

# The Outlook for Agriculture and Rural Development in the Americas:

A Perspective on Latin America and the Caribbean

## 2019-2020



UNITED NATIONS

ECLAC



Food and Agriculture  
Organization of the  
United Nations

IICA







# Chapter 3.

Key actions for rural  
and agricultural  
transformation towards  
inclusive and sustainable  
development in LAC



## 3.1. No sustainable development without rural development

It is not possible to overcome poverty or combat hunger, malnutrition and climate change, if societies and political actors in LAC do not recognize rural areas as an engine of economic, social and environmental development in their countries, at least with the same importance assigned to them in developed countries.

In order to progress towards the SDGs, it is increasingly important to take a multisectoral and multidimensional approach, and, in particular, to understand that rural and urban territories coexist and impact each other in efforts to reach the goals of the 2030 Agenda.

Most agri-food systems are based in rural areas, where renewable energy systems can be developed and actions taken to combat climate change and promote the sustainable management of natural resources, through agricultural

development and the provision of ecosystem services. Therefore, it is extremely important to address rural development by focusing on economic, social and environmental aspects, which would help to close the urban-rural gap, as well as by proposing models that promote economic growth through social and inclusive development (Bebbington 2019) in rural and urban areas. Without that commitment, it will be impossible to achieve the synergies necessary to achieve the 2030 Agenda in LAC.

### 3.1.1. Overcoming the urban-rural dichotomy is crucial

Today, rural areas are much less visible than urban areas in policy discussions, which is the result of an exclusively demographic perspective and traditional definitions of rurality, which do not consider the contributions of rural areas or their potential for economic and social development. Since the industrial revolution, the rate of growth of the urban population has far exceeded that of the rural population.

One of the consequences of greater growth of the urban population is that it has made rural areas invisible in public policies and in discussions regarding international agreements.

It also means that the important contribution and opportunities offered by rural areas to achieve the SDGs as part of the 2030 Agenda have not been recognized (Saravia–Matus and Aguirre 2019, Figure 3.1). In order to face the challenges of the 2030 Agenda, it is essential to recognize that all territories, whether urban or rural, are interconnected in terms of infrastructure needs, social protection policies and gender equality, with people living in the same environment and with the same basic rights.



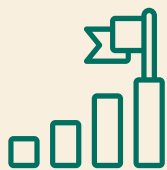
It is essential to raise awareness about the lack of visibility of rural areas in policy agendas, while recognizing their potential to prevent, mitigate and overcome the different causes of poverty and hunger in rural territories.



In 1970, urban dwellers already outnumbered rural dwellers. By 2030, more than 80 % of the population of LAC is expected to live in urban areas (UN 2018).



It is essential to prevent poverty from increasing, since its persistence operates as a mechanism that reproduces gaps between urban and rural areas, affecting access to basic services, health, education and infrastructure, among others.



The 17 SDGs for 2030 are comprised of 169 targets, divided into objectives (126) and the resources needed to achieve them (43), of which a total 132 must be achieved in rural territories (figure 3.1).

Rural areas have ceased to be considered as spaces characterized by deficiencies and poverty, and have begun to be understood as spaces that present opportunities to transform food and energy systems and promote ecosystem services, biodiversity conservation, the fight against climate change and the sustainable management of natural resources, such as land and water (Saravia–Matus and Aguirre, 2019).



Between 2014 and 2017, poverty increased in LAC from 45.1 % to 46.4 %.

Figure 3.1: The importance of rural areas in the 17 Sustainable Development Goals

Sustainable Development Goals	Targets	Resources needed to achieve the goals
SDG1 No Poverty	1.1 1.2 1.3 1.4 1.5	1.a 1.b
SDG2 Zero Hunger	2.1 2.2 2.3 2.4 2.5	2.a 2.b 2.c
SDG3 Good Health and Well-being	3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 3.9	3.a 3.b 3.c 3.d
SDG4 Quality Education	4.1 4.2 4.3 4.4 4.5 4.6 4.7	4.a 4.b 4.c
SDG5 Gender Equality	5.1 5.2 5.3 5.4 5.5 5.6	5.a 5.b 5.c
SDG6 Clean Water and Sanitation	6.1 6.2 6.3 6.4 6.5 6.6	6.a 6.b
SDG7 Affordable and Clean Energy	7.1 7.2 7.3	7.a 7.b
SDG8 Decent Work and Economic Growth	8.1 8.2 8.3 8.4 8.5 8.6 8.7 8.8 8.9 8.10	8.a 8.b
SDG9 Industry, Innovation and Infrastructure	9.1 9.2 9.3 9.4 9.5	9.a 9.b 9.c
SDG10 Reduced Inequality	10.1 10.2 10.3 10.4 10.5 10.6 10.7	10.a 10.b 10.c
SDG11 Sustainable Cities and Communities	11.1 11.2 11.3 11.4 11.5 11.6 11.7	11.a 11.b 11.c
SDG12 Responsible Consumption and Production	12.1 12.2 12.3 12.4 12.5 12.6 12.7 12.8	12.a 12.b 12.c
SDG13 Climate Action	13.1 13.2 13.3	13.a 13.b
SDG14 Life Below Water	14.1 14.2 14.3 14.4 14.5 14.6 14.7	14.a 14.b 14.c
SDG15 Life on Land	15.1 15.2 15.3 15.4 15.5 15.6 15.7 15.8 15.9	15.a 15.b 15.c
SDG16 Peace and Justice Strong Institutions	16.1 16.2 16.3 16.4 16.5 16.6 16.7 16.8 16.9 16.10	16.a 16.b
SDG17 Partnerships to achieve the Goal	17.1 17.2 17.3 17.4 17.5 17.6 17.7 17.8 17.9 17.10 17.11 17.12 17.13 17.14 17.15 17.16 17.17 17.18 17.19	

■ The target is of average or low importance for rural areas  
 ■ The target is highly important for rural areas (also affects urban areas)  
 ■ The target is exclusively related to rural areas (must be achieved in or by rural areas)

Source: Adapted from (FAO 2018).

From a geographical perspective, it is important to note that only 10 % of the world's territories are urban, which means that 90 % are "rural" or "rural-urban" (Demographia 2019, Cox 2010), including territories in which the vast majority of the world's renewable and non-renewable natural resources, as well as its terrestrial and marine ecosystems, are concentrated.

### 3.1.2. Urban-rural gaps in LAC must be closed to achieve the 2030 Agenda

In order to achieve the 2030 Agenda, it is not enough to make marginal adjustments in the dynamics of rural development, but rather a deeper structural transformation of rural areas is needed to strengthen and modernize them in economic, social and environmental terms. Rural development is a multidimensional issue that offers opportunities in agriculture, food systems and energy development, as productive areas in which the region can make important progress in meeting the SDGs. To achieve this aim, however, the existing lags in rural areas must be overcome:

- There are multiple interconnected urban-rural **socioeconomic gaps**, with poverty being one of the most worrying manifestations:
  - **Poverty:** During the period 2014-2017, the downward trend in rural poverty levels in LAC was reversed. Poverty actually increased in LAC in this period, although men and women were affected in different ways.

- **Social protection:** Despite the accelerated growth in coverage of pension systems since 2002, the level of rural coverage (22 % of the rural population) is still far from that observed in urban territories (54.7 % of the population). Despite the expansion of social programs, the rural population remains at a disadvantage compared to the urban population — 32.6 % of the rural population does not have health insurance and only 11 % live in households that receive social security benefits, compared to 9.8 % and 19 % in urban areas, respectively (OIT 2016).
- **Undernourishment and obesity:** The manifestations of food insecurity have a greater impact in rural areas. For example, although chronic child malnutrition in rural areas has decreased in recent years, it is still greater than in urban areas in virtually all countries of the region (Trivelli and Berdegué 2019), which is a clear setback in efforts towards SDG 2. In addition, the prevalence of obesity has increased in LAC, especially in rural areas, becoming one of the leading causes of death from chronic noncommunicable diseases (FAO 2018), which hinders progress towards SDG 3.
- **Access to infrastructure and basic services:** In LAC, access to these services remains limited for the rural population (Fort 2019). Connectivity and accessibility (roads, telecommunications, Internet) are limited, as is access to basic services, such as drinking water, sanitation and electricity

(Saravia–Matus and Aguirre 2019, Fort 2019), which represents an important obstacle in efforts to achieve SDG 6 (Clean water and sanitation) and SDG 9 (Industry, innovation and infrastructure), and even SDG 1 (End of poverty) (see Appendix 5.2). In addition, the urban-rural connectivity gap is not only physical, but also digital. For example, the difference in Internet access between urban and rural populations has reached 28 percentage points in some countries (see Digital Agriculture [AD], Section 3.2.2).

- **Education:** Education coverage levels in rural areas have increased significantly, but quality levels are lower than those in urban areas (Scott 2019, OECD 2010, Fuica et al. 2014, Saravia–Matus and Aguirre 2019). The gaps are even greater in tertiary education than in secondary school. In general, the gaps in education of rural youths compared to their urban peers are mainly explained by the income level and education of their parents (Scott 2019).
- **Health:** Despite the greater coverage of health services registered in recent years, and their greater use (partly thanks to the massification of social programs conditioned to the use of health services), the infant mortality rate continues to be higher in poorer rural population groups, such as indigenous peoples.
- **Employment:** Rural areas not only provide opportunities for productive transformation sectors,



In that period, the femininity index of rural poverty increased 6 percentage points (from 108.7 to 114.7), while the femininity index of extreme poverty rose by almost 2 points, from 113 to 114.9 (FAO 2018).



In 2015, 87.9 % of the urban population had access to potable water and sewerage infrastructure, while only 64.1 % of the rural population enjoyed such access (Saravia–Matus and Aguirre 2019, Fort 2019).

In 2017, the gap between the percentage of young people aged 15 to 24 with completed secondary education in urban and rural areas reached more than 20 percentage points in some countries of the region (see Appendix 5.2), compared to an average of 10.9 points in the region (Saravia–Matus and Aguirre 2019, Fort 2019).

Rural employment in LAC in primary activities associated with agriculture remains at 54.6 %, and is the main source of labour.

The proportion of child labour is more than double in rural areas compared to urban areas in most countries (CEDLAS and BM 2019).

It is alarming that the proportion of women who own land in the region ranges from 7.8 % to 30.8 % (FAO 2017). Given that this productive resource is fundamental for the generation of income and well-being, the lack of ownership limits the development of women in the region.

Ensuring the full and effective participation of women in the workforce is essential to achieving SDGs 5 (Gender equality) and 8 (Decent work and economic growth).

In LAC, land ownership is particularly concentrated, with a Gini coefficient of 0.79, the concentration in South America (0.85) being higher than in the Caribbean (0.75) (Oxfam 2018).

in which there has been a 20 % increase in rural labour, but also for service sectors, where there has been an increase of 25.8 % in rural labour associated with non-agricultural activities.

A problem to be addressed is that most rural jobs still have lower productivity than urban ones, which is reflected in the labour income gap.

- **Gender:** In LAC, gender disparities are present in terms of poverty, social protection coverage and access to key productive assets. The most worrying disparity is in the ownership of productive resources, which is persistently less favourable for rural women, and continues to limit their productive autonomy and access to markets.

With regard to wage labour, the participation of women is a minority. In 2010, women represented 25 % of the economically active population in agriculture in South America, 12 % in Central America and 24.5 % in the Caribbean (FAO 2017). However, the evidence indicates that women in the agriculture sector devote more hours to unpaid work than the average for those employed in the sector (CEPAL, 2016b).

Women in rural areas have higher illiteracy rates and lower secondary school attendance rates (Trivelli and Berdegué 2019), so their chances of achieving economic autonomy and accessing employment opportunities are lower than those of men.

- **Land access and tenure:** Many of the challenges of today's societies (eliminating poverty and hunger, improving environmental protection, etc.) have a dimension that is clearly related to land tenure, use and administration. Work must be done to improve the conditions of land tenure, and thereby reduce the high concentration of land ownership and use, and avoid the growing number of social conflicts in rural territories. Land tenure and administration must be adapted to allow socioeconomic development, increase incentives for productive and social investment, reduce the risks of ecological degradation, improve access and management of natural resources, facilitate tax collection processes and the generation of conditions for the protection of vulnerable communities through social programs, and, ultimately, create the foundation for achieving SDGs 1 (End of Poverty) and 2 (Zero Hunger).
- **Environmental challenges:** The wealth of biodiversity, natural resources and ecosystems in LAC stands out globally, constituting the main productive asset and source of knowledge generation for the region. Therefore, it is of utmost importance to develop sustainable means of production that protect the productive capacity and innumerable qualities of ecosystems and natural resources for the development and well-being of the population. The goals of the 2030 Agenda related to climate change (SDG 13), the conservation of marine resources (SDG 14) and the protection of biodiversity and

terrestrial ecosystems (SDG 15) should not only ensure the care of resources, but also seek to promote the development of sustainable and resilient modes of production (see Section 3.2.1). (UNEP 2016).

- **Biodiversity, ecosystems and natural resources:** The increasing loss of biodiversity is one of the most obvious consequences of the environmental degradation facing the region. It is estimated that around 74 forest ecosystems in the region are under threat and that tropical and subtropical humid forests, grasslands, savannas and tropical and subtropical scrublands have experienced the greatest loss of terrestrial biomes (Durango et al. 2019).

In terrestrial ecosystems, the reduction of biodiversity means a loss of intrinsic and genetic wealth. The costs that land degradation represents for the region are equivalent to USD 60 billion annually, which directly affects productive capacity and the possibility of exploiting environmental services in rural areas (Durango et al. 2019).

Unsustainable agriculture also has an impact on environmental degradation, especially due to land use changes, which are responsible for 70 % of the estimated loss of terrestrial biodiversity in the region (CBD 2014), together with the 70 % reduction of forest areas, compared with 35 % in Africa and Asia (FAO 2016).

Excessive use of inorganic fertilizers in some territories has influenced

the acceleration of soil carbon mineralization and its subsequent emission into the atmosphere. Organic carbon reserves in the soil are at critical levels due to unsustainable agronomic practices and deforestation (GARDI et al. 2014).

- **Climate Change:** There is no time to lose in facing this challenge. In 2014, extreme weather events linked to the increase in global temperature meant losses of grains and livestock in developing regions equivalent to USD 13 billion, and almost half of the losses occurred in LAC (FAO 2017). Agriculture, forestry and land use change are responsible for 42 % of GHG emissions and energy development accounts for 25 % of these emissions (Trivelli and Berdegué 2019, López, César Augusto Salazar and De Salvo 2017, CEPAL 2018).

Although natural disasters do not distinguish urban from rural, or gender differences, rural areas are often the ones with the most vulnerable infrastructure and, therefore, with the least resilience, so they are usually the most affected (Saravia–Matus and Aguirre 2019). In addition, women are more vulnerable to the effects of climate change, due to their reduced access to productive assets, the precariousness of their jobs and lower social protection coverage.

On the other hand, rural areas present the greatest opportunities to introduce a new productive logic to achieve sustainable development and combat climate change and its

LAC, with only 16 % of the planet's land area and 9 % of the world's population, contains 50 % of its biodiversity (UNEP 2016).

