim of enhancing the role of agriculture in mitigating GHGs.

A concrete product of this regional cooperation initiative is the report "Carbon sequestration in the soil through the adoption of sustainable management practices: potential and opportunities for the countries of the Americas" (IICA, 2021g), which addresses three important areas:

- the main scientific methodologies capable of identifying the effects of GAP on carbon sequestration in soils;
- the estimation of soil carbon stocks (0-30 cm) in all the countries of the region based on soil cover; and
- the estimation of the sequestration potential in the region through the adoption of GAP.

challenges are exacerbated by changes in land use, overexploitation of resources and the increase in pests and diseases, with invasive pests being one of the main causes of biodiversity loss.

Agrifood systems are highly vulnerable and require sufficient financing to implement mitigation and adaptation practices that strengthen their resilience, in line with the international commitments established in the Nationally Determined Contributions (NDC) (FAO, 2021c).

In addition, plants make inefficient use of nitrogen fertilizers, since they only take advantage of approximately 35 percent of the nitrogen applied (West et al., 2014). This is due to the loss of nitrogen in the soil-plant system caused by leaching, runoff, erosion and gaseous emissions. These problems contribute to global warming, since NO is one of the most significant greenhouse gases (representing 6 percent of greenhouse gases on the planet), and also affects the ozone layer in the stratosphere (FAO and IFA, 2004). Furthermore, the use of nitrogenous fertilizers does not address the need to maintain organic matter on agricultural land.

There are many opportunities for regional cooperation on these issues and one example is the Living Soils Initiative (see Box 4.1.1).

4.1.3. Conditions for scaling up the transition to sustainable production systems

About **1.2 billion people** live in agricultural areas that are experiencing very high levels of water stress and frequent droughts.

Agriculture is the largest consumer of water, accounting for more than **70%** of global water withdrawals, followed by industry and municipal services.

Currently, about **33%** of arable land has a moderate or high degree of degradation, due to soil erosion, acidification, salinization, compaction and chemical contamination (**FAO and GTIS, 2015**).

Innovative and sustainable agricultural approaches, practices and technologies play a crucial role in the transition towards sustainable agrifood systems (AFS). These initiatives contribute to combating hunger, malnutrition and poverty and, therefore, are fundamental to achieving the objectives established in the 2030 Agenda (FAO, 2019).

The transition to sustainable intensification means implementing various technological options and ensuring their compatibility (FAO, 2018). At the primary level, the main challenge is to move towards diversified production agroecosystems that reduce dependence on external inputs and are more efficient in the use of resources generated by the system by adopting, for example, bioeconomy approaches, the three R's (recycle, reduce, reuse) and waste reduction. This does not exclude the possibility of applying this approach on farms that are more specialized, which would facilitate working together with large agro-industrial chains (ECLAC, FAO and IICA, 2019). In addition, this transition is facilitated by four accelerators: technology, innovation (including digital innovation), data (including big data and precision agriculture) and complements (human capital, governance and institutions), which converge in a unified vision that supports the transformation process (FAO, 2021c).

Various agricultural approaches promote the transition to sustainable production, such as the following:

1. **Agroecology:** combines technologies, practices and innovations based on local, traditional and scientific knowledge (Box 4.1.2).

2. **Organic agriculture:** an agricultural production system without the use of synthetic chemicals, genetically modified organisms, growth regulators or additives in livestock feed.

3. **Conservation agriculture:** agricultural production based on three fundamental principles: minimum soil disturbance, permanent soil cover and crop rotation.

4. **Agroforestry:** trees play a key role in managing livestock or agricultural production systems in agricultural settings.

5. **Zero tillage:** maintains a permanent or semi-permanent organic cover to protect the soil, which allows microorganisms and soil fauna to perform tillage functions and balance soil nutrients.

There is also **regenerative agriculture**, which is based on the principles and practices of climate-smart agriculture, through an agroecological approach and oriented towards integrated systems management, with the objective of creating resilient livelihoods (Rainforest Alliance, 2020).

The transition towards sustainable agrifood systems (AFS) must include the evaluation of the health or performance of the agricultural sector, which cannot be limited solely to measuring the amount of production in terms of dollars, kilos, calories or tons of emissions. In this regard, it is necessary to consider an additional indicator of great importance: the quality of production. A quality agricultural offer, which always takes sustainability into consideration, is closely linked to the biological base of

Box 4.1.2.
Agroecology and livelihoods in global coffee systems.

Participatory Action Research (PAR) seeks to actively involve local communities in the research process and promote joint decision-making. In this case, the characteristics and impacts of diversification on coffee systems in Mexico and Nicaragua were explored, in order to understand how diversification of agricultural activities can strengthen the livelihoods of small-scale producers and contribute to the production of high quality coffee.

The team of academics and community facilitators worked closely with representatives and members of coffee cooperatives in both countries. Following small-scale coffee farmers over an extended period allowed for a fuller understanding of their realities and challenges.

The research focused on the application of agroecology to minimize negative impacts and maximize benefits for people and the environment. Following up on what was proposed by the producers themselves, agricultural calendars were created that reflected the different activities on the farms, which allowed informed decisions to be made and improved planning of agricultural activities throughout the year. These findings, which are applicable beyond Mexico and Nicaragua, highlight the importance of collaboration to address challenges facing coffee producers.

Source: **Agroecology and livelihoods (LAC and GIE, 2020)**

Existing tools, such as coffee certifications and payment for environmental services programmes, need to be improved to boost support for diversified agroecological coffee farms.

Opportunities can be explored to expand coffee value chains by introducing other products such as honey, cocoa and banana to the market.

The region includes **seven** of the **20** countries with the most plant varieties that are threatened, and **five** of the **20** countries with the highest number of endangered or threatened fauna species (**FAO, 2022c**).

It is estimated that land degradation causes economic losses equivalent to **USD 1.3 billion** per day globally, including natural resources such as water, soil and biodiversity (**FAO and GTIS, 2015**).

Sustainable soil management could increase food production by up to 58% (**FAO, 2015**).

Over the past 40 years, the world has lost **a third** of its arable land, partly due to unsustainable agricultural practices and the misuse of chemical fertilizers and pesticides.

It is necessary to strengthen the institutional framework that links the technical and political levels to facilitate decision-making, while taking advantage of the various coordination mechanisms that exist between countries and regions.

Box 4.1.3.
The CAMBio project in Central America

The CAMBio project, carried out in collaboration between the **Central American Bank for Economic Integration (CABEI)**, the **United Nations Development Program (UNDP)** and the **Global Environment Facility (GEF)** from 2008 to 2015, is an important example of regional cooperation. During that period, USD 56.4 million in credits were provided to support biodiversity-friendly **MSMEs**. This initiative contributed to the generation of more than 26,000 jobs for low-income people in five Central American countries.

Additionally, USD 2.3 million was allocated to provide non-reimbursable technical assistance, benefiting more than 26,000 **MSMEs**. Training was also carried out for 885 executives from 18 financial institutions (**CABEI 2023b**), thus strengthening knowledge and capacities in the field of environmental sustainability and providing support for sustainable ventures.

These achievements demonstrate the positive impact of regional cooperation in promoting biodiversity-responsible business practices and fostering sustainable development in the Central American region.

the territories, which reflects its natural endowment and biodiversity. In addition, a quality offer is based on the diversity of goods and services that make up the agricultural basket, which depend on the ability to create added value in the extensive and complex agricultural value chains in the region (ECLAC, FAO and IICA, 2019).

To achieve this, it is essential to implement monitoring, reporting and verification systems that allow comprehensive measurement by addressing the inherent complexities and identifying and measuring the co-benefits derived from the transition towards more sustainable agrifood systems. A clear example is the need to establish validation mechanisms for sustainable soil management, using indicators to monitor the progress towards sustainable production (FAO and ITPS, 2020).

Among the necessary measures are the integrated management of soil and water productivity, the use and conservation of biodiversity, and the responsible management of agrochemicals and fertilizers, as well as their replacement with alternatives such as bio-inputs. Integrated Pest Management (IPM) should also be implemented, and mechanization focused on sustainability and reduction of environmental impacts should be adopted (FAO, 2015).

In addition, public and private incentives are required to generate income that consider the effort involved in the transformation towards sustainable agrifood systems. It is also necessary to establish a positive cost-benefit relationship that fully recognizes the social and environmental costs and benefits, beyond the economic ones.

To support this transition, it is crucial to have a regulatory and governance framework that promotes intersectoral coordination. Financial services should be offered that facilitate investment in sustainable practices and access to "green" financial services.

In addition, participatory and horizontal technical assistance services are required, as well as the generation of capacities and evidence for informed decision-making. It is also important to guarantee access to technologies and information and establish business alliances that promote sustainable production and responsible consumption.

The linkage and participation of the different actors in the agrifood chain is essential in this process. A notable example of regional cooperation in this area is the CAMBio project (see Box 4.1.3) that provides financing and technical assistance for biodiversity-friendly micro, small, and medium-sized enterprises (MSMEs).

4.1.4. Why is it necessary to link sustainable production with the restoration of the productive landscape?

It is estimated that land degradation generates economic losses equivalent to USD 1.3 billion per day globally, considering natural resources such as water, soil and biodiversity (FAO and GTIS, 2015). To achieve the sustainability of production, guarantee the health of ecosystems, ensure the necessary future production and preserve global health, it is necessary to address the following challenges:

The need for integrated land and water management

Integrated land and water management is essential to ensure sustainable agrifood systems (AFS) and better production. In South America and Mesoamerica, around 45 and 74 percent, respectively, of cropland is degraded, compromising agricultural productivity in both regions. In addition, despite the fact that LAC has 34 percent of the total fresh water available in the world, all the sub-regions have experienced water scarcity.

According to the Status of the World's Soil Resources report (FAO and ITPS, 2015), approximately 50 percent of agricultural soils in LAC show some degree of erosion. Deforestation (see trinational initiative in Box 4.1.4), water erosion, the intensive application of agrochemicals, climate change and social inequalities, all caused by human activity (Gardi et al., 2014), are the main causes of degradation.

Water erosion

Water erosion is responsible for the loss of between 23 and 42 million tonnes (Mt) of nitrogen (N), and 15 to 26 Mt of phosphorus (P), from agricultural land globally on an annual basis. These fluxes can be compared to annual fertilizer application rates, which reach approximately 112 Mt of N and 18 Mt of P. This loss of nutrients needs to be replaced by fertilizers, which carry a high economic cost (USD 33-60 billion for N, and USD 77-140 billion for P).

Climate change adaptation and mitigation based on integrated landscape management

In the region, 77 percent of NDCs include mitigation and adaptation measures related to agriculture and land use. In addition, there is an increase in the number of public, private and public-private initiatives aimed at accelerating adaptation and mitigation (FAO, 2022c).

These initiatives include decoupling commodity value chains from

Between 2013 and 2019, **44%** of all tropical deforestation in the world occurred in **LAC** (FPTF, 2021).

It can take up to 100 years to form 1 cm of top soil (**FAO, 2015**).

Between 2010 and 2020, an average of 2.6 million ha of forest were lost per year.

Box 4.1.4.
Trinational Network for the Restoration of the Atlantic Forest of Alto Paraná

Forest resource degradation has prompted more than 100 participants from more than 33 governmental and non-governmental organizations, research institutes, companies, independent professionals, and local communities from Brazil, Argentina, and Paraguay to join the Trinational Network for the Restoration of the Atlantic Forest of Alto Paraná. This initiative, which was launched in 2019, is promoted by the Argentine Wildlife Foundation (Fundación Vida Silvestre Argentina) and the offices of the **World Wide Fund for Nature (WWF)** in Brazil and Paraguay.

The Trinational Network is inspired by the success of the *Pacto pela Restauração da Mata Atlântica* and the Paraná River Corridor Management Network. Its objective is to promote regional cooperation and combine the efforts of various sectors to promote coordinated action for the restoration and conservation of the Atlantic Forest of Alto Paraná. This collaboration seeks to increase the opportunities and scale of restoration and conservation projects developed due to the critical state of degradation of this important ecoregion.

Since 1961, the use of inorganic nitrogen fertilizers has increased almost nine times, while the use of water for irrigation has doubled (**Shukla et al., 2019**).

Four of the ten countries most affected by climate change in 1998-2017 are in the LAC region, which in the last decade accounted for 46% of global losses due to climate disasters (**FAO, 2022c**).

deforestation, supporting science and innovation to promote a low-emission livestock system, and strengthening the adaptive capacity of the fisheries and aquaculture sector. It is important to highlight that policies recognizing the land rights of indigenous communities, covering a total area of 227 million ha, have had a great impact in reducing or preventing carbon emissions caused by deforestation and forest degradation (FAO, 2022c).

In resilient agrosystems, agrobiodiversity plays a crucial role since a diversity of organisms is essential for the functioning and provision of ecosystem services. The elimination of a functional group of species or a trophic level can cause changes in the ecosystem towards a less desirable state, which will affect its capacity to function and provide services.

When environmental changes occur, the redundancy provided by various species allows the ecosystem to continue to function and provide ecosystem services. In this way, biodiversity acts as an "insurance" or "shock absorber" against environmental fluctuations, since the diversity of crops, trees and animals respond differently to variations, which contributes to a more predictable community and promotes ecosystem sustainability. Therefore, diversification strategies in agroecosystems are of great importance, since diversity translates into greater ecological heterogeneity, which increases the options for a continuous functioning of the system.

These actions may include associations and cooperatives, the establishment of supply networks, local supply and distribution chains, short marketing chains, local production of inputs, and practices that promote resilience and reduce the

Box 4.1.5.
SICA Climate-Smart Sustainable Agriculture Strategy (2018-2030)

The **Central American Agricultural Council (CAC)**, made up of Belize, Costa Rica, El Salvador, Guatemala, Honduras, Panama, Nicaragua and the Dominican Republic, stands out as an example of regional cooperation in the context of adaptation of the agricultural sector to climate change. In collaboration with organizations such as **FAO, IICA, the International Center for Tropical Agriculture (CIAT) and ECLAC**, the council has formulated the **SICA** Climate-Smart Sustainable Agriculture Strategy (2018-2030).

This strategy is based on three strategic axes closely related to the fundamental pillars of **Climate-Smart Sustainable Agriculture (CSSA)**: axis 1 focuses on efficient production systems for sustainable livelihoods; axis 2 addresses integral risk management and climate adaptation; and axis 3 is related to promoting sustainable agricultural landscapes with low carbon emissions.

In line with this strategy, various initiatives have been implemented that include technical spaces, applied analysis, training, and co-publications, with the aim of strengthening capacities in response to climate change and disasters. A community of practice in agricultural insurance has been established, in which various institutions of the sector, such as ministries, insurers, public and private banks, NGOs and partners share their experiences and lessons learned, while providing feedback on new initiatives. **FAO** has supported this community of practice by providing technical advice and analysis related to the development and implementation of the Plant Health Index (ECLAC and CAC, 2013, 2021).

The **SICA** Climate-Smart Agriculture Strategy stands out as an example of regional cooperation in Central America (Box **4.1.5**).

An agroecosystem is considered "resilient" when it is capable of continuing to produce food, despite facing challenges such as severe droughts or storms.

In the LAC region, 77% of **NDCs** include mitigation and adaptation measures related to agriculture and land use (**FAO, 2022c**).

vulnerability of producers to climatic events and institutional and political crises.

Considering the above, it is urgent to promote integrated landscape management, seeking more holistic and comprehensive solutions, as well as systemic approaches that foster an intersectoral approach, inclusion, and the establishment of public-private partnerships at different levels of government (see One Health 4.3). These solutions should make it possible to achieve the various development objectives in a balanced way and in an environment of increasing uncertainty (Ringler and Lawford, 2013; Thaxton et al., 2015).

It is essential to use tools that allow decision-makers to understand in advance the possible impacts, trade-offs and synergies of different alternatives, and at different time scales, in order to move quickly towards sustainability. This requires access to information and evidence-based decision-making (Rosegrant et al., 2014; Rosenzweig et al., 2016).

In this regard, it is necessary to strengthen capacities at the subnational level to

It is necessary to implement and scale up models adapted to local contexts, in order to promote the integrated management of water and soils, thus increasing the resilience, productivity and profitability of the systems.

facilitate the implementation of policies that promote the use of digital tools in land monitoring and natural resource management. This will make it possible to promote precision agriculture and proactively respond to threats through collaboration between the private, public and academic sectors (Loboguerrero et al., 2018).

Example of regional cooperation oriented towards integrated landscape management and ecosystem-based adaptation (Box **4.1.6**).

The Central American Dry Corridor extends from Guatemala to Panama, and the arid zones of the Dominican Republic.

Box 4.1.6.
Project for integrated landscape management and ecosystem-based adaptation in Central America

This is a project designed with the support of **CABEI** and the **United Nations Environment Programme (UNEP)**, which is currently in the last stage of review by the **Green Climate Fund (GCF)**.

The objective of this project is to help transform the reality of the region by facilitating access to micro-financing so that these vulnerable communities adopt adaptation strategies focused on the recovery of ecosystem services that cushion the impacts of climate change, and create market opportunities so that small-scale financial entities can play a multiplying role in climate action (**CABEI, 2023a**).

4.1.5. Managing production processes and their link to climate change: drivers for productive sustainability

It is estimated that agrifood systems are responsible for between **25%** and **30%** of total global GHG emissions (**IPCC, 2019**).

In LAC, **81.4%** of all farms, and 1 out of every 4 ha, are family farms, which totals more than 16 million family farms in the region (**FAO, 2022**).

Family farming is part of the livelihoods of more than 63 million people and contributes between 27% and 67% of total food production (**FAO, 2022**).

Climate change generated by human activity is affecting agricultural production, with stronger negative impacts expected by the end of the 21st century compared to previous periods. The impact of the worsening trends and climatic variability on productivity is estimated at between -2.3 and -10.7 percent in the period 2013-2040.

Additionally, the effects of climate change on pest species are complex since they interact with each other, and the impacts can be direct or indirect. The risks associated with the introduction of pests, and changes in their geographic distribution, seasonal phenology and population dynamics, are easier to predict in those pests that are sensitive to temperature variations. However, it is more difficult to predict the effect of these changes on pests with reproduction and distribution patterns that are strongly linked to factors such as water availability, wind, and crop management.

Prevention is presented as the most efficient and effective strategy to minimize the impact of a new pest. In this regard, it is crucial to consider climate change in the management of phytosanitary regulation systems at the national or regional level.

Developing countries, especially those that are highly dependent on agriculture, are the most vulnerable to changes in pest and disease patterns. Hundreds of millions of small-scale farmers depend exclusively on agriculture and aquaculture to survive.

The economy of countries is also affected by new pests and diseases that reduce the access of their agricultural products to international markets or increase the costs associated with inspection, treatment and compliance with food safety standards. Plant pests remain one of the main limitations for agricultural and food production. For example, fruit flies can cause significant damage to the production of fruits and vegetables and, with the increase in global temperatures, are spreading towards new regions. In addition, banana disease of the ***Fusarium oxysporum* f. sp. *cubense* Tropical Race 4 (Foc TR4)** is another threat that requires regional cooperation (**Box 4.1.7**).

Pesticides are often used in the fight against these pests, which may have serious side effects on human health and the environment, especially in poor rural communities that do not have access to less toxic compounds, nor to appropriate application or protection equipment.

Climate change can also affect food security. The proliferation of pests and diseases can result in an increase of pesticide residues and veterinary medications in food. Changes in precipitation, temperature and relative humidity can easily contaminate crops such as peanuts, wheat, corn, rice and coffee with mycotoxinogenic fungi, which can be mortal (**FAO, n.d.**).

The increase in the use of chemical fertilizers, pesticides and plastics has had a negative impact on the microbial functions of the soil by causing water pollution and generating serious impacts on human health (**UNEP, 2022**), as well as contributing to greenhouse gas emissions.

To increase the effectiveness of pest control actions, both local and regional strategies are required. Among others, governments can take the following actions: a) invest in early detection and control systems, such as border inspection, to avoid higher eradication and management costs; b) promote coordinated research and programmes that expand the options available for

The total CO2 emissions in agricultural lands of LAC exceeds **338** million tonnes, representing approximately 33% of global agricultural emissions (**FAO, 2020**).

The region was responsible for 63% of the total fresh or dried bananas and plantains exported worldwide in 2022, with Ecuador, Costa Rica, Guatemala and Honduras being the main suppliers in the region and global leaders (**IICA** based on **Trade Data Monitor**).

Box 4.1.7.
Fusarium oxysporum f. sp. *cubense* Tropical Race 4 (Foc TR4) threatens the production of musaceae

Currently, plantations and musaceae producers face the problem of *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4, which is a serious threat to the banana industry in the tropics. **Foc TR4**, like other Foc races (R1 and R2), cannot be controlled or eradicated from the soil with fumigants (**Pérez-Vicente et al., 2014**).

Its ability to survive decades in the soil, its lethal impact and its wide range of hosts make it the greatest threat to the world production of bananas and plantains in the last 20 years (**Pérez-Vicente et al., 2014; Ploetz, 2015; FAO, 2016a**). There are no banana varieties resistant to **Foc TR4**. Given the advance and danger of the disease, which has been detected in three countries of the Andean Region, immediate actions, joint work and cooperation between countries are required.

Pests, pathogens and weeds cause the loss of more than **40%** of the world's food supply (FAO, n.d.).

Transboundary animal diseases, such as foot-and-mouth disease, bovine spongiform encephalopathy, classical swine fever and, more recently, avian influenza are estimated to cause economic losses in the tens of billions of USD (FAO).

countries; c) strengthen national animal and plant health services; d) prioritize areas such as taxonomy, modeling, populations ecology and epidemiology; and e) integrate and organize national animal and plant health services more effectively, since they are often fragmented between different ministries and organizations (see One Health 4.3).

International cooperation is essential to ensure that all countries can successfully adopt adaptation measures for pest risk management in a scenario of climate change, through the exchange of information and coordinated responses between countries. The international exchange of information should be carried out through an official mechanism dedicated to providing data on the occurrence and risk of pests, as well as the development of possible strategies. Increased cooperation can facilitate the implementation of integrated pest management approaches, as well as strengthening the phytosanitary capacity of national and regional plant protection organizations to monitor and control pest outbreaks. Approaches such as "One Health" (see section 4.3) can be key in this regard (IPPC Secretariat, 2021).

An example of regional cooperation is COSAVE (see Box 4.1.8).

4.1.6. Land tenure: an enabling condition to reduce vulnerability and invest in the transition towards sustainable production

It is necessary to create synergies and promote collaboration between existing regional initiatives, programmes, projects and platforms, through a multi-sectoral and multi-stakeholder approach with financial, technological and capacity-building support.

It is necessary to promote the reduction of gaps in access to information, resources and participation in decision-making processes to improve the governance of agrifood systems.

Currently, the challenges of eradicating poverty and improving environmental protection are linked to the unequal distribution of means of production, especially land tenure, use and administration. Promoting a more equitable distribution is crucial to facilitate socioeconomic development, encourage productive and social investments, reduce ecological degradation, improve access to and management of natural resources, and protect vulnerable communities through social programmes. These efforts are essential to achieve SDGs 1, 2 and 5, which are related to ending poverty, achieving zero hunger and promoting gender equality, respectively (ECLAC et al., 2019).

Deforestation, the loss of biodiversity and ecosystem services are especially accelerated in areas where land tenure is uncertain, there are conflicts or institutions are weak. In the region, the high informality in land tenure mainly affects family farmers, who lack legal rights and are not reflected in cadastres or records. This results in the marginalization of these families and lands, which makes it difficult for them to participate in technical, organizational, and credit assistance programmes, including those aimed at promoting regenerative agriculture.

