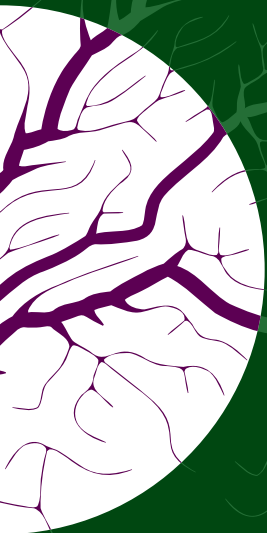


**Report
on Economic
Development**



Roots for the future

**A new rural landscape
in Latin America
and the Caribbean**



**DEVELOPMENT BANK
OF LATIN AMERICA
AND THE CARIBBEAN**



**Latin
America and
the Caribbean**

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In this report, all terms referring to positions, occupations, participants, beneficiaries, and other designations relating to people apply equally to both men and women. A distinction between genders is made only when it is relevant to the context.

Foreword

The economic development of Latin America and the Caribbean (LAC) is deeply linked to its rural territories. These areas concentrate strategic resources for the region, from fertile land, biodiversity, and forests to energy sources and critical minerals, and are home to nearly 120 million people. Rural territories play a central role in food security, the energy transition, and environmental sustainability, and constitute a fundamental pillar of long-term economic growth.

The structural transformations of recent decades have reshaped the rural landscape. Productive modernization, particularly in agriculture, has driven significant productivity gains and enabled the region to consolidate its position as the world's leading net exporter of food. However, this process has been accompanied by a sustained decline in agricultural employment, limiting the capacity of rural territories to retain population and to distribute the benefits of growth more broadly. In this context, strengthening productive linkages and promoting economic diversification are essential to ensure that productivity gains translate into more inclusive and sustainable territorial development.

Despite the progress achieved, rural areas continue to face persistent gaps across multiple dimensions of well-being. Disparities in poverty, job quality, access to basic services, and infrastructure remain significant compared to urban areas and are reflected in slower progress toward achieving the Sustainable Development Goals. These gaps disproportionately affect specific segments of the rural population, particularly Indigenous Peoples and women, who face additional barriers. Such inequalities constrain opportunities, reduce the capacity of territories to transform their resource endowments into well-being and economic development, and generate pressures that drive migration to cities in search of better prospects.

In this context, the region's rural territories occupy a strategic position in relation to major global transitions. Growing global demand for food, shifts in consumption patterns, and the energy transition are opening new opportunities for agriculture and related activities, including the extraction of critical minerals, low-carbon fuels, forestry, fisheries, aquaculture, and rural tourism.

The region has the conditions to further consolidate its role as a global food supplier while moving toward greater value addition. In several countries, successful productive experiences already demonstrate the potential of these sectors and generate lessons that can be replicated in other territories. Marked heterogeneity in productivity levels reveals substantial scope to improve economic performance through the adoption of more efficient technologies, practices, and organizational models.

Harnessing these opportunities also raises cross-cutting environmental and social challenges. The simultaneous expansion of multiple economic activities across shared territories and natural resources generates pressures on ecosystems and rural communities. Addressing these challenges requires appropriate regulatory frameworks, strengthened territorial planning and management capacities, and participatory mechanisms that engage local stakeholders, ensuring that productive development is compatible with environmental protection and social cohesion.

This Report on Economic Development builds on recent editions dedicated to climate change, the energy transition, and territorial governance, and examines rural areas as the space where these challenges converge.

At CAF -Development Bank of Latin America and the Caribbean- we recognize that advancing rural development is a necessary condition for achieving more sustainable, resilient, and inclusive growth processes across the region. In line with this objective, CAF consistently directs its financing, technical support, and knowledge production toward closing structural gaps in key areas for rural development, including infrastructure—such as irrigation, road and digital connectivity, and energy access—as well as strengthening human capital and expanding access to social services that broaden opportunities for rural populations.

As the region's green bank, CAF reinforces this commitment by promoting development models that integrate environmental sustainability as a cross-cutting pillar of its present and future interventions.

This report aims to serve as a tool for analysis and reflection for governments, the private sector, academia, and civil society, helping to ensure that the potential of rural territories translates into more sustainable and integrated development for Latin America and the Caribbean.

Sergio Díaz-Granados Guida

Executive President CAF –Development Bank of Latin America and the Caribbean–

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Abbreviations

AgTech	Agricultural Technologies
AI	Artificial intelligence
ASEAN+3	Association of Southeast Asian Nations plus China, Japan, and South Korea
BND	National Bank for Economic and Social Development (acronym in Portuguese)
BRL	Brazilian real
CAN	Andean Community
Caricom	Caribbean Community
CBAM	Carbon Border Adjustment Mechanism
CEDLAS	Center for Distributive, Labor and Social Studies (acronym in Spanish)
Celade	Latin American and Caribbean Demographic Centre. Population Division of ECLAC
CERTFOR	Chilean System for the Certification of Sustainable Forest Management
CIESIN	Center for International Earth Science Information Network
CIFOR	Center for International Forestry Research
CMAP	Participatory Environmental Monitoring Committees
CO₂	Carbon dioxide
COVID-19	Coronavirus disease
DATASUS	Department of Informatics of the Unified Health System
DANE	National Administrative Department of Statistics (acronym in Spanish)
DEGURBA	Degree of Urbanization
ECLAC	Economic Commission for Latin America and the Caribbean
Embrapa	Brazilian Agricultural Research Corporation (acronym in Portuguese)
ENAH	National Household Survey (acronym in Spanish)
ENIGH	National Household Income and Expenditure Survey (acronym in Spanish)
ERCE	Regional Comparative and Explanatory Study (acronym in Spanish)
ESG	Environmental, social, and governance
EU	European Union
EUDR	European Union Regulation on Deforestation-Free Products
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
Fintech	Financial technology
FSC	Forest Stewardship Council
GDP	Gross Domestic Product
GEO	Geostationary Earth Orbit
GHG	Greenhouse gases
GM	Genetically modified
GPS	Global Positioning System
GS	Gold Standard
GTAP	Global Trade Analysis Project
GW	Gigawatt
ha	Hectare

ICRAF	International Centre for Research in Agroforestry (World Agroforestry)
IC-VCM	Integrity Council for the Voluntary Carbon Market
IDB	Inter-American Development Bank
ICT	Information and Communication Technologies
IEA	International Energy Agency
IETA	International Emissions Trading Association
IGF	Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development
ILO	International Labor Organization
INEC	National Institute of Statistics and Censuses (acronym in Spanish)
INFONA	National Forestry Institute (acronym in Portuguese)
IoT	Internet of Things
IPUMS	Integrated Public Use Microdata Series
IRF	International Road Federation
ITU	International Telecommunication Union
JMP	Joint Monitoring Programme for Water, Sanitation and Hygiene
kg	Kilograms
kg/ha	Kilograms per hectare
LAC	Latin America and the Caribbean
m³	Cubic meters
Mercosur	Southern Common Market (acronym in Spanish)
MIALC	Internal Migration in Latin America and the Caribbean (acronym in Spanish)
NCRE	Non-Conventional Renewable Energies
n.d.	No date
NTM	Non-tariff measures
MtH₂	Million tons of hydrogen
OECD	Organisation for Economic Co-operation and Development
PISA	Programme for International Student Assessment
PPP	Purchasing Power Parity
PROCEDE	Program for the Certification of Ejido Rights and Land Titling (acronym in Spanish)
PRONAF	National Program for the Strengthening of Family Agriculture (acronym in Spanish)
PRONATEL	National Telecommunications Program (acronym in Spanish)
QR	Quick response code
RED	Report on Economic and Development
ROSCA	Rotating Savings and Credit Association
R&D	Research and Development
SDG	Sustainable Development Goals
SICA	Central American Integration System (acronym in Spanish)
SMS	Short Message Service
t	Tons
TFP	Total factor productivity
TFP+	Total factor productivity adjusted for land and capital endowments per worker
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development

UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Population Division
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNODC	United Nations Office on Drugs and Crime
USD	US dollar
USDA	United States Department of Agriculture
USMCA	United States–Mexico–Canada Agreement
VA	Value added
VCMI	Voluntary Carbon Markets Integrity Initiative
VSLA	Village Savings and Loan Association
WHO	World Health Organization
WITS	World Integrated Trade Solution
WRI	World Resources Institute

Introduction

In Latin America and the Caribbean (LAC), processes of productive modernization coexist with persistently high levels of territorial inequality—a tension that is particularly pronounced in rural areas. Despite productivity gains in agriculture and the expansion of other productive sectors, such as mining and clean energy, many rural areas continue to concentrate very high levels of poverty and labor informality.

This Report on Economic Development (RED) places rural areas at the center of the policy debate. On the one hand, they are expected to be key drivers of wealth creation in the coming years. On the other, they play a strategic role in contemporary agendas on growth, inclusion, and sustainability, in a context of increasing productive and social heterogeneity. The report examines the evolution and current state of rural productive structures and employment, demographic dynamics, the composition of household income, and gaps in the provision of infrastructure and basic services. Building on this analysis, it examines opportunities for productive diversification in key rural sectors, including agriculture and agribusiness, mining and energy, tourism, forestry, fisheries, and aquaculture. It also emphasizes the opportunities arising from the energy transition and growing global demand for sustainably produced primary goods.

The RED also shows that rural territories are undergoing profound transformations. While the decline in agricultural employment coexists with greater diversification of economic activities, the expansion of natural resource-intensive sectors opens new development opportunities and also raises challenges related to environmental sustainability, the distribution of benefits, and local governance. Moreover, in a global context shaped by climate change and greater exposure to environmental and price shocks, the interaction between these productive transformations and external risks heightens the vulnerability of rural households. These dynamics underscore the need for public policy responses that address productivity, resilience and sustainability, and social inclusion in an integrated manner.

This edition of the RED proposes a policy agenda to transform the potential of rural territories into sustained economic development and lasting improvements in the well-being of their inhabitants. The agenda brings together instruments aimed at increasing productivity and expanding access to finance and risk protection mechanisms. It also seeks to strengthen territorial governance linked to natural resource management, increase human capital accumulation, promote quality employment, and reinforce social protection.

As the development bank of Latin America and the Caribbean, CAF supports countries across the region in building territorial development strategies that are more balanced, inclusive, and sustainable. Rural areas are central to that vision—both because of their contribution to food security, environmental sustainability, and the energy transition, and because of their capacity to generate economic opportunities and well-being for millions of people. This RED reflects that commitment.

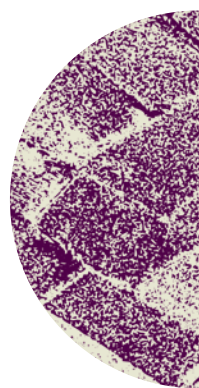
Christian Asinelli

Corporate Vice President of Strategic Programming
CAF –Development Bank of Latin America and the Caribbean–



1

**A new horizon
of opportunities
for rural areas**



Key messages

Economic development in Latin America and the Caribbean (LAC) is closely linked to the region's rural areas, where strategic resources such as food production, energy, biodiversity, forests, and critical minerals are concentrated.

Despite their importance for output and productive structures, rural areas continue to face persistent structural gaps in poverty reduction, access to basic services, job quality, and progress toward the Sustainable Development Goals (SDG).

Rural areas today are no longer defined solely by primary activities. Employment and income sources have become increasingly diversified, expanding into services and multiple stages of value chains.

Structural change in LAC has reduced the share of agriculture in employment and value added, yet the sector remains economically significant in most countries in the region.

Agricultural productivity has shown dynamic performance, but with pronounced heterogeneity and ample margins for sustainable improvement.

Growing international demand for differentiated food products creates opportunities for LAC to consolidate its position as a net global food supplier, but it also requires deep productive adjustments.