Between 1970 and 2014, according to the Living Planet Index of the World Wildlife Fund (WWF 2018), the reduction in the populations of LAC species exceeds the world index by 29 percentage points.

In terms of agrobiodiversity, it is estimated that 75 % of crop varieties have been lost in the last 100 years (FAO 2005), thereby affecting their resilience to pests and possibilities of adaptation to climate change.

LAC, 75 % of agricultural land suffered from degradation in 2015 (FAO and GTIS 2015).

Rural areas are responsible for 67 % of GHG emissions in the region.

The climate has a direct impact on the quality of life. The number of people affected by some type of natural disaster related to extreme weather events in LAC increased from 2.7 million in 1990 to 11 million in 2017 (Saravia–Matus and Aguirre 2019).



Between 2008 and 2016, energy produced from bioenergy sources increased by 48 %, which makes these sources attractive alternatives for the agricultural bioeconomy (see Chapter 4).

There is an important virtuous relationship between rural and agricultural development, and their complementarity is key to achieving the SDGs.

Decoupling economic growth from carbon emissions (decarbonization and green and blue growth), as well as promoting the use of renewable energies and the protection of ecosystems, will help to increase rural employment.

effects. In particular, technologies are being implemented in these areas to produce energy from unconventional sources, which increased production by 186 % between 2008 and 2016 in terms of gigawatts per hour (GWh) in LAC (Appendix 5.2). Among these

technologies, it is important to highlight those associated with solar energy, which saw production rise from 63 GWh in 2008 to 5,353 GWh in 2016, and those related to wind energy, whose production increased from 1,704 GWh to 45,274 GWh in the same period.

### 3.1.3. Rural opportunities to contribute to the 2030 Agenda and proposals for a new roadmap

The transformation of food and energy systems, extensions of ecosystem services and the fight against climate change will not be possible without an effective commitment from governments and work by key actors in rural territories. Despite the lags in rural areas in relation to urban areas, it is important not to lose sight of the opportunities offered by rural areas to help achieve the 2030 Agenda.

Some proposals are as follows:

- Invest in agricultural and non-agricultural activities in rural areas to promote non-agricultural rural employment, through policies to promote innovation, financing and investment (see Sections 3.3.2 and 3.3.3).
- Support the sustainable development of non-agricultural activities in rural areas, with a focus on geographical identity in areas such as tourism, gastronomy, handicrafts, training and hospitality for domestic animals, among others.
- Promote the diversification of activities to face the risks associated with vulnerability and income variability.
- Promote coordinated territorial development policies that take advantage of and strengthen the capacities of rural workers:
  - **Infrastructure:** Promote the development of centers that provide comprehensive primary care to rural households, expand electrification and sewerage and improve physical and telecommunications connectivity in a planned manner with a vision toward territorial development.
  - **Social protection programs:** Design programs that combine the benefits of rural productive inclusion and territorial development, with the objective of managing risks related to agricultural activity, increasing liquidity and facilitating access to credit (see specific recommendations in Section 3.3.2).



- **Promote healthy eating habits:** Beyond rural education, it is essential to promote changes in eating habits (healthy portions, traditional foods of indigenous peoples in local diets, etc.) and increase the supply of non-industrialized products at low cost and easy access for rural households.
- **Increase access to land and tenure security,** in order to increase productivity and avoid underutilization. Land tenure and management instruments should be expanded to provide support that guarantees legal security and resource management to promote productive investment and sustainable land use.
- **Promote the effective productive inclusion of women:** Beyond raising awareness, concrete actions should be taken that help to reduce the differences between men and women in access to land, productive assets and markets. It is also necessary to promote practices and policies that reduce the burden of unpaid work experienced by women, as well as ensuring their full and effective labour participation, which means adopting the following measures:
  - Promote measures and programs focused on overcoming the inertia that disadvantages women in rural areas, generating a virtuous circle of public-private cooperation and contributing to the awareness and prevention of the violation of women's labour rights.
  - Encourage family co-responsibility, the protection of women's rights and validation of the diversity of adults responsible for the care of children and dependents.
- **Promote Research, Development and Innovation (R+D+i),** in order to develop agricultural production technologies, energy resources and other opportunities that encourage innovation in rural areas, while also promoting sustainable use of the environment, improving production and contributing to the process of decoupling GHG emissions in the respective countries, as well as facilitating the sustainable use of terrestrial and marine resources (see Section 3.2.1).
- **Generate institutional transformations** and inter-institutional strategies aimed at proposing goals and timelines for the transfer of resources to help achieve the SDGs (see Section 3.3).

Social protection can be the first and most important tool for the development of broad rural development policies, especially when it is complemented with productive inclusion policies (inputs, technical assistance, credit) in “extended social protection” schemes (FAO 2018, Winder and Faret 2019).

Family farming (AF) and some forms of non-agricultural rural employment are instruments for overcoming poverty, when there are effective opportunities for access to factors of production, services and markets (Grisa and Sabourin 2019).

Creating a new rural narrative requires a deliberate effort to strengthen rural organizations, especially their capacities for negotiation and action in the public sphere, in order to strengthen the presence of rural actors in national, municipal and local decision-making schemes (Bebbington 2019).

The causal relationships are relatively clear: Agricultural development is a necessary condition for rural development, and rural development is a necessary condition for sustainable development.

“We need a profound reform of the world agrarian and food system, if we want to nourish the 815 million hungry people currently on the planet and 2000 million additional people who will live here by 2050”.

“Investment in agriculture is crucial to increasing the productive capacity in the sector, and sustainable food production systems are necessary to mitigate hunger-related problems”.

## 3.2. Agricultural development is key to rural development: a menu of complementary options

The importance of productive inclusion and the “two-way” intersectoral approach mean agriculture and its related activities should be taken as a “hard core” from which other complementary economic activities (industry, commerce, services) can be developed to promote development in rural territories.

The SDGs defined by the 2030 Agenda are a call to address the technical and financial difficulties of all family farms (FF) – ranging from the most consolidated to the poorest, where farming is at least partially for subsistence. In the latter type of agriculture, the problem is essentially investment: innovation exists, but it has another scope if we compare it with those faced by companies in general. This is not about promoting disruptive technologies - for example, introducing new productive items - that differentiate companies from their competitors and secure a place in the market. This can be done only in exceptional cases. Rather, the challenge in the case of the poorest FFs is to apply a comprehensive investment program capable of generating a volume of production that ensures, partially or totally, a minimum income and a certain level of well-being.

Facing this task is extraordinarily complex in very difficult conditions and with few resources, since it is about these farms reaching their productive ceiling through innovation and improvements in efficiency. To do so, producers must achieve two objectives:

1. To generate the largest amount of one or more subsistence agricultural products, some of which can be sold for monetary income.
2. To generate a minimum level of equilibrium biomass, so that the necessary ecological services that allow soil to efficiently sustain biological activity, support species diversity and act as the source of essential elements for the development of life remain uninterrupted.

There are then several “productivities” associated with the first objective, whose measurement depends on the context: as subsistence production loses importance, monetary income is increasingly valued. On the other hand, as food problems worsen, calories gain value, with a premium for proteins when the food problems are qualitative. (Dupriez 1982).

The second objective determines the long-term sustainability of the farm but is also relevant for immediate results in terms of productivity. Soil is the key

ingredient, understood as an edaphic complex that depends on the physical and chemical characteristics of the mineral substrate, its water supply and the quality of the materials of biological origin of which it is composed. Soil is the key factor that determines agricultural productivity and it is very sensitive to climate and biomass activity, as it is a particularly unstable substrate, which is disaggregated and displaced by the effect of sometimes very weak kinetic energies. This is more important in tropical agriculture regions, where rainfall is particularly aggressive and soils are easily eroded by the impact of rain drops. (Dupriez 1982).

As in any system, a single imbalance can compromise the efficiency of the whole: demographic pressure and fragmentation of the property play a structural role, as they tend to intensify soil rotations, depleting their fertility and generating erosion. But there are other imbalances: excessive use of machinery can generate soil compaction, which changes its texture. These changes modify water dynamics, which can compromise the soil's biological capital. In the current context of climate change and strong pressure on natural resources, a new balance is essential, and a new production model – based on the relationship between crops and agroecology - must be applied at the primary production level.

### 3.2.1. Sustainable intensification to end hunger, achieve food security, improve nutrition and reduce pressure on natural resources

We have three challenges ahead: adapt to climate change, provide food for a rapidly growing world population and absorb an exponential technological revolution. To face them successfully, new productive models are required in all segments. How should the reform of the global agri-food system proposed in the 2030 Agenda be carried out?

Currently, agriculture has a strong environmental impact and producers are the first victims of climate change. As a reaction to this phenomenon, the first steps in the application of more sustainable technologies and productive models have been taken. This process of sustainable intensification is combined with a new agricultural revolution, associated with exponential technological changes that occur globally.

Sustainable intensification means making several technological options compatible. At the primary level, it is critical to move towards agroecological production models, that is, “diversified agroecosystems, (which) mimic natural systems as faithfully as possible to improve sustainable production and independence” (FAO 2018d). This definition does not preclude the possibility of applying this approach in more or less specialized farms, and therefore, of working while connected to large agribusiness chains.

The strategy of combining subsistence production with production aimed at generating monetary income is expressed in Central America and southern Mexico, for example, in the corn-bean binomial, which is at the base of the productive and food systems of the peasant and indigenous rural population.

Small producers are critical to achieving the SDGs established by the 2030 agenda. Together they comprise 16 million small businesses and represent a majority segment in all countries, representing between 80 % and 90 % of all holdings (Sotomayor y Namdar-Irani 2016).





There are experiences of large-scale agroecological production in Argentina - mixed units of crops and livestock with an area of between 50 and 600 ha (Patrouilleau et al. 2017).

As biological material is processed, whether for food or for industrial raw materials, the key is to promote the aggregation of value and the emergence of a circular economy and a green economy. The development of life sciences for the replacement of fossil fuels is another critical aspect of this strategy. All these factors are relevant to move towards a bioeconomy-based global society (see chapter 4).

### What does it mean to implement an agroecological transition throughout LAC agriculture?

Examples of how digitalization can contribute to the ecological transition: (see also section 3.2.2):

- The use of weeding robots in organic agriculture avoids the use of agrochemicals.
- Use of sensors in irrigation systems could generate a **50 %** saving in the use of water in agriculture.
- Precision agriculture has reduced the application of agrochemicals by up to **60 %** in some regions and crops.
- The use of light, automated and remote-controlled machinery minimizes soil compaction.
- The use of robots in the wine sector allows for nighttime harvesting, which saves energy and improves fruit quality, as fruit should be cool before being placed in cold storage.

What specific characteristics should the transition towards more sustainable world agriculture have at the regional level? Conceptually, the priority is to preserve the great natural systems of the region that fulfill a global function in maintaining environmental balances. The Amazon (600 million ha and 30 % of the regional area), and other large natural systems, such as those of the Cerrados (11 % of the regional area), the Gran Chaco (3 %) and Patagonia (3 %), are still relatively poorly operated. At the other extreme, there are densely populated systems, such as the coastal

plantations (9 %) and the Mesoamerican corn-bean system (3 %), or areas that are subject to intensive agriculture, such as the Pampas in Argentina and Uruguay (5 %) (Dixon et al. 2001). The basic premise is that each major productive system has to make its own agroecological transition.

The soy production system is a case of interest, as it is highly specialized and large (occupying almost a third of cultivated land in South America). Under current conditions, monoculture is synonymous with vulnerability and

instability. However, grain production models, especially in the United States and Brazil, can combine the cultivation of soybeans and corn on a rotating basis (Cap y Malach 2012), and are therefore more adaptive than hyperspecialized. In Uruguay, Law 19,355, enacted in

2015, seeks the same objective, as it requires soy producers to give space to pastures for livestock. In both cases they are models that combine different productive options designed to ease the ecological transition.

## Sustainable use of natural resources

It is urgent to reverse degradation trends, changing soil dynamics, forest and agro-ecosystem management and to increase soil fertility, reduce erosion, increase biodiversity, promote water retention and prevent deforestation.

To the extent that it depends on them, the degradation of natural resources - soils, water, biodiversity, forests - and associated ecosystem services, together with climate change, restrict agricultural development (Steffen et al. 2015, Rockström et al. 2009, IPCC 2014). At the same time, the sector contributes substantially to humanity being close to exceeding several of the nine planetary limits within which we can operate safely (Campbell et al. 2017, Neufeldt et al. 2013), making a change in the management and use of resources that are essential to achieving the goals of the 2030 Agenda, especially of SDGs 1 (End of poverty), 2 (Zero hunger), 6 (Clean water and sanitation), 7 (Affordable and sustainable energy), 12 (Responsible production and consumption) and 15 (Terrestrial flora and fauna).

The soil is the element on which rural life is based. Still, it remains undervalued and threatened by degradation, desertification and deforestation, which, in turn, makes it more vulnerable to growing climate changes. Degradation implies a lower capacity to maintain moisture in the soil,

and it is anticipated that climate change is going to exacerbate the situation (IPCC 2014). The most productive areas of commercial agriculture (meat, soybeans and palm oil) generate the most degradation.

### Some urgent actions for sustainable natural resource management:

- Encourage integrated landscape management, seeking more holistic and comprehensive solutions and systemic approaches that promote intersectoral approach, inclusion and establishment of public-private partnerships at different levels of government, in order to find solutions that make it possible to achieve balance in the different development goals in conditions of increasing uncertainty (Ringler y Lawford 2013, Thaxton et al. 2015).
- Use tools that facilitate understanding (ex ante) of possible impacts, dichotomies and synergies of alternatives that can be generated at different time scales to move more rapidly towards sustainability and evidence-based

In the region, 350 million hectares are deforested (Vergara et al. 2018) and at least 300 million hectares show signs of soil degradation, due primarily to deforestation and overgrazing. (GARDI et al. 2014).

The 20x20 initiative, with the participation of 17 regional countries seeking to restore 50 million hectares, recognizes and promotes the restoration of degraded soils.

The restoration of 20 million hectares has an estimated value (net present value, NPV) of USD 23 000 million over 50 years, or about USD 274 per hectare of agricultural production (Vergara et al. 2018).

Increasing production diversity as the size of the farms grows is a challenge, but is necessary to maintain the production of diverse nutrients and viable, multifunctional and sustainable landscapes.

“The yield per day of work is almost twice as high in agroforestry systems as in monocultures in full sun.” (SDG 1) (Armengot et al. 2016).

“Over 286 agroecological projects in 57 poor countries show an average yield increase of 79 % on more than 12 million farms, with an average increase of households at 1.7 t / year (73 %).” (SDG 2) (Pretty et al. 2006).

decision making (Rosegrant et al. 2014, Rosenzweig et al. 2016).

- Implement and scale sustainable and comprehensive models, adjusted to local contexts, that promote integrated water and soil management to increase the resilience, productivity and profitability of systems.
- Continue developing capacities at the subnational level to facilitate

the implementation of policies that improve the management of natural resources.

- Take advantage of the availability of digital tools to observe the land and monitor the state of its natural resources, in order to boost precision agriculture and proactively respond to threats, by combining the efforts of the private, public and academic sectors (Maria Loboguerrero et al. 2018).