The strengthening of tenure rights, coupled with policies that promote agroecology, agroforestry and conservation agriculture, promotes the sustainable use of land and natural resources. These elements are essential for any strategy aimed at reducing rates of deforestation and land degradation, as well as improving water and biodiversity management in the region. In addition, they would support compliance with countries' international commitments, such as the Convention on Biological Diversity (CBD), the United Nations Convention to Combat Desertification (UNCCD), the Paris Agreement and the Sendai framework.

Box 4.1.8.
Plant Health Committee of the Southern Cone (**COSAVE**)

COSAVE is an outstanding example of regional cooperation. This committee brings together the ministers of agriculture of the member countries to carry out joint activities aimed at phytosanitary legislation, pest surveillance and control, inspection, training, information dissemination, diagnosis, research and provision of guidelines for the safe introduction of propagation material.

COSAVE has established important initiatives, such as the regional plan for the containment of **citrus Huanglongbing (HLB)**, the regional programme for the control of the boll weevil Anthonomus grandis Boheman, and the regional plan for surveillance and biological control of the eucalyptus bronze bug *Thaumastocoris peregrinus* (Hemiptera: Thaumastocoridae) (**Carpintero & Dellapé**).

The actions demonstrate the commitment of **COSAVE** member countries to jointly address phytosanitary challenges and adapt to the impacts of climate change. Regional cooperation strengthens response capacity, allows the sharing of knowledge and experiences, and facilitates the implementation of coordinated measures for the control and prevention of pests in the region (**COSAVE, 2023**).

The member countries of COSAVE are Argentina, Bolivia, Brazil, Chile, Paraguay, Peru and Uruguay.

Box 4.1.9.
Trilateral South-South Cooperation Project to modernize rural land cadastres

Under the Trilateral South-South Cooperation Project between **FAO, the National Institute of Colonization and Agrarian Reform and the Brazilian Agricultural Policy for Climate Adaptation and Low Carbon Emissions**, in collaboration with the Inter-American Network of Cadastre and Property Registry, initiatives are conducted to assess the current status, challenges, and proposals aimed at modernizing rural land cadastres in LAC. The following 15 countries of the region participate in the project: Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, the Dominican Republic and Uruguay. Through exhaustive bibliographical research, comprehensive diagnoses have been developed that include information on the geographic location, land administration system, types of soil and status of land regularization/formalization/titling, institutional support and governance.

The Trilateral South-South Cooperation Project is an example of regional cooperation to modernize rural land cadastres (Box **4.1.9**).

This regional collaboration has resulted in concrete actions to improve the rural land cadastre systems in the participating countries and strengthen territorial management, while guaranteeing the legal security of land tenure and promoting sustainable development in the region (FAO et al., 2022a).

4.1.7. Opportunities for regional cooperation to support the transition to sustainable production

Better governance involves consolidating spaces for multisectoral coordination at different levels.

Regional cooperation platforms, developed by various institutions, make it possible to take advantage of opportunities for cooperation and overcome the challenges facing countries to achieve a transition towards sustainable agricultural production.

Cooperation on land issues

In this regard, the Latin American and Caribbean Soil Alliance (ASLAC), aligned with FAO's World Soil Alliance, aims to raise awareness among the population about the importance of soils as a support for life in the planet. ASLAC's priority is to promote sustainable soil management in the region through the implementation and scaling up of GAP. To achieve this goal, the alliance has developed various tools, including the following:

The soil is the factor that determines agricultural productivity and is very sensitive to climate and biomass activity, as it is a particularly unstable substratum, which breaks down and moves due to the effect of sometimes very weak kinetic energy (**ECLAC et al., 2019**).

1. SoilLEX
2. Protocol for the Evaluation of Sustainable Soil Management.
3. International Code of Conduct for the Use and Management of Fertilizers.
4. Global Soil Doctors Programme.
5. Technical networks for monitoring soil conditions, such as GLOSOLAN (soil laboratories), INBS (black soils), INFA (fertilizer analysis), INSAS (salt-affected soils), INSII (soil information institutions), NETSOB (soil biodiversity) and INSOP (soil contamination), promoted by FAO.

CA4SH, a coalition of over 150 partners to improve soil health globally, was recently formed as a result of the **FSS** in 2021.

In addition, the "Living Soils in the Americas" initiative has been promoted, led by IICA in collaboration with the Carbon Management and Sequestration Center (C-MASC).

Numerous regional cooperation projects and programmes have also been implemented on the subject, which have allowed the use of tools such as digital soil mapping and sustainable soil management in various countries of the region, such as Argentina, Costa Rica, Colombia, Ecuador, Nicaragua, Paraguay, Uruguay and Venezuela. In addition, soil recarbonization projects have been carried out in Mexico and Costa Rica, as well as initiatives by soil doctors in Bolivia, Colombia, Chile and Ecuador.

Cooperation on water issues

The Expert Group on Regional Coordination, established by UN-Water in 2019, seeks to provide a platform for coordination and collaboration at the regional level on SDG 6 and related global policy

frameworks. Participants exchange information, knowledge and regional experiences and coordinate joint activities on water, sanitation and related issues carried out by UN-Water members and partners. In addition, the group seeks to facilitate the interaction of UN-Water with respect to the regional collaboration agreements established by the United Nations Secretariat.

The Conference of Ibero-American Water Directors (CODIA) arose as a response to the mandate of the I Ibero-American Forum of Ministers of the Environment to create a regional forum that included the main managers of water management in LAC. CODIA is a technical instrument to support the forum, which promotes modalities of cooperation in the area of water resources. It is made up of 22 countries in the Ibero-American region that seek to promote issues related to water.

In 2022, the Stockholm International Water Institute (SIWI) started developing a new initiative aimed at boosting global water cooperation. This initiative assesses the state and trends of water cooperation at different scales, in order to draw policy and practical lessons. Based on the knowledge acquired, it promotes and supports contextualized solutions for cooperation in the water sector and highlights its importance before decision-makers and water managers at the national and international levels.

The LAC Regional Group of Experts on Water Resources was created in the preparatory framework for the 2023 World Water Conference by ECLAC, under the auspices of UN-Water. Its objective is to strengthen and accelerate the implementation of SDG 6 through joint work. The group of experts is made up of representatives of prestigious institutions in the field of water resources from more than 20 countries in the region.

Cooperation in agricultural research

In the region there are several initiatives for regional collaboration in agricultural research. The Cooperative Programmes for Agricultural Research (PROCIs) are subregional mechanisms that involve national agricultural research institutes, with the aim of promoting cooperation on agricultural research issues. These programmes focus on strengthening institutions, coordinating research projects between various countries, and on technology transfer.

Currently, there are four PROCIs in operation: a) PROCISUR, which operates in Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay; (b) PROCITROPICOS, which is implemented in Brazil, Bolivia, Colombia, Ecuador, Peru, Suriname and Venezuela; (c) PROCIANDINO, which focuses on Bolivia, Colombia, Ecuador, Peru and Venezuela; and (d) PROCICARIBE in the Caribbean.

In Central America, the seven countries use a similar system called the Central American Integration System for Agricultural Technology (SICTA). The Caribbean Agricultural Research and Development Institute (CARDI) is the leading agricultural research and development entity in the English-speaking Caribbean. Its member countries are Antigua and Barbuda, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago.

In addition, the Tropical Agricultural Research and Higher Education Center (CATIE) is an autonomous, non-profit institution that focuses on

Soil organic matter can retain an amount of water equivalent to about 20 times its weight.

Efficient use of water, reduced use of pesticides and improved soil health can lead to an average increase in crop yields of 79% (**FAO and GTIS, 2015**).

It is essential to consider agriculture as part of the solution to the challenges imposed by climate change, as well as to listen to the voices of men and women farmers in the search for practical solutions aimed at strengthening production systems.

Although positive results have been achieved, the lack of financing and weak political leadership reduce the sustainability and impact of spaces for regional cooperation.

Markets must be diversified and promote the responsible production and consumption of food, fiber and energy.

agricultural and rural development, as well as the management of natural resources. Its member countries include all the Central American countries, as well as Bolivia, Colombia, the Dominican Republic, Mexico, Paraguay and Venezuela.

Regional cooperation for climate action

With the aim of promoting climate action in the sector, PLACA has been established as a regional mechanism for voluntary collaboration in agriculture and climate change that brings together representatives of the ministries of agriculture of several countries in the region, including Argentina, the Bahamas, Brazil, Colombia, Costa Rica, Chile, the Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Mexico, Panama, Paraguay, Peru, and Uruguay. FAO and ECLAC both act as the Secretariat of PLACA.

PLACA currently has a regional community of practice that is organized into four working groups: adaptation and mitigation; public policies; transfer of knowledge and good practices; and research, development and technological innovation. Among the results achieved are regional studies, self-study courses on topics such as rural extension and climate change or adaptation to climate change in the agricultural sector, technical seminars on transparency, stocktake reports, a methodology for biennial transparency reports and fact sheets on low-cost technological solutions implemented in local territories.

The **Family Farming and Agroecology Community of Practices** and the **Soils Community of Practices** are spaces that bring together more than 600 members and use various tools, such as webinars, conversations, discussion forums, repositories, and databases to promote sustainable agricultural production systems and proper soil and water management. These communities foster an open and practical dialogue, focused on the specific needs of farmers, especially small-scale farming families. Through the exchange of knowledge and experiences, including local knowledge and successful innovations, it seeks to address challenges such as the sustainable transformation of production, markets and consumption, as well as public policies.

The Global Alliance against *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4, which was established in March 2021, includes the participation of research institutions, universities, international cooperation organizations, such as IICA, and the private sector. Its areas of action include prevention and training, genetic improvement and control methods. The IICA **Musaceas – Foc TR4** network has facilitated institutional coordination, horizontal technical cooperation and knowledge management for institutional strengthening and technical capacity-building in countries affected by the disease.

The **ALER4TA** project, developed in Ecuador, Colombia and Peru and managed by IICA in collaboration with the German Society for International Cooperation (GIZ), aims to improve the capacities of countries to address the FocR4T disease, standardize regional guidelines, provide contingency plan training and strengthen FocR4T prevention actions carried out by technicians, producers and the general public.

IICA and its partners also have a **community of practice** for the implementation of the agricultural

components of the NDCs. This community seeks to respond to the needs expressed by the countries of the region by sharing lessons learned and successful experiences to highlight the progress made to date, the persisting gaps, and the need to overcome obstacles and strengthen sectoral actions aligned with the NDCs. Currently, around 11 countries participate, including actors from the public and private sectors involved in the daily implementation of these actions.

Along the same lines, the Caribbean Climate Smart Agriculture Forum aims to improve climate resilience in the agricultural sector at the local level. Through personalized and targeted training, the forum promotes climate-smart agricultural practices adapted to the socioeconomic and environmental situation of each country. The forum has trained hundreds of agricultural technicians and farmers, which have been provided with direct support materials and technical services to promote the implementation of these practices in various countries.

4.2
THE BIOECONOMY: PRODUCTIVE DIVERSIFICATION AND INCREASED AGRICULTURAL VALUE ADDED

Regional cooperation in bioeconomy should focus on capacity building in the public and private sectors to address trade and regulatory obstacles; in the promotion of articulated work with universities and science, technology and innovation entities; and in the formation of groups and networks specialized in bioeconomy issues throughout the region.

4.2.1. The global context

The bioeconomy is a development path based on the sustainable use of biological resources. Although there is no universally accepted definition, there is a growing consensus to characterize the bioeconomy as the production, use, conservation and regeneration of biological resources—including related knowledge, science, technology and innovation—to provide information, products, processes and services in all economic sectors and, thus, move towards a sustainable and inclusive economy (IACGB, 2018, 2020; Gomez-San Juan et al., 2019; ECLAC, 2020a; FAO, 2021a).

In agriculture, the power of the bioeconomy manifests itself through contributions to climate action, for example, through biotechnological applications for the development of plants better adapted to conditions of water, thermal, and salinity stress. Also, in the production of bio-inputs, for example, to reduce the use of synthetic fertilizers and greenhouse gas emissions. The development of bioenergy highlights the power of the bioeconomy to contribute to the energy transition and, together with the development of biomaterials, to contribute to fossil decarbonization. The power of the bioeconomy is also manifested in the field of health, considered holistically: a) environmental health, through the development of bioremediation solutions to address pollution problems that affect the quality of soils and waters; b) animal health, through the generation of vaccines

The power of the bioeconomy can be illustrated by the solutions it provides to global environmental problems, such as climate change, ecosystem degradation, biodiversity loss, and desertification and land degradation.

The bioeconomy strategies of China and the United States focus on priority areas such as biomedicine, bioagriculture , biomanufacturing, bioenergy, food security, biosecurity, climate change, and the resilience of supply chains, among others.

and medicines to prevent the transmission and development of zoonotic diseases in major and minor livestock species with the potential to affect human health; and c) of course, human health, as demonstrated by the rapid development of vaccines to face the COVID-19 pandemic, through the use of modern biotechnologies.

Control of the bioeconomy and its technologies will be an area of strategic competition in the new international order that has been shaped by the cascade of global crises that have occurred since the end of the first decade of the 21st century (with the financial crisis of 2007 -2008) and deepened with the COVID-19 pandemic and the war in Ukraine. Evidence of this is the *Five-Year Bioeconomy Plan 2021-2025* of the People's Republic of China[1], published by the National Development and Reform Commission on May 10, 2022 (Zhang et al., 2022), and the Executive Order on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Bioeconomy, signed by President Biden on September 12, 2022 (The White House, 2022).

4.2.2. The challenge of product diversification and value addition in agriculture in Latin America and the Caribbean

On average, **LAC** is a net agricultural exporter, but exports are concentrated in few basic products and concentration has increased.

During this century the sector has increased its participation in global exports. At the national level, the agriculture share of total exports varies from below 5% (for example, Suriname, Trinidad and Tobago), to cases above 50% (for example, Argentina, Ecuador, Paraguay, Uruguay). The sector has been one of the most resistant to impacts from COVID-19; for example, in 2020 agricultural trade grew 2.8% versus 2019, while in the rest of the sectors trade decreased, falling 7.4% (ECLAC et al. , 2022; ECLAC and FAO, 2020).

The concentration is greater still in the volume of exports: six products in 2000-2009 (19 worldwide) and four in 2010-2019 (19 to level world) contributed 60% of export volume.

LAC exports focus on a few basic products and concentration has increased. Between 2000-2009, 15 products represented 60% of total agricultural exports (versus 35 products representing 60% of global agriculture trade). In 2010-2019, this number decreased to 13 products (versus 39 at the global level).

Recent documents, including ECLAC (ECLAC, 2023b, a) and IICA (Chavarría Miranda, 2021; Trigo et al., 2023), have highlighted the bioeconomy as a alternative for dealing with the challenge of diversification and value addition, to incorporate modern knowledge in the field of science biological and health, as well as their related technologies, and to enhance traditional knowledge (ECLAC, 2022b, 2020a). In addition, these works highlight the bioeconomy as an engine for a sustainable and inclusive productive recovery in the face of the crises generated by the COVID-19 pandemic and the conflict between the Russian Federation and Ukraine.

In a recent report from the McKinsey Global Institute (Chui et al., 2020), bioinnovations are estimated to have an impact in up to 60% of physical inputs. LAC should be able to benefit from that potential, considering the capacity that exists in the region for biomass production, the availability of residual

[1]url of the article: https://goo.su/OamZF

and waste biomass in primary sectors and biologically-based transformation, the richness of its biodiversity and the capabilities in biological sciences that exist in many countries (ECLAC, FAO and IICA , 2019).

The analysis of export composition is indicative of the growth potential of the bioeconomy in the region, above all in the segments of greater sophistication. Table 4.1 presents a summary of the structure and evolution of exports of products linked to the bioeconomy in the region vis-a-vis global trends[2].

The analysis considers three sub-periods: the first two decades of the current century (2000-2009 and 2010-2019) and the 2020-2022 period, marked by the COVID-19 pandemic and the Russia-Ukraine conflict. Overall, it stands out that the proportion of exports related to the bioeconomy in LAC is around 30%, well above the 20% globally, without significant changes throughout the period of analysis. However, a closer look allows us to identify at least three dynamics between product categories.

A key factor is the dominance of basic products in bioeconomy exports in LAC, whose importance has increased, from about 50% in 2000-2002 to 54% in 2015-2019, with an emphasis on agricultural production. During the COVID-19 pandemic, this proportion increased even more, reaching 58%. In contrast, at the global level, the weight of basic products in total bioeconomy exports has remained stable, around 27%.

Secondly, the most dynamic component of the bioeconomy trade at the global level is the high value-added category of products (advanced bioeconomy), whose participation increased from 23% in 2010-2014 to 25% in 2015-2019 and to 29% in 2020-2022, due to the growth of biopharmaceutical products (associated with the COVID-19 pandemic) and of biofertilizers (associated with the Russia-Ukraine conflict). On the contrary, in LAC this is the least dynamic component, showing negative variation rates on aggregate and for most components and a reduction of its importance in the total bioeconomy exports. The only items with positive growth rates are natural products (which still lagged global growth) and bioenergy, that grew between 2010-2019 and 2020-2022 (46%), then fell between 2000-2009 and 2010-2019 (-37%).

Third, globally, the increase in the weight of advanced bioeconomy trade has been counterbalanced by the reduction in the importance of the basic product transformation bioeconomy, while in LAC the increase in the weight of the basic product economy has led to a loss importance to the other two categories, in which value-added activities are concentrated.

The three factors show that the process of primarization of exports has also occurred in the field of bioeconomy. There is even a notable contrast between the evolution of activities with higher added value (mainly natural ingredients, biofertilizers, biocosmetics and bio-pharmaceuticals), which presented significant growth rates globally, but decreased in LAC (ECLAC, 2022b). Table 4.2 shows how the region has a surplus in bioeconomy trade in basic products and processed products, but deficit in products of advanced bioeconomy.

The region shows a surplus in bioeconomy trade of basic products and in the transformation of basic products.

The region is highly deficient in advanced bioeconomy products; furthermore, the importance of advanced bioeconomy imports has increased versus exports in the same category.

According to **ECLAC (2020a)**, three categories of the bioeconomy are defined, which seek to capture different levels of diversification, added value and incorporation of knowledge and advanced technologies: i) bioeconomy of basic products, ii) bioeconomy of basic product transformation and iii) high value-added bioeconomy (or advanced bioeconomy).

The region has a surplus in the trade of basic and processed bioeconomy products, which results in a positive general balance. However, in the field of advanced bioeconomy, the region shows a significant deficit, with a constant increase in the importance of imports in relation to that of exports in all sectors.

[2]The analysis is based on the reclassification of biotrade data produced by UNCTAD - https://unctadstat.unctad.org/en/Biotrade.html#

Table 4.1

The World and Latin America and the Caribbean: Composition and evolution of bioeconomy exports, by category and sub-period (percentages)

Sectors	World					Latin America and the Caribbean				
	Composition (percentages)			Variation (percentages)		Composition (percentages)			Variation (percentages)	
	2010 - 2014	2015 - 2014	2020 - 2022	2015-19 vs 2010-14	2020-22 vs 2015-19	2010 - 2014	2015 - 2009	2020 - 2022	2015-19 vs 2010-14	2020-22 vs 2015-19
Bioeconomy of basic products	**27.2 %**	**26.6 %**	**26.0 %**	**4.9 %**	**14 %**	**49.1 %**	**53.6 %**	**57.6 %**	**13.7 %**	**19 %**
Raw materials	4.9 %	4.1 %	3.8 %	-10.4 %	9 %	3.3 %	3.3 %	3.2 %	4.8 %	9 %
Agricultural products	21.4 %	21.8 %	21.5 %	9.1 %	15 %	44.9 %	49.4 %	53.0 %	14.5 %	19 %
Natural fibers	0.9 %	0.7 %	0.7 %	-12.9 %	11 %	0.9 %	0.9 %	1.3 %	6.7 %	60 %
Commodity Transformation Bioeconomy	**49.6 %**	**48.3 %**	**44.6 %**	**4.3 %**	**8 %**	**43.2 %**	**39.9 %**	**36.6 %**	**-4.0 %**	**2 %**
Wood Industry	2.7 %	2.8 %	2.8 %	10.8 %	16 %	0.8 %	0.9 %	1.1 %	17.6 %	42 %
Pulp paper	7.6 %	7.0 %	6.5 %	-0.7 %	7 %	5.5 %	5.9 %	5.3 %	11.0 %	1 %
Feed industry	2.5 %	2.4 %	2.4 %	3.5 %	18 %	8.2 %	7.3 %	5.8 %	-6.1 %	-13 %
Food industry	20.5 %	20.5 %	20.3 %	7.2 %	15 %	22.8 %	20.4 %	20.1 %	-6.5 %	10%
Textile and clothing industry	15.5 %	14.7 %	12.0 %	1.8 %	-6 %	5.6 %	4.9 %	3.9 %	-9.4 %	-12 %
Tobacco industry	0.9 %	0.9 %	0.8 %	8.5 %	0 %	0.4 %	0.5 %	0.4 %	12.1 %	2 %
Bioeconomy of diversification and high added value	**23.3 %**	**25.1 %**	**29.4 %**	**15.4 %**	**36 %**	**7.7 %**	**6.5 %**	**5.9 %**	**-11.4 %**	**0 %**
Natural ingredients	2.2 %	2.1 %	2.2 %	4.9 %	21 %	1.1 %	1.2 %	1.1 %	5.6 %	2 %
Bioenergy	0.3 %	0.3 %	0.3 %	9.1 %	33 %	0.8 %	0.5 %	0.6 %	-36.7 %	46 %
Biofertilizers	2.7 %	5.3 %	8.8 %	108.4 %	95 %	1.5 %	1.2 %	1.1 %	-13.8 %	-1 %
Organic chemicals	1.0 %	0.9 %	0.9 %	-2.6 %	12 %	0.7 %	0.6 %	0.5 %	-4.8 %	-7 %
Biocosmetics and personal care	3.1 %	3.6 %	3.6 %	24.7 %	17 %	1.7 %	1.5 %	1.3 %	-11.1 %	-2 %
Biopharmaceuticals	14.0 %	12.9 %	13.5 %	-1.4 %	22 %	1.9 %	1.6 %	1.3 %	-12.2 %	-11 %
Total bioeconomy	**100 %**	**100 %**	**100 %**	**7.1 %**	**16 %**	**100 %**	**100 %**	**100 %**	**4.2 %**	**11.3 %**
Participation in total exports	**18.9 %**	**19.7 %**	**20.3 %**	**0.8 pp.**	**0.6 pp.**	**28.6 %**	**29.9 %**	**29.1 %**	**1.3 pp.**	**-0.8 pp.**

Source: Own elaboration from https://unctadstat.unctad.org/en/Biotrade.html#

Table 4.2

Latin America and the Caribbean: Trade balance of bioeconomy products, according to categories and by sub-periods

Sectors	Exports			Imports			Balance		
	Billions of dollars average			Billions of dollars average			Imports as a proportion of exports		
	2010 - 2014	2015 - 2019	2020 - 2022	2010 - 2014	2015 - 2019	2020 - 2022	2010 - 2014	2015 - 2019	2020 - 2022
Bioeconomy of basic products	**129.5**	**147.3**	**175.9**	**39.1**	**40.1**	**46.2**	**0.3**	**0.3**	**0.3**
Raw materials	8.6	9.0	9.8	4.9	4.4	4.8	0.6	0.5	0.5
Agricultural products	118.5	135.7	162.1	32.9	34.9	40.7	0.3	0.3	0.3
Natural fibers	2.4	2.5	4.0	1.3	0.7	0.7	0.6	0.3	0.2
Bioeconomy of transformation of basic products	**114.0**	**109.5**	**111.8**	**75.2**	**77.3**	**74.9**	**0.7**	**0.7**	**0.7**
Wood Industry	2.0	2.3	3.3	2.1	2.2	1.8	1.1	0.9	0.6
Pulp paper	14.5	16.1	16.3	16.3	16.1	15.3	1.1	1.0	0.9
Feed industry	21.5	20.2	17.6	5.8	6.5	6.8	0.3	0.3	0.4
Food industry	60.1	56.1	61.5	33.2	35.2	36.9	0.6	0.6	0.6
Textile and clothing industry	14.8	13.4	11.8	17.2	16.6	13.6	1.2	1.2	1.2
Tobacco industry	1.2	1.3	1.3	0.5	0.7	0.5	0.5	0.5	0.4
High value-added bioeconomy	**20.3**	**18.0**	**17.9**	**47.3**	**50.2**	**56.3**	**2.3**	**2.8**	**3.1**
Natural ingredients	3.0	3.2	3.2	4.7	5.2	6.5	1.6	1.7	2.0
Bioenergy	2.0	1.3	1.9	0.7	1.0	0.8	0.3	0.8	0.4
Biofertilizers	3.9	3.4	3.3	9.2	12.7	18.2	2.3	3.7	5.4
Organic chemicals	1.8	1.7	1.5	2.3	2.4	2.7	1.3	1.4	1.8
Biocosmetics and personal care	4.5	4.0	4.0	6.8	7.1	6.3	1.5	1.8	1.6
Biopharmaceuticals	5.1	4.4	3.9	23.6	21.8	21.9	4.7	4.9	5.5
Total bioeconomy	**263.7**	**274.7**	**305.7**	**161.6**	**167.6**	**177.4**	**0.6**	**0.6**	**0.6**

Source: Own elaboration from https://unctadstat.unctad.org/en/Biotrade.html#

4.2.3. Opportunities for productive diversification and value addition

The countries of the region have propitious conditions to promote the bioeconomy, due to their biological resources and capacities in life sciences. Opportunities for diversification and added value are in sectors such as *agriculture and livestock* (for example, proteins, plants as bioreactors, enzymes, ingredients), *forestry* (for example, bioplastics, new materials), *aquaculture* (for example, bioproducts, ingredients, proteins, enzymes), the *sustainable use of biodiversity* (for example, biopharmaceuticals, agricultural bio-inputs, ingredients, functional foods), *bioremediation* (for

Bioeconomy opportunities cover a wide spectrum, from low-tech initiatives (such as the generation of bioenergy from biogenic waste) to more complex projects focused on the creation of high value-added products (such as bio-inputs, alternative proteins, enzymes and biodiagnostic services), which make use of advanced technologies such as modern biotechnology and digital technologies.