Productivity gains in agriculture are necessary but not sufficient. The development of agri-food value chains and stronger productive linkages is essential to magnify the sector's contribution to rural development and to diversify rural income sources.



Rural territories are strategic in the emerging energy landscape given their resource endowments and productive potential. However, capitalizing on these opportunities requires careful management of environmental and social risks.



The forestry, fisheries, aquaculture, and tourism sectors hold significant productive potential and can also benefit local communities by generating employment, strengthening food security, diversifying income sources, and promoting the inclusion of traditionally excluded groups.



Fully unlocking the development potential of rural territories requires public policies and institutions capable of adding value, fostering productive diversification, and closing long-standing gaps in well-being.

A new horizon of opportunities for rural areas¹

Introduction

Economic development in Latin America and the Caribbean (LAC) is closely linked to its rural territories. These areas concentrate strategic resources for the region, including food production, energy, biodiversity, forests, and critical minerals. Rural areas are home to nearly 120 million people and host close to 18 million farms. As such, they constitute a central foundation for food security, the energy transition, and sustainable development across the region.

Nevertheless, these territories also exhibit some of the most persistent social, economic, and environmental gaps in LAC. Poverty, informality, gaps in access to basic services, and infrastructure constraints coexist with low average productivity, albeit with substantial heterogeneity across sectors and production units. This combination of factors reduces the capacity of rural territories to translate the wealth of their resources into well-being for

local communities, generating systematic gaps with urban areas and sustained shortfalls in progress toward multiple Sustainable Development Goals (SDG).

This situation not only affects the opportunities available to rural populations, but also conditions the region's aggregate economic performance. A development pattern based primarily on the extraction of primary products with low value added constrains the generation of quality employment and limits the ability to diversify local economies. Strengthening linkages within value chains related to agriculture, the energy transition, and other activities with strong local impacts has the potential to expand income sources, reduce vulnerabilities, and promote more inclusive and sustainable growth.

¹ This chapter was written by Dolores de la Mata y Juan Odriozola. Juan Barnes, Belén Cañuelo, Delfina Silva, and Emilse Vargas provided research assistance.

From this perspective, this Report on Economy and Development (RED) starts from the premise that rural growth and aggregate economic development are inseparable processes. Rural areas host significant productive opportunities, whose realization requires adding value, diversifying value chains, and strengthening economic linkages. For these transformations to materialize, appropriate public policies and robust institutions are essential to close structural gaps and sustain an inclusive and sustainable development process.

This chapter begins with a conceptualization of rurality and a description of the systematic well-being gaps faced by rural populations in LAC.

It then outlines the demographic and structural change processes that have taken place in the region, together with the evolution of productivity across the main economic sectors. The chapter also addresses the challenges facing rural populations across different economic sectors, including cross-cutting challenges related to environmental and social sustainability. In addition, it examines the opportunities arising from economic activities traditionally associated with rural areas, as well as from others linked to the energy and environmental transition, in order to anticipate some of the policies needed to harness them. These issues are explored in depth throughout the report.

What do rural areas encompass?

This report focuses on the people who live in rural areas and on the productive activities that take place there. Understanding rural areas requires considering two dimensions that, while related, do not fully overlap. On the one hand, there is the sectoral dimension, linked to specific economic activities, particularly primary activities. On the other hand, there is the territorial dimension, associated with geographic location and the characteristics of population settlements.

Historically, these two dimensions have been closely connected: rural areas were associated with the agricultural sector and with low population density. However, structural change has substantially transformed this relationship. Many primary activities—such as agriculture, mining, fishing, or forestry—continue to be located mainly in rural

settings due to their reliance on natural resources and geographic conditions. Today, however, a growing share of the employment and income of people living in rural areas comes from other sectors, such as services, construction, tourism, or energy production—a trend that has intensified over recent decades.

This separation between territory and economic activity implies that not all people living in rural areas are engaged in primary activities, nor are all primary activities carried out by rural populations. This partial disconnect between where people live and what they do for a living is a central feature of contemporary rurality and poses significant challenges both for its definition and for the design of territorial development policies.

Delineation of rural areas and rural populations

The delineation of what is rural poses both conceptual and empirical challenges. In practice, there is no single, universal definition of what constitutes a rural area. Countries use a wide range

of criteria to classify their territories, reflecting demographic, productive, and administrative differences (European Commission et al., 2024; Nelson et al., 2021).

In LAC, definitions of rurality have traditionally been binary and established in opposition to urban areas. The most commonly used criterion is population size, with thresholds often close to 2,000 inhabitants, although in many countries this is complemented by indicators such as population density, access to services, infrastructure characteristics, or the predominant type of economic activity (see Box 1.1). In other cases, delineation is based primarily on administrative divisions. This heterogeneity complicates cross-country comparisons and may obscure the internal diversity of rural territories.



Under current national definitions, the rural population of LAC was approximately 120 million people in 2025, about 18% of the region's total population

Under current national definitions, the rural population of LAC was approximately 120 million people in 2025, about 18% of the region's total population (CELADE–Population Division of ECLAC and UNDP, 2024). Its relative share has declined steadily since the mid-twentieth century, and projections indicate that this trend will continue in the coming decades. In absolute terms, the total rural population has been decreasing since the early 2000s.

Box 1.1

National definitions of rural areas

There is considerable heterogeneity worldwide in national classifications of rurality. Most countries rely primarily on population density as a defining criterion. More than half combine population size or density with other criteria (108 countries and territories), but only 37 use these indicators as the sole parameter (UNDESA, 2019).

This diversity of approaches is particularly evident in Latin America and the Caribbean. Table 1 presents the definitions used in 20 countries in the region. While population size is the most frequently applied criterion, used in 10 of the 20 cases, only four countries (Argentina, Bolivia, Mexico, and Uruguay) rely on it as the sole criterion. Even within demographic criteria, there are important nuances. Countries such as Peru and Colombia, for example, incorporate density into their definitions, but measure it through the concentration of dwellings rather than directly through population counts.

Costa Rica, Cuba, Guatemala, Nicaragua, and Panama include infrastructure-related aspects in their definitions, such as access to electricity and water, the presence of paved streets, or the availability of commercial establishments. Other countries, such as Chile, integrate economic criteria, including the share of the population engaged in primary activities. A further group bases its delineations exclusively on administrative criteria, as is the case in the Dominican Republic and El Salvador.

Table 1
Definitions of rurality adopted in Latin American and Caribbean countries

Country	Definition of rurality	Type of criteria
Argentina	Localities with fewer than 2,000 inhabitants, including population dispersed across the territory. Urban areas are defined as population centers with 2,000 inhabitants or more.	Population
Bolivia	Population residing in population centers with fewer than 2,000 inhabitants.	Population
Brazil	Population residing outside the boundaries of cities (municipal seats), towns (district seats), and officially defined isolated urban areas.	Administrative
Chile	Human settlement with 1,000 inhabitants or fewer, or with a population between 1,001 and 2,000 inhabitants when more than 50% of its labor force is engaged in primary economic activities.	Population and economic
Colombia	Defined based on the classification of territory outside municipal seats. Includes population centers (clusters of 20 or more contiguous dwellings with some infrastructure and basic services, located outside the urban area [municipal seat]) and dispersed rural areas (isolated or scattered dwellings without a defined urban layout or household public services, located outside population centers and municipal seats).	Urban characteristics and administrative
Costa Rica	Territory outside administrative urban centers. A distinction is made between concentrated rural areas (50 or more grouped dwellings with basic services) and dispersed rural areas (the remainder of the territory). Urban areas are defined as administrative centers with blocks, streets, sidewalks, public lighting, and services, including their urban periphery.	Urban characteristics and administrative
Cuba	Localities with fewer than 500 inhabitants or lacking defined urban characteristics. Urban areas are defined as localities with 2,000 inhabitants or more, as well as those with between 200 and 500 inhabitants that provide multiple services (commercial, health, education, cultural).	Population and urban characteristics
Dominican Republic	Population not residing in municipal or municipal district seats.	Administrative
Ecuador	Population residing in rural parishes, both in parish seats and in the rest of the territory. Urban population is defined as that residing in urban parishes, corresponding to cantonal seats.	Administrative
El Salvador	Population living outside the official boundaries of municipal seats, generally characterized by a dispersed settlement pattern.	Administrative
Guatemala	Any territory that does not meet urban criteria. Urban areas include cities, towns, villages, neighborhoods, or condominiums with more than 2,000 inhabitants, where at least 51% of households have access to electricity and piped water.	Population and urban characteristics
Haiti	Territory not classified as urban. Urban areas include cities, commune seats, and other officially recognized agglomerations with urban characteristics.	Administrative and urban characteristics
Honduras	Areas that do not meet urban criteria, including zones with dispersed populations. Urban areas are defined as population centers with 2,000 inhabitants or more that have basic services and at least one of the following: electricity, sewerage, or a health center.	Population and urban characteristics
Mexico	Localities with fewer than 2,500 inhabitants.	Population
Nicaragua	Localities with fewer than 1,000 inhabitants that lack a defined urban structure, such as paved streets, household electricity, and established commerce, among other services.	Population and urban characteristics
Panama	Territory that does not meet urban criteria. Urban areas are defined as localities with 1,500 inhabitants or more that have a set of basic services and infrastructure (electricity, water supply, sewerage, paved streets, commerce, media access, and a secondary school).	Population and urban characteristics
Paraguay	Territory located outside district seats, characterized by dispersed dwellings typically surrounded by cropland or countryside.	Administrative
Peru	Population centers that do not reach the urban threshold. Urban areas are defined as population centers that concentrate 400 or more dwellings in a contiguous space.	Dwellings / infrastructure
Uruguay	Territory that does not meet urban criteria. Urban areas are defined as population centers with a block layout, delineated according to basic services, land conditions, and the operational criteria of the National Statistics Institute (INE).	Urban characteristics and other (operational criteria)

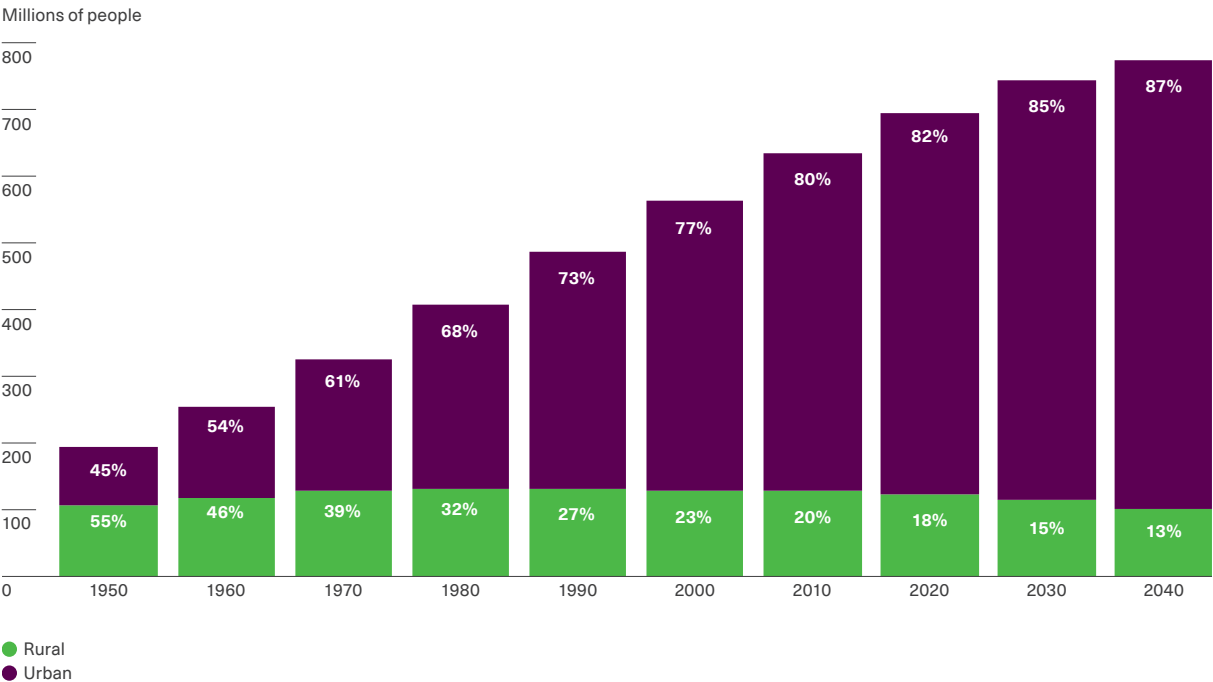
Source: Authors based on reviews by CEDLAS (2025) and ECLAC (2013).