### 3.2.2. Technological options for transformation

Agroecology, digitalization, gene editing and bioeconomy provide technological innovations whose application is unavoidable. However, these advances must proceed with caution, and be based on transparent procedures of social participation and interdisciplinary views. Using these premises, the actions proposed below can contribute to a successful transition towards the sustainable intensification of agriculture.

#### Agroecology

*Agroecology contributes to building more resilient and sustainable food systems from social, economic and environmental perspectives. Focused on people, knowledge and territories as agents of change, it facilitates transformation in the way of producing, marketing and consuming food (FAO 2018c).*

By focusing on people, agroecology is characterized by the creation of multi-actor and multi-disciplinary networks and by the co-creation of knowledge between scientists and local communities.

Agroecology emerges as an approach to sustainable agricultural production based on the application of ecological, social and economic principles to food systems (see box 3.1. Regional

consultations promoted by FAO with stakeholders indicate that agroecology is not a unique technology, but a set of practices adapted to each context that result in a fair and sustainable food system (see technologies in annex 5.2; (FAO 2018a, FAO and Commission on Genetic Resources for food and Agriculture 2019).

Agroecology allows an increase in the diversity of biological components and a reduction in external inputs in agricultural production systems at the farm and landscape level. Diversification implies having a wider range of species, varieties or races in a given sector, promoting positive or complementary interactions among them in the production systems. This diversity. It also serves to enhance the benefits of associated biodiversity, for example pollinators and biological control agents, as well as to generate



favorable microclimates to promote the nutrient cycle and contribute to pest control (Nicholls y Altieri 2015, Attwood et al. 2017).

Agroecology contributes to creating more stable and resilient agroecosystems, which are ultimately reflected in greater yield stability. The alignment of agroecology principles and concepts with the sustainability of

food and production systems motivated FAO to launch an initiative in 2018 to expand the scale of agroecology (FAO 2018b). This initiative calls on governments, producer organizations, consumers, civil society, academia, the private sector and international agencies to foster agroecological transition, based on evidence that proves its multiple benefits and positive impacts to achieve the SDGs.

### Box 3.1: Phases of the transition towards agroecological systems

The transition to agroecological systems is carried out through five phases. The first three focus on the farm, while the other two focus on the entire food system. These phases include:

1. **Increase in the efficiency of practices and resources:** The efficiency of conventional practices is improved to reduce the use and consumption of expensive, scarce inputs or those that are harmful to the environment.
2. **Replacement of external inputs:** Harmful practices and products are replaced with others that are more ecologically friendly. Organic agriculture puts the emphasis on this second phase, which reduces the harmful effect of some products. Includes practices aimed at comprehensive pest management and tillage reduction.
3. **Redesign of agricultural production systems:** Agroecological systems are redesigned to work on the basis of a new set of ecological processes, with the aim of addressing the root causes of problems, such as land degradation, loss of biodiversity and ecosystem services and water scarcity.
4. **Strengthening of adapted markets:** Consumers value locally grown food, and their purchase supports farmers who strive to move to the first, second and third phases of the transition process.
5. **Construction of a new sustainable food system based on equity, participation and justice:** The creation of a favorable environment is essential to support agroecology, as producers who wish to follow a more sustainable path often face limitations and risks.

Source: (Gliessman 2015, FAO 2018c)

“Through greater proximity between producers and consumers, agroecology helps reduce food waste (associated with SDG 12.3).” (Beausang et al. 2017 in (FAO 2019b).

“Long-term data show how, for a drought-sensitive crop such as field tomato grown in rotation with corn, organic soil management leads to more stable yields over time.” (Tiftonell 2014).

The increase in the costs of animal husbandry in complex systems is more than offset by the reduction in costs associated with agrochemicals and by higher and more diverse incomes (Tiftonell 2014).

For many farmers, the transition cannot be made at once, but through progressive changes towards greener practices and more sustainable food systems.

Improving efficiency in the use of resources is crucial for sustainable agriculture. The value of buying “locally” is a kind of “food citizenship” and becomes a force for change in the food system.

Short-term support will be needed through public policies that address structural barriers, providing positive incentives for diversification, while supporting producers in the critical period of transformation of their systems.

DA proposes a paradigm shift, which seeks to reconcile productivity and sustainability. It also closes the gaps between production and distribution, and producers and consumers.

### Digital agriculture (DA) as an engine for the agroecological transition.

*The application of Information and Communications Technology (ICT) tools in agriculture opens up a range of opportunities to improve production processes and promote agroecological transition.*

DA reduces the use of inputs, favors innovation and improves productivity, facilitates cooperation between farmers and allows a direct link between the two ends of the chain: producers and consumers. However, in order to take advantage of these benefits in an inclusive manner, profound adjustments in policies and service provision are required.

Digital tools are already being used to accelerate the transformation, for example:

- For many years, an important segment of farmers has been informed about the weather through cell phones and in many rural territories, Facebook has begun to be used to generate new contacts between producers and consumers.
- Horizontal experiences of the peasant-peasant type have emerged (for example, Yo Joven Rural in Chile) and WhatsApp groups have begun to be used to coordinate production chains (Think Tank Cacao in Ecuador). At the farm level, in Argentina, the 2018 harvest of extensive crops was carried out via 11,240 yield monitors, covering practically 100 % of the occupied area (Méndez and Vélez 2018).
- In the field of logistics, the large global companies specializing in

grains—Archer Daniels Midland (ADM), Bunge, Cargill, Louis-Dreyfus Company (LDC) and China National Cereals, Oils and Foodstuffs Corporation (COFCO) - have created an alliance to standardize data and digitize global transactions of agricultural shipments, using digital technologies, such as blockchain and artificial intelligence.

This approach is being applied in the soy chain and in other large chains in which the countries of South America are great players. This will increase the transparency and efficiency of the chain worldwide (Business Wire 2018).

- The SWIIN company operates a digitalized water rental system in the United States (called the “Airbnb” for water) (Renaissance Numérique 2015).

**The Access problem.** Despite advances in Internet access (see box 3.2, figure 3.2), more than half of the households in the region are still unable to access the network, and the access gap is larger in rural territories and in the lowest income quintiles. Thus, the digital rift between lagging rural territories and the most advanced urban sectors is still very high. There are many territories in the region that do not have network coverage, so-called “white areas”, where the dispersion of the population does not make private operations profitable.

This is a central problem, but it is likely to be solved relatively quickly. Technology is already available and there are even public initiatives to universalize the service through satellite technology.

### Box 3.2: Progress in internet access

The number of households connected to the Internet in the region grew 103 % between 2010 and 2016, from 3.9 % in 2000 to 56.4 % in 2016.

In terms of affordability, the cost of fixed broadband service of 1Mbps was equal to about 18 % of average monthly income in 2010, but by November 2017 that figure was only 1.2 %. All countries are below the 5 % threshold established as an affordability reference by the Broadband Commission of the United Nations.

Source: (CEPAL 2018b).

ICTs play a key role in achieving the 17 SDGs (D’Almeida y Margot 2018) and, in the case of agriculture and food systems, they promise a radical worldwide change, towards the elimination of hunger and poverty (Maru et al. 2018). Digital agriculture contributes to the achievement of several linked goals SDGs 1, 2, 9 and 12.

In terms of quality of service, the two highest performing LAC countries (Uruguay and Chile) had 15 % of their connections with speeds greater than 15 Mbps in 2017, while the worst had 0.2 %. As a reference point, worldwide, in the 10 most advanced countries 50 % of connections are above 15 Mbps (CEPAL 2018b).

62.1 % of individuals in LAC used the internet in 2017 (CEPAL 2018b).

The average adoption rate of 4G technology in LAC is 16.1 %, while 2G and 3G technologies each claim 40 %. There are great differences between and within countries (D’Almeida y Margot 2018).

However, costs are still an important barrier for areas where the population is dispersed. On the other hand, it is not possible to install land bases in territories that do not have energy coverage, which also makes it difficult to charge users’ devices, although solar energy is a solution. There are several initiatives underway that are designed to bring the Internet to most remote rural areas.

Several projects are currently competing to install a global satellite network:

- The Amazon Kuiper project, which aims to create an interconnected network of 3,236 satellites to give high-speed connectivity and low latency to offline communities worldwide.
- The PoitView Tech project, powered by Facebook, contemplates the launch in 2019

of the Athens satellite, located in low orbits, as the first step to subsequently install an equivalent satellite network.

- The SpaceX Starlink project, which seeks to create a network of 11,000 satellites to cover the Earth.

These projects, which aim to be in operation by 2022, will deliver connectivity (final solutions) to the most remote locations on the planet, that currently do not have the resources or infrastructure necessary to access the network (EMOL 2019)), achieving important cost reductions and service quality improvements. In addition, the region added 9 submarine cables (another 6 are planned for 2019 and 2020) between 2016 and 2018, and 18 internet exchange points (IXPs) were created between 2015 and 2017 to improve connectivity and data flow (CEPAL 2018b).



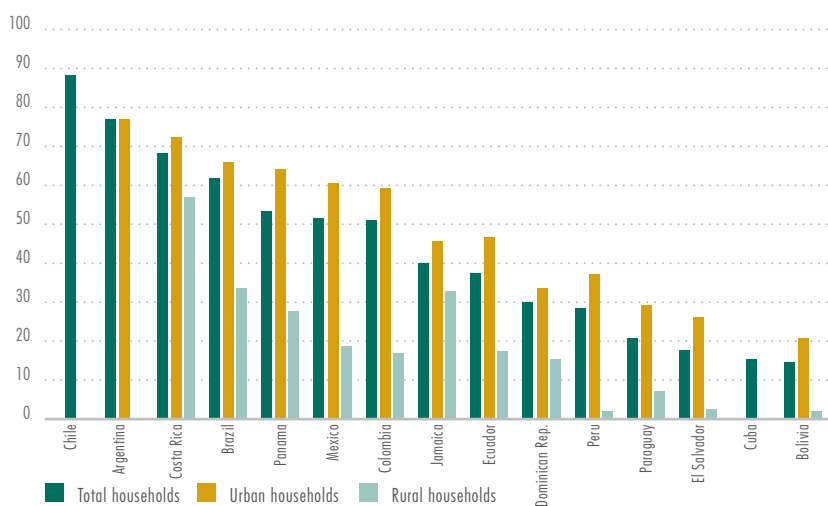
All this information confirms that the Internet will reach all rural corners very quickly, which will open up new possibilities for radical changes in food production, distribution, marketing and consumption.

In the digital area the main advances are associated with the operation of digital platforms, sensors, Internet of Things (IoT), robots, drones, big data, cloud computing, Artificial Intelligence (AI) and blockchain (box 3.3).

The potential of the sensors to implement traceability systems (tracers) is of particular importance for logistics or supply chains (for example, radio frequency identification or RFID are useful for recording the location and condition of perishable products and generate alerts for potential contaminants).

The use of IoT requires the design of new regulatory frameworks (for privacy, interoperability, among other reasons).

Figure 3.2: Households with internet access, by location (%).



Fuente: (ITU y ICTs 2019).

**Digital applications in agriculture:** Digital agriculture is based on two closely-associated lines of work:

1. The collection and treatment of a large amount of data, which makes it possible to optimize and rationalize decisions and use of resources, and at the same time, predictive analysis to anticipate scenarios; and
2. Peer-to-peer exchanges, which break with the traditional isolation of farmers and allows the emergence of collaborative governance and coordination modes, where a large number of actors can interact with ease.

### Box 3.3: DA Applications

- **Digital platforms:** Allow the integration of information, promote wider access and improve effective use of information and services. Platforms facilitate commercial and non-commercial transactions between companies (B2B), between companies and consumers (B2C) or between consumers (C2C). Other electronic platforms provide information on environmental regulations and administrative processes from both public and private sources.
- **Sensors:** Measure multiple properties of the physical world and transform them into digital data. The small size and low cost of sensors allow their integration into a series of artifacts and machines, making the IoT possible and supporting big data. Precision agriculture, dairy control (animal tracking), transport and logistics are the most important fields for application of this technology.

- **Great potential exists for satellite mounted sensors. Advantages include:** Global coverage, homogeneous data, repeated observations that create historical series, multiple observations per day allow almost real-time observation.
- **IoT:** The articulated sensors in IoT are used to monitor the health, location and activities of people and animals, as well as the status of production processes and / or the environment, among other applications. A responsibility problem can also be generated, which requires a clear determination of responsibilities, in case of malfunction.
- **Robots:** Can be used to carry sensors and thus extend the farmer's field of vision, but they can also be used to do technical work on the crop plot. Harvesters, which reduce soil compaction, are an example. They can also be used in other areas such as dairy management (milking robots).
- **Drones:** These unmanned aerial vehicles equipped with cameras can be very useful for calculating biomass or for assessing the level of fertility, water stress and other parameters of a crop. These machines are used to make agrochemical sprays, reducing soil compaction and applying much lower doses (precision applications).
- **Big data:** ICT, sensors and the increasing power of computers allow the generation, processing and interpretation of a large volume of digital data which can then be used to deduce relationships, establish dependencies and predict results and behaviors.
- **Cloud computing:** Allows access to computing resources in a flexible way and with low management effort. While the IoT allows data to be collected following specific rules, cloud computing allows data storage and aggregation, supporting big data analysis. Cloud computing and data analytics include machine learning applications and make it possible to operate at a new level of artificial intelligence.
- **AI:** It is defined as the ability of machines and systems to acquire and apply knowledge and to have intelligent behavior. These technologies, based on cognition, help computers to interact, reason and learn as humans do, which allows them to perform a wide variety of tasks that normally require human intelligence, such as visual perception, voice recognition, decision making, language translation and object manipulation.
- **Blockchain:** A distributed database, replicated in many places and operated jointly by many users. Decentralization eliminates custody restrictions, as all system data is digitally encrypted for a single identification. Once entered in the blockchain, no data can be modified or deleted without the knowledge of all participants. This technology is key to creating transparency, traceability and trust. The blockchain helps reduce information asymmetries and improve chain coordination.

Source: (OECD 2018)

Via drones, several indices can be generated, such as the normalized difference vegetation index (NDVI). This allows specific decisions to be made for a certain part of the crop plot, as well as for localized grazing.

Big data can help make decisions in real time, combining a wide variety of information from different sources.

In agriculture, AI is being used for remote pest recognition or for crop evaluation (via sending photos on the cell phone). This facilitates, for example, the design of extension services that operate virtually.

Blockchain is used to execute transactions, through "smart contracts," which help to verify and force the negotiation or execution of the contract without the intervention of third parties. With a smart contract, transactions occur only if certain pre-established requirements are met, creating an accounting for all transactions.

The success of emerging technological innovations depends on an entrepreneurial ecosystem that enhances the opportunities offered by the region, consisting of academic research, public innovation promotion agencies, investors and agricultural producers. (Vitón et al. 2017).

This ecosystem depends on companies that provide connectivity to the rural environment and public policies that enhance innovation systems. (Vitón et al. 2017)

The potential benefits of precision biotechnology in agriculture include opportunities to improve process efficiency, increase productivity, expand crop diversity and contribute to the adaptation of agricultural activity to environmental uncertainties (Zhang et al. 2018) (Boxes 3.4 and 3.5).