Biopharmaceuticals refers to the application of a living organism or active ingredient extracted from a biological system from its original or genetically modified form to prevent, alleviate or treat disease (**Behera et al. , 2020**).

example, wastewater treatment, recovery of degraded soils, water purification), *recovery of biomass waste* (for example, bioenergy, new materials, biofertilizers, protein and enzyme recovery) and the *biocosmetics*, biopharmaceuticals and biomedicine sector (personal care products, medicines, diagnostics).

Bioeconomy opportunities cover a wide spectrum. The valorization of agricultural and agro-industrial residues, the sustainable use of biodiversity and its elements, as well as the production and use of bio-inputs, are alternatives that have been identified as having the potential to promote productive diversification and increase value added (ECLAC, 2022b).

The most conventional form of **waste valuation** is through the production of bioenergy. However, the possibilities of use are extensive and open up new possibilities for industrialization based on biological resources (ECLAC, 2022b). In particular, applications related to the extraction of valuable components for applications in the pharmacological area; with the extraction of components that can be used as ingredients for food production, such as antioxidants and functional components; and

The Argentine PROBIAAR defines bio-inputs as biological products derived from microorganisms or macroorganisms, intended for agricultural, agrifood, agro-industrial and agro-energy production.

The Brazilian PNB proposes the creation of a Strategic Council and a National Bioinputs Observatory.

Box .4.2.1
Policies for the promotion of the production and use of bio-inputs in Argentina and Brazil.

Argentina. The Argentine Agricultural Bio-inputs Program (PROBIAAR), established by resolution 144/2021, aims to strengthen the bioeconomy by promoting the production and use of bio-inputs in agriculture, with an emphasis on local and regional development.

The operating manual was approved in May 2023 through provision 2/2023. PROBIAAR is complemented by the "Bioproducto Argentino" Seal Program (2017), granted by the Ministry of Agriculture, Livestock and Fisheries of Argentina (MAGYP) to sustainable and innovative biomaterials and bioproducts, and the Argentine National Biodevelopment Program (BIODESARROLLAR) (2022), which promotes bioproducts through cooperatives, SMEs and research entities.

Brazil. The National Bio-inputs Program (PNB), established by decree 10.375 and ordinances 102 and 103 (2020), seeks to promote the use of biological resources in Brazilian agriculture to reduce dependence on imported inputs and promote sustainable practices. It proposes to generate updated regulations and promote good practices, incentives for research, the development of bio-inputs and the provision of support to companies and biofactories.

Source: Own elaboration based on information available in MAGYP (2023b); SBA (2023); Biodevelop (2023); GNP (2023).

with the recovery of lignocellulosic compounds for the production of biomaterials and other applications in biomedicine, engineering and pharmacy.

The **sustainable use of biodiversity and its genetic elements and biochemicals** is based on the Convention on the Diversity Biological (CBD) in 1994 and Nagoya Protocol (NP) in 2010. The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in 2001. In particular, the NP refers to *"the fair and equitable sharing of the benefits derived from the utilization of the resources genetics, even through appropriate access to genetic resources and through the appropriate transfer of relevant technolgies, taking into account all rights to such resources and technologies and through appropriate financing, thereby contributing to the conservation of biological diversity and the sustainable use of its components"*. The mechanisms to comply with the objective of the PN are called Access and benefits Sharing (ABS).

The **pharmaceutical and cosmetic industries** are two areas with high potential for the sustainable use of biodiversity, as evidenced by their high growth rates in the international trade of bioproducts (Table 4.1). Biocosmetics are an alternative to conventional cosmetics that use ingredients derived from petroleum or mineral oil, which can be harmful and are not biodegradable (Goyal and Jerold, 2023).

The **development and use of bio-inputs** stand out as opportunities to increase the sustainability of agriculture and, at the same time, reduce dependence on imported inputs, especially chemical synthesis fertilizers. Box 4.2.1 summarizes some of the main elements of the policies of Argentina and Brazil; and box 4.2.2 presents two examples of successful Latin American companies in the production of bio-inputs.

The development of **innovative foods and ingredients** is another area of opportunity for the region, in which innovative business initiatives are already beginning to emerge and public policy has begun to be generated to promote their development, as is the case in Chile, with the **Transforma Alimentos** program. This is an initiative promoted by the Chilean Production Development Corporation and supported by the Ministry of Agriculture which, through public-private coordination and collaboration, seeks to promote the sustainable growth of the Chilean food industry, with a more diversified, sophisticated and competitive offer of products and services for global export markets[3]. The program operates through calls open to all innovative companies and includes four categories, two of them directly related to the topic in question: i) *next-generation food, beverages and ingredients*, which includes natural ingredients and alternative proteins, functional foods and beverages, products based on mushrooms, algae, insects and others, *free-from* and vegan categories among others; and ii) *agrifood tech*, which covers digital solutions and tools for monitoring critical variables, sensing, artificial intelligence,

[3]URL of the Transforma Alimentos program: https://transformaalimentos.cl/

Rizobacter has a production capacity of 200,000 daily doses of inoculants and is present in 40 countries. Its commitment to innovation is reflected in the investment of 20% of its profits in research and development.

With a presence throughout the Mexican territory and expanding to Central American countries, Biofabrica Siglo XXI demonstrates its impact both regionally and internationally.

Box 4.2.2
Successful cases of Latin American companies producing agricultural bio-inputs

Rizobacter (RB), founded in 1977, is a leading Argentine company in agricultural microbiology that leads the research, development, and commercialization of innovative biological solutions to promote optimal crop growth. Its presence in more than 40 countries is supported by lines of essential products, including inoculants, seed therapies, adjuvants, and fertilizers, which reach a wide range of producers globally with cutting-edge technologies. This company, which operates under sustainable management principles, adheres to international quality standards such as International Organization for Standardization 9001:2015 (ISO 9001:2015), ISO 14001:2015 and ISO 45001:2018.

On the other hand, Biofabrica Siglo XXI (BSXXI), an influential Mexican agrobiotechnology entity born in 2004, vitally links scientific research with agricultural production. Through partnerships with leading national research centers such as the National Autonomous University of Mexico (UNAM), the Institute for Biomedical Research (IIB), the Center for Genomic Sciences (CCG), the National Polytechnic Institute (IPN), the National Laboratory of Genomics for Biodiversity (LANGEBIO) and Center for Research and Advanced Studies of the IPN (CINVESTAV), the company has forged a solid foundation. Its focus on sustainable agricultural production through agrobiotechnology translates into an advanced research and development plant inaugurated in 2019. The application of advanced techniques for the study, isolation and selection of strains of beneficial microorganisms used as biofertilizers and for biological control of pests and diseases is fundamental in its approach.

Source: Own elaboration based on information available in Rizobacter (2023); Biofábrica (2023)

Regional collaboration plays a crucial role in promoting the exchange of experiences, in formulating policies and creating tools to support innovation, and in promoting collaboration between companies, universities, research centers, and science-related entities, technology and innovation.

4.2.4. Collaboration opportunities for the development of the bioeconomy in LAC

Taking full advantage of the opportunities offered by the bioeconomy in the region implies overcoming challenges and exploiting advantages, which can be addressed and strengthened through cooperation. Examples of these challenges include regulatory issues and access to markets, the development of capacities in science and technology, the promotion of innovation, the training of human resources and the creation of financing mechanisms.

Collaboration to overcome regulatory weaknesses

There are various types of regulatory barriers that limit the development of

the bioeconomy in the region. Among the opportunities for collaboration to overcome such barriers are the following:

I. development of regulatory frameworks, especially in areas where the advancement of knowledge and the application of new technologies is faster (for example, biotechnological applications, gene editing, synthetic biology);

II. convergence (to the extent possible) of national regulatory processes in relevant fields (e.g., access to genetic resources for research and development, protection of seeds and traditional plants);

III. development of similar classification criteria (to the extent possible) for new products related to the bioeconomy (e.g., functional foods and superfoods, biopharmaceuticals, agricultural bio-inputs, industrial enzymes);

IV. development of regulations that differentiate between conventional products and similar bioproducts (e.g., bioenergy, biopharmaceuticals, bioremediation, biomaterials, bio-inputs); and

V. strengthening of capacities to comply with regulations in the destination markets of bioeconomy products (for example, new food products, biopharmaceuticals and biocosmetics).

Collaboration can be strategic in the specific case of agricultural bio-inputs, given the interest they have aroused, due to their role in the transition to a more sustainable agriculture, as well as the vulnerability generated by the high dependence on imports of agricultural inputs, as has become evident with the Russia-Ukraine crisis, especially in the case of chemical synthesis fertilizers. Box 4.2.3 highlights the case of the MERCOSUR Bio-inputs for Agricultural Use Commission as an example of regional cooperation.

Collaboration to promote the valorization of biological resources and favor market access

Collaboration can also promote the valorization of biological resources, the expansion of markets and access to new markets. This is evidenced in: i) the economic, social and environmental quantification and valuation of bioproducts and pathways for the development of the bioeconomy; ii) tools to overcome regulatory and commercial barriers in the import/export of biological components; iii) the development of capacities to assess benefits and risks of new technologies and regulatory compatibility; and iv) the evaluation of options for the bioeconomy (sophisticated products against immediate opportunities, such as agrobiodiversity and agricultural residues).

In the case of barriers in biotechnological products and processes, collaboration can cover the development of legislation and institutions in ABS and the traceability of products related to biodiversity. In addition, it could include: i) carrying out technical and scientific studies to comply with regulations in destination countries; ii) obtaining export certifications, labels and seals; iii) the reduction of costs to meet seal or certification requirements; and iv) the reduction of perception barriers among consumers regarding the safety and innocuousness of bioeconomic products.

Collaboration to strengthen research and development processes

It is important to foster regional collaboration in areas of research and development in which several countries share the same interests. Some of these possibilities, which continue to

Regional cooperation could contribute to facing challenges and enhancing opportunities in areas such as regulation, access to markets, development of capacities in science and technology, innovation, human resources, and financing mechanisms for the development of the bioeconomy.

Regional collaboration could cover areas related to nomenclature, registration requirements, standards, biosafety and quality assurance.

It is key to develop capacities to assess possible trade-offs between different bioeconomy development paths, considering sophisticated products against immediate opportunities with high yield and impact potential.

Startups lead innovation in the bioeconomy and require greater access to capital and markets. Collaboration can broaden the understanding of their integration into global value chains and how public policies balance the environment, including support for young innovators and areas of advanced knowledge.

With the increasing focus on agricultural bio-inputs, it is crucial to strengthen cooperation to improve capacities, especially in soil microbiology, in order to characterize soil microbiomes and identify beneficial microorganisms adapted to different crops and local conditions.

Box 4.2.3
An example of cooperation: The Mercosur Bio-inputs for Agricultural Use Commission

At the end of 2020, in the framework of the LVI ordinary meeting of Sub-Working Group No. 8 "Agriculture", Argentina proposed the creation of the Bioproducts Commission (item 6, minutes No. 02/2020, LVI ordinary meeting SGT N ° 8), in order to agree on policies and standardize regulations on the matter. The proposal was made considering (Annex VII of the aforementioned minutes): i) the need to use inputs of biological origin that allow supplanting and/or complementing those of chemical synthesis; ii) the problem of global pollution; iii) the increase in ecological interests demanded by society; and iv) the need to give greater added value at source to regional primary productions, in order to foster the establishment of populations and regional sustainability. It is currently called the **Bio-inputs Commission for Agricultural Use (CBAG).**

At the first ordinary meeting of the CBAG, in September 2022, the 2023-2024 work program was outlined, which includes, among others, the following objectives: i) agree on a regional definition of bio-inputs for agricultural use and a common regional nomenclator; ii) harmonize regulatory criteria; iii) define guidelines that allow the granting of seals, certifications or distinctions; and iv) evaluate regulations in third countries that create export opportunities for these products.

Source: Own elaboration based on information available at https://calendario.mercosur.int/public/reuniones/11951

be relevant, have already been identified in regional consultation processes developed in the ALCUE-KBBE and ALCUE-NET initiatives (Rodríguez et al., 2019), highlighting issues related to: i) biodiversity (detection of metabolites and enzymes, bioprospecting); ii) eco-intensification (biological waste processing); iii) biotechnology (design and selection of multipurpose crops); iv) biorefineries and bioproducts (valorization of agro-industrial and urban waste, fractioning and valorization of residual biomass for biological products); v) transversal actions (such as support for the circular bioeconomy, market measures and policies for organic products, services and jobs); and vi) facilitation (intellectual property management or science-industry communication). At the 2018 Global Bioeconomy Summit (IACGB, 2018), the need for intersectoral and multilateral collaboration in bioeconomy research and development projects was also recognized, in order to optimize national funds and promote knowledge transfer in key areas, such as sustainable sources of protein for animal and human nutrition, healthy diets, microbial applications in health, food and environment, bioenergy, conservation and regeneration of ecosystems, sustainable materials, minimization of food losses and measurement and monitoring of impact of the bioeconomy.

Collaboration to promote innovation and entrepreneurship

Collaboration can help promote innovation and encourage entrepreneurship, for example, to:

I. develop innovative instruments that facilitate interaction between new bioeconomic ventures and universities or research centers, especially with a view to promoting bio-entrepreneurship among young people;

II. design financial and non-financial instruments to help new bioenterprises reach the global bioeconomy market and improve their capacities to respond and adapt to the speed of technological change; and

III. promote public-private and regional-multilateral collaboration to strengthen the national infrastructures necessary to meet the requirements of countries that import bioproducts, both in terms of infrastructures (for example, laboratories) and quality certifications (for example, good practices manufacturing, USDA and USFDA certifications, and certifications from the European Union.

Collaboration for capacity development

The advancement of the bioeconomy requires new knowledge to maximize biological resources. Enhancing the successful transition towards this approach can be achieved through cooperative schemes in professional training (for example, joint postgraduate programmes) and collaborations to boost scientific skills in research and development (see the previous section).

Collaboration can also support the adaptation of programs aimed at public officials, focused on strengthening capacities to overcome commercial and regulatory obstacles that could restrict the advancement of the bioeconomy (such as formal education, technical training and application of ICT and digital technologies).

The progress of the bioeconomy, particularly in activities of high value and sophistication, requires an environment conducive to innovation, a culture of collaboration in university-company research and cooperation between academic institutions and science, technology and innovation entities. These approaches can also be reinforced through collaboration, especially for the formation of bioeconomy clusters.

Sharing best practices on development of policy and regulatory frameworks

In the formulation of national bioeconomy strategies, collaboration facilitates the sharing of good practices in areas such as:

- Design of consultation processes and participation mechanisms, through the articulation of actions at the national, regional and local levels to identify territorial needs and strengths.
- Dissemination of information on successful bioeconomic companies and ventures to raise awareness and diversify the economy. Development of support and involvement mechanisms, prioritizing stakeholders.
- Systematization of information on financing for innovation, aimed at bio-innovators.
- Creation of participatory, educational and informative processes that allow society to learn about the bioeconomy and its impacts. Collaboration enhances the effectiveness of these strategies.

An example is the **LAC** bio-entrepreneurs platform, promoted by IICA and offered to the entire community free of charge (**IICA, 2023c**)

IICA and the Technological University of Pereira (Colombia) offer a Virtual Diploma in Bioeconomy aimed at coffee growers in LAC which, among other things, will promote the application of tools to create and run new bio-businesses (Restrepo, 2023).

The bioeconomy promotes a change in the predominant technoeconomic paradigm, based on the use of resources fossils.

FONTAGRO and **IICA** have launched the IV Contest of Successful Cases of Innovations in Bioeconomy 2023-2024, which seeks to highlight bioeconomy strategies aimed at transforming agrifood systems in **LAC** (**FONTAGRO, 2023**).

Increase knowledge about the opportunities and benefits of the bioeconomy

The bioeconomy challenges the fossil-based resource paradigm, but a deeper understanding of benefits and risks is required. The collaboration can tackle this in three areas:

I. Among development and policy makers, highlighting how a sustainable bioeconomy links to multiple SDGs, from reducing poverty to promoting innovation and sustainable consumption.

II. In the business world, taking advantage of economic opportunities and creating jobs by developing friendly products and atmosphere-friendly value chains.

III. With the general public, building confidence in bio-economic products (such as biopharmaceuticals) and promoting awareness of the benefits of products with a lower fossil footprint (such as bioplastics and bio-inputs).

Regional cooperation covers not only the creation and development of national bioeconomy strategies, but also the monitoring of their implementation and the evaluation of the impact of support policies and measures.

Information, monitoring and evaluation

The bioeconomy is at an early stage of development in LAC, both in the formulation of strategies and in their implementation, so in this context collaboration emerges as an essential resource for sharing knowledge and experiences.

Within the scope of cooperation, the impact evaluation becomes relevant by taking advantage of the existing experience in the region. An example is the development of environmental satellite accounts, such as those created in the context of the System of Environmental Economic Accounting (SEEA), which complement the System of National Accounts (SNA). Likewise, the creation of observatories (for example, environmental or political) and the development of indicators to monitor the progress of the SDGs are highlighted.

Several regional initiatives for the development of information relevant to the bioeconomy can be strengthened through greater cooperation. For example :

- The Brazilian Bioeconomy Knowledge and Innovation Observatory developed by the Getulio Vargas Foundation[4];
- The Bioeconomy Observator[5], focused on the Amazon bioeconomy, developed by the CGEE, in association with the MCTI;
- The Biobusiness Platform[6] developed by the UNDP in support of the National Bioeconomy Strategy of Costa Rica;
- The Transformar platform[7], developed by the IDB with the objective of facilitating access to science-based opportunities on the transformation of renewable biological resources into bio-based products; and
- The bioeconomy network organized by the IDB, with representatives from countries of the region interested in formulating policies for the bioeconomy, in which ECLAC, IICA and UNESCO participate as observers.
- For its part, the FAO has developed a set of aspirational principles and criteria for a sustainable bioeconomy (FAO, 2021a), as well as indicators for monitoring and evaluation of the sustainability of the bioeconomy (Bracco et al., 2019).

[4]Observatory of knowledge and innovation- https://goo.su/xNm7T
[5]OBio - https://www.cgee.org.br/-/obio
[6]Platform Bionegocios - https://bionegocios.cr
[7]Platform Transform- https://transformar.bio/

- In addition, ECLAC has collaborated in the preparation of a bioeconomy satellite account for Costa Rica (Vargas et al., 2022) and has prepared satellite accounts for 13 countries in the region using this methodology (Vargas et al., 2023).

- In addition, IICA developed the OPSAa tool that monitors, among other topics, initiatives, policy frameworks, and information resources on the bioeconomy (OPSAa /IICA, 2023b); promotes networks and coalitions in the bioeconomy (box 4.2.4) and supports the design of satellite accounts in Ecuador (Ortega et al., 2021) and Uruguay (IICA, 2021d).

Box 4.2.4
Strategic networks in bioeconomy in LAC

The bioeconomy in **LAC** holds significant potential to boost competitiveness, sustainability and inclusion. However, the size and complexity of the pending task mean that it cannot be addressed in isolation; no country, institution or cooperation agency can face it on its own. **IICA**, together with allied countries and institutions, seeks to cultivate cooperation and synergies focused on strengthening capacities, implementing policies, providing support and creating tools to promote markets.

These joint efforts have given rise to alliances and strategic networks, such as the **Latin American Bioeconomy Network** , whereby local, regional and international actors converge committed to the advancement of the bioeconomy. Focus areas include metrics; governance, positioning, sensitization and acceleration of bio-enterprises ; and formulating individual approaches for the bioeconomy (**IICA, 2023d**).

There are also the initiatives of the **Pan-American Coalition of Bio- Liquid fuels (CPBIO)** (see **box 4.6.1** on p. 144) and the Pan-American Bio-Inputs Platform , as a result of a pact between **LAC** nations and institutions during the first Pan-American Bio-Inputs Forum. This collaborative platform is focused on the investigation, development, regulation and promotion of bio-input support services.

These joint initiatives not only materialize the vision of a robust bio-economy in the region, but also reinforce the role of regional institutions as the driving force of coordination

Members of the Latin American Bio economy Network are IICA, the IDB, UNESCO, the GGGI, the Stockholm Environment Institute, Allbiotech, iGEM , the AECID and the German Cooperation with **LAC**.

In addition, they are members of the Latin American Bio-inputs Network of public policy makers for the bioeconomy of Argentina, Colombia, Ecuador, Brazil, Mexico, Uruguay, Paraguay, Costa Rica, and Bolivia.