The Degree of Urbanisation (DEGURBA) classification, which is based on harmonized population density and contiguity criteria, improves international comparability and allows for a more precise characterization of the rural–urban continuum. Under this methodology, which applies more restrictive parameters than many national definitions, the rural population of the region was estimated at around 100 million people in 2025, approximately 15% of the total. According to this criterion, about half of the rural population lives in rural villages (small settlements with some degree

of density), while the other half resides in dispersed or largely uninhabited areas.²

Throughout this report, the characterization of the population's socioeconomic and demographic conditions is based primarily on national sources, such as censuses and household surveys, which use each country's official classifications. Nevertheless, where data availability allows, the analysis is also complemented by the DEGURBA classification.

Graph 1.1
Total population and share of the rural population in Latin America and the Caribbean, 1950s-2040s



Note: Projection values correspond to the midpoint of each decade.
Source: Authors based on data from UNDESA (2019).

2 The DEGURBA classification distinguishes three territorial categories: cities; towns and semi-dense areas; and rural areas. Within rural areas, a further distinction is typically made between rural villages and dispersed or largely uninhabited rural areas (European Commission et al., 2024). For further details, see Chapter 6.

Lagging performance of rural areas in achieving the SDG targets

Rural areas show significant gaps across multiple dimensions of well-being, ranging from access to basic services to economic opportunities and job quality. These gaps are reflected in slower progress toward several Sustainable Development Goals. Table 1.1 presents a set of indicators linked to different SDGs and highlighting this situation.

In virtually all cases where comparisons between urban and rural areas are possible, a systematic gap is observed to the detriment of rural areas. The gaps are particularly pronounced for basic quality-of-life indicators: 69% of the urban population has access to safely managed drinking water services, compared with 51% in rural areas (SDG 6). Only 11% of rural households have access to basic sanitation services, compared with 65% in urban areas (SDG 1). In education, rural students achieve approximately half the level of mathematics proficiency attained by their urban peers (SDG 4). Labor informality affects 67% of rural employment, compared with 47% in urban areas (SDG 8). Rural women devote an average of 27 hours per week to unpaid domestic and care work, compared with 23 hours among urban women; as a result, gender gaps in this dimension are substantially wider in rural than in urban areas (SDG 5). These disparities not only limit the current well-being of rural populations, but also condition their future opportunities and the capacity of these territories to contribute to regional economic development.³



Rural areas lag behind in well-being, access to basic services, and economic opportunities, with slower progress toward the Sustainable Development Goals

A key issue to highlight is the limited availability of disaggregated information to adequately monitor progress toward many SDG targets in rural territories. The lack of sufficiently detailed data constrains governments' ability to diagnose gaps, prioritize interventions, and design evidence-based policies. A systematic review of SDGs 1 to 8 conducted for this report (based on multiple sources)⁴ shows that a significant proportion of official indicators either lack rural-urban disaggregation, are not comparable across countries, or are simply not measured in rural areas.⁵ Among the sources consulted, only 30% of the indicators actually have rural-urban information for, in each case, more than five countries in the region over the last 10 years. Graph 1.2 presents these results for each SDG.

The lack of information obscures key dimensions of rural realities and limits the ability to monitor progress toward the SDGs, as well as the design of public policies. Strengthening statistical systems to capture this territorial dimension is essential to improve the monitoring of territorial gaps and to guide more effective policy responses.

3 Some studies analyzing rural-urban gaps in life satisfaction, based on survey data, report mixed results for LAC. Valente and Berry (2016) find no significant differences between rural and urban areas, while more recent evidence from Tassinari et al. (2025) points to lower life satisfaction in rural areas compared with semi-urban and urban areas.

4 In addition to the Socioeconomic Databases for Latin America and the Caribbean (SEDLAC), the World Bank and United Nations databases, data collected by several of its agencies were used, including the Food and Agriculture Organization (FAO), the Economic Commission for Latin America and the Caribbean (ECLAC), the World Health Organization (WHO), the International Labor Organization (ILO), the International Telecommunication Union (ITU), and the United Nations Educational, Scientific and Cultural Organization (UNESCO).

5 The analysis identified 64 official indicators associated with SDG targets 1 to 8, which, in principle, could be measured with rural-urban disaggregation.

Table 1.1

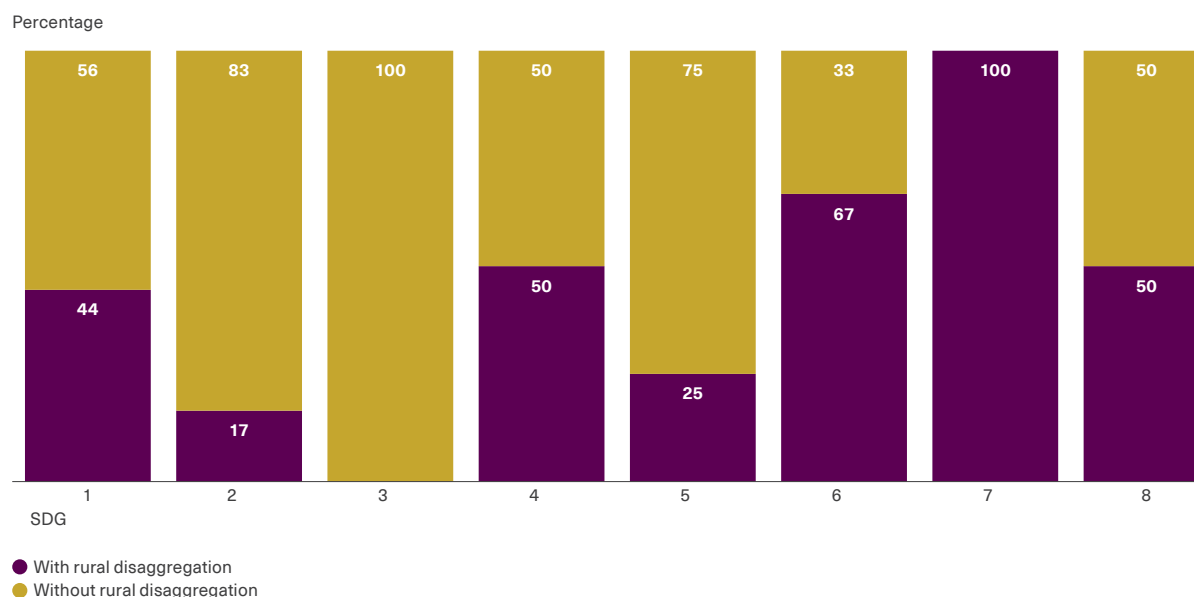
Indicators linked to SDG targets by area. Average for Latin America and the Caribbean

Goal	Indicator	No. of countries with data	Rural	Urban	Year	Source
SDG 1 End poverty	Share of heads of household reporting that they live in households with access to basic sanitation services	25	11%	65%	2024	United Nations (n.d.a)
SDG 2 Zero hunger	Prevalence of stunting (height-for-age) among children under five	12	18%	12%	Multiple years	Bancalari et al. (2025)
SDG 3 Good health and well-being	Infant mortality rate (deaths in the first year of life per 1,000 live births)	17	28	21	Multiple years	Bancalari et al. (2025)
SDG 4 Quality education	Minimum proficiency level achieved in lower-secondary mathematics (ratio)	16	0.52*		2019	United Nations (n.d.a)
SDG 5 Gender equality	Time devoted to unpaid domestic and care work, by sex (hours per week)	9	Men: 7 Women: 27	Men: 8 Women: 23	2018	CEDLAS (2025)
SDG 6 Clean water and sanitation	Share of the population using safely managed drinking water services	13	51%	69%	2024	United Nations (n.d.a)
SDG 7 Affordable and clean energy	Share of heads of household reporting that they live in households with access to basic electricity services	14	96%	100%	2023	CEDLAS (2025)
SDG 8 Decent work and economic growth	Share of informal employment in total employment	14	67%	47%	2023	CEDLAS (2025)
SDG 9 Industry, innovation and infrastructure	Share of the rural population living within 2 km of an all-season road	33	66%		2025	Buccari et al. (2025)
SDG 10 Reduced inequalities	Share of people living below 50% of median income	11	35%	14%	2022	ECLAC (n.d.b)
SDG 12 Responsible consumption and production	Domestic consumption of fossil fuels per capita (million tons)	36	30**		2023	United Nations (n.d.a)
SDG 13 Climate action	Greenhouse gas (GHG) emissions from the agricultural sector (million metric tons of CO ₂ equivalent [MtCO ₂ e])	33	35**		2022	ECLAC (n.d.a, taken from WRI)
SDG 14 Life below water	Sustainable fisheries as a share of GDP	21	0.23%**		2021	United Nations (n.d.a)
SDG 15 Life on land	Share of degraded land over total land area	22	17%**		2019	United Nations (n.d.a)
SDG 16 Peace, justice and strong institutions	Women who have ever experienced sexual violence by their most recent partner, as a share of women aged 15–49	6	5.0%	5.6%	Multiple years	CEDLAS (2025)
SDG 17 Partnerships for the goals	Share of heads of household reporting internet use	13	50%	77%	2023	CEDLAS (2025)

Note: SDG 11 (Sustainable cities and communities) focuses primarily on dimensions associated with urbanization and is therefore not included. Some indicators are proxies for the targets established under the SDGs. *For SDG 4, the indicator is expressed as a ratio: a value of 1 indicates parity between areas; values below 1 indicate a disadvantage for rural areas. **SDGs 12–15, related to sustainability and climate action, are highly relevant for rural areas; however, their indicators are not easily assignable to a specific geographic area.

Graph 1.2

SDG monitoring indicators with available information in rural areas potentially measurable in Latin America and the Caribbean



Note: The graph includes SDG 1 (End poverty), SDG 2 (Zero hunger), SDG 3 (Good health and well-being), SDG 4 (Quality education), SDG 5 (Gender equality), SDG 6 (Clean water and sanitation), SDG 7 (Affordable and clean energy), and SDG 8 (Decent work and economic growth). Within these goals, 64 official indicators with potential for territorial disaggregation were identified. Of these, 46 do not have published data with territorial breakdown, although such disaggregation would be feasible given the availability of underlying data. The total number of indicators (64) is distributed as follows: SDG 1 (9), SDG 2 (6), SDG 3 (24), SDG 4 (8), SDG 5 (4), SDG 6 (3), SDG 7 (2), and SDG 8 (8).

Source: Authors based on a review of SDG monitoring indicators from multiple organizations (see footnotes 4 and 5).

Rural poverty: Trends and characteristics

Among the indicators that reveal persistent gaps in the region, poverty is perhaps the one that best synthesizes the constraints faced by rural territories—and the one for which the most disaggregated information is available. Rural areas in LAC account for a disproportionate share of the population living in poverty. In 14 countries in the region, around 40% of all people living below

the international poverty line (USD 6.85 per day in 2017 purchasing power parity [PPP]) resided in rural areas in 2023. This share rises to 54% when considering those living in extreme poverty (USD 2.15 per day in 2017 PPP).⁶

⁶ These data are drawn from household surveys in the CEDLAS (2025) database. The countries included are Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Honduras, Mexico, Panama, Paraguay, Peru, the Dominican Republic, and Uruguay. The database contains a harmonized measure of total household income, constructed by incorporating income from multiple sources (both labor and non-labor), including monetary income (such as wages, self-employment earnings, capital income, and other transfers) and non-monetary income (including the value of production for own consumption and in-kind remuneration, such as food, housing, or services provided by the employer). Income is also adjusted to account for differences in the cost of living between rural and urban areas. For further details, see Chapter 7.