Key actions: In its recent report on policy opportunities for digital innovation, the OECD identifies key areas in which policies must be adapted to the digital age:

- Data access policies, as key ingredients of innovation;
- Policies to support innovation and entrepreneurship, including the need to adapt the intellectual property system;
- Research, education and training policies; and
- Policies to develop competitive, collaborative and inclusive innovation ecosystems (OECD 2019).

In summary, efforts are required by both public and private actors to:

- Overcome connectivity gaps;
- Address the need for appropriate digital developments for different types of producers in different regions;
- Improve clarity in the regulation of information privacy; and
- Strengthen the capacities of producers, other actors in agricultural chains and agricultural support services.

#### Gene editing: A path towards precision biotechnology in agriculture

*Biotechnology affords opportunities to improve process efficiency, increase productivity, expand crop diversity and contribute to the adaptation of agricultural activity to environmental uncertainties.*

Given the growing challenges of agriculture, it is necessary to generate, know and use various available technologies, and biotechnology has advanced significantly in this direction. For more than two decades, biotechnological advances in agriculture have been deployed through genetic modification based on gene insertion (a process known as modern biotechnology or transgenesis). Certainly, the results of the application of transgenesis are seen in the almost 192 million hectares planted with genetically modified crops (GM) crops including corn, soybeans, rapeseed and cotton, and through the linking of more than 17 million agricultural producers in 26 countries (ISAAA 2018a).

However, agricultural biotechnology is constantly evolving. For some years, it has generated advanced techniques (Gupta and Musunuru 2014) that allow the replication of existing genes or the modification, replacement or fabrication of new ones with very high precision. The biological and environmental risk is low, production is relatively quick and affordable for most academic, research and development institution laboratories in both the public and private sectors. These new techniques (box 3.4) are characterized by being very precise, thanks to advances in DNA sequencing (Levy and Myers 2016) and the consequent decrease in costs (Wetterstrand 2019). Thus, biotechnology has entered a new era of precision (Wetterstrand 2019).

It is clear that precision biotechnology has very high development potential, so it is necessary to ensure the safety of its application and its products. Biosafety regulation is a way of guaranteeing agricultural health, food safety and environmental impact (Rocha 2019).



### Box 3.4: Technical aspects of gene editing

Most gene editing techniques (CRISPR / Cas, TALEN, ZFN) employ mechanisms to repair double chain breaks of deoxyribonucleic acid (DNA). Said ruptures are introduced into the genome, at sites close to the area where DNA modification is desired, using nuclease enzymes from specific sequences. Once this step is completed, DNA rupture repair can be carried out by directing the precise natural DNA repair mechanisms. Through the interaction of the rupture mechanisms with those of DNA repair, modifications can be created that range from the timely change of an element (nucleotide) of the DNA sequence to the insertion or removal of several genes.

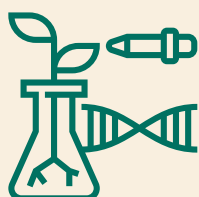
Among the experimental applications of gene editing are the following: a) generation of plants with characteristics of interest (for example, soybean with high oleic content and low linoleic content; potato with lower amounts of reducing sugars; corn with reduced phytate; purple tomato with high anthocyanin content; rice with high amylose content; potato and corn with high amylopectin content); b) crops that exhibit resistance to biotic factors (diseases of bacterial, fungal and viral origin) and tolerance to abiotic factors (drought, frost and herbicides); and c) plants with physiological modifications, such as parthenocarpy in tomato, thermosensitive male sterility in corn, acceleration of ripening in tomato, mushrooms with anti-oxidation (browning) phenotype, sugar cane with altered composition of cell walls and efficiency improvement in saccharification, etc.

Source: (Rocha 2019).

It is clear that precision biotechnology has very high development potential, so it is necessary to ensure the safety of its application and its products. Biosafety regulation is a way of guaranteeing agricultural health, food safety and environmental impact (Rocha 2019)

The discussion about regulation of products resulting from gene editing is wide (Jones 2015). For example, for the Court of Justice of the European Union, organisms obtained through gene editing techniques must be subject to the Directive on Modified Living Organism (LMO) (Court of Justice of the European Union 2018), to which some European countries (Fortuna 2019) and other regions (USDA 2018a) have expressed confusion and the need to review this ruling. There have also been reactions from the European scientific community - scientists from 120 research centers requested

to review the decision, citing the delay that it could cause in the development of more sustainable agriculture. The potential benefits of modification, including greater yield and less use of chemicals and water, mean long delays for approval, and places European agriculture at a disadvantage versus its main competitors (CRAI 2019). Similarly, concerns have been expressed about the implications that the judgment could have on poor countries that could benefit from the new gene editing technologies, but which may be inclined to curb their introduction (Purnhagen y Wesseler 2019). In contrast, several countries have expressed the need for appropriate regulatory approaches based on science and risk analysis (Friedrichs S; Takasu Y; Kearns P; Dagallier B; Oshima R; Schofield J; Moreddu C. 2019), which promote regulatory cooperation and build trust to avoid possible trade problems that could impede innovation (CMSF and OMC 2018).



Achieving good understanding and use of these new biotechnologies will depend on the success of communication efforts.

Biotechnology can contribute to the generation of new products and processes in the chain:

- EPrimary link: New seeds with various characteristics of agronomic interest (SDG 2).
- Processing: New enzymes to optimize energy expenditure.
- Agroindustry: Product life extension through biological process interference.

Table 3.1: Legislation on precision biotechnology in LAC countries.

Country	Instrument	Date
Brazil	Normative Resolution No. 16, which establishes requirements for submitting consultations to the National Technical Commission on Biosecurity (CTNBio) on innovative precision improvement techniques.	15 January 2018
Chile	Inquiry form for propagation material developed by new breeding techniques.	23 June 2017
Colombia	Resolution of the Colombian Agricultural Institute (ICA) No 00029299 “by which the procedure for ICA processing of requests for an improved crops with innovation techniques in plant breeding through modern biotechnology is established, in order to determine if the crop corresponds to a LMO or a conventional type”.	1 August 2018
Ecuador	Articles 229 and 230 of Chapter II of the Regulations to the Organic Code of the Environment.	21 May 2019
Honduras	C.D. Agreement SENASA 008-2019 approving the authorization procedure for applications related to the use of new genetic improvement techniques (precision biotechnology).	27 August 2019
Paraguay	Resolution MAG 565 “Prior consultation form for products obtained through new breeding techniques.”	13 May 2019

This has led some countries of the American continent to have issued standards for objectively and proactively dealing with precision biotechnology products (table 3.1).

As a general rule, the regulation of edited organisms is based on the nature of the change and the decisions for release authorization are made on a case-by-case

### Box 3.5: Biotechnology contributions to SDG fulfillment

- Generation of new seeds and improved planting materials (SDG 1, 2, 13, 15).
- Generation of bio-inputs (SDG 1, 13, 15) for the conservation and use of biodiversity.
- Use of biochemical and molecular markers (ODS 2) for traceability.
- Use of BT technology (*Bacillus Thuringensis*) and generation and use of virus resistant materials (ODS 1, 2, 3, 6, 13, 14, 15) for the control of pests and diseases.
- Disinfection of planting material and generation of seeds tolerant to drought, salinity, etc. (SDG 1, 2).

basis, based on scientific evidence, so that (in the absence of foreign DNA sequences) it can be determined that the edited organisms do not conform to the LMO definition of the Cartagena Protocol on Biosafety of the Convention on Biological Diversity. Thus, the decision focuses more on products than processes.

Based on the dissemination experience associated with GM plants, it is clear that assertive communication strategies are required to inform the public about the actions of agricultural biotechnology, in general, and gene editing, in particular. This strategy should be able to explain what precision biotechnology is (especially versus LMOs), outlining key applications, scope and limitations. In addition, it is important to consider that in order to

achieve such positioning it will be necessary to explain the usefulness and safety of gene editing techniques based on scientifically validated information and ensure that the gene editing is not positioned as opposed to transgenesis, but rather presented as a new biotechnological alternative that improves on current tools and has potential applications throughout agriculture.

Precision biotechnology emerged to solve problems and has generated tools that evolve and improve. The safety of its products is being rigorously evaluated by the regulatory entities at the country level. In addition, in order to achieve greater clarity, the topic is being discussed in international forums (for example, within the framework of the Convention on Biological Diversity).



### 3.2.3. On the need to measure the sustainable productivity of agricultural productive systems

Green productivity or sustainable productivity is a strategy to improve productivity and environmental performance for socioeconomic development in general (Ahmed 2012). It is necessary to move from partial measurements of productivity (for example, yields per hectare) to measurements of the total productivity of the factors Total Productivity Factor (PTF), and towards the measurement of the total resource productivity (TRP), which takes into account the environmental products and services of the production system (see box 3.2.3 and figure 3.3).

In 2018, the average Partial Factor Productivity (PFP) of the agriculture sector per agricultural worker in LAC was USD 7 200, which compares with a TFP per agricultural worker of USD 70 108 in the United States, of USD 93 110 in Canada and of USD 32 437 in the European Union (World Bank 2019).

According to data available for 2015, the average annual growth of agricultural TFP in LAC was 1.18 % over the last five years, compared with 1.41 % over the same period worldwide, with significant differences between countries and subregions (Fuglie and Rada 2018).

#### Box 3.6: Measuring sustainable productivity

Productivity measurements combine one or more products with one or more inputs (see figure 3.3 as a conceptual frame of reference):

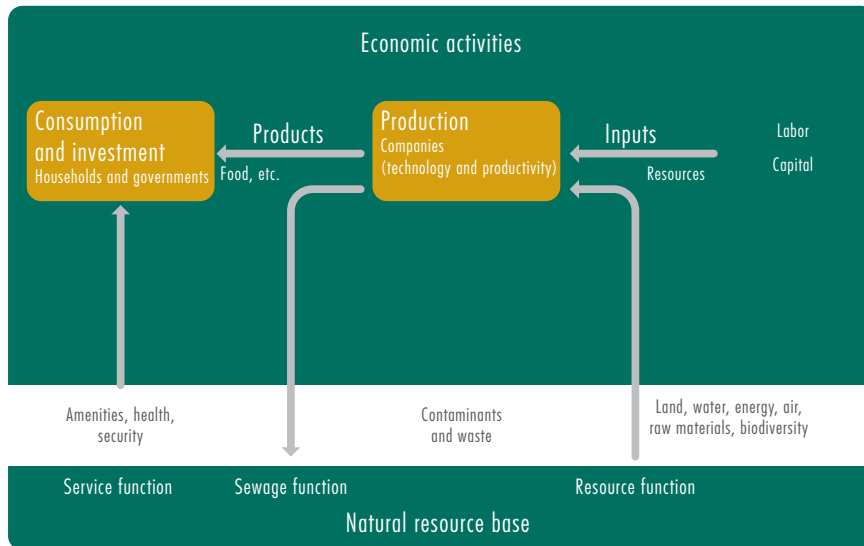
- PFP measures, such as yields per hectare or added value per agricultural worker, compares one product or a group of them with a production factor (land or labor).
- TFP measures the ratio of all marketable products (crops and livestock) and marketable inputs (land, labor and capital), but does not consider inputs or products to which the producer does not assign an economic value.
- TRP tries to extend the TFP indicator to include environmental products and services that are not valued by the market. In the calculation of TFP, the aggregation of products and production factors is based on market prices; on the contrary, non-market valuation methods (such as shadow prices, the cost of depletion and the cost of social opportunity) are required to value and aggregate environmental products and services and are therefore necessary to estimate the TRP.

Total Green Factor Productivity (PTFV) is another way of measuring productivity that internalizes in its measurement the intensity of carbon emissions (CO<sub>2</sub> per worker) as an additional input to those traditionally included in the calculation of TFP (Ahmed 2012).

Source: (Fuglie et al. 2016, Ahmed 2012).

In line with the 1992 Earth Summit, the concept of green productivity (GP) was launched in 1994 under the premise that both economic development and environmental protection are key strategies for sustainable development.

**Figure 3.3: Conceptual framework to measure the productivity and sustainability of economic and environmental goods.**



Source: (Fuglie et al. 2016).

In fact, there has been no major progress since the issue of agricultural productivity, and in particular productivity measurements that include environmental goods and services, was emphasized in a report (Fuglie et al. 2016) presented at the meeting of the Group of the 20 (G-20) of leading agricultural scientists, held within the framework of G20 Presidential Meeting in Antalya, Turkey (2015).

**Towards the measurement of green or sustainable productivity in agriculture:** In 2012, the United Nations Statistical Commission adopted the Integrated System of Environmental and Economic Accounting. This fact offers an opportunity to incorporate the concept

of environmental sustainability in TFP measurements (Laborde and Piñeiro 2018).

However, on the input side, it remains a political and technical challenge to incorporate inputs or factors of production, including natural resources that have limited market representation (such as soil, water and biodiversity). On the supply side, consideration for the net value of environmental damage produced is the challenge.

The basic approach is to obtain measures for the quantities and economic values of environmental goods and services used in agriculture and include them, together with measures for market

An increase in TFP is attributed to the increase in the efficiency of production processes, rather than the increased use of inputs.

Appropriate measurements of the productive performance of agriculture constitute a key metric to consistently monitor progress towards the achievement of the SDGs (see box 3.7). The irreversibility of the degradation and depletion of natural resources caused by some economic activities forces us to go beyond reduced productivity measurements (see box 3.2.3).

In China, the growth of TFP, without considering the effect of CO<sub>2</sub> emissions, was 1.35 % during the 1988-2006 period; however, productivity growth fell to -1.62 % during the same period, when the intensity of CO<sub>2</sub> emissions per worker was included (Ahmed 2012).

The traditional productivity indicator, which does not take carbon emissions into account, underestimates the green growth that results from efficient and effective environmental protection policies in countries of the Organization for Economic Cooperation and Development (OECD) (Shen et al. 2017).

goods and services, in the calculation of the TRP. This will not only provide more complete information on progress towards sustainable development but will also provide the means to assess the effects of policies to achieve that goal. The literature (Laborde y Piñeiro 2018, Fuglie et al. 2016, Shen et al. 2017, Ahmed 2012) suggests some criteria to be used for the identification of environmental services to be incorporated in the TRP or GTFP calculations, valuation methods, data sources and alternatives to TRP calculation.

### Box 3.7: Agricultural TFP and the SDGs

The challenge and relevance of monitoring sustainable improvements in agricultural productivity are explicitly linked to goal **2.3** of doubling small producer agricultural productivity, goal **2.4** to ensure sustainable food production, goal **12.1** of achieving sustainable production and consumption and goal **12.2** of achieving efficient use and sustainable handling of natural resources.

The need to adjust the TFP measurement methodology to monitor water use would improve the metrics of agricultural efficiency and is directly related to goal **6.4** on water efficiency in all sectors of the economy. The broad goal is conservation and sustainable use of fresh water. In addition, the ecosystem services, and in the valuation of production, their potential damages must be taken into account as inputs (goal **15.1** of conservation and sustainable use of fresh water. In addition, ecosystem services must be considered as inputs, along with, in the evaluation of production, potential damages (goal **15.2** on forest ecosystems and their services).