4.3
PRAGMATISM IN ONE HEALTH: OPPORTUNITIES AND CHALLENGES

With support from international agencies and the academic sector, progress is being achieved in implementing the One Health approach, regarding which there have been successful intersectoral experiences. However, there is a need for greater regional coordination, policies and public-private partnerships in order to expand its application at the regional, national and territorial levels, and to capitalize on its benefits

4.3.1. Introduction

Regional cooperation is key to overcoming the challenges involved in implementing the **One Health** approach.

The COVID-19 pandemic directed public attention to risks facing both animals and humans, highlighting the importance of the environment for both parties and raising concerns about other dangers that could also become a pandemic. In response to these issues, the One Health approach has been gaining traction as a management alternative, given the interdependent nature of health.

The One Health approach was launched almost twenty years ago (Boxes 4.3.1 and 4.3.2). Since then, progress has been achieved in refining the concept and promoting its importance. The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together. Its goal is to tackle threats to health and ecosystems, while addressing the need for collective action in the management of clean water, air, soil and safe and nutritious food. To that end, the approach fosters the implementation of measures that tackle climate change while contributing to sustainable development. This was the topic addressed in the previous version of this report (ECLAC et al., 2021).

Intersectoral coordination (agriculture, environment and public health) and cooperation between international, public and private organizations at the supranational, national and local levels is crucial to put into practice the One Health approach.

Box 4.3.1.
Origins of the **One Health** concept

Dr. Rudolf Virchow (1821-1902) coined the term zoonosis and emphasized the need for coordinated actions between the fields of human and veterinary medicine (**Schultz, 2008**).

Dr. Calvin Schwabe (1927-2006), regarded as the father of veterinary epidemiology and the precursor of veterinary public health, underscored the interdependence between human and veterinary medicine.

4.3.2. The One Health approach, cooperation and regional coordination

Vichow and Schwabe highlighted the interaction between human beings and domestic and wild animals. They identified the need for collaborative work to understand and, most importantly, to combat shared diseases (zoonosis) (Lerner, 2013).

The One Health approach originated out of concern regarding the emergence and re-emergence of diseases, as well as recognition of interdependence and, most importantly, of the need to address these issues by drawing from the expertise of various disciplines of public health, animal health, wildlife, ecosystems and social sciences, among others. To that end, it fosters the involvement of governments, non-governmental organizations and society as a whole (Box 4.3.2).

Adoption of the approach by professional associations, the joint preparation of documents by international or multilateral agencies and the organization of technical and scientific meetings have played a key role in promoting and adapting the concept from the outset (Box 4.3.2).

As shown in Box 4.3.2, crucial and dynamic inter-institutional coordination actions have been undertaken at the global level, including:

- The establishment of the One Health High-Level Expert

Since its inception in the XIX century, the **One Health** approach has promoted cooperation and coordination between veterinary medicine, human medicine and biology (**Lerner, 2013**) (**Box 4.3.1**).

Box 4.3.2.
Emergence and evolution of the **One Health** approach

In 2004, a meeting convened by the **Wildlife Conservation Society (WCS)** resulted in the Manhattan Principles, which list 12 recommendations and coin the phrase **One World, One Health (OWOH) (OWOH, 2004)**.

Gibbs (**2014**) outlined the series of actions undertaken during the first ten years of inter-institutional and professional coordination, including:

- Backing of the American Veterinary Medical Association (2006) and the American Medical Association (2007).
- Development of a joint strategy in response to the risk of emerging and re-emerging infectious diseases (**FAO, WOAH, WHO, UNICEF, UNSIC** and **World Bank – 2008**).
- Hanoi Declaration, which recommends broad implementation of the concept (2010), and the Tripartite Concept Note (2010).
- Multiple technical meetings and scientific events on the topic, including the organization of the 1st International **One Health** Congress in 2011.

Zoonotic avian influenza, which has heavily impacted Asia since 1997, and the **COVID-19** pandemic sparked renewed interest in the **One Health** approach following previous epidemics such as the "Spanish flu" in the XX century.

Panel (OHHLEP) in 2022, the development of an updated definition (Box 4.3.3) and the publication of conceptual documents, change theory and technical updates on key topics.

- The establishment of the Quadripartite Alliance between the World Health Organization (WHO), the World Organisation for Animal Health (WOAH), FAO and the United Nations Environment Programme (UNEP), as well as the publication of the One Health Joint Plan of Action (WHO et al., 2022).

At the regional level, the Andean Community (CAN), the Permanent Veterinary Committee of the Southern Cone (PVC), the International Regional Organization for Plant and Animal Health (OIRSA) and IICA, among other international systems and agencies, stand out for their joint work and participation in the actions promoted by the

The Quadripartite Alliance called for urgent global collaboration to translate the **One Health** approach into political actions in the countries (**WHO, 2023c**) (**Box 4.3.4**).

Box 4.3.3.
2022 Definition of the One Health High-Level Expert Panel
(**OHHLEP et al., 2022**)

"One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent. The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food".

Box 4.3.4.
Quadripartite call to action for **One Health**

1. Prioritize One Health in the international political agenda, increase understanding and advocate for the adoption and promotion of the enhanced intersectoral health governance.
2. Strengthen national One Health policies, strategies and plans.
3. Accelerate the implementation of One Health plans.
4. Build intersectoral One Health workforces.
5. Strengthen and sustain prevention of pandemics and health threats at source.
6. Encourage and strengthen One Health scientific knowledge and evidence creation and exchange.
7. Increase investment and financing of One Health strategies and plans.

Quadripartite Alliance (Box 4.3.5), as well as for the establishment of the One Health Policy for the Region of the Americas within the framework of the 73rd Session of the Regional Committee of WHO for the Americas.

The strategic lines of action of the One Health Policy for the Americas are as follows (WHO and PAHO, 2021):

1. Carry out analysis and mapping of the complex interactions between actors and processes in the fields of human, animal, plant, and environmental health in specific national contexts.
2. Establish multidisciplinary, multisectoral, consensus-driven mechanisms for One Health governance, for stewardship and financing of functional structures working across institutions and enabling coordination, communication, engagement, and collaboration, and for access to relevant knowledge and resources.
3. Strengthen the multidisciplinary and intersectoral aspects of existing mechanisms and frameworks related to the human-animal-environment interface.
4. Foster multisectoral activities, including strategic planning, emergency preparedness and response, integrated disease and health surveillance and reporting, laboratory testing and networks, and best practices to drive evidence-based collaborative actions underpinned by risk analysis and encompassing risk assessment, management, and communication.
5. Embrace digital health solutions, scientific tools, and

Although progress has been achieved, coordination and collaboration remain major challenges in applying the concept.

Box 4.3.5.
Contributions of the Quadripartite Alliance in the Americas

- Provide a global framework for governance and decision making regarding the implementation of the One Health strategy.
- Establish formal communication, coordination and collaboration mechanisms.
- Contribute to the implementation of specific projects, such as multi-partner projects on antimicrobial resistance in Peru.
- Implementation of the Regional Project "Working together to fight antimicrobial resistance in seven Latin American countries" with EU resources.
- Facilitate the prioritization of activities and areas of action (e.g., emerging zoonotic diseases, wildlife, Antimicrobial Resistance (AMR), food safety, climate change, etc.).
- Co-creation of capacities to address health in an integrated manner.
- Possibility to scale up and expand resource mobilization actions.

At the **United Nations Food Systems Summit** (2021) and at **COP27** (2022), the Director General of **IICA** highlighted the importance of implementing the **One Health** approach to sustainably transform **AFS**.

emerging technologies that facilitate One Health initiatives.

6. Promote research and capacity building on health threats at the human-animal-environment interface across different sectors and disciplines.

IICA, in turn, has emphasized the need to apply the One Health approach since 2021, through joint work with high-level political stakeholders, policymakers, technical specialists and representatives of various sectors, including the private sector (Cordero et al., 2021).

4.3.3. Zoonotic diseases as a starting point– The need for intersectoral, transdisciplinary and multi-level coordination and cooperation

Implementation of the One Health approach to prevent and control zoonotic diseases will undoubtedly yield better results than working independently. Evidence has shown that coordinated work between the public health and animal health sectors is the most efficient way to control and eliminate these diseases and, in turn, mitigate their negative socioeconomic impacts (Narrod et al., 2012). In addition to coordination between animal health, public health and environmental interventions, it will also be necessary to develop integrated systems, such as surveillance, diagnostic and risk communication systems.

The World Bank (2010) estimated that zoonotic diseases have caused direct losses in the amount of USD 20 billion and indirect losses of over USD 200 billion.

Recognizing the interdependence between sectors is a necessary starting point. However, it is also important to bear in mind that each sector's participation in addressing each issue will have a different priority level. Overall, intersectoral coordination involves recognizing the lack of a sectoral balance with respect to determinants or effects. In that sense, the One Health approach contributes to optimizing the costs and benefits of interventions. Usually, sectors will work separately; in fact, even when intersectoral meetings are held, tasks are often distributed in such a way that each sector works independently. Empirical evidence shows that, even when problems affect all three sectors, actions implemented tend to focus more

In humans, rabies caused over 3.7 million **disability adjusted life years (DALYs)** and economic losses of USD 8.6 billion a year (**Hampson et al., 2015**).

Box 4.3.6.
PANAFTOSA: Regional Program for the Elimination of Human Rabies Transmitted by Dogs

Since 1983, the Pan American Health Organization has organized the **Meeting of Rabies Program Directors in the Americas (REDIPRA)** (health and agriculture), which allows for coordinating veterinary and public health actions, particularly those related to diagnoses, surveillance and communication. The ministries of health lead the implementation of actions, including the provision of post-exposure prophylaxis to a million individuals and the vaccination of close to 100 million dogs per year.

on certain sectors. Although progress has been achieved, it is necessary to continue increasing coordination, cooperation, solidarity and, most importantly, inclusion.

There is evidence that illustrates the application of the concepts introduced in the previous sections. The following section provides three examples of actions carried out in the region to combat zoonotic diseases.

Eradication of rabies in the Americas

Since 1983, the Pan American Health Organization (PAHO), through PANAFTOSA, has coordinated the Regional Program for the Elimination of Human Rabies Transmitted by Dogs in the Americas, providing technical cooperation in this topic (Box 4.3.6).

Human rabies transmitted by dogs has consistently decreased, from 300 cases in 1983 to two in 2020, while rabies transmitted by wild animals has been gaining greater relevance. Between 2021 and 2022, the Regional Information System for the Epidemiological Surveillance of Rabies (SIRVERA) reported 23 human deaths due to rabies, 10 of which were caused by bites from rabies-infected dogs and occurred in four countries, while the remaining 13 cases were associated with other domestic and wild animals, with the vampire bat as the main transmitter (PAHO and WHO, 2018).

Elimination of taeniasis/ cysticercosis

Taenia solium generates the most significant global Foodborne Disease (FBD) of parasitic origin. Taeniasis/ cysticercosis is the leading cause of epilepsy in humans, especially in low and middle-income countries. Although porcine cysticercosis has a minimal effect on animals, pig meat in endemic areas could have a lower market value and, eventually, be penalized through inspection systems (Larkins et al., 2022).

In 1993, the International Task Force for Disease Eradication (ITFDE, 1993) cited cysticercosis as one of four diseases with the potential to be eradicated from the planet. It was not until two decades later, however, that, based on inter-institutional research, the Cysticercosis Working Group in Peru published the first (Garcia et al., 2016) proof of concept for elimination (interruption of disease transmission) in a large region (Box 4.3.7).

Notwithstanding the foregoing, the disease still represents a challenge. The WHO has prioritized cysticercosis as one of 20 neglected tropical diseases and underscored the need to implement intensified control in hyperendemic areas by 2030 (WHO, 2021).

Avian influenza with zoonotic potential

There are four types of influenza viruses (A, B, C and D), of which Influenza A represents the greatest public health concern. The Influenza A virus is divided into subtypes based on the properties of their surface proteins: hemagglutinin (H) and neuraminidase (N), of which there are 18 and 11 different subtypes, respectively. Viruses are usually named after the host and such combinations. The subtypes that pose a potential risk to humans are avian influenza A(H5N1), A(H7N9) and A(H9N2), as well as swine influenza subtypes A(H1N1), A(H1N2) and A(H3N2). Only some viruses of those subtypes can be occasionally transmitted to humans, as a result of direct contact with infected animals or a contaminated environment (WHO, 2018).

In 2013, human infection with avian influenza A(H7N9) was reported in China with more than 1,500 cases and some deaths. Sporadic human infection with avian influenza A(H7N7) and A(H9N2) and swine influenza A(H1) and A(H3) has also been reported (WHO, 2023b).

In the Americas, avian influenza A(H5N1) was initially concentrated in North

Despite being fully preventable, rabies causes 60,000 deaths a year **Sánchez et al. (2020)** and **Crozet et al. (2020)**.

The success of the **One Health** approach in the Americas can be attributed, in part, to coordination between the fields of health and agriculture. The Regional Program on Rabies in Herbivores **(PAHO et al., 2022)** represents a significant challenge due to the relevance of wild animals and ecosystems.

The **WHO** reports an estimated 2.5 to 8.3 million cases of neurocysticercosis each year, which generate an economic impact of 2.8 million **DALYs (Butala et al., 2021)**.

Box 4.3.7.
First proof of concept for elimination (interruption of transmission) of taeniasis/cysticercosis

The Cysticercosis Working Group in Peru (**Garcia et al., 2016**) presented the first proof of concept for elimination of taeniasis/cysticercosis in a region in northern Peru, implementing an optimized strategy in 107 villages comprising 81,170 people and 55,638 pigs. From a **One Health** perspective, expected results were achieved thanks to coordinated work between the public health and animal health sectors. Specifically, knowledge gained from decades of research, inter-institutional collaboration between universities in Peru and the United States, community involvement and efforts to understand the swine production system and community behaviors played a key role in the success of the experience.

A meta-analysis of more than 670 national studies on neurocysticercosis found estimates that range from 0.25 to 9.00 **DALYs** per 1,000 people (**Larkins et al., 2022**).

In 1997, human infection with avian influenza A(H5N1) was reported in Hong Kong. Subsequently, the virus spread from Asia to Europe and Africa, becoming endemic in several countries.

Over the past 20 years, up to January 2023, 21 countries have reported 868 cases of avian influenza A(H5N1) infections that have resulted in 457 deaths (**WHO, 2023b**).

America. In the United States, Highly Pathogenic Avian Influenza (HPAI) AH5N1 re-emerged in January 2022 (the last case had been reported in 2016); since then, and up to April 2023, it had been detected in more than 58.5 million poultry across 47 states, in 6,542 wild birds, in 150 wild mammals and in one human being (CDC, 2023). In April 2023, there were 7,300,000 infected birds in 9 out of 10 provinces in Canada (CFIA, 2023). In LAC, although HPAI (H7N3) was detected in Mexico in 2012, A(H5N1) in particular was detected in October 2022, and had affected 5.5 million birds in 23 poultry farms in four states by January 2023 (CIAD, 2023). In South America, the first case of A(H5N1) was reported in backyard poultry in Colombia in October 2022. By June 2023, it had already been reported in 18 countries across the region (Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Ecuador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, the United States, Uruguay and Venezuela). Between 2022 and June 2023, three cases of human infection were reported in the United States, Ecuador and Chile (PAHO and WHO, 2023).

Avian influenza, particularly HPAI, must be addressed from a One Health perspective. Seabirds are the primary reservoir hosts of the virus and migratory birds play a key role in the transboundary transmission of the disease. It is therefore crucial to understand migration routes and to ensure that ecosystem management includes measures aimed at addressing the issue of avian influenza. The impact of the AH5N1 virus on wild species must also be emphasized. It is estimated that, in the first six months of 2022, 400,000 wild birds died worldwide (The New York Times, 2022). In Peru, according to the National Service of State-Protected Natural Areas (SERNANP, 2023), an agency of the Ministry of the Environment, from November 2022 to March 2023, 3,487 South American sea lions and 63,000 seabirds, primarily pelicans, were reported dead.

The effects of the disease on domestic poultry include mortality followed by culling, a fundamental measure to curb the spread of the virus, which has been applied to 60 million birds in the Americas since 2020. The disease has gravely impacted the economy. For instance, the 2014-2015 outbreak

in the United States, which affected 38 million birds, resulted in the loss of 15,693 jobs, an output loss of USD 2.6 billion, and a loss of value-added tax of USD 981 million (Decision Innovation Solutions, 2015).

Along those lines, in March 2023, WHO/PAHO held a regional consultation for strengthening intersectoral work in the human-animal interface of influenza, with special emphasis on surveillance and response (PAHO, 2023).

On the other hand, although it is not a foodborne illness, the effects of infection in domestic poultry and measures to curb the spread of the disease affect food security, due to a reduced supply and price distortion. Furthermore, in poultry producing regions, the impact is greater, given that it affects employment and income. Although it is difficult to fully identify the effect of the disease on prices, news records indicate that the price of eggs increased by 70% in 2022 in the United States (CNBC, 2023) and that the price of turkey increased by 73% during Thanksgiving compared to the previous year (CNBC, 2022).

From an intersectoral perspective, regional coordination is crucial, especially given the fact that it is a transboundary disease. In the Americas, most actions are currently carried out by the agriculture sector, especially by veterinary and poultry production services, which coordinate with environmental and public health authorities (Box 4.3.8).

The pandemic potential of zoonotic avian influenza is unpredictable (**WHO, 2018**). Although few cases have been reported in humans, the risk persists. It is therefore crucial to coordinate mitigation measures among health, agricultural and environmental agencies.

4.3.4. Impactful emerging issues that require a **One Health** approach

The One Health approach originated in the context of infectious diseases that affect humans and wild and domestic animals alike. However, pursuant to the OHHLEP, there are many issues that require coordinated action, a few of which are outlined below.

AMR is a global issue that stems from the misuse of antimicrobials, whereby bacteria, viruses and parasites take advantage of their capacity for mutation and become resistant to such drugs. This renders drugs unusable or limits their use in treatments, resulting in the death of humans and production animals.

A multisectoral approach should be used to tackle AMR and actions to mitigate this problem should take into account the agrifood chain (from farm to table), ensuring that the entities in charge of public and animal health lead this process and coordinate actions with the private sector, among others.

The Quadripartite leads coordinated actions on AMR in the Americas and includes the participation of international agencies, regional systems and the public and private sectors. The last annual report of the WOAH on antimicrobials intended for use on animals estimated that 69% of the countries that contribute voluntarily to the report no longer utilize growth promoters in animal production. However, 26% continue to use them, including countries in the Americas, Asia, the Far East and Oceania (WOAH, 2022)

Water, soil and air

Prüss-Üstün et al. (2016) estimated that 12,6 million of the deaths occurring at the global level in 2012, which represented 23% of the total number of deaths, could be

It is estimated that **AMR** causes 700,000 deaths a year globally (**RAR, 2016**).

It is estimated that, by 2050, **AMR** would reduce the global **GDP** by 1.1% and 3.8%, in a low-impact and high-impact scenario, respectively (**World Bank, 2017**).

Approximately 56% of the 20 countries surveyed have **AMR** surveillance programs and 44% have informal pilot programs to monitor **AMR (IICA, 2020)**.

Since 2017, **IICA** has trained more than 2,000 professionals in the public, private and academic sectors of 31 countries of the Americas in the development of integrated **AMR** surveillance systems.

To this end, IICA has promoted a program focusing on soil protection, in partnership with Dr. Rattan Lal of The Ohio State University, who was also a co-recipient of the Nobel Peace Prize and a winner of the World Food Prize (**IICA, 2021a**).

attributed to environmental factors. These factors also accounted for 22% of the global burden of disease, according to **DALYs**.

The **WHO** (**2023a**) indicates that health problems can stem from environmental factors such as air pollution, improper water treatment, noise pollution and the presence of chemical and radioactive contaminants in the air. On the other hand, it is also an accepted fact that environmental degradation of human origin has produced water, soil and air pollution, impacted ecosystems and resulted in the extinction of various species, among other effects. In terms of the rural world, **McDermott and Grace (2012)** reported that contaminated irrigation water is linked to problems such as cholera, cryptosporidiosis and chemical intoxication. Poor management of reservoirs may also compound problems such as schistosomiasis and malaria (that kills 1,1 million people each year). Close to 6% of the burden of disease in less developed countries has been attributed to water (**McDermott and Grace, 2011**). In general, water is a critical and direct cause of **FBDs** and a source of contamination in food chains.

Soils are essential to more sustainable agrifood systems that will ensure that enough food can be produced for a growing world population and that poverty is eradicated (**Box 4.3.9**).

The use of pesticides on crops, the improper use of veterinary drugs and ineffective management of waste from animal production can contaminate soils and affect soil microflora. Subsequently, this reduces productivity, which in turn affects food security and poses a threat to human and animal health.

Chemical pesticides continue to be a vital resource for agricultural production worldwide. They are significant, given that they help to ensure the high levels of production and productivity required to feed

Box 4.3.8.
Mechanism for coordinating international cooperation in avian influenza

Under the **Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs)**, the Standing Group of Experts on Avian Influenza has met (December 2022 and April 2023) and issued recommendations. Since October 2022, collaboration between veterinary services and the private sector, in coordination with the health and environment sectors, has been further strengthened through coordination mechanisms established within the framework of regional integration systems such as **CAN**, the **Southern Agricultural Council (CAS)**, the **PVC**, **OIRSA**, the **Caribbean Agricultural Health and Food Safety Agency (CAHFSA)** and the **Caribbean Animal Health Network (CARIBVET)**.

Box 4.3.9.
Regional Coordination in the Living Soils of the Americas Program

On the eve of the **United Nations Food Systems Summit**, **IICA** convened a meeting of ministers and authorities from countries in the Americas, and of representatives from major companies in the agriculture sector, drawing significant attention to the importance of soil health. During the discussions, the governments of the region and private sector stakeholders expressed their steadfast commitment to the initiative, convinced that maintaining soil health is one of the key challenges facing agriculture.

This concept ensures a coordinated approach to address the misuse of pesticides by the sectors and parties involved.

the world's 8 billion people and reduce losses due to pests and diseases. Climate change has triggered changes in the presence and behavior of pests and diseases, which has increased the challenges facing agricultural production and farmers. Moreover, the capacities of countries to regulate, oversee and manage the use of pesticides are very diverse, creating a series of toxicological, ecotoxicological and environmental risks that demonstrate the need to address the problem of improper pesticide use through an integrated approach as embodied in the concept of One Health.

Food security and food safety

As outlined in the analysis of the regional and global context in Chapter 2, LAC has experienced a greater proportional increase in hunger and food insecurity than the rest of the world, which is partially due to the region's higher levels of income inequality (45,9%) in comparison to other regions.

Traditionally, food security has been defined based on four dimensions: availability, stability, access and use. The contribution of the One Health approach to food security is a frequent topic in forums and meetings. The absence of health in agricultural production systems (pests or animal diseases) has a direct impact on food availability, whether it be due to a reduction in productivity or to the death of animals or plants. Moreover, in addition to reducing the food supply, the absence of health also affects stability, due to the cyclical and seasonal nature of these factors and their effects, as well as their relationship to climate. A decrease in the supply in competitive environments can also trigger price increases, which in turn will have a negative effect on access. This negative effect is more marked in rural populations, which will suffer a decrease in income and in the availability of food, in cases in which they cultivate crops for self-consumption. One example that illustrates the gravity of this type of situation is the African Swine Fever (ASF) outbreak in China, which decimated 20 % of the global pig population, through the loss of animals that either died of the disease or that were culled to control the spread of the virus. This not only had a substantial effect on availability and stability

The **WHO** estimated that there were 600 million cases of **FBDs** in 2010, resulting in 420,000 premature deaths and producing annual losses of USD 95 billion, primarily in low- and medium-income countries (**Jaffee et al., 2019**).