Beyond the absolute concentration of poor populations, poverty incidence is also significantly higher in rural areas. In 2023, 34% of the rural population lived in poverty—twice the 17% observed in urban areas (Panel A of Graph 1.3). This persistent gap shows that even when economies grow and aggregate poverty declines, rural territories consistently lag behind.

Significant progress has been recorded over the past two decades. Rural poverty incidence declined from 66% to 34% between 2003 and 2023. Improvements in the well-being of rural households

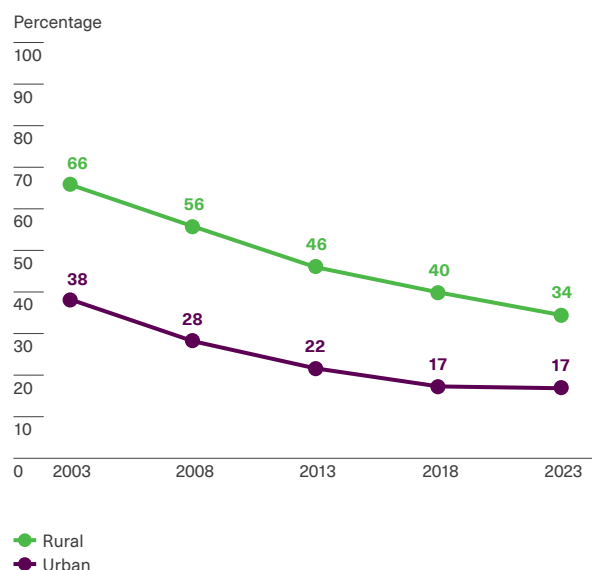
occurred alongside economic growth and changes in productive structures. Panel B of Graph 1.3 indeed shows a strong negative association between countries' GDP per capita and rural poverty rates.

●●

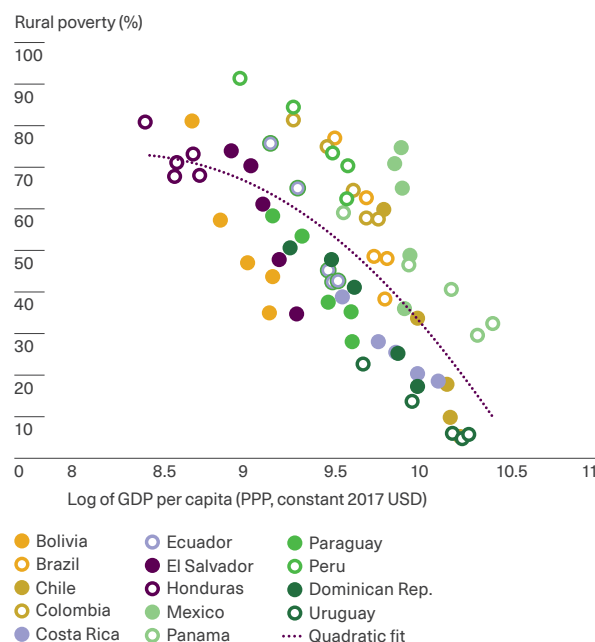
In 2023, 34% of the rural population lived in poverty—twice the 17% observed in urban areas

Graph 1.3
Rural poverty in Latin America and the Caribbean, 2003–2023

Panel A.
Poverty rate by area. Regional average



Panel B.
Relationship between the rural poverty rate and GDP per capita



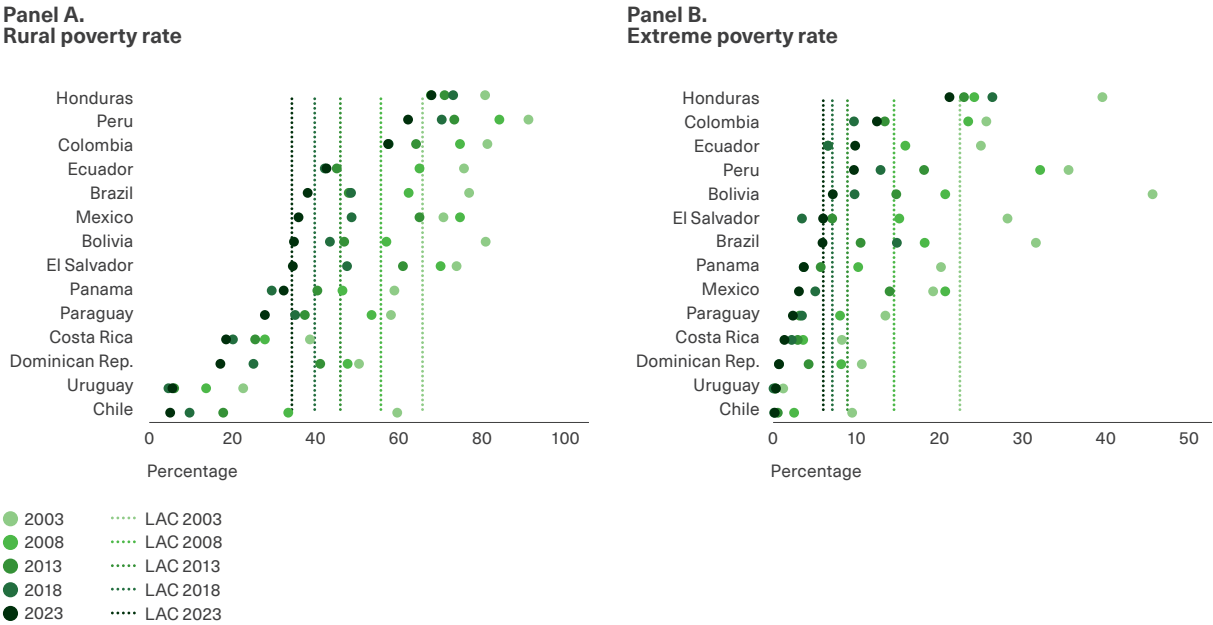
Note: Poverty is defined as the share of the population living in households with income below a threshold of USD 6.85 per person per day (PPP). Each point in Panel B represents a country–year observation. The years considered are 2003, 2008, 2013, 2018, and 2023.

Source: Authors based on data from CEDLAS (2025) and World Bank (2025h).

Reductions in rural poverty and extreme rural poverty over the 2003–2023 period were observed in all countries (Graph 1.4).⁷ In general, countries' relative positions in terms of rural poverty levels remained broadly unchanged, with Uruguay and Costa Rica recording the lowest levels, and Peru and Colombia among those with the highest. Chile and Bolivia stand out for particularly pronounced reductions in rural poverty levels.

Rural poverty rates display clear and persistent patterns by age, gender, education, and ethnicity, as shown in Graph 1.5. Poverty incidence declines with age (Panel A), is broadly similar for women and men (Panel B), decreases with the educational attainment of the household head (Panel C), and is higher among Indigenous peoples and Afro-descendant populations (Panel D).⁸

Graph 1.4
Incidence of poverty among rural households in Latin American and Caribbean countries, 2003–2023



Note: Poverty (extreme poverty) is defined as the share of the population living in households with income below a threshold of USD 6.85 (USD 2.15) per person per day (PPP).
Source: Authors based on data from CEDLAS (2025).

7 Haiti and Venezuela are possibly the only exceptions to the region's overall downward trend in poverty in recent decades; however, official statistics are not available for either country.
8 These patterns tend to be similar within each country, as shown in Graph A.1.1 in the appendix, available in the online edition of this edition of RED.

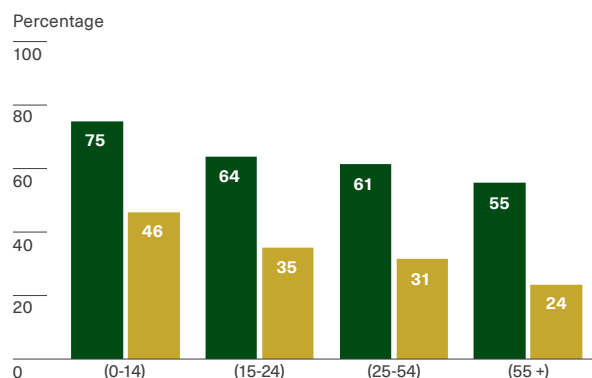


Mechanized coffee harvesting in Brazil.

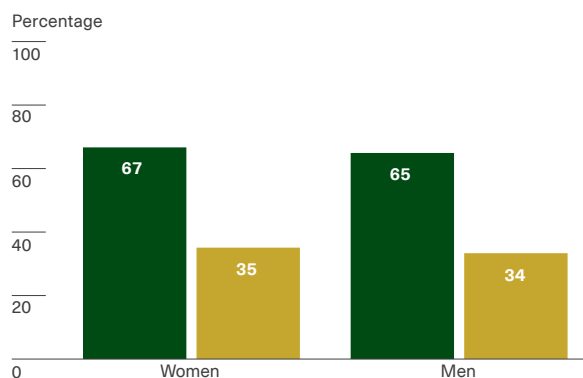
Graph 1.5

Rural poverty by age, gender, education, and ethnicity. Latin America and the Caribbean average, 2003 and 2023

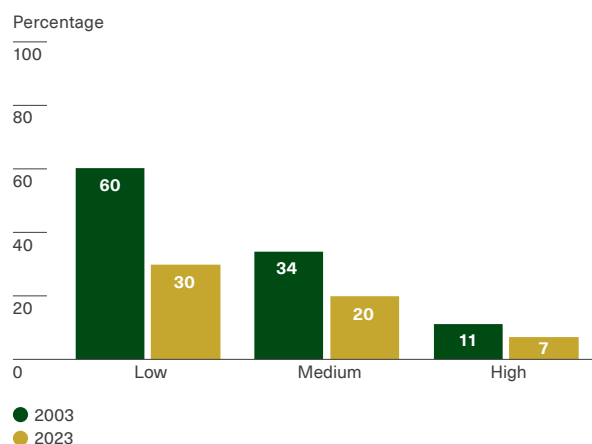
**Panel A.
Age**



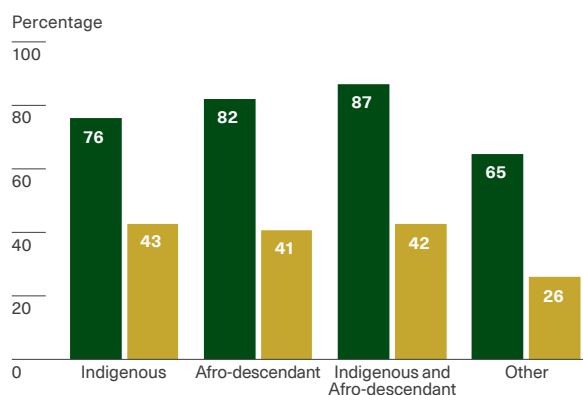
**Panel B.
Gender**



**Panel C.
Education of the household head**



**Panel D.
Ethnicity of the household head**



Note: Poverty is defined as the share of the population living in households with income below a threshold of USD 6.85 per person per day (PPP). Low education refers to individuals who have not completed secondary education; medium education to those who have completed secondary education or have incomplete tertiary education; and high education to those who have completed tertiary education.

Source: Authors based on data from CEDLAS (2025).