The promotion of the achievement of sustainable gains in TFP should be an important component of the strategy of growth and diversification of income, with full environmental considerations. This is directly related to goal **8.1**, of increasing per capita income in a sustained manner; with goal **8.2**, to achieve higher levels of productivity through diversification; and with goal **8.4**, to improve the efficiency of global resources and strive to decouple economic growth from environmental degradation.

Source: Based on Laborde y Piñeiro 2018.

There is still a long way to go in the construction of standardized, consistent and comparable databases between countries and sectors, significant efforts are underway:

- The OECD Agri-Environmental Indicators Database (AEI) contains data on soil, water, biodiversity and by-products from the use of material inputs (fertilizers, pesticides and energy).
- The United Nations System of Environmental Economic Accounting (SEEA) includes natural product flows (water, energy, emissions and wastes) and environmental asset stocks and flows (wood, water, fisheries, soil and land).
- The WORLD KLEMS initiative was created to promote and facilitate the analysis of productivity at the global level. Further work is needed to incorporate sufficient and disaggregated information on the agricultural sector and to include land as a factor of production (Laborde y Piñeiro 2018).
- FAO agri-environmental indicators database on GHG, soil carbon content and water extraction for agriculture.

### 3.2.4. Inclusive agricultural sectors for diversified, competitive rural economies

The development of sustainable, diversified and competitive agricultural sectors in order to achieve the SDGs will not be possible without the inclusion of the broad socio-productive sector comprised of family farmers and the landless rural population. Many of these people live in conditions of hunger and poverty and are at the mercy of climate vulnerability, which poses a threat to the sustainability and competitiveness of the region's agriculture.

#### Social and productive inclusion of agricultural sectors

The inclusion of the region's large rural socio-productive sector through social protection guarantees and its incorporation into pathways leading to economic inclusion contribute directly to the achievement of objectives related to SDGs 1 and 2 (end poverty and hunger), by increasing the coverage of social protection (Target 1.3) and the population's access to economic resources (Target 1.4) and

its resilience (Target 1.5.), ending hunger and ensuring access to safe food for everyone (Target 2.1.) and doubling the agricultural productivity and incomes of small-scale producers through secure and equal access to natural assets and financial and non-financial rural services (Target 2.3).

Affording the agricultural sectors of LAC higher levels of social and productive inclusion will make it possible not only to advance toward the eradication of hunger and poverty, but also to create

In 2015, the average annual income of a rural worker was USD 363, less than half the average of USD 804 earned by an urban worker (CEPAL 2018c).

An average of 54.6 % of the employed labor force in 16 countries of the region continue to work in the primary agricultural sector (see Table 5.3 in the annexes).

FF accounts for more than 50 % of agricultural employment in 14 of the 17 countries in the region for which information is available (Weller 2016).



In Latin America (15 countries), income from agricultural work is 40 % less than the average income of people employed in all branches of economic activity (Weller 2016).

In 19 countries in the region, an average of only 11 % of the rural population live in households with at least one member affiliated to a social security system (WB 2019).

In 19 countries in the region, an average of 63 % of the rural population live in a household that receives at least one type of social assistance (or non-contributory social protection) (WB 2019).

In 19 countries in the region, an average of 24 % of the poorest rural quintile receive no type of social protection (WB 2019).

the enabling conditions required for most rural households and productive units to adopt and take advantage of practices and technologies that will result in greater complexity, diversity, competitiveness and sustainability in agriculture and rural territories, which is a basic step toward the attainment of SDG goals 8 (Decent work and economic growth), 10 (Reduced inequality), 12 (Responsible production and consumption), 13 (Climate action), 14 (Life below water) and 15 (terrestrial ecosystems).

#### Need to adopt a two-way intersectoral approach in rural areas

Over the last four decades, the rural transformation processes of countries in the region have ended up consolidating rapid urbanization, relatively smaller agricultural sectors, and higher agricultural productivity, which has been accompanied by the continued existence—and in the case of extreme poverty, an increase—in the gaps in well-being between urban and rural areas and inequality (see section 3.1.1).

Thus, despite being a sector that has seen steady increases in modernization, productivity and connections with international markets, agriculture has failed to act as the strong driver of rural poverty reduction in the region. In LAC, the growth of the agricultural sector—especially during the 2000s, during the boom in exports of raw materials—was concentrated mainly in certain geographical areas best equipped to produce the goods required, and related to specific products linked to producers with access to foreign markets (Da Silva et al. 2010). It is

this “Latin American paradox” (IFAD 2016b, p. 80) that will be economically and socially untenable in the medium and long terms.

The specific objectives of diversification, increased complexity (see section 3.2.5), the adoption and mainstreaming of technological innovations, sustainable intensification (see section 3.2.1), and resilience are unattainable unless the broad socio-productive sector of FF is incorporated into the process. Since FF accounts for more than 50 % of employment in the agriculture sector in 14 countries of the region (Weller 2016), increasing productivity and closing the gaps in wages (see section 3.1) can help strengthen economic and social sustainability, in line with the principle of the 2030 Agenda of “not leaving anyone behind.”

This can only be achieved by overcoming inaction and the obstacles to the planning, design, implementation and evaluation of policies, strategies and programs in the agricultural sector, and adopting a “two-way” intersectoral approach to social protection and productive inclusion in rural areas.

Indeed, the lack of quality education services and market linkages, inadequate infrastructure, high levels of informal employment, limited access to credit (see section 3.3.2), the limited coverage and adaptation of social protection systems, information gaps and the economic barriers that the rural poor and FF households face daily are some of the factors that account for the stagnation of rural poverty, social immobility in the countryside, and less dynamism in the socio-productive sector (FAO 2018d).

## Key actions toward the close coordination of social protection policies and agricultural interventions

### 1. Decoupling decisions about consumption and investment: the coverage of the social protection system

The first step in a two-way strategy designed to increase inclusion and cohesiveness in agriculture is to expand the coverage of the social protection of the rural population, especially the population dependent on agriculture. Social protection is key not only to ensuring basic levels of well-being and promoting the construction of human capital, but also to achieving important productive impacts to construct inclusion strategies (purchase of inputs, change to riskier and more profitable productive strategies, small investments, etc.) (Tirivayi et al. 2013, FAO et al. 2016, Bastagli et al. 2016).

### 2. Protection and promotion: coordinating social protection and agricultural interventions

Once the rural population's access to social protection has been guaranteed and the first social and productive impacts have been achieved, the coordination of protection and promotion should be consolidated by achieving the combined impact of pertinent, differentiated social protection and agricultural interventions on the same target population (see 5.6 in Annex 5.6). The way in which these objectives are coordinated will depend on the institutional setup in each country.

Based on previous international experience, the options are as follows (Soares et al. 2017):

- the implementation of economic inclusion strategies integrated into national poverty reduction and rural or economic development programs, focused on participants in social protection programs;
- the integration of social protection elements into agricultural investment and territorial development plans;
- a comprehensive social protection program with an approach focused on livelihoods, which combines social services (in most cases, income transfers) with productive services;
- complementary programs or interventions that involve the coordination of two policy sectors or units sequentially, and applying a theory of broad change; and,
- social protection and productive inclusion programs that overlap or are aimed at the same target population.

### 3. Access to rural services and markets: closing the circle of double inclusion in agriculture

Since the 2000s, the countries of the region have promoted different policies in support of FF that mark a historical break with the agricultural development strategies implemented hitherto (Sabourin et al. 2014). The experiences and lessons learned should now be tapped to make

In the 10 countries of the region for which information is available, an average of only 1.3 % of the rural population access active labor market policies (WB 2019).

To strengthen and revitalize agricultural economies, the first step should be to protect poor rural households in order to stabilize their consumption, contain their risks and provide the basic conditions required to release all their productive potential by means of pertinent, differentiated agricultural policies.

No productive inclusion strategy without social protection will be effective unless it decouples the resources used for the household's immediate needs from those that could be used for investment.

It has been documented that around 80 % of the loans granted by Brazil's National Program to Strengthen Family Farming (PRONAF) go to the wealthiest family farmers, promoting their incorporation into value chains dominated by agribusiness, such as the soybean and sugarcane chains (Da Silveira 2016).

One challenge is the lack of flexibility and adaptability of financial mechanisms when it comes to socially and environmentally innovative production strategies, such as agroforestry and agroecological models.

Despite the relatively unprecedented public effort since the 2000s, financing for FF continues to face challenges in terms of coverage and investment and the availability of loans to meet the needs of the different types of FF and production strategies on a scale sufficient to reverse the dynamics of social and economic exclusion at the macro level (Sabourin et al. 2014).

further, continuous improvements aimed at strengthening pathways for double (i.e., social and productive) inclusion.

In regard to financial services, even those intended to contribute to greater inclusion have not been able to incorporate the most vulnerable FF sectors (see section 3.3.2). The beneficiaries continue to be actors with a greater capacity to pay, a better position in the market and better access to information.

With respect to value chains and marketing, some authors affirm that the inclusion of producers in these economic circuits has not led, in principle, to markets that can be considered favorable to small-scale family farmers (for example, fair trade policies, local farmer markets, or specialized niche-based markets). There have been some small initiatives, which have tended to be the exception rather than the rule in general agricultural policy, dominated by instruments and facilities for the development of agribusinesses in commodity chains. (Clark 2017) has argued this point in the case of Ecuador and (Fernandes et al. 2010) in the case of Brazil's National Biodiesel Production and use Program (PNPB). The latter, rather than giving average family farmers the means to consolidate

their production infrastructure collectively, actually integrates them into unfavorable production and trade arrangements dictated by large agribusiness corporations operating in the territories (see also section 4.3.2).

Finally, in the case of preferential or protected markets, the positive effects of interventions of this kind can only be achieved and consolidated to the extent that (Nehring et al. 2017, p. 12):

- a) family farmers are capable of meeting the institutional demand, getting better organized and achieving higher yields with the assistance of solid agricultural policies consistent with the objectives pursued;
- b) family farmers access effective, inclusive climate risk management schemes;
- c) there is investment in infrastructure and services, such as roads, electricity, water, sanitation and information technology;
- d) producer organizations and cooperatives are strengthened; and,
- e) technical assistance and rural extension mechanisms are improved to enhance the skills required to administer this specific production and marketing model.

### 3.2.5. The challenge of diversification and the adding of value

Although LAC has great potential for agricultural and agribusiness production, the diversity of its productive base is limited, as is the complexity of its agricultural exports, which are dominated by commodities (soybeans, corn, wheat, etc.). The generation of value added is an important but challenging task for most countries in the region, which have made little progress in exporting more processed products.

A transformation of agriculture aimed at achieving the SDGs calls for production to be measured taking several criteria into account. Measuring the sector's health in terms of the amounts produced alone—expressed in dollars, kilograms, calories or tons of emissions—ignores one important indicator: the quality of production. A supply of quality products reflects the biological base of territories, mirroring their natural riches and biodiversity. A supply of quality products is also based on the complexity of the basket of goods and services, which depends on the capacity to create value added across the long, complex value chains organized around regional agriculture.

Despite the region's enormous biodiversity, its agricultural exports (measured in value) follow the same historical pattern, characterized by the predominance of a few products. Between 1961 and 1990, two products—coffee and sugar—accounted for 40 % of the value of the region's agricultural exports (FAO 2019a). In recent years, the weight of the two products has fallen to nearly 11 %, while the soybean complex (beans, oil and meal) now accounts for 25 % of the value of LAC's agricultural exports. Currently, ten products make up 56 % of the value of agricultural exports,

while the figure for the world as a whole is 29 % (FAO 2019a). In terms of cultivated land, the region is even less diverse: 85 % of cultivated land is used for ten large categories. A single crop, soybeans, is grown on 57.4 million hectares, 34 % of the region's entire cultivated land (FAO 2019a).

The historical pattern of the region's agricultural exports is also characterized by their lack of complexity and the major role and weight of commodities (soybeans, corn, wheat, etc.). Cacao and soybeans are cases in point. At the global level, the value of chocolate by weight is 59 % higher than that of cacao beans. In the region, there are exporters of both cacao beans, (Ecuador and Peru) and chocolate (Mexico, Brazil and Argentina) (see Figure 3.4). Generating value added (downstream) is an important but challenging task for most countries in the region. In Peru and Ecuador, there is a slight trend toward exports of more processed products, but there is still a long way to go in developing those chains (Figure 3.4).

Soybeans are an example of the modern commodity; however, they are part of a long, complex food chain, with value added concentrated downstream.



Given the increase in global demand for agricultural products, LAC is in an enviable position. With only 9 % of the world's population and 4 % of the rural population (FAO 2019a), the region possesses 16 % of agricultural soils (FAO 2019a), 33 % of unused land suitable for agriculture (Deininger and Byerlee 2012), 23 % of forest cover (FAO 2019 a) and 50 % of the world's biodiversity (UNEP 2016).



In 2016, the price of a ton of soybean oil was nearly **double** that of a ton of soybean meal (FAO 2019a).

Argentina has opted for a strategy of exporting by-products (number one in the world, with **44 %** of the trade in soybean oil), while Brazil exports mainly soybeans (see Figure 3.4).

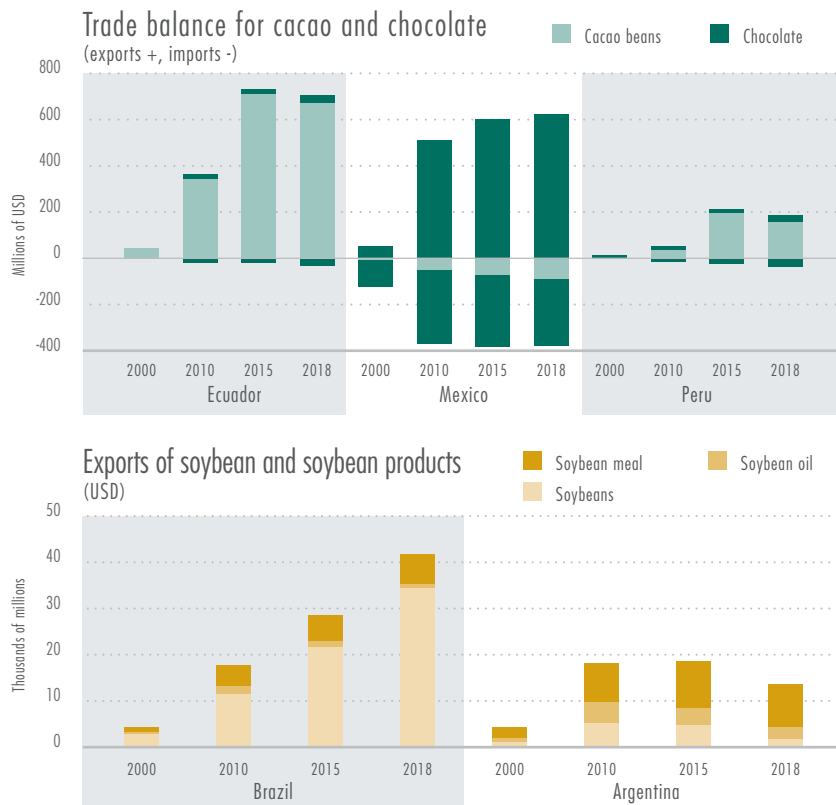
Although soybeans are a commodity, there are many **options for obtaining more value further down the chain**: meal is an important input in pork and fish production; soybean biomass is used to produce biofuels (bioethanol and biodiesel); and soybean lecithin and glycerin are important inputs for a variety of industries (they are used, for example, in the production of cosmetics and medicines).