FBDs account for 5% of the global burden of diseases. In particular, diarrhea syndrome is the cause of 1,4 million childhood deaths each year, 33% to 90% of which can be attributed to food (**McDermott and Grace, 2011**).

(given the importance of the breeding pigs to ensure continuous production of piglets and fattening pigs for slaughter), but also created a huge imbalance in access, given the effect on prices.

On the other hand, the dimension of use is closely related to food safety. The One Health approach is essential to ensure safe and healthy food and food systems. Implementing it would be the most efficient means to control most Foodborne Diseases (FBDs) and would substantially reduce losses. Human health is only possible with a safe environment and healthy agrifood systems.

4.3.5. **One Health** as an engine for agrifood system transformation

At the **FSS**, the ministries of Agriculture of the Americas underscored the fact that agricultural producers should be duly represented and their leading role in transforming **AFS** should be fully recognized.

In 2021, the General Directorate of IICA established a team in the Agricultural Health and Food Safety (AHFS) Program to oversee conceptual discussions on the One Health approach and to develop and organize workshops and discussions on the issue, its practical application and its role in transforming agrifood systems (AFS). Working documents for discussion were prepared and meetings were organized, both internally and with public and private counterparts. As an outcome of these actions, a document was prepared (Cordero et al., 2021) on the contribution of One Health to agrifood system transformation (see the 16 key messages in (IICA, 2021e)). Moreover, there are specific actions in relation to the approach encapsulated in the action tracks defined for the Food Systems Summit (FSS), namely, to ensure access to safe and nutritious food for all; shift to sustainable consumption patterns; boost nature-positive production; advance equitable livelihoods; and build resilience to vulnerabilities, shocks and stress.

The call to action focused on five issues:

- The implementation of efficient rural-based coordination mechanisms.
- Promotion and execution of rural-based pilot plans, through public-private partnerships.
- Plans and strategies for family farming regions.
- Promotion of a culture of safety, based on chains and food protection.
- Efficient implementation of international standards in agrifood health and food safety services and through intersectoral coordination.

4.3.6. Advances in cooperation, challenges and opportunities

There are multiple examples of coordination involving the One Health approach. One notable example at the hemispheric level is the Inter-American Ministerial Meeting on Health and Agriculture (RIMSA), which was founded in 1968 and which has included the participation of the ministries of Health of the hemisphere (RIMSA, 2008) since 2000. In 2016, RIMSA formally adopted a One Health approach and PAHO subsequently approved the One Health Regional Plan of the Americas 2021. As mentioned before and along those same lines, some time ago the organization

introduced REDIPRA, for the Rabies Program (Box 4.3.6).

On the other hand, regional integration systems have also made headway in the area of coordination. The CAN Technical Committee for Agricultural Health (COTASA) has prioritized work in One Health. One pointed example is the creation of the Ad Hoc Committee of Andean Focal Points for Avian Influenza, which is addressing this disease from a One Health approach. Moreover, the PVC, in its 2020 strategic plan explicitly adopted the One Health approach and incorporated it as a fundamental element.

At the subregional level, IICA provided technical cooperation in the Andean Region to determine priorities and practical interventions (Forero et al., 2021). National and regional meetings were held, capacities were strengthened, and priorities were identified in the health, environmental and agricultural sectors, including issues such as rabies, food management, food safety and the management of water sources. Work options include regular technical roundtable sessions, One Health roundtable sessions, intersectoral coordination, regional coordination and public-private coordination. At the national level, there are various institutional structures, such as:

- The Multisectoral Coordination Group – One Health – Bolivia.
- The National Intersectoral Technical Commission for Environmental Health (CONASA) – Colombia.
- The National Council for Zoonotic Diseases– Colombia.
- The Permanent Multisectoral Commission for the Prevention and Control of Zoonotic Diseases – Peru.
- The National Commission on Zoonotic Diseases– Venezuela.

The academy has also worked to incorporate the One Health approach into the training of professionals and research. One example of coordination between Latin America and Europe is the Sapuvet Network (Box 4.3.10).

Coordination experiences in the **One Health** approach have occurred at the hemispheric, regional and national levels. Outstanding examples include **RIMSA, PAHO, COTASA, CAN** and the **Sapuvet** Network, among others.

Box 4.3.10.
The **Sapuvet** Network – Cooperation between Universities in Latin America and Europe

The **Sapuvet** Network is a network of Latin American and European universities, initially funded by the **EU**, which has adopted and promoted the concept of **One Health** in veterinary public health, education and research.

When the network was launched in 2002, it included faculties in three European countries (Italy, Spain and the Netherlands) and five Latin American countries (Argentina, Costa Rica, Cuba, Nicaragua and Peru). It then moved on to Phases II and III and currently there are five European and eleven Latin American universities, twelve collaborating institutions and the **WHO/WOAH/FAO** center for research and public health development (**De Meneghi et al., 2011**).

The **Sapuvet** Network organizes technical events, conducts student exchanges and interfaces with the International **One Health** Network.

Although **EU** funding ended in 2012, the Network continues to function, demonstrating persistence over a two-decade period and providing an important example of generational succession.

4.3.7. Final comments

In recent decades, efforts to develop and promote the concept of One Health have made significant headway largely due to the collaboration and coordination among international organizations at the global and regional levels. There are now inter-agency collaborative platforms and collaborative structures in the Americas between the health and agriculture sectors, particularly in relation to zoonotic diseases. However, there are still challenges for which regional coordination is key, such as in:

- Implementing regional and national coordination mechanisms (joint work by the ministries of Health, Agriculture and the Environment).
- Overcoming limitations in human and financial resources, while ensuring equitable allocation among the various sectors involved.
- Demonstrating the benefits of adopting a One Health approach in a clearer and more concrete manner.
- Reconciling the different priorities of the sectors involved, taking into account the diametric differences between national public health and veterinary services.
- Improving governance, institutional structures and legal and financial arrangements at the national level.
- Promoting high-level political support to facilitate multisectoral decision making and collaboration that is transparent and reflects a willingness to share information with decision makers at the national level.

4.4
SOCIAL AND ECONOMIC INCLUSION WITH GENDER EQUALITY IN THE AGRICULTURAL AND RURAL SECTOR

Regional cooperation offers opportunities to foster innovative policies and informed dialogues to promote greater social and economic inclusion in agrifood systems and rural areas of **LAC**, as well as to face the challenges of achieving equal conditions for all people, including equitable access to resources and services, equal participation in digital environments and the closing of social and gender gaps

Social inclusion is one of the most important challenges facing the region. For this reason, governments, civil society, and academic and interest groups have sought to reach agreements regarding policies that bridge the gaps between different groups, for example, between rural and urban sectors or between women and men.

Although social inclusion is a very broad concept that encompasses multiple dimensions, the gender approach recognizes the differentiated impact of policies on people based on factors such as ethnic identity, social position, sexual orientation and disability, among other characteristics (Swisscontact, 2020).

The levels of inequality between various social groups – including disparity in access to resources, public goods and social security and, finally, inequity in the exercise of political and social rights – are very high, and in some cases have even increased due to the effects of the COVID-19 pandemic. This phenomenon affects to a greater extent rural areas of the countries of the region, where the highest proportion of poverty and greatest gender gaps are concentrated, along with a lack of access to public goods and social services such as education, housing, sanitation and health. In addition, a large proportion of employment in this sector is precarious, low-productivity and temporary.

These inequalities tend to affect women, young people and populations of indigenous peoples to a greater extent, meaning that their contributions are made invisible and their participation is limited, thereby increasing the disparities that impede human and economic development.

In addition, young people face high levels of exclusion, which means they migrate rapidly from rural to urban areas and even increase transnational and interregional migratory flows.

Since the dynamics of agricultural production for food supply take place in rural territories, it is crucial to understand the specific characteristics of the local actors, both in terms of gender and intersectionality, in order to achieve their effective inclusion in food systems.

The challenges are numerous and on multiple fronts, but there are experiences in public policies and public-private collaboration that have helped to address many of the factors that cause social and economic exclusion of people in rural areas.

It is essential to design comprehensive policies that address social and economic inclusion, explicitly incorporating gender equality, which will make it possible to establish key elements in the diagnosis and design of policies in the region.

Agricultural producers and food system workers are essential links in the supply chain. Without agricultural production, there are no raw materials for food, which puts food security at risk. In addition, agriculture is crucial to eradicate poverty, boost rural development and provide ecosystem services for sustainable food systems (**IICA, 2021e**).

Regional cooperation and its mechanisms have played an important role in disseminating and replicating these positive experiences, contributing to greater degrees of inclusion and equality, which have resulted in a region that is advancing towards the achievement of the SDGs by 2030. CELAC, in its declaration of January 2023, called on countries to prioritize productive development with social inclusion and gender equality, and allocate their available resources to achieve this end. The declaration also emphasized that this objective can only be materialized by achieving strong social cohesion within the countries, which requires spaces and mechanisms for high-level dialogue (CELAC, 2023).

4.4.1. Urban-rural gaps: far from achieving social, economic and gender inclusion

In Latin America and the Caribbean, around 58 million women live in rural areas. In addition, the region has around 160 million young people, between the ages of 15 and 29, which includes 30.9 million rural youth (**Guiskin, 2019**).

Despite the crucial role that women and rural youth play in agriculture, food security and the preservation of biodiversity, they face a series of problems and inequalities in terms of access to productive resources, education and training, as well as other structural problems that affect their development and that of the rural sector as a whole (Guiskin, 2019).

To achieve sustainable, inclusive and equitable development in LAC, it is essential to understand the role played by rural territories and the agrifood sector. Twenty percent of the region's population, or about 120 million people, lives in rural areas. Many of these people are engaged in agrifood systems and, despite the fact that a decrease in the rural population is expected in the coming decades, the demand for food will more than double by 2050 (FAO, 2022b).

Poverty and extreme poverty disproportionately affect the population in rural areas of Latin America, where the incidence is 14 and 11 percentage points higher than in the urban population, respectively (**ECLAC, 2022c**).

For this reason, it is important to address the existing socioeconomic and productive gaps and advance towards a structural transformation of rural territories. To achieve the SDGs, the rural sector and its local actors must be incorporated as key agents for development, as well as taking advantage of the opportunities they offer for agrifood systems, while considering an intersectional gender approach that ensures no one is left behind.

The crises caused by the COVID-19 pandemic, the climate crisis and various events around the world, such as the war between Ukraine and Russia, have focused attention on the agrifood systems of the Americas, not only because of their importance for the countries of the region, but also due to their strategic role in ensuring global food, nutritional and environmental security. In addition, these crises and events have revealed the limitations, weaknesses and vulnerability of agrifood supply chains in the face of changes affecting the countries of the region, as well as the need to promote more resilient and sustainable agri-food systems. In 2020, these events caused a significant increase in poverty in the region and, although the economic recovery led to an increase in average household income in 2021, the gaps between the urban and rural sectors have remained (see Chapter 2).

The rural population has limited access to basic services. The health sector presents a significant gap between urban and rural areas in terms of service coverage and affiliation to health systems. The basic services coverage deficit is 11.3 percent in urban areas and 23.9 percent in rural areas, mainly due to the lack of health personnel. In addition, the urban/rural gap in affiliation to health systems exceeded 20 percent in 2019 (ECLAC, 2020b). Moreover,

the percentage of people between the ages of 20 and 24 who have completed secondary education was 47.4 percent in rural areas and 71.6 percent in urban areas in 2018 (ILO, 2021), which accounts for the lower cultural capital in rural areas that results in lower probabilities of accessing qualified jobs and decent employment.

The structural problems of rural territories, such as low levels of wages and income and low coverage of social security systems, with high levels of informality and strong links to activities in the primary sector, make it imperative to generate synergies between social protection interventions and agriculture (FAO, 2017; Winder-Rossi and Faret, 2019).

According to ECLAC,[8] 52 percent of people employed in the rural sectors of Latin America work in the agricultural sector. However, this sector is characterized by high levels of labor informality; 76.2 percent of rural jobs are informal, which is 31 percentage points higher than in urban areas.

In relation to the care crisis, "*rural women in Latin America dedicate an additional ten hours to care work and domestic responsibilities, compared to women in cities, and triple that of rural men. This also makes them less mobile and more dependent on their immediate environment*" (Ramos, 2019).

In addition, within the EAP, the percentage of the population that works in low-productivity sectors is more than 30 percentage points higher than in urban areas, reaching close to 80 percent of the total workforce (ECLAC, 2020b).

To these structural issues related to employment, wages and formality, new issues have arisen that affect the social and economic inclusion of rural actors. For example, "digital technologies offer a great opportunity to improve access to marketing channels, information and financial services, which translates into significant savings for both producers and consumers. However, the lack of digital access and skills in rural areas limits their potential" (ECLAC et al., 2021).

Therefore, to avoid the marginalization of small-scale farmers and promote agricultural innovation adapted to the current challenges facing the sector, it is essential to invest in infrastructure and technology that is appropriate considering the characteristics of rural areas. Despite its high economic and social return, only a fraction of the public budget for the agriculture sector is allocated to these areas (OECD, 2022). Additionally, the lack of access to electricity is a significant challenge in rural areas, affecting 17 million people (OECD et al., 2022).

In addition to the existing structural gaps, it is important to consider the impact of climate change on rural areas and climate-sensitive agricultural activities. The effects caused by climate change could lead to changes in the structure, yields and cycles of crops (OECD et al., 2022) (see section 4.1). The ecosystems of Central and South America are highly exposed to the consequences of these phenomena (WMO, 2021), which is alarming given that the intensity of extreme weather events has increased from 9 percent in 2000 to 57 percent in 2020 (FAO et al., 2021).

The effects of climate change not only threaten the livelihoods of farmers, but also their sources of food.

Since 2015, hunger has increased steadily in the region, climbing faster than the world average (see Chapter 2), and the region had the highest cost

There is a significant educational gap between urban and rural areas; the average number of years of study for the **Economically Active Population (EAP)** aged 15 years or over is 6.9 years in rural areas and 10.5 years in urban areas.

The probability of being employed in the informal sector is 1.7 times higher for rural workers than for urban workers (**ILO, 2021**).

By 2030, climate change could push 2.4-5.8 million people in the region into extreme poverty, with Brazil and Central American countries being the most vulnerable (**Jafino et al., 2020**).

Between 2019 and 2021, the number of people experiencing moderate or severe food insecurity in **LAC** increased by 8.9 percentage points (see **Chapter 2**).

[8]Based on country household surveys (Household Survey Database, BADEHOG).

New strategies for social, economic and gender inclusion are urgently needed to adapt to the challenges and opportunities faced by rural territories, especially focused on those social groups that have been historically excluded, in order to guarantee the well-being of the rural population and the sustainability of equitable and inclusive agrifood systems.

of a healthy diet in 2020 (USD 3.89 per person per day) (FAO et al., 2023). The effects of the COVID-19 pandemic increased the food insecurity of rural women, who tend to prioritize the food and nutrition of men and other dependents. These indicators are even more worrying in rural areas, where, for example, obesity is one of the main causes of death from chronic non-communicable diseases (FAO, et al., 2018).

The COVID-19 pandemic exposed the serious pre-existing inequalities in rural areas. Despite the slight economic recovery observed after the pandemic, the inequality gap continues to be significantly greater in these areas than in urban areas of LAC, which is noticeably intensified when it comes to young people, women and, especially, indigenous people and Afro-descendants (Box 4.4.1).

4.4.2. Social and gender inclusion as a framework for the design of public policies and regional cooperation

Designing inclusive policies for the rural sector and **agrifood systems** requires considering four major structural processes that are underway: growing global demand for food, the effects of climate change, the integration of primary production into global agrifood systems, and the effects of multiple global crises.

Targeted policies for greater social inclusion

The UN defines social exclusion as *"the involuntary exclusion of individuals and groups from the political, economic and social processes of society, which prevent their full participation in it"*. This sociological perspective emphasizes the multidimensional processes that generate exclusion, including those associated with structural factors of social inequality and that involve non-compliance with human rights and lack of citizenship, which directly impact access to resources (social, economic, political, civil and cultural) and limit or prevent the development of individual capacities (UNDP, 2015). Gender inclusion refers to the recognition of the structural causes of inequalities between genders, which permeate all social, cultural, economic and political relations. For this reason, it should be incorporated into the analysis of the context, planning and execution of any public or private intervention, because only by adopting a gender approach is it possible to achieve effective social, generational and gender inclusion.

Designing appropriate policies for the rural sector and agrifood systems implies considering the elements related not only to social and gender inclusion, but also to the set of transformations or structural processes that affect agriculture and agrifood systems.

In this regard, four major changes have been identified that impact agriculture and the rural sector (Trivelli and Berdegué, 2019; Díaz-Bonilla and Furche, 2021; ECLAC, FAO and IICA, 2021), which also directly affect the efforts aimed at increasing the social and economic inclusion of the agricultural and rural sector:

- the growing global demand for food;
- the effects of climate change on the productive base and the contribution of agriculture as a result of greenhouse gas emissions;
- primary production integrated into global agrifood systems; and
- the effects of different shocks, such as those generated by the COVID-19 pandemic, war and price inflation, which ECLAC calls multiple crises (see Chapter 2).

These changes affect different populations within the rural sector in different ways and, therefore, in order to alleviate the impacts of these changes on the social and economic spheres,

Box 4.4.1.
Youth, women, indigenous peoples and Afro-descendants

Poverty levels have worsened in rural areas, where social inequalities affect traditionally excluded groups to a greater extent, such as young people, women, indigenous peoples and Afro-descendants. According to data from **ECLAC (Household Survey Data Base (BADEHOG)**, the prevalence of poverty in rural communities is higher among the population belonging to indigenous peoples and Afro-descendants, especially women.

In **LAC**, poverty and extreme poverty affect youth more than adults, both in rural and urban areas (**Guiskin, 2019**).

The informal employment rate among the population aged 15 to 24 is 11 percentage points higher than that of those over 25 years in the rural sector (**ILO, 2021**).

it is important to consider the specific characteristics of each group.

In this context of long-term transformations, but also of recent shocks, the national authorities of the region, in their latest CELAC declaration (2023), recognized and highlighted the central role that the region plays in food security and nutrition at the global level (see chapter 3). CELAC reiterated its commitment to promote effective actions aimed at guaranteeing food security, supporting agricultural and rural development, and promoting an increase in sustainable food production and food availability, as well as creating an international trade system for agricultural products that is fairer, more transparent, inclusive, equitable and predictable (see section 4.5). Policies consistent with this commitment are already being designed, as can be seen in Table 4.4.

Similarly, CELAC is committed to promoting actions as part of the energy transition that guarantee a sustainable, accessible, affordable, reliable and safe energy sector, within the framework of the SDGs. Along with these commitments, there is clearly a demand for social inclusion policies in agrifood systems that consider the transformations that are taking place in the rural and agrifood sector.

Economic and social development policies for the agricultural and rural sector, aimed at the objectives of social inclusion and economic growth, must consider the heterogeneity within and among the countries of the region. For example, there are countries, such as Brazil and Argentina, that are more integrated into global markets, but others are net food importers, such as some Caribbean countries. We can also see this heterogeneity within countries, where there are some territories linked to markets in which food is produced in a very competitive manner and small-scale agriculture and rural populations are integrated into value chains, but in other territories family farming and rural areas are excluded from the processes of modernization and linkage to markets.

The common purpose is to create an agricultural sector that is a vehicle for social, economic and gender inclusion, as well as an engine for economic growth in the countries of the region. LAC is a net exporter of food (see section 4.5 and chapter 2). Therefore, in order to

To meet the objective of promoting social and economic inclusion in agriculture and the rural sector, it is necessary to have a set of targeted policies that allow the instruments to be adapted to the context of each geographical and social space, as well as to all **intersectionalities** present in the territory within a framework of common purpose.

Governments should support innovation systems that fulfill a double purpose: increasing productivity and ensuring social inclusion in a fair and equitable manner (see **section 4.6.4**).

Public goods are considered to be those that meet the condition of not being exclusive, divisible, or incurring costs to whoever uses them (**Chibbaro et al., 2022**).

In 17 of 23 countries in the region, rural women are less likely to own a mobile phone than men. In addition, the connectivity index in rural schools is around 15%, and rural women are the least connected in society (**Rotondi et al., 2020**).

A comprehensive care system must be developed in which all sectors of society participate.

maintain and improve this capacity in an inclusive and equitable manner, it is necessary to increase land and water productivity (see 4.1).

It is also necessary to strongly increase labour productivity, which means providing comprehensive care services that are fundamental in empowering women's work and increasing their productivity. Technology is essential for this task (FAO, 2022b). The inclusion of small-scale farmers and excluded groups (women, youth, and indigenous and Afro-descendant populations) on the path toward achieving greater productivity is a requirement to achieve social and economic inclusion.

The path towards greater productivity in agriculture and agrifood systems must go hand in hand with value chains that integrate family farming and sustainably improve access to decent work for rural women and youth, so that changes in productivity are reflected in the increase in real wages of male and female workers.

Policies can be a vehicle for social inclusion, which means they must be aimed at generating incentives and capacities in economic agents and the different actors in the food system. For this reason, the following five pillars are proposed as a basis for the development of social and economic inclusion policies for agriculture and the rural sector.

Investment to increase access to public goods

Examples of the types of goods that have a high social and private return are the following:

- Scientific and technological innovation for agriculture.
- Investment in public infrastructure that optimizes physical and digital connectivity.
- Investment to ensure availability and access to the use of water resources.
- The development of initiatives that increase the resilience of the sector in the face of the adverse consequences of climate change.
- Services to protect plant and animal health and ensure food safety.
- The negotiation of new international trade agreements and the improvement of existing agreements.
- Statistics on and for the agricultural sector, and digital platforms to carry out administrative procedures online.

Capacity building in rural areas with an emphasis on women and youth, while recognizing and incorporating their different intersectionalities

For the transformation of agriculture and the rural sector to be inclusive and equitable, it must be accompanied by the expansion of decent, safe and well-paid work that includes the care economy. Thus, an essential condition to achieve this objective is to increase the capacities and skills of workers in the rural sector.

A central issue is the need to acquire new digital skills and competencies. The development of policies aimed at improving these skills, with a focus on women and youth, will help countries to take advantage of the opportunities presented by this structural change with social inclusion (Ramírez, 2022).

This extremely limited access to cell phones and the Internet adds to various problems faced by women and youth in rural areas, such as barriers to obtain financing, training,

formal employment, land ownership, and even the coverage and quality of Internet connections (Ziegler et al., 2020).

Therefore, it is essential to identify the different realities and challenges faced by rural youth and women in terms of digitization, innovation, technology, science, and other areas of development of agrifood systems in the region.

Integration of Family Farming in value chains

Box 4.4.2.

Fund for the Development of the Indigenous Peoples of Latin America and the Caribbean (FILAC)

FILAC develops programmes to promote Good Living-Living Well (Buen Vivir-Vivir Bien) as an alternative of dignified life for the indigenous peoples of **LAC**. It seeks to ensure the full realization of human and collective rights, while promoting intercultural coexistence. The objective is to generate equal opportunities and overcome forms of exclusion and domination by strengthening capacities and providing technical advice and policies for dialogue and agreements between states and indigenous peoples.

One of its most important lines of work is the design of economic development strategies with identity. This involves supporting the design and implementation of processes and initiatives that promote development in line with the recognition, protection and promotion of the economic, social, cultural, political and environmental rights of indigenous peoples, communities and organizations.