Structural change in Latin America and the Caribbean

Beginning in the mid-twentieth century, the region underwent a sustained process of urbanization which, as noted earlier, significantly reduced the

share of the rural population. In that context, more than 50% of total employment in LAC—and nearly all rural employment—was concentrated in the

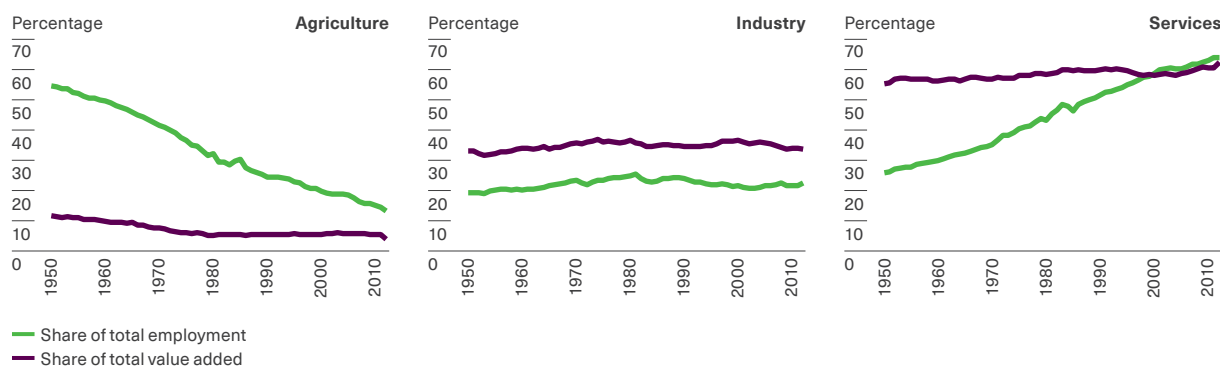
agricultural sector, which accounted for around 12% of regional value added. As economic development progressed, this demographic transformation was accompanied by a simultaneous shift in the productive structure, with a gradual reduction in the relative weight of agriculture in both employment and production.

The reallocation of labor from low-productivity sectors, such as traditional agriculture, to higher-productivity sectors, such as industry and modern services, is known as structural change, one of the main characteristics of economic growth (Duarte & Restuccia, 2010, 2020; Herrendorf et al., 2014; Kuznets, 1973). Graph 1.6 illustrates this process in LAC by showing changes in the shares of employment and value added across three sectors—agriculture, industry, and services, according to the standard classification—for the average of nine countries in the region between 1950 and 2010. The graph shows a marked decline

in the share of employment in agriculture and a more moderate reduction in its contribution to value added. In contrast to the historical experience of developed countries, a large share of labor reallocation in LAC took place directly from agriculture to services, with manufacturing playing a less prominent role in the intermediate stages of development. Moreover, although agriculture's share of both value added and employment has declined substantially, it remains higher than in developed economies.⁹

● ●
Although agriculture's share of value added and employment has declined significantly, the sector continues to account for larger shares in both dimensions than in developed countries

Graph 1.6
Evolution of the shares of employment and value added by sector in Latin America and the Caribbean, 1950–2010



Note: The data include employment levels and value added in national currency for Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru, and Venezuela. Value added figures are deflated to 2005 US dollars using the World Development Indicators base (World Bank).

Source: Authors based on data from Timmer et al. (2015) and Kruse et al. (2023).

⁹ For example, in 2010 in the United States, agriculture accounted for 1.5% of total employment and 1.2% of value added, while services accounted for 83.9% of employment and 80.9% of value added.

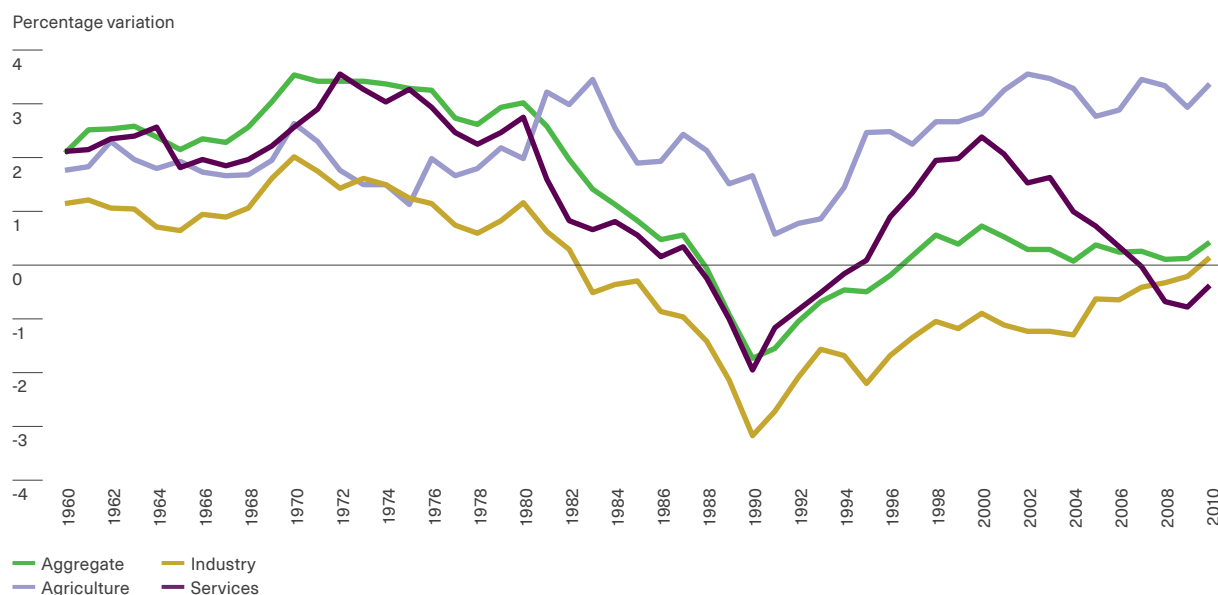
During this process of structural change, LAC economies went through a period of moderate productivity growth. Graph 1.7 presents the moving average of the rate of change in labor productivity since 1960, both at the aggregate level and by sector. At the aggregate level, an initial period is observed in which productivity growth rates were consistently positive. This period ended in the 1980s, when productivity growth began to decelerate progressively, eventually turning negative. From the 1990s onward, labor productivity growth for the economy as a whole remained virtually flat over the period analyzed. At the sectoral level, the initial period of sustained growth is also evident. The decline in aggregate productivity observed since the 1980s and the

subsequent stagnation are explained by a sustained fall in productivity in industry and services, while the agricultural sector shows positive productivity growth rates throughout the entire period analyzed.

A reallocation of workers toward low-productivity sectors, as occurs with the expansion of informal services, can have negative effects on aggregate growth (Rodrik, 2016). When successful, structural change allows for improvements in job quality, reductions in inequality, diversification of the export basket, and greater resilience to external shocks. Through this process, countries can move away from dependence on low-value-added sectors and advance toward more complex economies with higher technological content (Hausman et al., 2007).

Graph 1.7

Rate of change in labor productivity in Latin America and the Caribbean, 1960–2010



Note: The data include values for Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru, and Venezuela. The lines represent the 10-year moving average of productivity growth rates.

Source: Authors based on data from Timmer et al. (2015).

As noted earlier, agriculture has lost relative weight in the economy, but this is an expected outcome of the sector's modernization and the associated process of structural change. As shown in Graph 1.7, agriculture has become an increasingly dynamic sector in terms of productivity growth, although there remains substantial scope to further expand production in a sustainable manner. Nevertheless, given its current weight in

the productive structure, the sector alone is unlikely to serve as the engine of economic development in LAC. In this context, it is also essential to develop non-agricultural primary sectors, strengthen value chains across all primary sectors, and reinforce linkages with industry and related services. These strategies can contribute to the development of rural areas and play an important role in reducing persistent well-being gaps.

Opportunities and challenges in rural productive sectors

From a productive perspective, rural territories constitute an important source of strategic goods and services for LAC. They host the agricultural sector, but also a wide range of activities linked to the energy and

environmental transition, as well as sectors that are intensive in local employment. Together, these activities make it possible to diversify rural household income sources and strengthen their economic resilience.

Agricultural sector

Productive potential and natural resource endowments

LAC has a favorable endowment of natural resources for agricultural activities, but this potential is not always fully realized. While this characterization masks significant differences across and within countries, the evidence indicates that the sector still has substantial scope to raise productivity. At present, two segments coexist: on the one hand, a dynamic and globally competitive agricultural segment that has successfully capitalized on many of the region's natural advantages; on the other, a more traditional segment characterized by medium and low productivity levels.

Average value added per worker remains well below levels observed in high-income countries (Graph 1.8). These productivity gaps can be

attributed both to lower endowments of other factors of production per worker (such as land and capital) and to more limited use of intermediate inputs, as well as to differences in the efficiency with which these factors are combined.¹⁰ Estimates produced for this report, based on satellite data and agronomic models, suggest that the productivity gap per unit of land relative to developed countries could be closed—or even turn into a surplus—through improvements in agricultural practices, more efficient use of inputs, and crop reallocation (Adamopoulos, 2025).

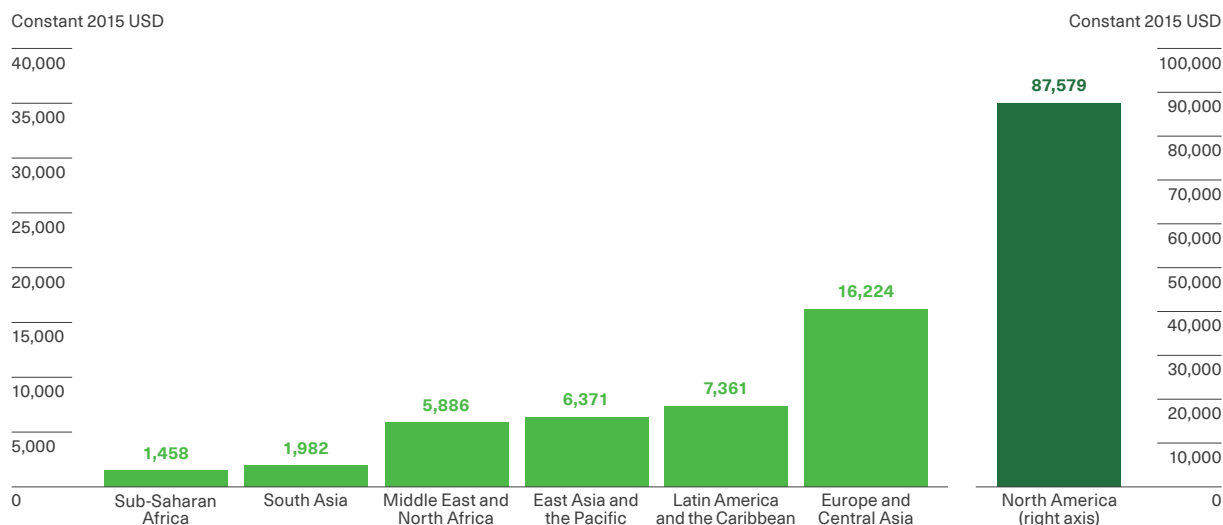


LAC has a favorable endowment of natural resources for agricultural activities, but this potential is not always fully realized

¹⁰ The efficiency with which factors are combined captures a range of effects, including technological progress, innovation, work organization, infrastructure, institutional quality, scale of operation, and the allocation of resources across productive units.

Graph 1.8

Value added per worker in the agricultural sector by region, 2023



Note: Value added per worker is expressed in 2015 US dollars. Values for North America are shown on the right axis, while those for the other regions are shown on the left axis. The agricultural sector includes agriculture, forestry, and fisheries.

Source: Authors based on data from the World Bank (n.d.).