The value of agricultural exports grew from USD 62 billion in 1995 to USD 256 billion in 2017 (see Figure 3.5), at a composite rate of 6.6 % per year. Around 16 % of this growth, USD 32 billion, involved new products.

Exports of chicken and pork from Brazil, cranberries and cherries from Chile, industrial foods from Argentina and a variety of agricultural products from Mexico to the United States are the most striking developments of the last quarter of a century.

An example of the growth of new products is the value of cranberry exports from Chile and Peru, which were worth more than USD 1.1 billion in 2018 (Comtrade 2019).

Figure 3.4: Value and complexity of LAC exports: the cases of cacao and soybeans.



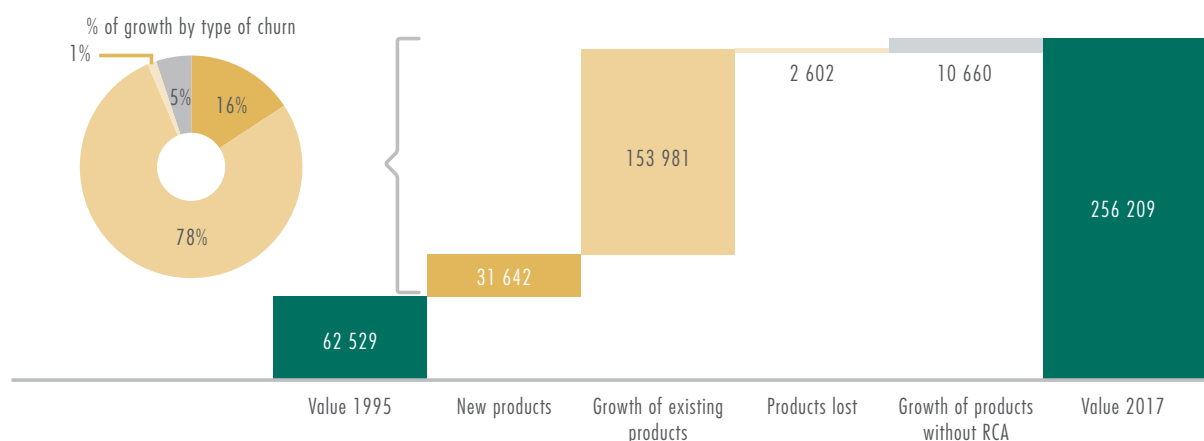
Source: prepared by the author with data from (Comtrade 2019).

### Agricultural trade in constant change

Despite the fact that commodities account for a large proportion of the region's agricultural production, the mix of products is constantly evolving. Over the last quarter of a century, for example, the sector has changed significantly, generated new products and penetrated new markets. As the region takes more advantage of the diversity of local products (and markets them), new ones are increasingly being added to total exports. The region has a large range of products that have

always been consumed locally and, as a result, are known in other markets. Another factor is its capacity to supply fresh, off-season products, processed food and industrial goods made from major commodities, for which the research and development (R&D) component is important. Many factors are opening up new possibilities: at the micro level, for example, changes in consumer tastes and preferences; and, at the other extreme, at the macro level, free trade agreements or technological changes promoted by the bioeconomy (see Chapter 4).

Figure 3.5: LAC: Evolution of the value of exports by type of growth (in millions of USD).



Source: Prepared by the author, based on (Comtrade 2019).

Note: Includes crop and livestock farming, forestry activities, aquaculture and fisheries. A new product is defined as one (by country) whose Revealed Comparative Advantage (RCA) was negative in 1995, and became positive in 2017. The results underestimate the impact of trade innovations due to limitations in the trade classification system, with new products sometimes being added to an existing classification, when a new tariff code should be created instead.

As a result of this series of factors, a large number of the region's products have experienced very high growth (see Annex 5.5). Since 1991, 32 products have recorded higher growth rates (value of exports) than the growth rate for soybeans. Most of the peripheral categories mentioned are innovative, if not in terms of production, in terms of exports.

Furthermore, they make intensive use of labor and technology, which has given rise to new production chains. The food needs and tastes of the global population are now changing rapidly, and the region has the resources to meet those needs and the technologies to ensure that resources are not exhausted. Over the next 25 years, the changes will be even greater.

### 3.2.6. Making better use of trade agreements in the agricultural sector

Preferential trade agreements are valuable instruments for increasing and diversifying exports and improving competitiveness. Public policy actions and coordination between the public and private sectors can foster their use. A comprehensive approach that incorporates different measures is more likely to yield positive results than isolated interventions.

Over the last two decades, countries in the Americas have signed a little over 140 preferential trade agreements (PTAs) in order to increase and diversify products and export markets and improve competitiveness (see Figure 3.6)<sup>3</sup>, and thereby generate economic growth, create employment, promote changing production patterns, and reduce poverty. By liberalizing trade in goods and services and establishing a framework of clear, transparent and non-discriminatory standards that give economic agents certainty, PTAs create an enabling environment for achieving those objectives.

<sup>3</sup>The agreements are available at [http://www.sice.oas.org/agreements\\_e.asp](http://www.sice.oas.org/agreements_e.asp).

Exports of countries signed up to 74 PTAs increased by an average of 30-40 % during the period 1998-2009 (Maru et al. 2018, Jean and Bureau 2015).

Mexico's exports rose by 642 % and its imports by 338 % between 1993 and 2015 under the North American Free Trade Agreement (NAFTA).

The specialized technical language used in such agreements is an obstacle to their comprehension and practical application (IICA 2016a, Plaisier et al. 2018).

Trade helps to promote economic growth and employment (SDG 8), guarantee sustainable types of consumption and production (SDG 12), and strengthen the means of implementation and revitalize the global partnership for sustainable development (SDG 17).

### Box 3.8: Trade and the SDGs

Trade plays a critical role in supporting the attainment of the SDGs, in particular the eradication of poverty (SDG 1), by promoting growth (especially in developing countries), offering new employment opportunities and lowering the prices of goods and services for poor consumers, mainly of foodstuffs.

It also helps to end hunger (SDG 2), because it facilitates fast, reliable access to food produced overseas. In addition, rules-based trade helps to create an environment for transparent production and investment, without distortions, which is essential for food security.

Source: (OMC 2019).

Figure 3.6: Preferential trade agreements in the Americas as of July 2019.



Source: Prepared by the author based on (OEA 2019) as of July 2019.

In the agricultural sector, in which trade barriers are higher, PTAs play an even more important role in facilitating access to markets. The signing of a PTA is often insufficient in itself to promote trade, however. Beyond the baseline conditions of competitiveness and productivity that affect positioning in international markets, the factors listed below can limit the use of such agreements, in particular as tools for promoting new exports or new exporters:

- **Conditions of market access:** Even though there are differences among PTAs, it is not unusual for certain goods to be excluded from the respective tariff reduction program, with imports being subject to a most-favored-nation tariff or, in some cases, quotas with a preferential tariff for a specific volume of imports.
- **Lack of information and knowledge:** Greater knowledge of PTAs translates into greater use (PwC 2018).
- **Lack of effective export support programs:** In addition to PTAs, potential exporters need assistance to obtain information about markets and to develop those markets. The lack of such programs negatively affects the possibilities of exporting, in particular in the case of small- and medium-sized agricultural exporters (Lederman et al. 2009).
- **Weaknesses associated with the quality or volume of exports:** To enter markets, agricultural products must comply with sanitary and phytosanitary standards, as well as food safety and quality measures. The insufficient capacity of the public or private sectors to meet such standards in a sustained manner, or to negotiate the corresponding protocols, limits or impedes market access.
- **Trade costs:** The costs associated with trade in agricultural products (tariffs and nontariff measures, transportation, logistics and customs procedures, etc.) are very

high in Latin America (Arvis et al. 2012). The frictions they generate can nullify a country's comparative advantages, impacting in particular the capacity of small- and medium-scale agricultural producers to participate in agrifood value chains.

- **Institutional weaknesses:** The lack of trained staff in the public sector, poor interinstitutional coordination and insufficient economic resources, among other factors, can affect the performance of government functions associated with the use of PTAs.

Public policy actions and greater coordination between the public and private sectors can improve the conditions and thus enable producers and businesses to take more advantage of the opportunities offered by PTAs. Some of the main actions that can increase the use of PTAs as export platforms are as follows:

- **Prioritization of policies:** Making the growth of exports and participation in agrifood value chains a priority helps to send a clear signal to the productive sector, coordinate institutional efforts, and allocate the resources necessary to support the utilization of trade agreements.
- **Specialized analyses:** Carrying out specialized studies on the factors that affect the use of PTAs, by market and by product, makes it possible to inform and manage more effectively the programs and resources needed to strengthen the conditions for improving their use (Álvarez 2012).

PTAs have made Chile the world's leading exporter of fresh grapes, fresh cranberries, fresh plums and dehydrated apples; the second largest exporter of fresh cherries, in-shell nuts and dormant flower bulbs; and the third largest exporter of raisins, unshelled nuts, wine in bulk and frozen raspberries.

The evidence suggests that the bigger the tariff preference, the greater the probabilities of exporting (Jean and Bureau 2015).

Very strict or complex rules of origin can also limit trade, especially for small and medium-sized enterprises (Plaisier et al 2018).

Insufficient knowledge of the content and impact of PTAs limit their utilization. An effective promotion agency helps boost exports.

Chile's experience in exporting fruits to various markets confirms the importance of the respective plant health authorizations to promote exports. In addition, smaller quantities of exports can be more difficult to place in markets.

The time/cost involved in exporting and importing in LAC is much longer/higher than the average in OECD developed countries (CEPAL 2017).

The lack of specialized business organizations can have a negative impact on producers' interests in their dealings with governments, as can the absence of a more business- and export-oriented culture in general (IICA 2016a).



PTAs can help make the agricultural sector more competitive and increase productivity by affording access to cheaper, better-quality seeds, fertilizers, agrochemicals, machinery and packing and packaging materials, etc. By fostering access to inputs and capital goods with more technological content, they can also contribute to technology transfer and improved management and production practices.

Information should begin to be disseminated when an agreement enters into force, but the process should also be continuous, as part of sustained efforts to ensure the agreement is utilized.

- **Improved conditions of market access:** PTAs should be thought of as “living” instruments, which need to be reviewed to adjust them to market conditions and, especially in the agricultural sector, to examine the exclusion of products or other factors that may be limiting their utilization. Successful experience with other products and markets can be of help with this exercise, as can the experience of other countries.
- **Dissemination of information and knowledge:** The texts of PTAs are always available, but information that is important to the productive sector needs to be “translated,” so it is useful for practical purposes. Electronic platforms are useful tools for supporting the organization of events, and the preparation of publications containing detailed information about the opportunities offered by an agreement.
- **Market intelligence and trade promotion programs:** The work of export promotion agencies is critical in order to construct the country image; to provide support services, such as training, technical assistance and capacity building for exporters; to carry out marketing activities, such as trade fairs, export and import missions, establishing of international contacts, etc.; and to supply trade intelligence, market studies, and publications in support of the sector.
- **Capacity building for compliance with standards:** The capacity to export agricultural goods is linked to the capacity to comply with the standards in export markets, and to demonstrate they have been complied with. Therefore, efforts to improve the capacity of the public and private sectors to meet food safety and animal and plant health requirements are of critical importance. This includes enhancing the technical capacity to carry out testing, inspection, certification and approval procedures as part of quarantine systems; perform risk analyses and determine adequate protection levels; and make information services more effective.
- **Trade facilitation:** A settled agenda for the implementation of the WTO Trade Facilitation Agreement (TFA) and, more broadly, for the reduction of trade costs is crucial to make export products more competitive. This should include improved customs management and the facilitation and streamlining of transactions, increased public investment and better interinstitutional coordination. Transparency and simplification should be at the heart of this effort, and the use of new technologies like blockchain should be explored with a view to facilitating trade.
- **Institutional capacity building:** Improving the capabilities of public sector institutions, in particular those of ministries of agriculture and trade and the agencies in charge of customs procedures and border controls, is crucial to ensure that the public sector’s approach to the use of trade agreements is closely aligned and effective. Coordination

with enhanced specialized private sector organizations that represent producers' interests is also essential.

- **Support from the international community:** The assistance of

international cooperation agencies is important to build capacity, disseminate good practices, provide financial resources and, in general, improve the region's export culture.

### 3.2.7. The importance and challenge of developing local markets

Domestic markets play a crucial role in efforts to attain the SDGs, especially in the food and nutritional security (FNS) of the population in LAC. Moreover, these markets are essential to efforts to achieve sustainable territorial or area-based development, eradicate rural poverty and provide and increase the supply of fresh and varied foods that promote a healthy diet.

#### Short circuits and public procurement as options to improve the rural population's FNS in rural territories

Short marketing circuits are a form of trade centered around the sale of fresh or seasonal products, such as fruits and vegetables. In general, the producers and consumers are in close geographical proximity, and therefore there is little or no intermediation between them, so the sale price is lower (FAO et al 2018).

In LAC, short marketing circuits have proliferated and have become consolidated mainly through ecological and organic fairs and markets, such as the free fairs of Chile (Box 3.9), the markets of Loja and Cuenca in Ecuador or those of Jalisco and Xalapa in Mexico. These points for the purchase and sale of fruits, vegetables, fish and other fresh products, provide easy access to food in the neighborhoods of large urban settlements, middle-sized towns and rural villages and communities (FAO et al 2018, Rodríguez and Riveros 2016).

The use of blockchain technology in a pilot program designed to test the receipt of information about certificates of origin under NAFTA permitted almost instantaneous communication with the U.S. customs and border protection agency, avoiding the duplication of information and facilitating the early identification of potential problems and more direct communication with importers (CBP 2019).

In 2017, Chile became in the second largest exporter of fresh fruits to China. With exports worth more than one billion dollars, Chile supplied 18 % of that market, surpassing other suppliers like Vietnam, the Philippines, the United States, New Zealand and Australia. (Gonzalez 2018) explains the reasons for this success.

Associated with SDG2 - to end hunger, achieve food security and improve nutrition and promote sustainable agriculture- is Target 2.C to "Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility."



The significant size and value of government food procurement programs can be used to advance various political objectives, such as encouraging healthier diets, promoting agricultural development and encouraging more sustainable food production systems.

It is estimated that FF accounts for more than **80 %** of farms and that it supplies between **27 %** and **67 %** of total food production in the different countries. It also accounts for between **57 %** and **77 %** of agricultural jobs and is a key sector in the promotion of food security and poverty eradication (FAO et al 2018).

### Box 3.9: Farmers' fairs: the case of Chile

There has been a major growth of farmers' fairs in Chile, where subsistence farmers have organized themselves to sell their produce at weekends in towns and rural villages. Around 600 farmers' fairs are currently operating in the country, involving around 24,000 producers. This trend is the result of a public policy (INDAP, Mercados Campesinos) and the efforts of the producers themselves.