It is important to highlight the Fund's programmes for the strengthening of leadership, the development of capacities and the participation of indigenous women in political, economic and social decision-making spaces. In addition, **FILAC** has implemented an unprecedented programme that promotes the empowerment of indigenous youth in the Latin American and Caribbean region, so that their voices are heard and taken into account in all spaces of intergenerational dialogue.

This work is supported and enriched by the Education for Equity Programme, aimed at strengthening the capacities of men and women to promote the recognition, transformation and generation of conditions for the effective realization of the individual and collective rights of indigenous peoples to overcome the challenges they face in all areas.

FILAC promotes extensive processes of training, research, systematization and dissemination of knowledge and technologies, with innovative approaches based on the indigenous peoples' own intercultural methodologies. These horizontal knowledge dialogues are the foundation of **FILAC**'s daily work.

Source: Freddy Mamani Machaca - FILAC President

FILAC is an international body with governing bodies that ensure equal representation of indigenous peoples and the governments of the Member States, which have the full capacity to make decisions related to the future of the institution and its work.

The integration of Family Farming into value chains must be promoted through the implementation of the gender approach, based on strategies that guarantee equal opportunities for men and women in order to improve their social impact.

As shown in chapter 2 and section 4.5, LAC is a net exporter of food. Its agricultural sector has a set of advantages due to which it has an important participation in global food markets (FAO, 2022b). Designing and implementing policies that link small-scale farmers to value chains contributes to inclusive rural and agricultural development. To achieve global market participation with local social inclusion, it is essential to implement technology transfer support mechanisms and increase access to credit, insurance and subsidies focused on property infrastructure that is critical for food production.

Strengthening land, water, and forest ownership rights of rural populations and indigenous and Afro-descendant peoples

Greater gender-sensitive investment is an effective way to close productivity gaps, in order to produce nutritious food and generate income with the aim of improving the affordability of a healthy diet.

A considerable number of rural populations, particularly rural women and indigenous peoples, have precarious access to land, water and forests. Strengthening ownership rights through land and water cadastres, titling, and registration policies contributes to increasing the inclusion of groups in rural areas that have traditionally been excluded from mainstream development (Boxes 4.4.2 and 4.4.3).

Women in rural areas have historically faced, and continue to face, barriers and discrimination in land ownership and decision-making related to its use. Thus, integrating a gender approach in actions aimed at strengthening property rights implies recognizing and addressing these inequalities, which means it is essential to develop laws, policies and practices related to land and water access and tenure, as well as forest management, among others.

Strengthening of Family Farming organizations

The integration of Family Farming into value chains must be promoted through the implementation of the gender approach, based on strategies that guarantee equal opportunities for men and women in order to improve their social impact.

In general, small-scale farmers face a set of costs that can be reduced by increasing the scale of production, as well as logistical difficulties that make it difficult to compete in increasingly globalized markets. Access to technology and financing is also more difficult and costly when faced individually. Organizations such as cooperatives are an instrument to promote economic, social and gender inclusion that requires the support of specific public policies adapted to the reality of each country (Box 4.4.4).

In this regard, it is necessary to understand and address the multiple forms of discrimination and disadvantages that some women face in family farming. This implies strengthening the leadership of women in decision-making processes, as well as contributing to generating equitable conditions for their participation in markets and in decision-making at all levels. Therefore, it is essential to incorporate the intersectional gender approach in public spending aimed at providing support related to general services and public goods.

The combination of public budgets, development financing and contributions from the private sector is necessary to face the challenge of increasing social and economic inclusion in the agricultural and rural sectors. The design of targeted policies is also required, which are focused on the removal of structures that perpetuate social exclusion and contribute to connecting rural territories and groups excluded from these territories to global markets, as well as to the social benefits to which they are entitled.

LAC: a laboratory for agricultural and rural social and economic inclusion policies

The heterogeneity between countries in the region is high. Therefore, the strategies for each of them must consider their specific contexts. The various impacts that have been mentioned, such as those related to

Box 4.4.3.
Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests (**VGGT**)

The **VGGT** represent the only negotiated international standard on this matter. Since they were endorsed in 2012 by the UN's Committee on World Food Security (CFS), **FAO** has provided meeting spaces for discussion, analysis and coordinated promotion of public policies, tools and institutional mechanisms for cooperation between various actors in the region aimed at improving governance of tenure of land and natural resources.

Among the main regional technical cooperation platforms and networks in the region, of which FAO is a member and/or promotes joint work agendas on this issue, are the following: RICRP; CPCI; REAF-MERCOSUR; RedParques, which is also supported by **UNEP** and other technical partners; the **ILC** and **Tenure Facility**, among others. These alliances are strategically important to avoid fragmented and sectoral approaches, strengthen South-South Cooperation and increase investment in issues such as access to land, especially to support women, indigenous peoples, Afro-descendant and peasant communities; the inclusive modernization of rural cadastres; and the improvement of the governance of forest tenure and biodiversity, among others.

Among the participants in these multi-stakeholder spaces are cadastre and land registry entities; agriculture and environment ministries; judicial authorities; agrarian institutes focused on rural development, forests and/or protected areas; academia; cooperatives and organizations of peasants, indigenous populations and civil society.

the COVID-19 pandemic, wars, and the increasing consequences of climate change, bring different opportunities, constraints, and risks for countries in the region. Given this disparity, policies must apply to different target populations, different opportunities, and different constraints and problems to be addressed. This variety of policies represents a valuable set of experiences in the region. In this regard, sharing information on the results of the policies implemented, the challenges faced and the ways to overcome these difficulties is a source of lessons learned that can help to generate better policies that produce better results.

The regional collaboration spaces (see, for example, the forum of ministers in Box 4.4.5) offer a great opportunity to improve the design of policies based on the territorial reality and with a focus on gender intersectionality, while fulfilling their commitment to support countries of LAC in contributing to global food security, as well as promoting the inclusion of all people linked to agriculture and the rural sector.

Table 4.3 shows, by way of example, the variety and scope of policies being implemented in LAC. The policies, initiatives and projects that in recent months (January to March 2023) have been published on the websites of the ministries of agriculture of six countries are presented. Those related to climate resilience and those aimed at women and young people have been selected.

This information seeks to highlight the great variety of instruments that have been implemented in the countries of the region. In addition to those presented in Table 4.3, and the frameworks and initiatives registered in OPSAa/IICA (2023), 149 news items were identified

It is necessary to coordinate efforts by governments, academia, and civil society to design better policies that make it possible to meet the goals set for 2030, which is not just a challenge for each country, but a task for the entire region.

that refer to policies, programmes or projects related to the policy guidelines referred to in the previous section. Based on this sample, it is possible to:

1. Assess the efforts made by the countries to implement measures that address current issues, such as increasing resilience to climate change.

2. Systematize, based on the evaluations linked to these initiatives, the lessons learned, the recommendations and the elements with potential for replication to take advantage of the knowledge obtained.

Regional collaboration offers opportunities to add value to regional initiatives and provide relevant information to countries on social and economic inclusion policies in the agricultural and rural sectors. The possibility of developing public policies focused on strategies for social inclusion, based on specific precedents of different designs in different contexts, coupled with providing actionable information, is a very useful exercise for the countries of the region that can be addressed through regional cooperation spaces.

Finally, the opportunity to learn and generate policy proposals to promote growth with a gender-inclusive approach in the region's rural territories contributes to responding to the global challenges facing the region. The challenges that humanity faces, such as climate change, the fight against hunger, and the need for greater socioeconomic inclusion and gender equality, can be addressed through solutions developed in the South. Thus, coordinating actions by governments, academia, and civil society to design better policies that make it possible to meet the 2030 Agenda goals is not only a challenge for each country, but a task for the entire region.

It is expected that the model law will be presented in the second half of 2023, which will make it possible to influence national parliaments to promote development policies that include approaches to agri-food cooperatives, digital transformation, inclusion of family farming, democratic participation in cooperatives, incorporation of women and youth in cooperative governance, education and training, inter-cooperative circular economy, financing and tax incentives.

Box 4.4.4.
FAO and **PARLATINO**: Towards a model law on agri-food cooperatives for the region

The current global scenario, after multiple successive crises, has generated the need to rethink the way in which the different actors contribute to the efficiency, resilience, inclusiveness and sustainability of agrifood systems. In this context, the cooperative model has been a catalyst for these objectives, in addition to integrating family farming, women and youth.

Along these lines, within the framework of the work plan between the **FAO** Regional Office for **LAC** and the **Latin American Parliament (PARLATINO)**, there is the need to develop a model law proposal for the promotion of the agrifood cooperative sector in the region. In this regard, a consultation process was carried out with various relevant actors in the sector, including the **International Cooperative Alliance (ICA)** and its Cooperative Law Commission, **REDACOOP**, as well as representatives of national cooperative associations, national federations and confederations and leaders of local cooperatives. In addition, an online consultation open to the public was carried out. Through these consultations, proposals for the content of the model law were collected based on general cooperative principles.

Box 4.4.5.
Permanent Forum of Ministers, Vice Ministers, and Senior Officials of the Americas

The Permanent Forum of Ministers, Vice Ministers and Senior Officials of the Americas, led by **IICA**, serves as an important space for women to influence public policies and promote gender equality in agrifood systems (AFS).

The first forum (**IICA, 2021c**), held in July 2021, highlighted the role of women in the sustainable development of the agricultural sector and the need for specific public policies to achieve gender equality.

The second forum (**IICA, 2022a**), held in July 2022, emphasized the importance of creating networks and achieving specific solutions that eliminate gender gaps and enhance the capacities of women in agrifood systems (AFS).

The third forum (**IICA, 2022b**), which took place in October 2022, addressed the issue of care as a gender gap that affects the productive participation of rural women. The need to have specific programmes to reduce the gaps in education, financing and political inclusion of rural women was highlighted.

The fourth forum (**IICA, 2023b**), held in August 2023, reiterated the importance of prioritizing the development of a care economy and promoting the transformation of agri-food systems with gender equality and intersectionality. This would allow a greater participation of women in employment, production, markets and decision-making in agrifood systems (AFS).

This permanent forum seeks to establish collaborative links with other sectors and regional initiatives, including regional integration mechanisms related to agriculture and women's rights.

Table 4.3:

Sample of policies implemented in the region that promote agricultural and rural development and are consistent with greater social inclusion in two examples.

Country	Policy/actions	Description
a. Development of initiatives to increase the resilience of the sector in the face of the adverse consequences of climate change.		
Brazil	Plan ABC+	A national strategic agenda to face the consequences of climate change
Chile	National Landscape Restoration Plan	Recovery of one million ha of landscapes and ecosystems by 2030
Peru	Catastrophic Agricultural Insurance	Free insurance, financed 100% with resources from the State.
Argentina	Protection programme for producers affected by drought	Automate the management of 69,000 producers.
Brazil	Crop Insurance Benefit	Aims to guarantee minimum survival conditions for family farmers.
Argentina	Closing Productive Gaps Programme	Specialized technical assistance.
Peru	Catastrophic Agricultural Insurance	A social protection proposal aimed at small-scale livestock producers with limited resources.
b. Building capacities with an emphasis on women, youth and indigenous peoples.		
Chile	Innovative Rural Youth Programme	Promote innovation in rural youth between 18 and and 35 years of age.
Colombia	Economic and financial education programme	Aims to provide rural women and youth with the tools for proper management of household finances and their productive projects.
Peru	Rural and Indigenous Women Entrepreneurship Strategy	Promote small-scale enterprises in agriculture, forestry, livestock and crafts.
Mexico	Training indigenous peoples in the sustainable breeding of native bees	Provide training through the technology transfer package: *"Native bees with productive potential in agri-food systems"*.

4.5
REGIONAL COOPERATION AS A MEANS OF STRENGTHENING AGRIFOOD TRADE IN **LAC**

Regional cooperation provides opportunities to consolidate the role of agrifood trade in driving economic development, regional and global food security, and sustainability. Joint actions, technical improvement and experience sharing will be instrumental in restoring the multilateral trading system, increasing intraregional trade and enabling the region to make better use of existing opportunities and trade agreements.

The resilience of agrifood trade to the crises

Latin America and the Caribbean (LAC) is the world's major net food exporting region, playing an important role in the food and nutrition security of the world and of the region itself. In 2022, agrifood exports from LAC[9] accounted for 18% of the world's total agrifood exports[10], having increased from 15% in 2021[11].

LAC has a strategic advantage, given its wealth of bio-based resources. It is also the developing region with the largest amount of per capita land reserves suitable for conversion to agriculture. This situation provides an immense opportunity for the region to consolidate its role as a stable supplier of agrifood products for itself and the world – a role that also carries with it significant responsibilities in terms of conservation and sustainability (ECLAC, 2021).

In recent years, the region has faced multiple and successive crises, such as those stemming from the COVID-19 pandemic, the impacts of extreme climate events and the war in Ukraine. These crises have compounded hunger and food insecurity (See Chapter 2 for context). In fact, between 2019 to 2021, these two problems increased in this region more than any other. The crises also triggered hikes in food prices, which rose to record levels in March 2022 (see Chapter 2). There were also increases in the international prices of fertilizers, causing severe fallout in the region, given that it imports close to 85% of the fertilizer it uses from other regions. (ECLAC et al., 2022).

Despite the crises, agrifood exports from LAC[12] performed favorably in comparison to total exports over the 2020-2022 period, which made it one of the main engines for economic recovery during that period. Nonetheless, most recently (January – March 2023), the value of agrifood exports from fourteen countries in the region[13], decreased slightly (by 0.7%) (more details in Chapter 2).

LAC exports 41.7% of the agrifood products that it produces. (**OECD and FAO, 2022**)

Agrifood exports in **LAC** are increasing, even in times of crisis (2.1% in 2020, 15.2% in 2021 and 29 % in 2022), amounting to more than USD 350 billion and surpassing the 17% growth of total exports recorded in 2022.

The average increase in international prices for nitrogen fertilizers (ammonium and urea), potassium and **DPA**, over 12 months, was 96%, in May of 2022. (see Chapter 2).

[9]ECLAC, with data from COMTRADE, customs information from thirty-three countries and mirror statistics from countries without data.
[10]IICA, based on TDM data; includes 103 countries with data updated to 2022.
[11]IICA, based on the TDM data of 112 countries with information updated to December 2021.
[12]ECLAC, with data from COMTRADE, customs information from thirty-three countries and mirror statistics from countries without data.
[13]Argentina, Bolivia, Brazil, Colombia, Chile, Costa Rica, Ecuador, El Salvador, Guatemala, Nicaragua, Mexico, Paraguay, Peru and Uruguay.

The fragmentation of the multilateral trading system into multiple trade blocs because of the crises could further weaken the system, as it would make it more difficult to arrive at agreements on issues that are currently under negotiation.

The inadvertent effects of the Ukraine war had a visible impact on production during the final three months of 2022. On the heels of the positive growth in the volume of production in the agriculture, hunting and fishing sectors in 2019, 2020 and 2021 (4.2%, 1%, and 1%, respectively), the growth rate declined by 0.8%[14] in 2022, due to the sharp decline in agricultural GDP in some countries in the final three months of that year, most notably in Argentina, Colombia and Brazil, where it fell by 10%, 3.9%, and 2.9%, respectively. (Durán, 2023).

The decline in the value of agricultural and agroindustrial trade during the first three months of 2023 demonstrates the need to promote regional cooperation, in order to improve production and access to food at the regional level, and to ensure that agrifood trade in the region can contribute to food security.

The impact of global geopolitical changes on trade

In 2022, the region's main agrifood export markets were the United States, with 22%; China, with 19%, and the Netherlands, which accounted for 4% of exports, and which is one of the major ports of entry to the **EU**[a].

Another element worth noting is the fact that the tensions created by these crises, particularly due to Russia's invasion of the Ukraine, are increasing the impact of global geopolitics on trade. This new scenario could have an effect on the global agrifood system, by causing profitability criteria, which were the basis for the creation of global value chains in the past, to be substituted and complemented by geopolitical criteria. Not only would this disrupt the agrifood trade flow, but it could have a negative effect on competitiveness, due to increased costs, as well as on food security and nutrition (FSN) and environmental sustainability, due to geographical imbalances between production and consumption.

These changes in the global economy will necessitate a greater level of integration at the hemispheric level. Given the damage to supply chains from the pandemic and heightened geopolitical tensions, there is a need to diversify suppliers and to bring them closer to the domestic market, which would allow LAC to capture links in value chains based in the United States and the EU. Geopolitical tensions stemming from the war in Ukraine have enhanced the region's image as a stable food supplier. The economic success of China has prompted it to increase salary levels, which are now higher than salaries in most of LAC. This factor will no doubt boost the competitiveness of countries in similar time zones and with profound cultural, historic and, in some cases, linguistic ties. Furthermore, the global imperative to abandon the use of fossil fuels has strengthened the comparative advantage of the region in terms of green production and renewable energy sources. Strengthening and effectively leveraging these linkages to achieve diversified and dynamic development will mean that countries will need to keep pace with all the innovative ideas emerging globally, as well as to access global markets to gain scale and equip local actors, which will require greater insertion into the global economy (Maloney et al., 2023).

The importance of promoting open and transparent trade

Regional cooperation is a fundamental tool, which along with integration, enables countries in the hemisphere to exchange best practices, by developing projects and/or policies to build capacities in each participating country. This can help to consolidate agrifood trade in the region as an

[14] Argentina, Bolivia, Brazil, Colombia, Chile, Costa Rica, Ecuador, El Salvador, Guatemala, Nicaragua, Mexico, Paraguay, Peru and Uruguay.
[a] Source: ECLAC, based on COMTRADE.

engine for economic development, food security and regional and global sustainability.

Given that 86% of LAC agrifood exports in 2022 were destined for extraregional markets[15], and that the region is home to a significant number of both net exporting countries and net importing countries, it is essential that the region promote open and transparent trade to exploit complementarities between trade surplus and trade deficit countries.

In different regional, hemisphere and global forums, countries of the region have emphasized the importance of working together to achieve open, predictable and functional markets, and to encourage fair, equitable and sustainable trade (see Box 4.5.1). In particular, they have highlighted the importance of fostering a standards-based multilateral trading system, anchored in the World Trade Organization (WTO), which should promote non-discrimination, predictability and the security needed to allow the region to tap its production and trade potential.

Maintaining the free flow of trade is particularly important in times of crisis, such as those experienced in recent years. For example, during the COVID-19 pandemic, most measures that were adopted sought to facilitate trade, not only of key personal hygiene and healthcare products, but also agrifood products. However, the application of trade-restricting measures persisted.

LAC countries actively participated in the agricultural negotiations leading up to the recent WTO ministerial conferences, presenting numerous ambitious proposals on agricultural reform. Some negotiation proposals were presented by individual members and others were presented as a group. For example, in the twenty-four months before the Twelfth Ministerial Conference (MC12), the region's countries co-sponsored fifty-one of the ninety-six proposals that were presented, which demonstrates the importance of agriculture in the multilateral trade negotiations. However, it must be pointed out that despite the number of co-sponsored proposals, the region still has not been able to define a common position with respect to most of these issues. More joint proposals were submitted on domestic support and market access than on any other of the issues.

No progress was made during MC12 on the eight negotiation issues related to the WTO agricultural reform program. The fact that various LAC countries are leading players in global food production and trade has prompted them to assume a proactive role in seeking alternatives to consensus that would deepen agricultural reform ahead of the Thirteenth Ministerial Conference (MC13), which poses a major challenge amidst the call for joint positions within the region.

The ability of the region to strengthen its agrifood trade hinges on improving countries' capacity to analyze multilateral rules affecting trade and on promoting their participation in processes to approve and prioritize future national and regional standards (Box 4.5.2).

The strengthening of global governance is particularly critical in combating tariff increases; potential non-tariff barriers, due to the introduction of more restrictive sanitary requirements; and significant increases in production and export distortions.

The region is home to sixteen net exporting countries that are considered to be the world's "pantry", most notable of which are Argentina, Brazil and Chile, as well as sixteen net importing countries, including Dominican Republic, Haiti and Venezuela (see **Chapter 2**).

During the pandemic, **LAC** countries adopted seventy-four trade measures with respect to products and goods to address the crisis, fifty of which were aimed at facilitating trade. Seven measures were implemented with respect to agrifood products, five of which were for trade facilitation[b].

[15]ECLAC, FAO, IICA, based on COMTRADE and customs information from thirty-three countries.
[b] Source: IICA, based on WTO data.

Box 4.5.1.
Global, hemispheric and regional declarations

Among the declarations made in recent months, those made within the framework of the following events are particularly noteworthy: the VII Summit of Heads of State and Government of **ECLAC**; the **WTO MC12**, where 16 countries of the region presented the "Declaration on the Reform of Multilateral Rules for Agricultural Trade" (**WTO, 2022**); the **37th Regional FAO Conference for Latin America and the Caribbean** (LARC37) in 2022 (FAO, 2022d); and the United Nations Food Systems Pre-Summit in 2021, where **IICA** presented a message on behalf of thirty-one ministers of Agriculture of the region (**IICA, 2021d**).

Recently, the relationship between agricultural production, environmental sustainability and agrifood trade has attracted particular interest. On the one hand, countries in the region see this as an opportunity to position themselves as suppliers of sustainable food for the region and for the world. Yet, they have certain concerns that the new standards that are being promoted—purportedly to fulfil global environmental objectives—may become trade barriers. The region would benefit immensely if these discussions were raised within the multilateral trading system and a consensus reached, which will necessitate joint efforts.

Despite the efforts and progress

The ability of the region to strengthen its agrifood trade hinges on improving countries' capacity to analyze multilateral rules affecting trade and on promoting their participation in processes to approve and prioritize future national and regional standards.

Table 4.4:
Latin America and the Caribbean: Negotiation proposals on agricultural issues, in preparation for the WTO Twelfth Ministerial Conference (presented between June 2020 and June 2022)

Agricultural negotiation issue	Number of countries that presented proposals	Number of joint proposals
Domestic support	12	8
Market access	10	4
Public stockholding for food security	19	2
Export restrictions	27	5
Transparency	6	1

Source: Prepared by the International Trade and Regional Integration Program of **IICA**, based on **WTO** information.

Box 4.5.2.
Participation of **LAC** countries in global and regional forums

IICA, in collaboration with strategic partners, such as the **USDA APHIS/FAS** and **Regional Plant Protection Organizations (RPPOs)**, has assisted in increasing the participation of the region's countries in the **World Organization for Animal Health** (**WOAH**), the **International Plant Protection Convention** (**IPPC**) and Codex Alimentarius, promoting meetings to devise shared strategies, propose changes in regulations, prepare joint positions and participate actively in prioritizing future regulations. These actions assist in fostering open, transparent trade that is based on standards and science. Furthermore, in partnership with **CAN**, **SIECA**, **CAC** and most recently, **FAO**, the Institute is working on harmonizing regional regulations on pesticides.

Agrifood exports within subregions (2022): Central America, 20.2%; the Caribbean, 13.2%; the Andean Region, 9.9%; and the Southern Region 7.9%, versus imports: the Southern Region, 57.8%; Central America, 28.5%, the Andean Region, 18.3% and the Caribbean, 1.9% (**IICA, TDM**).

made to further regional integration, intraregional exports continue to be limited compared to exports to other parts of the world. Despite the 16% growth in these exports compared to 2021, they still accounted for only 14% of total exports. The main destination markets were Brazil, Chile, Argentina, Peru and Colombia, whereas Argentina, Brazil, Chile, Paraguay and Guatemala were the main countries of origin[16].