Productive modernization of agriculture can generate labor market mismatches at the local level, which public policy must anticipate and address to ensure that productivity gains translate into broader improvements in rural territories.¹¹ Among the mechanisms that can amplify these effects and contribute to rural household well-being, investment in infrastructure—particularly road connectivity, logistics, and digital infrastructure—stands out. Improvements in rural roads facilitate access to markets and basic services and expand opportunities for labor mobility (Costinot & Donaldson, 2016; Sotelo, 2020). Digital connectivity, in turn, strengthens the development of non-agricultural rural activities, especially in services, allowing employment displaced from agriculture to move into more productive and more formal occupations.

Agri-food value chains and productive linkages

Agri-food value chains are a key factor in amplifying the sector's impact on rural development and on economies in general (Barrett et al., 2022). As countries develop, a growing share of value, employment, and income is generated in processing, logistics, storage, distribution, and marketing stages (Davis et al., 2023; Hazell et al., 2024). These linkages can raise productivity, attract investment, improve food quality and traceability, and generate higher-value added exports, while also helping to energize rural economies and facilitate consumer access to higher-quality, more diverse, and lower-cost food (FAO, 2021c).

¹¹ A study on Brazil illustrates the heterogeneous effects of technological change. While both the adoption of genetically modified soybeans and the introduction of a second maize harvest increased agricultural productivity in high-potential areas, their effects on employment differed: the expansion of soy reduced demand for agricultural labor and put downward pressure on industrial wages, whereas the second maize harvest increased agricultural employment, reduced industrial employment, and raised wages (Bustos et al., 2016).

Foreign direct investment has played a dominant role in transforming the region's agri-food systems, driving the expansion of supermarkets and food services, but with a high degree of concentration. In 2018, international chains accounted for 56% of supermarket food sales (Barrett et al., 2022). For agri-food value chain opportunities to translate into local impacts, these chains must therefore be linked to rural segments and domestic suppliers, including small-scale producers.¹²

International integration and product differentiation

The agricultural sector also plays a central role in LAC's international integration (Morris et al., 2020). Over recent decades, the region has consolidated its position as a net food exporter, with a large and growing trade surplus (Graph 1.9, Panel A). In 2023, agricultural and agro-industrial products accounted for 22% of LAC exports, compared with just 8% worldwide (UNCTAD, 2025b). In this context, projected global population growth and shifts in consumption patterns reinforce opportunities to consolidate the region's role as a food supplier to the world. However, these figures primarily reflect the export structure of most Latin American countries, while the Caribbean and some Central American countries remain net food importers (Graph 1.9, Panel B). For Caribbean and Central American countries, strengthening regional trade integration policies offers a channel to generate mutual benefits by improving access to food and enhancing food security (see Box 1.2).



The region has consolidated its position as a net food exporter, with agricultural exports accounting for a much larger share than the global average

In developed countries, a transition toward more sustainable diets is under way, accompanied by growing demand for differentiated food products, supported by increasingly stringent environmental and social standards.¹³ This creates significant opportunities for the region, while also requiring profound adjustments in productive systems.

In this context, product differentiation becomes key both to capitalizing on opportunities in international markets and to overcoming a long-standing challenge in the region: its structural exposure to volatility in primary commodity prices (Ocampo, 2017). Examples such as Colombian coffee or Uruguayan beef show that the adoption of quality, traceability, and certification standards can help stabilize incomes, improve international positioning, and open access to higher-value markets (Karl & Baethgen, 2025; Parente-Laverde, 2020).



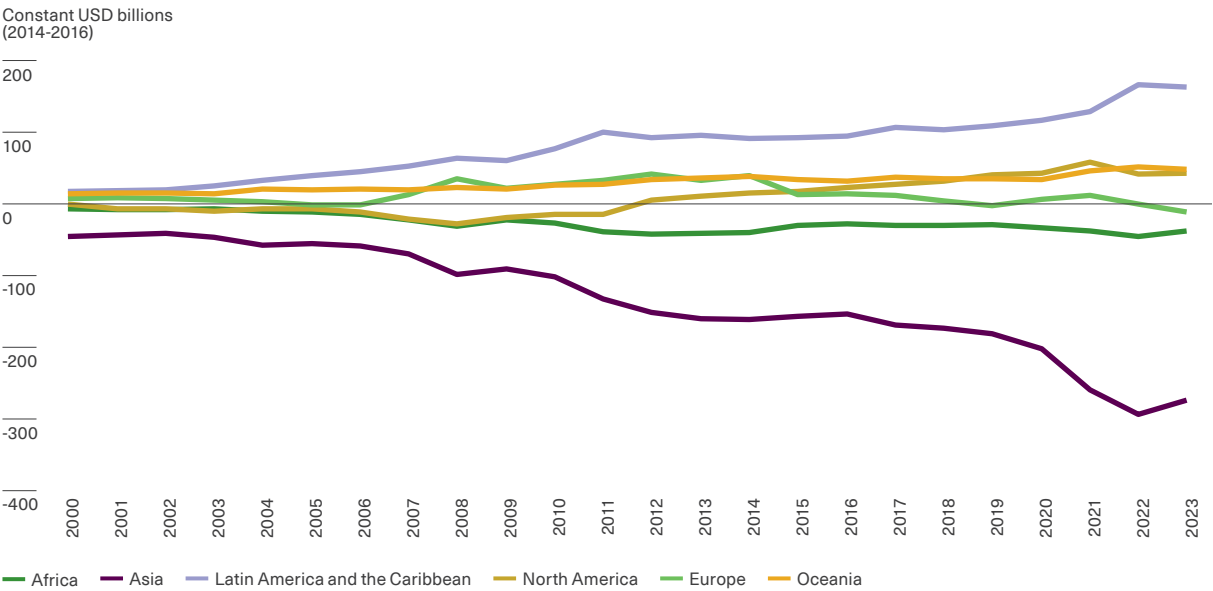
International demand for differentiated food products creates opportunities for LAC, but also requires profound productive adaptations

¹² Although the evidence is mixed, there are successful experiences when well-designed agricultural contracts are combined with technical assistance, access to finance, and mechanisms that reduce the high compliance costs associated with quality and traceability standards (Barrett et al., 2022). In particular, small producers may have comparative advantages in certain labor-intensive or differentiated crops, which allow them to compete effectively in niche markets.

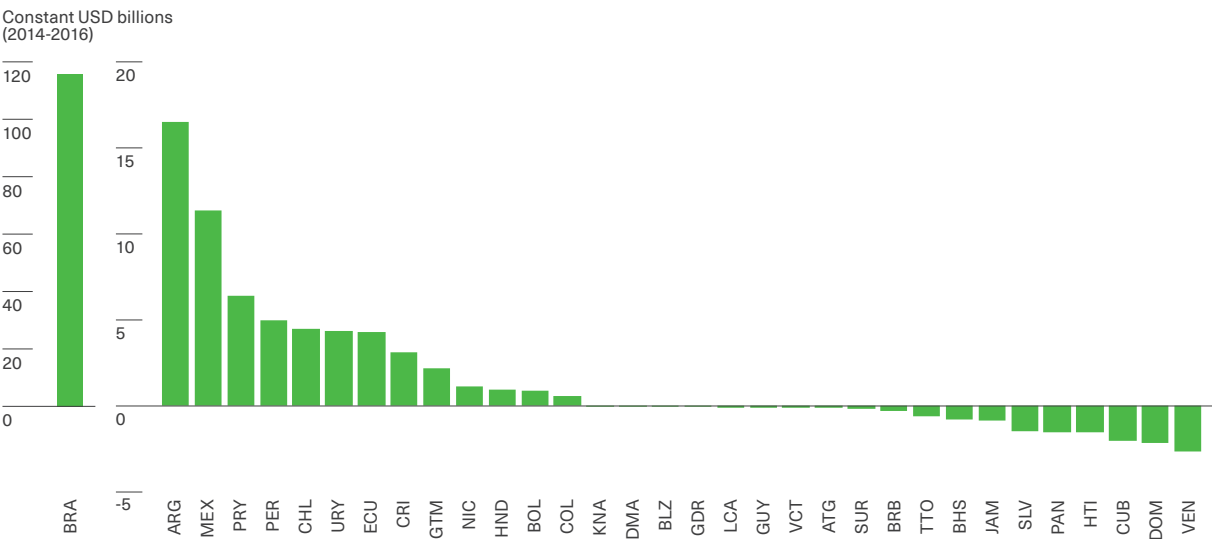
¹³ These may include requirements related to organic certification, deforestation-free production, animal welfare, fair trade, full traceability, and water or carbon footprints, among others.

Graph 1.9
Net food exports

Panel A.
By region, 2000–2023



Panel B.
By country, 2023



Note: The bars in Panel B represent food exports minus food imports, excluding fisheries and aquaculture products. Brazil is shown separately for visual clarity.

Source: Authors based on data from FAO (2024a).

Box 1.2

Regional integration and food security: the case of the Caribbean Community (CARICOM)

Food security has become a strategic priority on the regional integration agenda of the Caribbean Community (CARICOM). According to estimates by the World Food Programme (WFP, 2025) nearly 3 million people—close to 17% of CARICOM's population—face moderate or severe food insecurity. With the exception of Belize and Guyana, most member states are net food importers, with some countries relying on imports for more than 80% of their food consumption. This high degree of external dependence is compounded by the high cost of access to healthy diets.^a On average, the Caribbean records the highest costs worldwide, at levels approximately 42% higher than those observed in North America, the region with the lowest costs.

In this context, the Treaty of Chaguaramas—which established the Caribbean Community, its Single Market, and its framework for economic integration—includes an agricultural policy aimed at promoting productivity, competitiveness, and intraregional food trade as instruments to strengthen food and nutrition security. Building on this foundation, in 2022 CARICOM, together with the Inter-American Institute for Cooperation on Agriculture (IICA), launched the “CARICOM 25% by 2025 Vision” program, later extended to 2030, with the objective of reducing the cost of food imports by 25% through the promotion of local production and intraregional trade. The initiative includes actions such as reducing trade barriers, strengthening agro-industrial production, and improving access to insurance for the transport of agricultural goods. Between 2022 and the end of 2024, the program contributed to a 24% increase in regional food production (Caricom, 2025; IICA, n.d.).

Nevertheless, there remains substantial scope to deepen intraregional agrifood trade. The Caribbean continues to face a highly restrictive environment, characterized by high agricultural tariffs, with averages close to 20% in most countries—and even higher in some cases—and significantly above those applied to non-agricultural goods. These customs tariffs are also higher than the average most-favored-nation tariff applied to agricultural products in Latin America and the Caribbean, which stood at 14% in 2023 (ECLAC, 2024a).

These barriers are compounded by structural constraints, such as limited maritime connectivity, high freight costs, and weaknesses in logistics infrastructure, as well as costs associated with non-tariff measures—particularly compliance with sanitary, phytosanitary, and technical requirements—which globally are equivalent, on average, to a 17% tariff on agrifood products (ECLAC, 2024a).

Finally, shortcomings in trade facilitation—including the lack of harmonization of standards, customs procedures, certifications, and controls—increase transaction costs and clearance times. This constrains intraregional trade flows, even in the absence of high tariff and non-tariff barriers (Sanguinetti et al., 2021).

a. FAO defines a healthy diet as one that provides not only adequate calories, but also appropriate levels of all essential nutrients and food groups necessary for an active and healthy life.

Within this differentiation strategy, native foods can occupy a particular niche. Several emblematic products that began to be marketed on a large scale over the past 25 years—such as açai, quinoa, and chia—illustrate this potential. These products combine attributes valued in international markets, including nutritional benefits, resilience to climate change, and contributions to the conservation of agricultural biodiversity, by preserving local varieties that might otherwise be displaced by homogeneous agricultural systems based on standardized crops and varieties. In addition, they can be integrated into certification and traceability schemes that facilitate access to higher-value market segments. Recent studies emphasize that traditional plant genetic resources and the maintenance of crop diversity are essential for sustainable agriculture, access to micronutrients, resilience to climate change, and resistance to pest proliferation (Cadena-Zamudio et al., 2024; Goud et al., 2023).