These farmers' fairs have the following characteristics:

- They have a major impact on family incomes, improving consumption levels and allowing for reinvestment processes;
- In general, they specialize in fresh produce: vegetables, fruits, eggs, honey, cheeses, medicinal plants and crafts, etc.
- Only small volumes of production are sold; therefore, they are not suitable for medium-sized producers;
- They provide direct contact with consumers, sometimes using social networks such as Facebook and others; and
- Over time they become more professional, consolidating their internal organization, developing regulations, improving their infrastructure, raising their quality standards and diversifying their products.

Meanwhile, public procurement of FF products is another emerging trend that has gradually been incorporated into the agendas of many LAC countries. For example, Brazil, Guatemala, Honduras, Paraguay and Uruguay have promulgated laws with mechanisms for the procurement of FF products. (see Annex 5.4). Through public procurement, the population can be provided with fresh, varied and nutritious foods (FAO et al 2018).

The role of public food procurement in efforts to provide social and economic benefits has gained importance in recent years.

Countries increasingly use public food procurement schemes as a strategy for promoting the participation of small farmers in markets and improving their livelihoods. A recent study by the FAO and the International Policy Center for Inclusive Growth (IPC-IG) compiled global good practices to promote smallholders' participation in public food procurement initiatives and to promote synergies in food and nutritional security (Miranda 2018).

In LAC, FF encompasses sectors ranging from fisheries, subsistence farming and landless peasants, to

family agriculture of a scale that generates surpluses and is inserted in local and national markets.

### Proposed actions

1. **Create a legal and institutional framework:** The State and local governments should create a legal and institutional framework that encourages the creation of short marketing circuits and public procurement systems. It is important to develop instruments that recognize the value of local production and its economic, social, environmental and cultural impact, as well as concrete measures to promote these.
2. **Improve the articulation of stakeholders and policies at the local and national levels:** The intersectoral nature of the different stakeholders and sectors—agriculture, development, production, trade, technological development, education, health and social inclusion, etc.— is fundamental to design and implement sustainable policies that respond to the diverse needs of different stakeholders, paying special attention to vulnerable populations (see Sections 3.3 and 3.2.4).
3. **Governments should create specific frameworks for public sector food procurement** to eliminate bureaucratic obstacles, reduce costs and give small farmers competitive advantages. Public food procurement from smallholders should also be closely coordinated with interventions in

different sectors. Government food procurement initiatives should establish coordinated targeting mechanisms that can promote an overlap between the beneficiaries of agricultural interventions and the farmers that supply food to government institutions.

4. **Implement policies in support of FF:** Differentiated policies can help to ensure access to proper nutrition by those populations most affected by the inequalities of the food systems: rural dwellers, those living in poverty, women and indigenous populations (FAO et al 2018).
5. **Improve and facilitate market access:** It is important to improve the negotiating power of family farmers in the markets where their produce is sold, so that value chains can operate more effectively and in a more balanced way. This requires a combination of actions focused on promoting and consolidating associative processes, capacity building and the provision of technical assistance, rural extension services and financial resources. (Rodríguez and Riveros 2016), See section 3.3.2).
6. **Raise awareness among the population:** It is important to value diversity and the different characteristics of short market circuits and FF, both as suppliers of fresh food and as forms of sustainable production that place value on the local food culture. This can also improve the acceptance of foods that promote a healthy diet and support a change in eating habits.

Short marketing circuits for agrifood products help to respond to social demands and to support producers' insertion in markets on more equitable terms (CEPAL et al 2014).

The creation of food baskets and menus that incorporate nutritional objectives, the production of small farmers and the seasonality of produce requires intersectoral cooperation and a close dialogue between stakeholders in the areas of procurement, agriculture and nutrition.

FF is key to FNS and poverty reduction; therefore, it is essential to improve access by family farmers to production, technological and financial resources.

Differentiated policies in support of FF have a positive impact on the generation of agricultural jobs, on poverty mitigation and on the conservation of biodiversity and cultural traditions (FAO 2014).



## 3.3. Institutional framework for sustainable development

Over 60 % of the investments required to implement Agenda 2030 must be made in rural areas; only in this way will it be possible to ensure an effective and sustainable transformation of food and energy production (Diaz-Bonilla and Saravia-Matus 2019).

The task of achieving the SDGs greatly exceeds the sphere of competence, mandate and capabilities of any ministry or rural institution, no matter effective it may be.

No single actor alone is capable of spearheading the necessary changes in the agrifood systems to reduce the alarming levels of overweight and obesity, eliminate rural poverty and tackle the challenges of climate change (Trivelli and Berdegú 2019).

An urgent institutional modernization is required to secure and allocate the necessary funds to achieve inclusive and sustainable rural development, especially as regards the allocation of public resources to agriculture, food systems and the rural milieu.

In most countries of the region, the institutions of the agrifood sector were created by governments between the 1950s and 1960s, with the aim of significantly increasing national food production, in a context of growing urbanization and industrialization.

Subsequently, the severe adjustments implemented during the 1980s and the 1990s served to reduce the State's presence in the sector, rather than to create new institutions or modernize existing ones. The current institutional framework

resulting from those two processes is notoriously inadequate to ensure the efficient and effective governance of the rural sector's economic, social and environmental processes (Penagos and Ospina 2019, Gordillo 2019, Berdegú and Favareto 2019, Trivelli and Berdegú 2019).

Institutional modernization should allow for a more efficient, effective and inclusive implementation of actions to address the challenges of Agenda 2030.

### 3.3.1. The need to increase the degree of interinstitutional coordination

The growing complexity of development problems demands more sophisticated institutional responses. Thus, intersectoral coordination has become an increasingly important goal in the contemporary narrative of development. However, this process continues to be a major challenge, both for governments and other stakeholders- simply because coordination implies higher transaction costs.

Breaking the inertia of isolated sectoral action demands political will

at the highest level, a clear idea of the expected outcomes as well as the design, implementation and continuous evaluation of political, administrative and budgetary mechanisms that encourage coordinated action.

At least two types of inter-institutional articulation require attention:

1. **Vertical coordination:** This occurs between different political-administrative levels, from the national to the local.

Vertical coordination is especially important because it enables the local or territorial levels to play a significant role in the processes of design and implementation of policies and programs. The incentives for coordination must include efforts to improve the efficiency and efficacy of programs and their instruments, assurances that any services provided are better adapted to local conditions or situations and the possibility of complementing financial and non-financial resources between different levels of government.

2. **Horizontal coordination:** This occurs between different sectors within the same government and serves to create instruments for the focalization of policies and programs, associated with intersectoral management mechanisms, with well-defined goals and commitments. Horizontal coordination is of interest because it can create complementarity, thereby increasing efficiency, avoiding dispersion and promoting coherent public action. The incentives for coordinated action must be very well defined for all the actors involved.

To implement coordination, instruments are required for the focalization of policies and programs, associated with intersectoral management mechanisms, with well-defined goals and commitments for each institution involved. It is also necessary to use appropriate mechanisms. One option is to establish large inter-ministerial commissions and their public programs, of a hierarchical and multisectoral nature, which tend to encompass “all” the dimensions of

development. The complexity of this task and the legal and administrative constraints characteristic of public administration generally hinder the implementation of these models.

In addition to the challenge of horizontal and vertical coordination, efforts are required to coordinate actions with other non-governmental stakeholders, such as corporations, supermarkets, producers’ associations, civil society organizations, trade unions and consumers, among many others. These coordination efforts provide the foundation for generating State policies and ensuring a greater degree of effectiveness in the design of public programs (see Section 3.3.3) to help countries achieve the SDGs. The main technical elements for a coherent interinstitutional coordination appear to be:

- the joint definition of problems and viable solutions by different sectors;
- the precise definition of the parties or groups subject to the policies and programs, based on precise and transparent focalization tools;
- the definition of clear goals and public commitments to their fulfilment;
- the active participation of social stakeholders in supporting implementation of the policies and programs; and
- transparent monitoring and accountability mechanisms for the allocation of budgets and other incentives for the stakeholders involved.

To accelerate changes in rural governance it is necessary to create collaborative spaces involving different stakeholders: rural and urban; governmental and non-governmental; and local, national and global (Gordillo 2019, Penagos and Ospina 2019, Berdegué and Favareto 2019).

It is essential to promote a new rural governance that facilitates consensus and more expeditious action, in order to increase the degree of inter-institutional and intersectoral coordination, recognizing the diversity of stakeholders and the role played by each one, even those who have traditionally been sidelined from the decision-making process.

One option is to move beyond the arborescent and matrix-based organizational structures typical of the industrial era and operate through policy networks and issue-based coalitions implemented by two or more institutions that work on a common theme (Moulier Boutang 2007). This system has proven to be more appropriate for action in the current complex and multipolar scenario.

Figure 3.7: Diagram representing a generic solution to facilitate the achievement of the SDGs at country level.

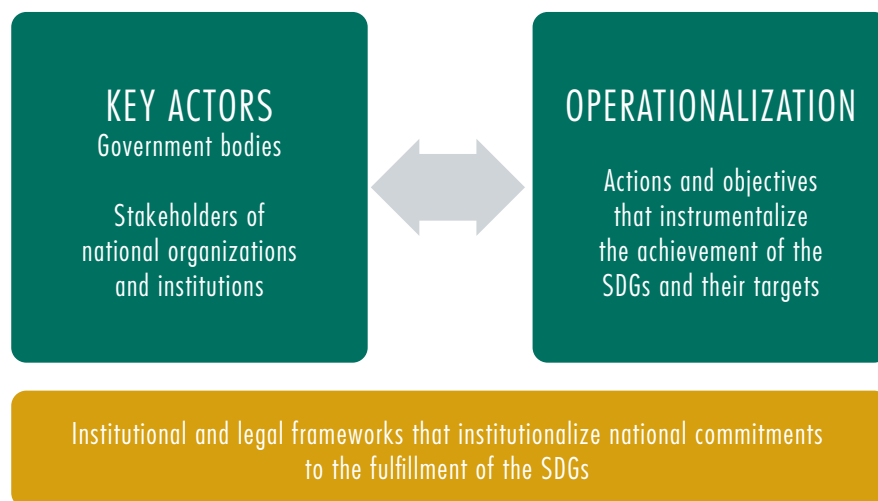


Figure 3.7 shows a formula for the governance of the SDGs and Box 3.10 provides a concrete example in the region: the case of Costa Rica. This shows that it is possible to achieve interinstitutional coordination in the national sphere, by proposing specific and gradual goals at local level and having institutions responsible for their monitoring. One of the central elements of this institutional framework is the responsibility of a government body for allocating the public expenditure required to comply with Agenda 2030.

### Box 3.10: Governance for the attainment of the SDGs: The case of Costa Rica.

As part of the process for the governance and implementation of the SDGs, in 2015 Costa Rica created the High-Level SDG Council, comprised of the country's President and the highest authorities of the ministries of Foreign Relations, Environment and Energy and National Planning and Economic Policy. The Council's main functions are:

- To define a national policy for the planning, implementation and monitoring of the SDGs with a prospective approach, integrating the economic, social and environmental dimensions, in accordance with human rights and national and international law.
- To establish the measures necessary for the allocation of financial resources for the implementation of the SDGs.
- Those derived from the exercise of its areas of competence.

In addition to this body, there is also the Technical Secretariat for the SDGs; the SDG Technical Committee, whose role is to “verify the fulfillment of specific commitments assumed by public sector organizations”; the National Institute of Statistics (INEC), an advisory body that monitors compliance with targets; and the National Forum of the SDGs, as a mechanism for accountability in relation to the fulfilment of the SDGs and their targets.

Source: (CEPAL and UN 2019).

### 3.3.2. Financing and financial inclusion for agricultural and rural transformation

To increase the financial penetration and inclusion of the agricultural and rural sectors and close investment gaps in the long term, interventions are required in the form of regulations, institutions and instruments at the level of individuals, organizations, value chains and territories as well as at the macro level.

#### The role of the financial markets in the construction of sustainable agrifood systems

Rural financial markets are essential components of the banking and financial structure that links savings and investment through the economy; they can also have a substantial impact on the financial aggregates and on macro-financial stability.

Given their importance, and as a result of the global economic crisis and food price peaks of 2008 and 2011, there has been renewed interest in the operation of financial markets and the impacts of their malfunction on the economy and on human wellbeing.

As a result of these concerns, international bodies have been created to address this issue. An example is the Global Partnership for Financial Inclusion (GPFI), which is committed to implementing the Action Plan on global financial inclusion, signed by the Group of Twenty (G-20) leaders at the Summit of Seoul (2019). One of the lines of work involves supporting SMEs, including those of the agricultural and rural sector.

Similarly, in 2017, the International Fund for Agricultural Development (IFAD), together with other institutions, created the Smallholder

and Agrifood SME Financial and Investment Network (SAFIN), with the aim of bringing together the private, public and philanthropic sectors, plus rural producers and businesses, to address, through coordinated action and investment, the challenges that affect rural and agricultural financing.

In this context, an important question is how to mobilize financial resources to support investments in technology, innovation and sustainable agrifood systems at the scale necessary to generate a significant global impact (Diaz-Bonilla 2018, Diaz-Bonilla and Callaway 2018, Diaz-Bonilla et al 2018). In the context of that general question, an important aspect to consider is the role played by financial markets - especially rural markets - in that financing.

#### The levels of financing and public expenditure on agriculture in LAC remain relatively low

The inadequate levels of agricultural financing are likewise reflected in the relatively low percentage of agricultural credit's share of total credit in most LAC countries (Figure 3.8).

Agricultural financing is also low when measured in terms of agriculture's share of the national GDP, according

The SDGs contain numerous references to financial inclusion as part of the fight against hunger and poverty and for gender equality, and in general, the call to develop sustainable agrifood systems, all of which requires political, institutional, technological and investment innovations.

To achieve zero hunger worldwide by 2030, would require USD **265 billion** annually over the period 2016-2030<sup>a</sup>, broken down as follows: USD **67 billion** for social protection and USD **198 billion** for pro-poor investments.

With respect to LAC, it would be necessary to invest an additional USD **6 billion** annually in social protection and USD 2 billion to pro-poor production investment (McGuire 2015).

<sup>a</sup>In constant USD of 2013: additional to the baseline scenario.

The Agriculture Orientation Index (AOI) for Government Expenditures in developed countries is 1.25, while in LAC it is just 0.31.

Only 51 % of women in LAC have a current account, seven percentage points below men. The guarantees and levels of income required prevent more women from gaining access to the financial system, and some financial institutions even continue to ask about “the head of the household” or “the owner” of the house or the land, thereby perpetuating gender stereotypes. (OECD et al 2019).

Several of the anti-rural biases of the traditional credit system, as well as their focus on marketing and processing, but not on investment, originate in the dispersion and limited scale of clients and in covariant risks (climate, prices, pests and the seasonality of production).

Despite an increase, only 30 % of the rural population aged over 15 years in LAC uses financial services, such as savings and loans; these services are obtained mainly from actors that operate outside the formal financial sector, such as agricultural and non-agricultural enterprises, informal loan providers, etc. (FAO and Academia de Centroamérica 2016).