The strengthening of regional integration is a critical element, as not only does it increase the supply of food and inputs produced in close proximity, thereby minimizing food security risks, but it also promotes production linkages that will fuel economic and social development, by generating direct and indirect employment and reducing susceptibility to shocks in external markets.

The need for regulatory convergence

One of the elements that undermines regional integration is the regulatory heterogeneity among countries, which can cause unnecessary delays and significant costs that complicate cross-border trade, even when these regulations have been introduced for legitimate reasons. Regulatory heterogeneity demonstrates countries' capacity to ensure regulations and requirements are up to date and science-based, as well as in keeping with international standards, guidelines and recommendations (see examples for dairy products: Box 4.5.3).

The aforementioned regulatory heterogeneity can incur costs for exporters, for example costs to gather information and knowledge about applicable regulations; costs to adjust products and/or production processes in keeping with different national regulations; and evaluation costs to ensure that products abide by testing, inspection and certification requirements of export markets. Major advances in this area will depend on ensuring cooperation between countries and regions, as well as

As proof of the existing potential, intraregional trade[c] in the food, beverage and tobacco sector could increase from USD 13 billion to USD 21 billion, which would be equivalent to moving from a rate of 15.6% intraregional trade, measured in exports, to approximately 22.5% (**ECLAC, 2023c**).

[16]ECLAC, based on COMTRADE, customs information from thirty-three countries of the region and mirror statistics from countries without data.
[c]Argentina, Bolivia, Brazil, Colombia, Costa Rica, Chile, Ecuador, El Salvador, Guatemala, Mexico, Panama, Peru and Uruguay

Various training activities have been held to ensure that there is a common understanding of the approved rules, as well as follow-up activities to assess the effectiveness of their application.

The average tariff on food increases from 4.4% to 9.8% when one takes into account the estimated 5.5% value of non-tariff measures.

The elimination of non-tariff measures or their reduction through regulatory convergence would have a positive effect on growth in intraregional trade (**Dolabella and Durán, 2021**).

Box 4.5.3.
Harmonization of Central American Regulations for the Dairy Sector

IICA, the **Central American Dairy Federation (FECALAC)** and the Central American Agricultural Council (SECAC) are working jointly to strengthen the sustainability and resilience of the Central American dairy sector. The focus of these actions is on regional integration to address common challenges in relation to trade, sanitary issues and quality. Harmonization of regulations in the dairy sector is part of ongoing efforts to implement a regional agricultural policy since 2008. Nine **Central American Technical Regulations (RTCA)** for the dairy sector have been approved under this process, based on a technical proposal with fifteen regulations presented by these organizations.

RTCA 67.04.65:12 Use of Dairy Terms, which was the first to be approved, is the most important regulatory document for the dairy sector, as it establishes the correct use of dairy terms in relation to food marketed in the Central American region. This regulation also provides the legal framework for specific dairy product regulations.

This regional cooperation effort has had a positive impact on the dairy industry and on consumer protection, as the regulatory framework has facilitated control and surveillance efforts by the authorities, and has helped to prevent products that fail to comply with regulations from coming into the region.

between the public and private sectors.

Estimates for intraregional imports in LAC indicate the continued application of many non-tariff measures (AVEs) that exceed the average tariffs applied in intraregional trade, in terms of Ad Valorem Equivalents: 3.9% versus 2% (ECLAC, 2021).

The two sectors that present the highest AVEs are agriculture, hunting and fishing, on the one hand, and food, beverages and tobacco, on the other. In agriculture, hunting and fishing, the average tariff applied would move from 2.2% to 10.5%, if non-tariff measures—estimated at 8.3%—were imposed.

The need to improve trade facilitation

Another key element that must be considered is trade facilitation, which would include ensuring effective implementation of the WTO Trade Facilitation Agreement (Box 4.5.5), in addition to expediting customs clearance, automating and digitalizing processes and fostering information exchange, among other procedures (Box 4.5.4). These measures would also stand to improve coordination between the sanitary and phytosanitary

Box 4.5.4.
Extensive integration within the framework of the **Secretariat for Central American Economic Integration (SIECA)**

The extensive integration of Honduras, Guatemala and El Salvador within the framework of **SIECA** has been a gradual and progressive process, aimed at establishing a customs union in the region to enable the free flow of goods within the region, regardless of origin, trade facilitation and the unrestricted movement of people. The process was launched by Honduras and Guatemala in December 2014 and El Salvador recently joined the initiative. To date, of the nine border posts identified for integration, three are already in full operation (**SIECA, 2022**).

authorities and customs officials, as well as inspection processes, logistics times, food distribution and transparency. These improvements would facilitate trade and also reduce costs, increase availability of and access to food and lessen food losses due to prolonged delays at the border. Moreover, they may also improve food distribution times when the supply is unstable, such as what happened in recent years, due to the impact of successive disruptive events.

Utilizing integration mechanisms

The region has certain advantages when it comes to trade, given the presence of various regional integration mechanisms, whose structure facilitates the implementation of joint actions by members, via technical secretariats and specialized working groups. Some examples are SIECA, the Andean Community (CAN), the Secretariat of the Southern Common Market (MERCOSUR), the Latin American Integration Association (ALADI), and the Caribbean Community Secretariat (CARICOM), among others.

The need to reduce transportation and logistics costs

A third element involves transportation and logistics costs that reduce trade opportunities and competitiveness, particularly for fresh or perishable products that must be delivered quickly and stored under controlled temperatures. Special mention must be made of the situation in the CARICOM region. Despite the fact that limitations in routes and frequency have been a constant factor in this region for some time, particularly to connect directly with and among various countries in the subregion, the solution is more a factor of the interaction between supply and demand. Routes and their frequency depend on the demand (Box 4.5.6). Therefore, if the volume of trade is insufficient, it would be difficult to change the conditions in the short and medium term (Santamaría, 2023).

Public-private partnerships that are established in balanced regulatory environments provide an alternative to improve the infrastructure of developing countries. They also assist in better distributing the risks among public and private stakeholders and

Trade facilitation simplifies and expedites import and export processes, which assists in reducing trade costs and improving competitiveness in the region.

Box 4.5.5.
Trade facilitation in **SIECA**

In the area of trade facilitation, SIECA has been working to assist countries in Central America to implement the WTO Trade Facilitation Agreement, as it represents a key step in optimizing border procedures and streamlining customs operations, with a view to reducing times and costs to ensure the competitiveness of the region. Moreover, SIECA in making headway in developing a Central American trade facilitation strategy[a].

[a]More information at: https://www.sieca.int/?pageid = 8020

have become a complement to public investment. Some countries in the region have had some successful experiences in this area.

The need to make better use of existing trade agreements

Although the region has signed more than 140 **preferential trade agreements (PTAs)** in the last two decades, the potential of most of them has not been fully exploited.

A fourth element that would assist in consolidating the role of agrifood trade in the region would be to make better use of existing trade agreements and to evaluate the need for and interest in renegotiating or promoting new agreements, mainly between the different LAC subregions. Although the region has signed more than 140 PTAs in the last two decades, the potential of most of them has not been fully exploited. A review of the trade agreements between countries in the region reveals that most focus on bilateral relations and relations within the subregion, which suggests that this is an opportunity for negotiation among the subregions to foster intraregional trade.

Achieving more effective use of signed trade agreements is not simply a matter of disseminating them. It is also important to ensure that they are completely understood and that there are sufficient national and regional capacities to implement and administer them correctly. The complexity of some agreements and the limited interaction between the different institutions that are responsible for their implementation poses a challenge for countries in the

Box 4.5.6.
Logistics centers and ports in the Caribbean

Jamaica is an important logistics and transshipment hub, moving more cargo than any other Caribbean country, followed by Freeport in The Bahamas, which is positioning itself as a competitive global logistics hub. Ports in Trinidad and Tobago function more as subregional ports, whereas the other ports within this trade bloc are classified as service ports. There are no more than ten commercial ships arriving at ports of entry into Antigua and Barbuda, Dominica, Grenada, Saint Kitts and Nevis and Saint Vincent and the Grenadines on a weekly basis, other than cruise ships (**González, 2020**).

region. A special effort must be made to build the capacities of sanitary and phytosanitary authorities, whose expertise is essential in order to efficiently harmonize the regulatory, control, surveillance and inspection processes that are particularly important for the proper administration of agreements. Opportunities to conduct training on these issues are often limited at the national level. Moreover, the high turnover within technical teams in public institutions provides more reason for countries and institutions to promote synergies among themselves to facilitate the sharing of knowledge and best practices (see Box 4.5.7).

Trade promotion as a means of diversifying markets

More intensive trade promotion actions will allow the region to diversify its markets and export products; drive intrarregional trade and facilitate greater participation of small and medium-sized companies and producer organizations in international trade. One area that will need to be improved is the strengthening of the connection between supply and demand at the regional level, using new technologies and electronic media that make it possible for more companies to participate. There have been some cooperation actions implemented at the regional level, the most noteworthy of which have been the *"virtual business roundtables for agrifood chains in LAC"*, organized by FAO, IICA, SECAC and SIECA (Box 4.5.8). Other relevant cooperation actions include SIECA's Central American Trade Network (CATN), the Andean Business Meeting organized by CAN, the macro business roundtables of the Pacific Alliance and ALADI's *Pymes Latinas Grandes Negocio's* platform.

Moreover, the creation of regional production chains, as well as increased cooperation on regulatory matters, facilitates the participation of micro, small and

Box 4.5.7.
Regional trade policy training programs

In recent years, **FAO** and **IICA**, along with other strategic partners, such as **SIECA** and **SECAC**, have implemented regional and subregional programs on agricultural trade policy, international trade and agriculture, and trade and food security, which have enjoyed the participation of more than 1,300 individuals from the public and private sectors. A specific training program was developed for staff in the ministries of Agriculture and Trade in the **SICA** region, focusing on the multilateral agricultural trading system and addressing issues such as: the Agreement on Agriculture; the Sanitary and Phytosanitary Agreement, and the Trade Facilitation Agreement, as well as issues related to origin, intellectual property and antidumping, among others. It bears mentioning that in 2023, **FAO** and the **CARICOM** Secretariat organized specific courses on agriculture and trade agreements for the English-speaking Caribbean region.

Trade agreements account for 35% of bilateral agreements in the region (out of a total of 528).

Bilateral trade agreements are concentrated within subregional blocs: 10 in the Central American Common Market **(CACM)**, 91 in **CARICOM** and 52 in **ALADI**.

The number of agreements between subregions is considerably less, as they account for only 33 of the 349 bilateral trade agreements.

Approximately 78% of intrarregional imports within **LAC** are granted zero tariff treatment, as a result of trade preferences (**ECLAC, 2021**).

ALADI's *Pymes Latinas Grandes Negocios* platform has four centers: business; information and foreign trade data; training and logistics.

medium-scale farmers in trade, whether as direct or indirect exporters, through secondary cooperatives or through farmer cooperatives (Box 4.5.9), which ultimately could increase the level of exports outside of the region.

Strengthening the role of agrifood trade in the region is imperative

Within the current framework, a holistic approach must be adopted to strengthen the role of agrifood trade in the region as an engine of

To date, 3,248 companies have participated and there have been approximately USD 150 million of business opportunities created.

Box 4.5.8.
Virtual business roundtables

FAO, IICA, SECAC and **SIECA** jointly organized six hemispheric business roundtables between 2020-2022, entitled *"Virtual Business Roundtables for Agrifood Chains in Latin America and the Caribbean"*.

Two additional editions will take place in 2023. It is worth noting that on average 59% of the participating companies have been **MSMEs** and 25% have been family farming organizations. In addition to buyers from across **LAC**, a growing number of buyers from the United States, Asia and Europe have attended, creating potential new business opportunities. The participating companies were from the following subsectors: primary products and their byproducts; processed food; and production and marketing services.

The +Cotton project has benefited more than 11,000 small-scale cotton farmers in Argentina, Bolivia, Colombia, Ecuador, Haiti, Paraguay and Peru.)

Box 4.5.9.
The +Cotton Project

The +Cotton project is a collaborative effort between the Government of Brazil, through the Brazilian Cotton Institute and the Brazilian Cooperation Agency (ABC), and the **FAO**.

The purpose of the project is to connect farmers to sustainable regional markets, as a means of reclaiming the intrinsic value of family farming and generating income. Through its actions, the program aims to manage the cotton supply to strengthen value chains in the participating countries, as well as to foster the creation of regional value chains to encourage private sector participation and to promote coordination among production clusters. **ALADI** has come on board this cooperation project, providing support to analyze sanitary and phytosanitary measures applied in the regional cotton chain.

economic development, food security and regional and global sustainability. This also calls for a renewed vision to bring about concrete benefits. As such, LAC should promote regional cooperation actions that would:

- create an open, transparent, equitable and predictable multilateral system,
- ensure more effective use of trade agreements,
- strengthen intrarregional trade, and
- make more effective use of opportunities arising in international and regional markets, through trade promotion actions with a regional focus.

In the multilateral sphere, the active participation of countries in the region in debates on the new WTO reforms is critical, as this is the forum that addresses matters that are fundamental to the future of trade in the region, for example:

- the conclusion of agricultural negotiations related to market access, trade liberalization of agricultural products and the reduction of trade-distorting domestic support;
- the increased monitoring and transparency of commercial measures;
- improvement in the clarity of notifications; and
- improvement in the dispute resolutions mechanism.

Moreover, it would be worthwhile to strengthen the participation of countries in international reference bodies, such as Codex Alimentarius, the World Organization for Animal Health (WOAH) and the International Plant Protection Convention (IPPC), as these forums determine the international standards governing global food trade.

The following actions would assist in developing a regional agenda on this issue:

- Creating regional networks consisting of permanent representatives to the WTO from LAC countries, as a means of providing a platform to develop negotiating positions that help to strengthen the participation of the region in multilateral forums;
- Ensuring the inclusion and participation of permanent representatives to the WTO from LAC countries in informal groups and committees of the WTO, to enable them to acquire a broader perspective of the interests of other regions regarding trade issues, as well to afford them the necessary preparation for the new rounds of negotiation in all areas of the WTO; and
- Ensuring closer engagement with international observer organizations to the WTO, which could serve as facilitators in discussions taking place on various issues.

On the other hand, making more effective use of existing trade agreement to drive agrifood trade within and outside of the region will require **greater coordination between ministries of Foreign Affairs, External Trade, Production and Agriculture**. Particular emphasis should be placed on capacity building, whether of the ministries of Agriculture; the divisions in other institutions that interact with ministry teams for trade promotion and negotiation; or key private sector stakeholders, such as producer organizations and customs

Regional participation in multilateral forums could be strengthened by creating regional networks, ensuring closer engagement with international observer organizations and participating in informal groups and committees.

Making more effective use of existing trade agreements and increased agrifood trade will require greater coordination between ministries, as well as capacity building, the creation of inter-institutional synergies and the establishment of new agreements for intraregional food trade.

It is important that the region explore the need for and technical and political feasibility of signing new agreements, mainly between the various subregions, as a means of driving intraregional food trade.

agencies, among others. In the same vein, international organizations and integration mechanisms can spearhead processes to strengthen capacities and promote the creation of networks that will facilitate greater inter-institutional presence and enhance coordination between ministries of Agriculture, Trade, the Environment and other key stakeholders, such as Customs.

In line with efforts to foster greater cooperation and technical improvement, **inter-institutional synergies** must be promoted in a bid to develop studies on trade opportunities afforded by existing trade agreements that have not been tapped by countries. The results of these studies must then be disseminated to the private sector, industry associations and associations representing the various production sectors.

Regulatory cooperation will foster the sharing of information, and best practices, as well as dialogue, within the public sector and between public and private entities.

The strengthening of intraregional trade will require the promotion of trade facilitation and improved competitiveness, in aspects such as: proper implementation of the WTO Trade Facilitation Agreement; expedited customs clearance; automation and digitalization of processes; sharing of information; improvement in schedules and optimization of customs services to reduce logistical and transportation costs; and customs reforms, with a focus on fiscal policy administration, among other measures.

Trade promotion provides a means of improving the use of existing trade agreements and assisting organizations of small and medium-scale producers.

Moreover, efforts must be made to **further regulatory convergence** and to ensure that the trade policy direction of the countries is aligned with existing regional economic integration processes in LAC. Regulatory convergence can be achieved through different regulatory instruments, according to geographic scope (national or regional legislation or multilateral regulations). It could also be achieved through different technical measures (harmonization, equivalency, mutual recognition, and interpretation and application procedures, among others). Beyond the tariff sphere—where significant headway has been made in gradually reducing existing tariffs on final goods and inputs, thereby reducing production costs—regional actions should also focus on technical standards for sanitary and phytosanitary matters, with a focus on labelling and packaging.

To enhance **trade facilitation**, the region will need to promote regulatory cooperation to encourage informal information exchange that will allow stakeholders to consult each other and to share best practices and principles, such as transparency; to use impact evaluation; and to identify strategic areas in which countries or regions can introduce more formal and integrated cooperation mechanisms, such as international harmonization and standardization, mutual recognition agreements or regulatory equivalence determinations.

If the region is to increase its presence in major destination markets; make more effective use of existing trade agreements; boost intraregional trade; exploit new business opportunities arising from changes in the agrifood trade flow, due to adjustments in the geopolitical sphere; and facilitate the participation of companies and organizations of small and medium-scale producers, **trade promotion actions must be strengthened.** Specifically, it must: a) build export capacities; b) receive support in identifying trade opportunities; c) promote production chains that facilitate indirect exports from producers and organizations of small- and medium-scale producers; and d) organize trade promotion events that connect supply to demand.

Ideally, regional cooperation actions should focus on organizing business roundtables and trade missions and on participating in agrifood trade fairs, whether face-to-face or virtual, while ensuring the participation of multiple countries in the same subregion or from various subregions. This will facilitate the creation of economies of scale, which in turn will make it possible to increase and diversify these events and the beneficiaries of these actions, thus consolidating the image of the region as a net food exporter to the world.

4.6 ENABLERS OR ACCELERATORS OF **AFS** TRANSFORMATION

Thus far, we have proposed measures to enhance regional cooperation, in a bid to achieve sustainable production, develop the bioeconomy, implement a **One Health** approach and create more inclusive **AFS**, while also strengthening the region's agrifood trade. Outlined below are other elements, such as the energy transition, use of digital technologies, information and knowledge management, as well as funding, which can enable or accelerate **AFS** transformation.

4.6.1. The energy transition as an opportunity for sustainable development of AFS

The energy transition, which is the reduction of greenhouse gas emissions in all sectors of the economy, offers a promising outlook for the sustainable development of agrifood systems. One of the cornerstones of this transition is the decarbonization of the transport sector – a scenario in which liquid biofuels emerge as key components in the search for environmentally sustainable and economically viable alternatives. The agriculture sector, which is the major provider of raw materials for production of these biofuels, will play a fundamental role in this process.

Liquid biofuels will be pivotal in decarbonizing the transportation sector and will become increasingly important in a world in which most vehicles are powered by internal combustion engines. The new energy paradigms, such as electromobility and hydrogen propulsion, call for increased production of renewable energy, a requirement that most countries will not be able to achieve in the short and medium term. Moreover, the mass adoption of electric vehicles will take considerable time, as they are more costly and more expensive to maintain. Multi-million-dollar investments in renewable energy, transportation, electricity distribution systems and in the widescale installation of electric charging stations will also be needed. Making these kinds of investments in the short and medium term will prove extremely difficult for many governments. On the other hand, liquid biofuels offer an already available alternative to fossil-based energy; are economically viable and environmentally sustainable; and do not require a new fleet of vehicles nor monumental efforts by the State to create new infrastructure (Actualidad Agropecuaria, 2023).

In terms of public policy, it is worthwhile noting that in 2021, 60 countries had introduced some type of legislation, which

A significant component of the global energy transition strategy, which is seeking to achieve carbon neutrality by the year 2050 (**IEA, 2022**), focuses on decarbonizing the transport sector.

A sustainable supply of raw materials and collaborative research and development of technologies can strengthen the region's capacity to capitalize fully on this energy transition.

The **CPBIO** is comprised of several organizations, including: **The Sugar Association of El Salvador, ACR, AICA, ALUR, APAG, APLA, APROBIO, AZUCALPA, BIOCAP, CAAP, CNIAA, CNPA, FEDECOMBUSTIBLES, LAICA, PERUCAÑA, UNALA, UNEM, UNICA, USGC, ACSOJA, MAIZAR, BIOMAIZ, CARBIO, CIARA-CEC** and **CAA**.

Box 4.6.1.
International cooperation on biofuels: creation of the
Pan American Liquid Biofuels Coalition (CPBIO)

The **CPBIO** is comprised of the main business and industrial associations in the Americas involved in the production and processing of sugar, alcohol, corn, sorghum, soybeans, vegetable oil and cereals, among other agricultural products.

Twenty-five organizations founded the **CPBIO** at a meeting at **IICA** Headquarters, with a view to coordinating the development, promotion and sustainable consumption of clean biofuels in the Americas. The Institute will serve as the Technical and Executive Secretariat of the Coalition.

The twenty-five founding organizations of the **CPBIO,** which are based in several countries of the Americas, signed a declaration underscoring the need for a solid and coordinated institutional framework to promote biofuels. It stressed the fact that liquid biofuels, in particular, play a key role in decarbonizing the transportation sector, thus helping to improve air quality, public health, diversification of the production supply and agricultural and economic development.

The CPBIO maintains that biofuels offer an environmentally sustainable and economically beneficial solution.

Note: See **Actualidad Agropecuaria (2023)**

were primarily mandates on direct or indirect fuel blends, ensuring some level of liquid biofuel consumption. Moreover, more than ten municipal governments had issued mandates governing the use of bioethanol, biodiesel or both (OPSAa/IICA, 2023).

In addition to traditional biofuel mandates, new regulatory schemes are now being implemented, most notably the "low carbon fuel standards" (LCFSs), which are mechanisms that are seeking to decarbonize the transport sector by providing incentives, and which are usually technology agnostic. California is one outstanding example (Torroba and Orozco, 2022).

Biofuel production also reduces dependence on a single energy source and provides sustainable employment Even as the production of biofuels for land transportation is increasing, there is also a major surge in the development of biofuels to reduce the immense environmental impact of air and maritime transportation. In particular, the dependence of the aviation sector on liquid fuels is unique, as there are no immediately available technological alternatives for decarbonization, particularly for medium and long-haul flights that produce 73% of the emissions of the sector. Thus, Sustainable Aviation Fuels (SAFs) represent the best hope to achieve international air transportation decarbonization targets, as these fuels could contribute about 65% of the

reduction in emissions needed by the sector (Torroba, 2023), to enable it to meet its net-zero carbon emission commitments by 2050 (IATA, 2022).

Likewise, the IMO (2018) has committed to reduce GHG emissions generated by international maritime travel and has set itself the target of eliminating them completely as soon as possible during this century. Biofuels could also play a significant role in this process.

Thus, it is clear that the agriculture sector, by providing sustainable raw materials, plays a major and increasingly important role in the global energy transition, particularly in the transportation sector.

4.6.2. Digital technologies as a key instrument for sustainability

Digital technologies will be a determining factor in the shift towards more sustainable agrifood systems, as they facilitate more informed and precise management of various agrifood processes. Thus, they can assist in boosting production, through the increasingly efficient use of inputs and natural resources and even the provision of ecosystem services. Digital technologies could also prove indispensable in expanding the application of sustainable practices. The growing availability of digital technologies is gradually pushing the agrifood sector towards digitalization. For the most part, the primary or secondary objective of these technologies is to generate environmental benefits (for example, to reduce the environmental footprint of agrifood production). For instance, a recent study on digital AgTechs in the Andean region, conducted by the Inter-American Development Bank (IDB) and IICA, indicated that one of the most important areas of impact of 70% of the AgTechs that were studied was environmental sustainability.