Sustainable agricultural production

Opportunities to expand agricultural output and increase productivity can generate pressures on natural resources and emissions, in a context in which agriculture is one of the main contributors to greenhouse gas (GHG) emissions in LAC.¹⁴ However, the adoption of sustainable practices should not be understood as being at odds with productivity: in many cases, these practices are also the most efficient and help strengthen the sector's resilience to climate change, making it possible to sustain yields over time.



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The adoption of sustainable practices should not be seen as incompatible with productivity: in many cases, they are also the most efficient and help strengthen the sector's resilience to climate change

At the global level, recent studies suggest a slowdown in the growth rate of total factor productivity in agriculture, partly as a result of climate change. The increasing frequency and intensity of extreme weather events, together with gradual changes in temperature and water availability, are beginning to erode the gains achieved in productive efficiency across different regions. In this context, the adoption of more sustainable practices helps reduce vulnerabilities, limit losses, and increase the resilience of the sector.

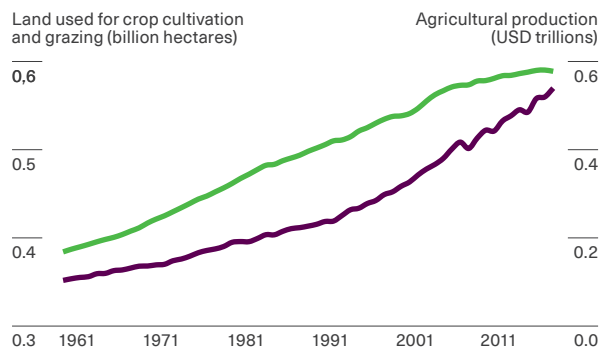
The expansion of the agricultural frontier—generally toward less productive land—represents the main sustainability challenge for the agricultural sector, given its close link to deforestation and GHG emissions (Brassiolo et al., 2023). This underscores the importance of ensuring that increases in agricultural production in LAC stem from productivity gains. Graph 1.10 shows that between 1960 and 2020, North America, Europe, and Oceania managed to significantly increase the value of their agricultural output while reducing the area devoted to cultivation, as a result of the modernization of their agricultural systems. This modernization included the use of improved seeds and resilient crops, mechanization, precision agriculture, and improvements in the use of fertilizers and irrigation (FAO, 2020b). In contrast, during the same period, the increase in the value of agricultural output in LAC was accompanied by an expansion of the area devoted to agriculture.

¹⁴ Nearly 60% of the region's carbon dioxide (CO₂) emissions originate from agriculture, land use, and land-use change. The latter are largely explained by deforestation driven by the expansion of the agricultural frontier (Brassiolo et al., 2023). This is compounded by other critical challenges, such as the overexploitation of natural resources, soil and water pollution, and ecosystem degradation, which reduce environmental services and affect both productivity and the well-being of rural populations.

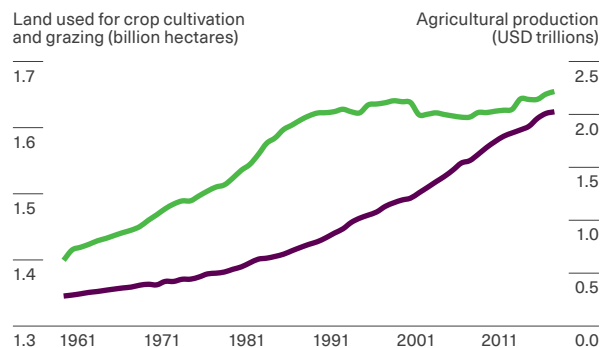
Graph 1.10

Evolution of agricultural production value and agricultural land use by region, 1960–2020

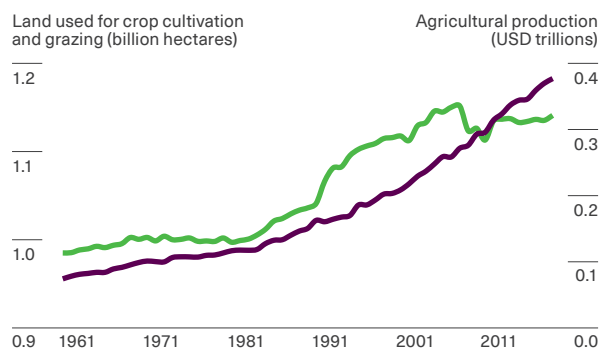
Latin America and the Caribbean



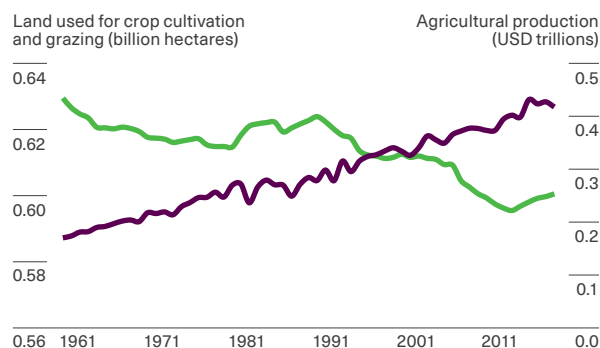
Asia



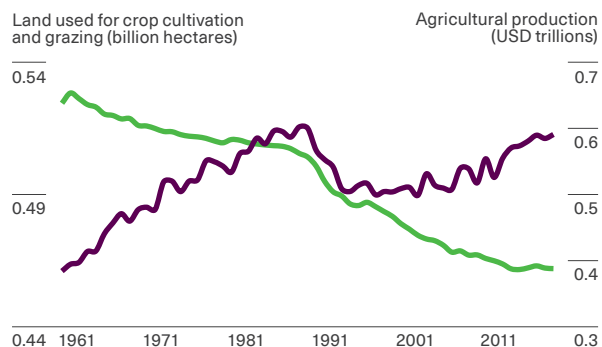
Africa



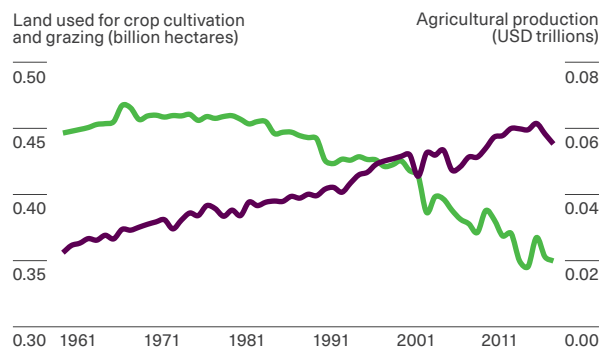
North America



Europe



Oceania



— Land use
— Agricultural production

Note: The left axis measures land use as the total area, in billions of hectares, devoted to cropland and grazing land. The right axis in each panel measures the gross value of agricultural production for the combined total of crop and livestock products and is expressed in 2015 US dollars.

Source: Authors based on Klein Goldewijk (2023) and FAO (2025n).

Productive sectors linked to the energy transition

Rural areas in LAC occupy a strategic position in the context of the global energy transition, given their abundance of natural resources (such as critical minerals) and their advantageous conditions for the production of low-carbon fuels, including green and blue hydrogen and biofuels. The reconfiguration of energy markets, marked by a shift away from fossil fuel dependence toward growing demand for renewable-based alternatives and electrification, offers a unique opportunity for LAC countries to develop their mining and energy sectors in a sustainable manner.



Rural areas in LAC are strategically positioned in the global energy transition, given their abundance of natural resources, such as critical minerals, and favorable conditions for the production of low-carbon fuels

Critical minerals and value chain development

LAC has an abundant endowment of critical minerals, concentrated largely in rural territories, which positions the region as a strategic actor in the global energy transition. Chile, Peru, and Mexico together account for nearly 45% of global copper production, with Chile ranking as the world's leading producer. In addition, territories in Argentina, Bolivia, and Chile form the so-called Lithium Triangle, which concentrates more than 60% of global reserves, primarily in brine deposits (IEA, 2025b; Valencia et al., 2025). This endowment has enabled the region to become a leader in several primary extractive markets, amid growing demand associated with renewable energy, electric vehicles, and other clean technologies (IEA, 2023b).

However, this regional leadership faces growing challenges. The discovery of large hard-rock lithium reserves and the accelerated development of these resources in other regions—often at lower extraction costs and shorter development timelines—are diversifying global supply and eroding LAC's dominant position. In this context, advancing the development of value chains is essential, particularly in activities such as refining and the production of intermediate and final goods, including batteries (ECLAC, 2023; López et al., 2019). Additional investment in this area could open opportunities for growth and economic diversification, including the creation of local processing capacities and the production of components for clean energy technologies (IEA, 2023a). Chile, for example, has begun to move in this direction through investments in research and development linked to lithium industrialization (ECLAC, 2023).

Artisanal and small-scale mining (ASM) represents an additional challenge. Although its presence in the extraction of critical minerals remains limited, growing global demand and territorial fragmentation could favor its expansion. ASM employs around 1.7 million people in the region, mainly in rural areas, and is characterized by high levels of informality, environmentally harmful practices, and greater exposure to criminal organizations (World Bank 2020a; UNODC, 2025a). In this context, strengthening regulatory, oversight, and support mechanisms for small-scale miners will be key to preventing negative impacts and ensuring more inclusive and sustainable exploitation (IGF, 2024).

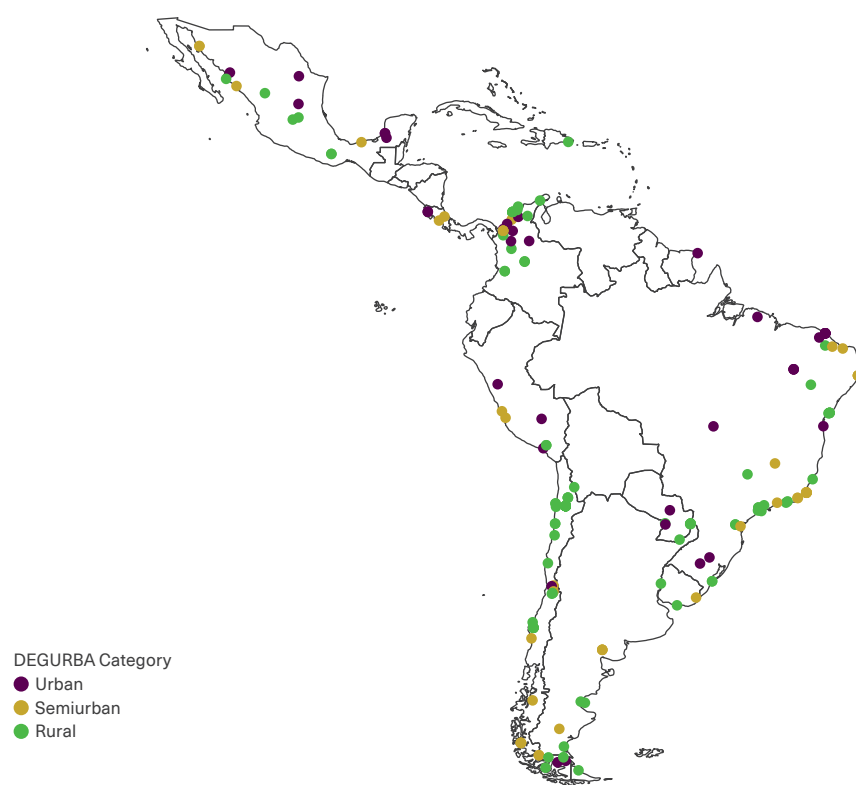
Mining has traditionally been associated with negative environmental impacts. The region exhibits high levels of social conflict and frequent complaints regarding environmental and social impacts, often in contexts marked by political, economic, and regulatory instability. This situation discourages large-scale, long-term investment, hampers the adequate capture and distribution of mining rents, and heightens environmental risks (IEA, 2023b).