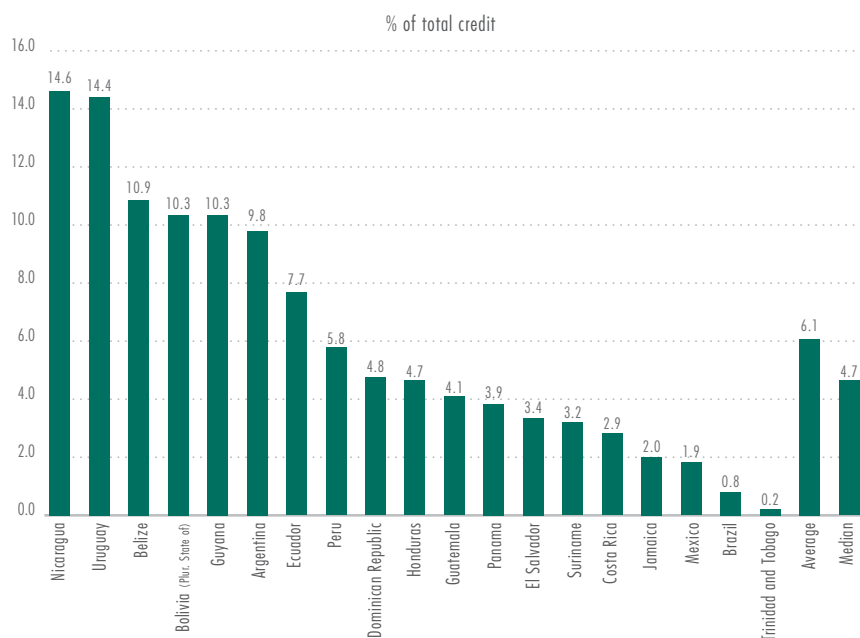
to the agriculture orientation index<sup>4</sup> for credit (figure 3.9).

### Actions to create an efficient, equitable and solid financial and banking system in LAC

Given the low levels of financing and public expenditure on agriculture, for farmers and rural stakeholders in general to become creditworthy subjects, several interventions are

needed to overcome barriers associated with covariant risks, geographic dispersion, low scale production, lack of effective guarantees, limited offers of long term credit, a credit supply that is not adapted to agricultural production and investment cycles, excessive bureaucracy to obtain loans credits and the absence of information and records on the profitability and risks associated with agriculture.

**Figure 3.8:**  
Agricultural credit as a percentage of total credit in LAC countries



Source: (Díaz-Bonilla and Fernández-Arias 2019).

<sup>4</sup>Agricultural credit as a percentage of the total credit divided by the agricultural GDP as a percentage of the total GDP.



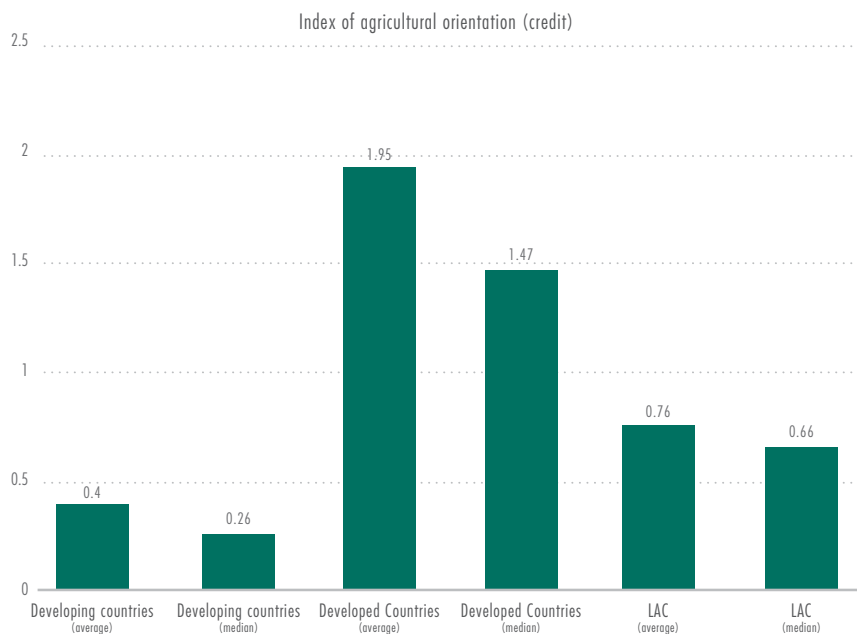
**First**, it is necessary to promote appropriate macroprudential policies, recognizing the need to improve the efficiency of rural financial markets, given their importance in mitigating the risks of banking and systemic crises; and to manage the aggregate instability (covariant risks) of the rural economy, considering the risks associated with credit, liquidity, foreign exchange exposure, cyclical income fluctuations and the valuation of assets.

**In second place**, interventions are required to improve/create regulations

that can affect/enhance the operation of rural financial markets and financial institutions in relation to their three main objectives:

1. to serve as a payment system for the economy, through a set of services used for the transfer of money between financial institutions;
2. to act as an intermediary between savers and investors; and
3. 3) to act as a key provider of risk management services.

**Figure 3.9:**  
Agricultural credit orientation in LAC, developing countries and developed countries



Source: (Díaz-Bonilla and Fernández-Arias 2019).

The combination of public goods, financial instruments and contractual arrangements with small-scale farmers and agribusiness through Public-Private Partnerships and with Producers (A3Ps) can attract additional resources and the support of banks, capital investors, input suppliers, machinery servicing firms and other providers of the value chains (IFAD 2016a).

The focus on the individual and on the totality of the home-business, rather than on the project or financial portfolio, is the best way to manage risk; this serves to capture the sector's heterogeneity since each client is different. The challenge is to establish and maintain direct individual long-term relationships at low cost, making use of the new technologies (IFPRI et al 2019).

A survey of farmers in Peru shows that when producers are linked to a business, their net incomes are on average 13 % higher; if they are linked to an organization, their net incomes are 25 % higher; but when these links are combined, i.e. they are linked to an organization through a company, their net incomes are 41 % higher (IICA 2016b).

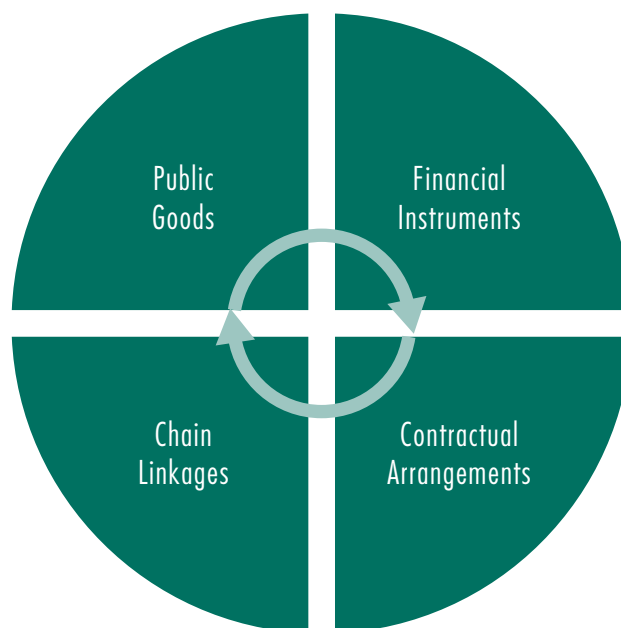
Investment in connectivity and rural infrastructure could reduce production costs in a more sustainable way, even more so than a subsidy on interest rates (IFPRI et al 2019).

**In third place,** it is necessary to create incentives to maximize the advantages and overcome the limitations of each type of financial institution, so that it can fulfill its role of providing credit, managing savings and offering financial services to the rural population. This requires us to consider a variety of agents, such as agricultural development banks (first and second tier), commercial banks, savings and loans cooperatives, community and communal banks, formal microcredit institutions, non-governmental organizations, charitable institutions and informal lenders.

**In fourth place,** it is important to promote comprehensive financial management in agricultural value chains by:

- creating conditions that enable people to access credit;
- improving the micro-management of businesses in value chains, taking advantage of available chain-based financial instruments, e.g. leasing with option to purchase, warehouse receipts, invoice discounting, etc.;
- improving the intermediate management of value chains, making use of A3Ps models (see Figure 3.10); and
- improving the macro management of value chains with a collaborative approach to policymaking, dialogue, consensus and decision-making, and for the management of shared solutions.

Figure 3.10: Model of A3Ps



Source: Authors, based on (IFAD 2016a).

**In fifth place**, there is a need to design efficient systems for the delivery of financial support products and services, and for the provision of other financial services. These products include traditional insurance, micro-insurance, index-based insurance, systems based on technology (photos taken with cell phones), credit guarantee funds, agricultural investment funds, social investment funds and green funds.

**In sixth place**, it is of the utmost importance to promote support services, such as investment in agricultural R&D; animal and plant health; infrastructure (roads, electricity, telecommunications and, in general, the structure of small

and medium-sized cities); irrigation; land titling programs, meteorological systems, effective judicial systems and public security in rural areas.

**Finally**, public policies must be put in place to promote, in a manner that cuts across the actions proposed above, efficient, inclusive and solid financial markets. The task pending is to design banks for the agricultural sector that will complement the private system, address market failures, help improve public policies, provide transparent financing and incentives for good management, and that will be subject to proper regulation and supervision.

### 3.3.3. New criteria for the design of public programs

Despite the valuable initiatives described in the previous section, a growing gap is evident in the area of agricultural and rural development policies. The political systems appear to be overwhelmed, since they are subject to strong social pressures, in a context of tight restrictions on public funds (CEPAL 2019c). In addition to financing problems, the notion of hierarchy as a principle for creating social order is becoming obsolete. Government institutions alone are not capable of resolving current problems and challenges. Consequently, there is a need to establish a new balance between State and society, through the creation of mixed governance systems that combine self-organization by local communities, together with businesses and other civil society stakeholders, and the support and regulation of public institutions.

This is especially important for the promotion of investment in the rural milieu. Because of their economic fragility, smallholder businesses and other types of rural SMEs cannot develop or advance with the resources obtained from past earnings (cash flow). The contribution of their own resources and the commitment of local communities constitute central elements, since they define the strategic orientation and mode of operation of area-based programs. However, to achieve an adequate level of investment it is essential to secure external resources, outside of the communities, either through subsidies, soft loans, grants or other forms of financing. In order to have an impact, these investments require the support of technical and advisory systems, as well as other complementary programs. All this implies mobilizing a substantial volume of resources.



Public debt reached 42.3 % of regional GDP in 2018, compared with 39.4 % in 2017. At the level of countries, noteworthy cases include Argentina, where in 2108 public debt reached the equivalent of 95 % of GDP, while in Brazil and Costa Rica public debt reached 77 % and 53 % of GDP, respectively (CEPAL 2019c).



The use of digital platforms can help improve general coordination between stakeholders external to the area (national and foreign) with local actors, and among these.

### Box 3.11:

#### The importance of redirecting public spending toward the creation of public goods

A study by the IDB, which included 15 LAC countries, showed that increases in total public expenditure on agriculture are important, but that the share of expenditure on public goods is far more important:

- If 10 % of the expenditure allocated to the private sector for the payment of subsidies were redirected to the creation of public goods (without altering the level of total public expenditure on agriculture), this would generate a 5 % increase in per capita agricultural income.
- Alternatively, to obtain a similar increase of around 5 % in per capita agricultural income, it would be necessary to increase total public expenditure on the agricultural sector by 25 % or more (maintaining a constant expenditure structure).

This effect on the composition of public expenditure is attributed only to public spending on agriculture, i.e. it does not include expenditure for the rural sector.

Source: Based on (Anriquez et al 2019).

In a restrictive situation, we are obliged to take advantage of technological changes to reconsider how to implement this investment process. The first step is to conduct a thorough review of public programs, seeking to make these more efficient, transparent and participatory. A major dilemma is related to the priority assigned to the provision of public goods versus private goods (see Box 3.11). In a context of fiscal constraints, public goods take priority, given their crucial role in the proper functioning of the sector. With respect to private goods (though not exclusively), a new combination of resources is required, financed by producers, governments, international cooperation, businesses, social funds, non-governmental organizations (NGOs) or the ethnic communities that live in developed countries (through remittances), among other possibilities.

Faced with a technically challenging scenario, low capitalization, and many other restrictions, farms and rural SMEs have always used preexisting resources, recombining these to produce new elements. In the current scenario, it is necessary to extend this approach. Traditional practices must be optimized by making use of the new technologies and reappraising the value of the local assets available in the rural milieu (Sotomayor et al 2019).

From that perspective, the installation of new platforms that provide services to producers is an option that merits careful consideration. A co-managed platform implies a far more active involvement by local communities. This means expanding the role and functions traditionally assumed by local producers and business people to include actions ranging from administering associations and setting strategic objectives, to organizing fairs and

other local events, co-financing extension services, placing value on unused resources, the joint construction and maintenance of infrastructure, peer to peer learning and the implementation of many other local development initiatives.

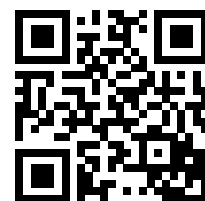
This approach also assigns a larger and more active role to external stakeholders with links to those territories: on the one hand, consumers and urban inhabitants, who through their consumption and other interactions play an increasingly decisive role, assisted by digital technologies; and on the other, the so-called global stakeholders, such as NGOs, universities, transnational corporations and international cooperation agencies.

The aim is to operate as a “network of networks”, articulating preexisting networks and providing systematized information about the events and activities taking place in the territory (and outside of it). This will also facilitate peer to peer learning, offering opportunities to all those who wish to offer products and services, as well as to make some type of contribution. The idea is to take full advantage of the collaborative economy to make common use of infrastructure and machinery, connect machines and systems, change the scale of short marketing circuits, integrate resources and enhance businesses, encouraging the emergence of a new social intelligence to achieve the goals of Agenda 2030.





Visit the website at [www.agrirural.org](http://www.agrirural.org) to access the full report and other information resources that may be of interest to users: historic reports, technical bulletins, executive summaries, infographics, videos, *inter alia*.





UNITED NATIONS

ECLAC

**Economic Commission for Latin America and the Caribbean**  
Headquarters: Av. Dag Hammarskjöld 3477, Vitacura, Santiago de Chile  
Telephone: (56-2) 2271-2000 • 2210-2000  
Fax: (56-2) 2208-0252  
PO Box: Casilla 179-D, Santiago de Chile  
Postcode: 7630412  
E-mail: [dpsantiago@un.org](mailto:dpsantiago@un.org)  
Website: [www.cepal.org](http://www.cepal.org)



**Food and Agriculture  
Organization of the  
United Nations**

**Food and Agriculture Organization of the United Nations**  
Regional Office for Latin America and the Caribbean  
Av. Dag Hammarskjöld 3441, Vitacura  
Santiago, Chile  
Telephone: (56-2) 2923-2100  
E-mail: [FAO-RLC@fao.org](mailto:FAO-RLC@fao.org)  
Website: [www.fao.org/americas](http://www.fao.org/americas)



**Inter-American Institute for Cooperation on Agriculture**  
Headquarters  
PO Box: 55-2200 San José, Vázquez de Coronado  
Telephone: (506) 2216-0222  
Fax: (506) 2216-0233  
E-mail: [iicahq@iica.int](mailto:iicahq@iica.int)  
Website: [www.iica.int](http://www.iica.int)