Currently, there are several developments that involve the use of a combination of various digital tools to provide solutions that facilitate more sustainable production. The following are just a few examples:

- Precision irrigation that reduces water consumption by up to 70%.
- Variable application of phytosanitary products, reducing their use by up to 80%.
- Smart detection and control of pests, enabling more efficient pest control.
- Platforms that allow users to measure and certify carbon emissions, while also issuing recommendations on how to reduce them.

Digital technologies for agricultural use do not focus solely on managing specific processes. They are also used to **support or complement decision-making by the farmer**. For example, there are digital technical support tools (through platforms such as WhatsApp or text messaging) that have been shown to improve the productivity of farmers and the incorporation of sustainable practices by up to 8%. Similarly, new solutions using generative artificial intelligence promise to offer basic support in agriculture decision-making processes (Fabregas et al., 2019).

The incorporation of Artificial Intelligence (AI) into the agricultural digitalization process not only assists farmers in decision-making, but also facilitates automation and the streamlining of activities, which is critical to more sustainable management of agrifood systems. Thus, the most effective research on the application

Irrigation systems with sensors, actuators and algorithms are being developed to measure and distribute water where and when the crop needs it.

Sensors and software are being incorporated into spraying equipment to ensure that the herbicide is applied only where weeds are detected.

There is also increased use of sensors to monitor pests and algorithms to suggest appropriate times to apply pest control measures.

Box 4.6.2.
Regional cooperation to drive the development and use of digital technologies

Cooperation among countries in the region is not only essential because of the diversity of agriculture in the Americas, but for at least two reasons:

1. Many of the challenges or problems in agrifood chains that can be resolved by using digital technologies are common to all the countries (for example, traceability, efficient use of inputs, etc.),
2. Development of digital technologies is primarily decentralized and their applicability is usually not country-specific (for example, various digital AgTech technologies are used in multiple countries).

Therefore, challenges and problems, as well as the available technology, must be discussed at the regional level, to guide the development and facilitate the adoption of technologies that have proven to be effective.

The agrifood digitalization process is in the early stages. Despite the wide array of available technology, usage is low, due to different types of barriers.

Thus, countries must collaborate to examine the existing barriers in various situations and to implement measures that facilitate digital use (for example, policies to promote technology adoption, model digitalization projects, dissemination of successful digitalization experiences, etc.).

At the 2023 staging of Digital Agriculture Week, organized by IICA (IICA, 2023a), various stakeholders in the area of agrifood digitalization stressed the need to create regional forums for discussion and coordination, to ensure maximum development of the LAC AgTech ecosystem (Box 4.6.2).

Twenty-eight leading AgTechs from twelve countries of the Americas that are part of the **IICA** network indicated that 63% of the farmers with whom they interact have a low level of digitalization[d] (only 4% use these technologies frequently).

of AI in agriculture (Bedi and Gole, 2021; Hespeler et al., 2021; Paradkar et al., 2021; Subeesh and Mehta, 2021; Moisa et al., 2022; Paymode and Malode, 2022; Xu et al., 2022) focuses on the automatic detection of pests, weeds and diseases; the evaluation and prediction of phenology and crop yield; the optimal application of fertilizers and irrigation; and the detection of patterns in large volumes of field data. One interesting example of digital technology use for pest prevention and management in agriculture is a joint initiative by the plant health systems of member countries of the Plant Health Committee of the Southern Cone (COSAVE), namely Argentina, Bolivia, Brazil, Chile, Paraguay, Peru and Uruguay. With the support of IICA, a digital monitoring and alert platform was developed for the South American locust (*Schistocerca cancellata)*, seeking to improve the region's capacity to detect the presence of the pests, therefore facilitating and improving the efficiency of pest control and management. The system enables users to share information on the presence of pests in real time; to

[d]Partial use of simple solutions (for example, accessing of climate or price information by mobile phone; use of simple calculation templates or WhatsApp).

measure the size of their swarms and to predict the direction in which they will travel, thus equipping countries to carry out more timely and sustainable control of these outbreaks.

Regional cooperation to drive digital technologies

Hand in hand with growing digitalization, there is an upsurge in technology innovation and development models. It is also worthwhile noting that several new related businesses—usually referred to as AgTechs—are appearing on the scene. These companies offer a wide array of solutions and are becoming a key pillar of agrifood digitalization (Bisang et al., 2022). There are also new types of stakeholders emerging that are driving the process, for example, business accelerators or incubators, risk capital funds, etc. Together, these newcomers, along with traditional players in innovation systems, have created the "AgTech ecosystem" that is producing many of these digital solutions.

The AgTech phenomenon has evolved tremendously in LAC, although it is far from reaching its potential. One indicator of its growth is the multiple AgTechs that have emerged in recent years. In 2019, Vitón et al. (2019) identified more than 450 AgTech businesses. However, more recent studies indicate the existence of more than 1,500 AgTechs in Brazil (RADAR AGTECH, 2023), almost 200 in Argentina (MAGYP, 2023a) and approximately 90 in the Andean region (IDB study, to be published). Coupled with this is the mushrooming presence of accelerators and investment funds, many of them based in LAC countries.

The potential of the AgTech ecosystem in LAC is extremely high. The ecosystem can give rise not only to digital technologies that improve the competitiveness and sustainability of farmers, but also to knowledge economy businesses with immense opportunities to be scaled up at the regional or global level (Box 4.6.2).

4.6.3. Knowledge platforms to facilitate regional cooperation in AFS

As we have demonstrated throughout this report, collaboration among countries in the Americas is essential to tackle the various challenges facing AFS. Of particular importance is the need to exchange data, information and knowledge on sustainable production, climate change resilience, production diversification, value addition, the One Health approach, regional trade and integration, the energy transition and agrifood digitalization.

Opportunities for collaboration and exchange among countries vary and depend on the type of challenge, scope, users, products, processes and sphere of action. They may include:

- Research and scientific studies using quantitative and qualitative data to assess agricultural and food production processes from a scientific perspective.
- Practical experiences of people involved in agrifood activities, including traditional techniques and practices passed down from generation to generation that have proven to be effective in specific contexts.
- Knowledge at the community or territorial level on the

Local knowledge is particularly valuable for adaptation to climate change and sustainable management of resources.

An understanding of the market assists in making decisions on financial, commercial and risk-related aspects.

environment, crops, indigenous varieties and practices adapted to specific contexts.

- Specific techniques, skills and practices for the operation of agricultural equipment, irrigation systems, pest and disease control, among other operational aspects.
- Knowledge of markets, product demand, prices, production costs and logistics.
- Knowledge of food preferences, local customs and social dynamics that are essential to decision-making and that can affect decisions on crop selection, production diversification and promotion of gender equality.
- Governmental policies or regulations, standards and rules related to the agrifood sphere.
- Climate patterns, variability and short- and long-term climate predictions are essential in making informed decisions and adequately managing risks involved in agrifood system activities.
- The latest trends and technological developments, such as precision agriculture, biotechnology and artificial intelligence are critical in making decisions that will improve productivity, equality and sustainability.

Knowledge of policies and regulations are fundamental to ensure that decisions are aligned with regulatory frameworks, and to take better advantage of support mechanisms and instruments of the State.

The Specialized Information Resource Center of the SIDALC Alliance (**SIDALC, 2023a**), which compiles pre-defined searches on topics that are of interest to members of the Alliance. These knowledge resources are automatically updated thanks to contributions from participating institutions.

The interdisciplinary nature of evidence synthesis fosters intersectoral collaboration and the co-creation of policies and strategies, which, in turn, facilitates decision-making across all levels and components, and by all stakeholders of **AFS**.

Given the prevailing opportunities and challenges for information and knowledge exchange, regional knowledge platforms that focus on specific aspects, ranging from agriculture and food to science and technology, are particularly valuable. In addition to those mentioned in Section 2.4, or in Section 4.2.4, other platforms of note include:

- **The SIDALC Alliance (an international agricultural, fisheries, forestry and environmental information service platform)** (SIDALC, 2023b): Headed by IICA, this is a strategic platform for the dissemination and sharing of knowledge resources generated by institutions and organizations in LAC, thereby facilitating access to resources related to the agriculture sector and agrifood systems.
- **AgriPerfiles** (AgriPerfiles, 2023): This platform functions as a knowledge network that enables users to identify and connect with experts in the agrifood sector. It enables the sharing of skills, experiences and knowledge in specific areas of specialization, which is useful in determining potential areas for collaboration.
- **RedBioLAC (Latin American and Caribbean Biodiversity and Biotechnology Network)**: This network brings together researchers, academics and professionals from the region with an interest in biodiversity and biotechnology. It facilitates collaboration, experience sharing and the dissemination of research and scientific developments.
- **MAAP Platform (monitoring of the Andean Amazon)** (MAAP, 2023): This platform focuses on the monitoring and analysis of deforestation and degradation in the Amazon region. It provides updated information and interactive maps and also analyzes changes in the forestry landscape.
- **SDG Gateway (regional knowledge platform on the Sustainable Development**

Goals): This is a platform developed by ECLAC together with the 22 agencies, funds and programs of the United Nations System in the region. It has become a powerful tool to monitor countries' progress and needs with respect to the implementation of the 2030 Agenda for Sustainable Development and the fulfillment of the 17 SDGs.

- **AGRIMONITOR** (AGRIMONITOR, 2023): This IDB database of producer support estimates in LAC enables policymakers and policy analysts to monitor agricultural

The results of evidence synthesis can prove extremely useful in discussions regarding how best to achieve sustainable **AFS**.

Box 4.6.3.
The **Avanzar2030** evidence synthesis program

Developed by the **International Food Policy Research Institute (IFPRI)** together with the **University of Notre Dame** and **IICA** and funded by the **United States Department of Agriculture (USDA)**, the **Avanzar2030** program is a continuation of **Sustainable Solutions to End Hunger (CERES2030)**. Its main objective is to translate the ministerial agreements in the lead-up to the recent **United Nations Food Systems Summit (FSS)** into operational objectives and related policy interventions to support policymakers in the process (**IICA, 2021b**).

The program seeks to highlight the key role of agriculture in eradicating poverty, achieving rural development and preserving the environment. **Avanzar2030** utilizes solid evidence to address climate change, food security in emergency situations, population growth, decent employment, poverty reduction and improved food security.

The program applies the **evidence-informed decision-making (EIDM)** methodology, the machine learning approach and evidence synthesis. The model relies on machine learning to synthesize information from more than 500,000 citations related to agriculture. It is an adaptable model that can process data in several languages, including Spanish. The analysis is complemented by another dynamic cost model that estimates the resources required to implement various interventions.

The **Avanzar2030** program focuses on three pillars: policies, technologies and institutions. With respect to policies, it seeks to foster public interventions that support innovation in agriculture and food security. The technology pillar recognizes the key role of technology in introducing new tools and systems, such as precision agriculture and genetic engineering. Lastly, institutions such as regulatory agencies and sectoral organizations are key to providing infrastructure and the necessary support to drive innovation and its adoption.

Note: More information available at **CERES2030 (2023); IFPRI (2023); Mohammed (2023).**

We must generate evidence to support innovations in **AFS** that can benefit the poorest farmers and the environment, bridging the information gap and driving promising interventions based on results and costs (**Arias et al., 2021**).

policies and measure the magnitude and composition of public spending in the sector.

Evidence synthesis

In addition to the abovementioned systems and platforms for managing and sharing information and knowledge, another valuable tool is **evidence synthesis.** This interdisciplinary approach synthesizes and analyzes relevant data, research and knowledge to facilitate decision-making regarding development priorities and objectives.

By bringing together and analyzing a wide range of data and knowledge from various sources, such as scientific research, traditional agricultural practices and local experiences, evidence synthesis can identify patterns, trends and innovative solutions to enable informed decision-making and provide a comprehensive understanding of the environmental, economic and social challenges facing AFS.

The Avanzar2030 program (Box 4.6.3) represents a practical application of evidence synthesis. The purpose of the program is to translate the agreements reached by the ministers of Agriculture of the Americas (IICA, 2021b) in the lead-up to the United Nations Food Systems Summit (FSS) into operational objectives, related policy interventions and concrete actions, with a view to supporting the transformation of AFS in LAC. The results of Avanzar2030 enable governments to prioritize their interventions, estimate associated costs and identify more effective and efficient support tools.

4.6.4. What type of funding is needed to transform AFS?

Agricultural productivity in **LAC** will need to increase by an average of 28% over the next ten years in order to strike a balance between the environmental sustainability of production and food prices, which should be affordable for consumers and fair for producers (**OECD and FAO, 2022**).

The previous sections reviewed various key actions for the sustainable and inclusive development of AFS in LAC, with special emphasis on those that require regional cooperation actions. Most of those key actions, including those that involve joint work between countries of the region and those that each country can implement individually, involve implementation costs that will need to be financed[17] .

To determine the funding required, it is necessary to estimate costs involved, which, in turn, requires a clear definition of key actions in terms of quantitative objectives, specific instruments to achieve them (including technologies) and institutional arrangements. This cost estimation exercise can be carried out individually for each key action (e.g., support for family farming), as well as for comprehensive programs for the sustainable and inclusive development of AFS that involve several actions.

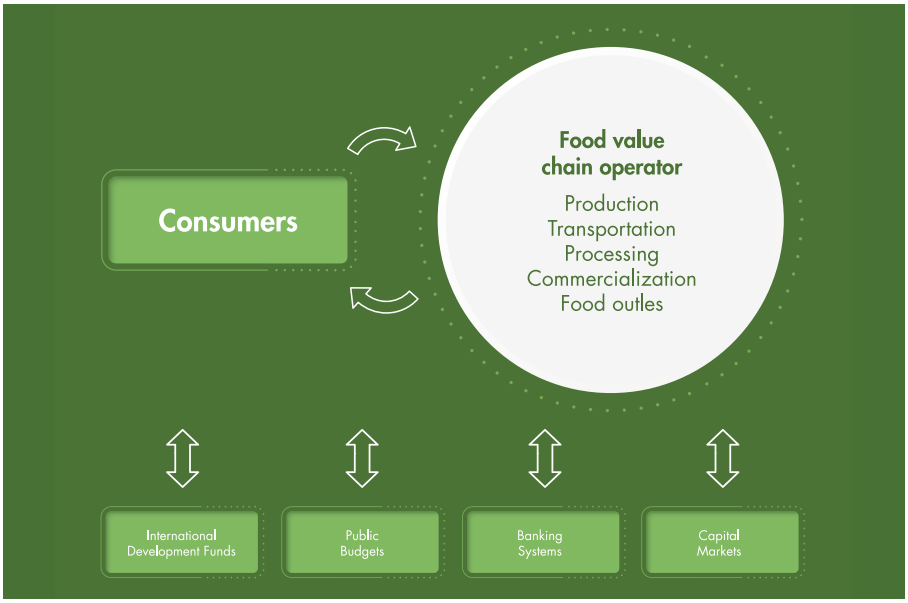
The following section addresses how to fund comprehensive programs from a broader perspective. It is important to note, however, that estimated costs for comprehensive programs are not provided for LAC or for individual countries in the region (refer to Díaz-Bonilla and Saravia-Matus (2019); Díaz-Bonilla (2023a); Díaz-Bonilla and Echeverria (2022) for partial estimates.

First, it is important to clarify the meaning of "funding". This document

[17]This section is based on **Díaz-Bonilla and Furche (2021); Díaz-Bonilla et al. (2022)** and **Díaz-Bonilla (2023b)**

Figure 4.1:

Flow of funds for agrifood systems



Source: Díaz-Bonilla et al. (2021)

considers financial flows in the economy as a whole and adopts the conceptual framework of Díaz-Bonilla et al. (2021), according to which there are six main financial flows: two that are internal to AFS and four that are external (Figure 4.1).

Internal financial flows include food and food-related expenditures by consumers (first flow), which constitute the sales/revenues of operators. As such, they fund the running costs, investments and profits/savings of farmers, agribusiness operators and other economic stakeholders in agrifood systems (second flow).

The other four flows are considered external to agrifood systems and include international development funds (loans, grants and other forms of financial support from multilateral development banks, bilateral aid agencies and philanthropic groups); national government budgets (expenditures and revenue); banking system operations; and capital market funding.

The following section briefly describes potential ways to redirect and expand the six financial flows, with special emphasis on those that can benefit from cooperative actions in the region.

Measures for flows internal to AFS

For instance, with respect to food consumption, governments can implement various measures that influence the prices, revenue, preferences, structure and operation of markets that guide consumer decisions and help redirect demand towards healthier, more sustainable diets. Possible actions include the use of taxes and subsidies; social welfare networks that focus on disseminating information on and educating consumers about nutrition; and regulations (e.g. labeling, requirements, advertising standards, etc.).

Governments also influence the production and related decisions of food chain operators through taxes and subsidies,

Each of these flows is guided by decisions made by different types of stakeholders (each of which is divided into different categories). Therefore, the actions and measures required to redirect them towards funding for the sustainable and inclusive development of **AFS** in **LAC** will vary.

Overall, an adequate macroeconomic, trade and labor framework and other policies are needed to guide financial flows towards the desired objectives. Subsequently, specific measures will need to be applied for each of the flows.

As a global leader in agricultural productivity, the United States invests three times as much as South America and almost five times as much as Central America and the Caribbean. To achieve a similar level of investment, the **LAC** region would require approximately USD 60 billion per year (**OECD and FAO, 2022**).

as well as regulations and controls related to health, nutrition, food safety, labeling, advertising and environmental conditions (including by eliminating deforestation and reducing food losses and waste), working conditions, fair competition or other social objectives.

However, in addition to directing financial flows for food consumption and production towards desired objectives, it is also necessary to increase and redirect external financial flows[18].

Strategic management of international funds

With respect to international development funds, countries in the region can work together in various ways to expand and utilize these funds in a more strategic manner. There is an ongoing debate in multilateral development banks (MDBs) regarding whether it is better to increase lending capacity by increasing leverage (changing financial policies without increasing capital), increasing capital (without changing leverage) or some combination of the two.

According to the **OECD**, support provided to producers amounted to USD 600-700 billion globally; however, this amount includes a variety of expenditures and transfers to producers that cannot be repurposed.

Another possibility is to take advantage of various forums to pressure developed countries to meet their climate finance commitment to mobilize USD 100 billion for developing countries, which should involve a significant grant element. International public resources should also be utilized more strategically to leverage and mobilize the vast liquidity in global private capital markets. Possible ways to achieve this include guarantees to reduce risks in specific projects or thematic (social or environmental) bonds that can support investments that address broader humanitarian and development objectives.

Expenditure on **science, technology and innovation (STI)** in our countries should be increased to at least 2% of the agricultural **GDP**.

Another example of international public resources that can be utilized in a more strategic manner are the IMF's Special Drawing Rights (SDRs), a significant part of which are in the hands of high-income countries that do not need these funds. These resources can be utilized for purposes other than those currently considered by the IMF, and that could have a greater impact on developing countries (refer to Diaz-Bonilla (2021b); Von Braun and Diaz-Bonilla (2021)). Countries of the region can use their voting power in the boards of directors of MDBs to emphasize the need to strengthen the capacity of these institutions to address issues requiring collective action. Specifically, they can call for improving coordination among countries and avoiding fragmentation and competition among these institutions.

Improved allocation of public budgets

There is also a need to improve the allocation of public budgets for the sustainable and inclusive development of AFS. Countries of the region can commit to conducting a comprehensive review of public spending and revenue to reallocate them towards public goods and eliminate private subsidies, especially those that support unhealthy diets and contribute to greater greenhouse gases emissions, such as fossil fuels. This review includes the current debate on repurposing the amount allocated to support agricultural producers.

In the case of LAC, total public spending in agriculture, forestry and fisheries averaged close to USD 25 billion between 2015 and 2019. Public budgets also include large direct subsidies to fossil fuels (totaling approximately USD 826 billion globally, extrapolated from Parry et al. (2021)). Within the framework of the Glasgow Climate Pact adopted at COP26, countries committed to accelerating efforts to phase out these subsidies, which would reduce the

[18]IICA is currently advising the financial group of the UN team based in Rome that is supporting countries in designing and implementing national programs for food systems as a follow-up to the Summit held in September 2021.

use of fossil fuels and could be reallocated to adaptation and mitigation actions in the sector involving science, technology and innovation; fostering payment for environmental services; and providing support for vulnerable populations. The latter effort will require increasing, refocusing and redesigning social assistance, which, during the 2014-2018 period, totaled almost USD 85 billion per year, of which approximately USD 44 billion were money transfers.

Banking systems and capital markets

Lastly, it is also necessary to direct banking systems and capital markets towards investments and funding that are aligned with the desired objectives for AFS. Some banks and other investors have made pledges and established coalitions such as the Glasgow Financial Alliance for Net Zero (GFANZ), through which they have committed to mobilizing USD 100 trillion by 2050 for investments that benefit climate, with an annual flow of around USD 3-4 trillion. The effectiveness of these commitments will depend on an adequate macroeconomic, regulatory and incentives framework, which should include legislation on net-zero targets, pricing of externalities, development of carbon markets and similar measures, to guide financial flows.

Inclusive funding

Small-scale farmers and SMEs, especially those led by women, youth and ethnic groups, are among the most vulnerable AFS stakeholders. Coordinated action is necessary in order to create incentives to finance the inclusive transformation of food systems, with special emphasis on these vulnerable groups (see section 4.4). Within the framework of adequate monetary programs that address inflationary objectives, central banks can issue dedicated lines of credit to financial entities, which, in turn, can finance loans, focusing on small-scale farmers and SMEs, especially those led by women, youth and ethnic groups.XVI

Well-managed public development banks, which already play a key role in climate finance, can be powerful tools for addressing market shortcomings that affect agriculture. Improvements must be made to regulations, which are designed for the urban sector and for activities with more regular cash flows than those in the agriculture sector, which requires payment schemes that are better aligned with the pace of its activities. Adequate financial instruments must also be developed, with more long-term loans supported by innovative insurance plans, technical assistance and better climate and market information, all of which can contribute to mitigating some of the risks in agriculture. The development of long-term credit for investment may require funding from public fiscal or monetary sources (such as the aforementioned rediscounts from central banks) or intermediation in capital markets.

Funding in production chains

Funding mechanisms within production chains and for input and equipment suppliers should also be strengthened, as a potential means of providing loans to small-scale farmers and female family farmers. Beyond the obstacles to credit, there is a shortage of other financial products and services required by small-scale farmers, rural populations and food system SMEs. This is true both on the financing side (such as leasing, warrants and invoice discounting, which require the adaptation of regulations and operational mechanisms) and on the payments and savings side (e.g., simplified demand and savings deposits, which can be a valuable risk mitigation tool for rural households). In all these cases, digital technology can reduce transaction costs and generate more information on potential clients, which reduces risks for financial institutions.

Capital markets, in turn, require the development of a robust portfolio of investment opportunities (including individual projects, impact investment funds, green bonds and other instruments).

Monetary transfers could be geared towards multiple objectives such as poverty, production, nutrition, the environment and financial inclusion (**Díaz-Bonilla, 2021a**).

With respect to revenue, it is important to improve tax administration; reassess and adjust sales, income, wealth and trade taxes; as well as implement international initiatives to control corruption, money laundering and tax evasion.

Having an international team dedicated to developing investment opportunities could help mobilize private funds for the sustainable and inclusive development of **AFS**.

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