Low-carbon fuels

LAC has particularly favorable conditions for the production of low-carbon fuels, especially hydrogen and its derivatives, as well as biofuels, by leveraging abundant natural resources located largely in rural territories. The region combines high potential for solar and wind power generation, availability of freshwater, and natural gas reserves, creating favorable conditions for the production of green and blue hydrogen at costs that could rank among the lowest in the context of the global energy transition (IEA, 2024).

Nevertheless, the deployment of green hydrogen currently faces constraints related to its high production costs, although these show a downward trend (IEA, 2024). In the case of LAC, advantages in renewable resource endowments make it possible to anticipate entry into the lowest-cost segments as technologies mature and project scale expands—projects that are already beginning to be developed in rural and semi-urban areas of the region. The territorial location of these projects also raises challenges related to access to freshwater, which in several countries is being addressed through the use of desalinated seawater, thereby reducing competition with other uses. The region has already made progress in low-carbon hydrogen projects (Figure 1.1).

Figure 1.1
Low-carbon hydrogen projects by level of urbanization (DEGURBA)



Source: Authors based on data from IEA (2023a) and Schiavina et al. (2023).



Aerial view of Villa Centro Castillo, Chile.

Biofuels represent another relevant opportunity, although one that remains largely underexploited outside Brazil. In particular, the production of biogas and biomethane from agricultural residues offers an attractive circular-economy pathway, with positive impacts on productive diversification, local linkages, and rural incomes.¹⁵ These fuels stand out for their energy versatility: biomethane for its ability to substitute fossil fuels in transport without requiring technological adaptations, and biogas for its use in electricity generation, heat production, injection into natural gas networks, or upgrading into biomethane suitable for transport.

However, the expansion of biofuels faces significant constraints, with access to financing representing one of the main bottlenecks. Limited lender experience with biofuel production projects, together with general risk perceptions and the long payback periods of biorefinery projects, often translates into high financing costs and limited access to credit (Makepa & Chihobo, 2024; OECD, 2022a). Added to this is competition for land use in primary production, which reinforces the case for advancing schemes based on organic residues that help reduce environmental and productive pressures.

Forestry, fisheries, aquaculture, and tourism

Forestry, fisheries, aquaculture, and tourism are essential sectors for employment generation, food security, income diversification, and the inclusion of traditionally excluded groups, such as rural women and Indigenous populations. The region has significant potential for the sustainable use of its natural resources to develop these activities, which could help strengthen local economies.

the need to consolidate more sustainable primary production and value chains.



Forestry, fisheries, aquaculture, and tourism are essential sectors for employment generation, food security, income diversification, and the inclusion of traditionally excluded groups

Forests and the forestry sector

LAC is home to the largest remaining expanse of tropical humid forests in the world, particularly in the Amazon basin. The clear competitive advantages that several countries in the region hold in the production of forest products, together with the expected dynamism of global demand for goods derived from these resources, point to a scenario of expansion for the sector. According to projections by the Food and Agriculture Organization of the United Nations (FAO, 2022a), global consumption of industrial forest products is expected to increase by 37% by 2050. Harnessing this opportunity to create goods and services places pressure on the environment, reinforcing

In this context, certification systems have gained increasing importance. These mechanisms make it possible to differentiate and add value to supply by opening access to more demanding markets, while requiring firms to comply with strict social, environmental, and labor criteria. In doing so, they help promote more equitable practices with forest-sector communities and workers. Such certifications become even more valuable in light of the European Union's Regulation (EU) 2023/1115, which imposes additional requirements for forest products to enter its market.

¹⁵ Although they tend to be more costly than first-generation biofuels, some studies show that fuels produced from residues can be cost-competitive (Jonker et al., 2015; Macrelli et al., 2012).

The climate crisis also presents an opportunity to generate income from forest resources and ecosystem services, as in the case of carbon credits. LAC accounts for 45% of the total volume of voluntary carbon credits in circulation globally,¹⁶ a market that reached its peak issuance volume in 2021, at around USD 2.1 billion annually (ILACC, 2025). In the voluntary market, a substantial share of these instruments (37% of carbon credits) comes from initiatives linked to forestry and land use. Beyond potential access to green finance, forest conservation provides key benefits for water regulation and soil erosion control, generating direct benefits for agricultural activities.

Fisheries and aquaculture

Nine out of ten fishers worldwide work in artisanal fisheries, mostly in rural areas, and their catches account for approximately half of global production (FAO, 2016). With coastlines on two oceans and abundant aquatic resources, LAC contributes around 9% of global fisheries and aquaculture production and 1% of global exports (FAO, 2025a). Chile and Peru rank among the world's largest producers and exporters of fishery products, while Ecuador stands out in shrimp aquaculture.

The main challenge facing the fisheries sector in LAC is ensuring the sustainability of catches. Only one of the four FAO-defined fishing areas in the region reaches levels close to 85% of assessed marine species within biologically sustainable limits,¹⁷ while in the Southeast Pacific Ocean area this share falls to around 33%. This situation is compounded by illegal, unreported, and unregulated fishing, as well as environmental pressures such as climate change, pollution, and habitat destruction, all of which threaten the sector's productivity and long-term viability.

Sustainable aquaculture emerges as the main opportunity for the region, as it allows for a sustainable response to growing global food demand while reducing pressure on marine and ocean fisheries (FAO, 2024b). The FAO (2022c) estimates that the Americas, from Canada to the Southern Cone, will be the region with the largest increase in aquaculture production, particularly in Chile, where output is projected to rise by nearly 50% between 2020 and 2030.

Fishery and aquaculture products are among the foods with the highest nutritional content and the lowest environmental footprint (FAO, 2024b). LAC is the second region with the lowest per capita consumption of these products, with notable exceptions such as Peru and some Caribbean countries. Dietary shifts that incorporate a greater share of such products could contribute to improving regional food security.

Rural tourism

Tourism in LAC has grown steadily over the past 25 years in both revenues and visitor numbers, a trend interrupted only by the COVID-19 crisis. Recent reports point to shifts in tourist preferences, with rising demand for cultural and nature-based tourism (Gandolfi & Ramírez, 2025), a segment of particular importance for rural areas in LAC.

For rural territories in particular, the emergence of rural and community-based tourism stands out. These activities tend to value and preserve natural and cultural resources while generating local income and employment (Gandolfi & Ramírez, 2025). They can also be especially important for economies with large rural populations, such as Andean countries and, in particular, Caribbean countries, given the central role tourism plays in their economies.

¹⁶ Voluntary carbon markets are global systems in which companies, governments, and individuals buy and sell carbon credits to voluntarily offset their greenhouse gas emissions, financing emissions-reduction or removal projects, such as reforestation or renewable energy projects, among others.

¹⁷ "Biologically sustainable limits" refer to catch levels that allow a fish population to maintain its size and reproductive capacity over the long term.

The main challenges facing tourism include the sustainability of activities, the capacity to adapt to the impacts of climate change, and the adequate provision of basic services. Given the sector's close reliance on natural resources, it is essential to strengthen it with resources that enable investment

in climate adaptation, alongside the development of resilient infrastructure in rural areas. In this context, access to basic services, including as safe drinking water, electricity, and internet connectivity, is a key factor in attracting and diversifying tourism demand.

Environmental and social sustainability challenges

Harnessing the productive opportunities of rural areas gives rise to cross-cutting environmental and social sustainability challenges, stemming from the simultaneous expansion of multiple economic activities across shared territories and natural resources. These challenges are not sector-specific; rather, they arise from growing pressure on public goods and common resources, as well as from negative externalities that markets do not adequately internalize.



Harnessing the productive opportunities of rural areas poses cross-cutting environmental and social sustainability challenges stemming from the simultaneous expansion of multiple economic activities across shared territories and natural resources

One of the main challenges facing agricultural, forestry, and biofuel production activities is competition for land use. Their expansion can generate risks of deforestation, biodiversity loss, and soil degradation if not accompanied by appropriate regulatory frameworks and sustainable production practices. In fisheries, challenges are linked to the management of common resources. Overexploitation of fish stocks, the growing presence of illegal, unreported, and unregulated fishing, together with the impacts of climate change, threaten the sector's long-term sustainability

and associated livelihoods in the absence of effective systems for regulation, monitoring, and enforcement.

Mining and low-carbon fuels also pose significant environmental tensions, primarily related to intensive freshwater use and the risk of water and soil contamination. These pressures can give rise to territorial conflicts with local communities and affect pre-existing economic activities, such as agriculture or fishing, particularly in river basins. In this context, the expansion of these activities requires regulatory frameworks and environmental management mechanisms capable of reconciling decarbonization objectives with the sustainability of rural territories.

Rural tourism, for its part, offers opportunities for productive diversification, but also entails risks of environmental degradation and infrastructure overuse when growth is not adequately planned.

The expansion of rural productive activities does not, by itself, guarantee significant impacts on local employment. Many of these sectors are capital- and technology-intensive and generate relatively low labor demand; without complementary policies, their benefits therefore tend to concentrate and generate limited spillovers. In agriculture, this dynamic is evident: rural agricultural employment has declined steadily despite sustained growth in production and, for the first time in 2023, accounted for less than 50% of total rural employment. The development of agri-food value chains, however, offers a key channel to expand local employment and income impacts. Mining is another capital-intensive sector. In this case, mechanisms for redistributing mining rents and stabilization funds,

together with requirements for local hiring and procurement, can contribute to better local capture of resource rents. Finally, in both artisanal and small-scale mining, artisanal fisheries, and certain forestry activities, the formalization of employment and improvements in working conditions can lead to direct gains in the well-being of rural populations.

Maximizing the local impacts of rural productive development requires cross-cutting enabling conditions. Investment in infrastructure, access to basic services and connectivity, together

with strengthening the human capital of rural populations, are key to ensuring that the benefits of sectoral growth translate into more inclusive and sustainable territorial development.



The expansion of rural productive activities does not, by itself, guarantee significant impacts on local employment

Institutional capacities to harness rural opportunities

The pursuit of the productive potential of rural territories to improve the well-being of their populations depends, to a large extent, on institutional capacity to effectively steer and coordinate the development of productive sectors.

First, institutions must be able to mobilize public and private investment toward rural territories. As documented in Chapter 8, the region faces significant gaps in road, digital, electricity, and social infrastructure—such as health and education—which constrain development and territorial integration. For these investments to materialize into effective projects, it is also essential to strengthen the management capacities of subnational governments, which, particularly in larger countries, are responsible for the formulation, execution, and oversight of these works (Alves et al., 2025). Institutional strengthening must be complemented by the training and empowerment of local actors, including producers, community organizations, and rural associations. Technical skills, knowledge of resource management, and organizational capacity enable communities to participate actively in project planning, oversight, and management, helping ensure that investments and initiatives translate into sustainable and equitable benefits while reducing environmental impacts.

Modern rural development also requires coherent and predictable regulatory frameworks that place sustainability at the center of productive transformations (De Salvo et al., 2025). Updated regulations help steer investment toward more efficient and sustainable practices, facilitate access to markets with environmental and social standards, and encourage innovation. In territories where activities compete for the same resources, regulatory quality and enforcement are essential to provide certainty for investors and producers, prevent negative environmental impacts and conflicts, and ensure that benefits translate into improvements for local communities. In this context, inclusive governance mechanisms that incorporate local communities, Indigenous peoples, and small-scale producers into decision-making processes strengthen the legitimacy of public policies, contribute to a more equitable allocation of resources, and reduce conflicts over land and resource use.

Another central aspect is closing the significant gaps in statistical information systems, cadastral records, and territorial data. The lack of systematic and comparable information limits the ability to design evidence-based policies, monitor inequalities, and evaluate outcomes. Addressing this challenge requires robust national statistical systems that integrate geospatial information

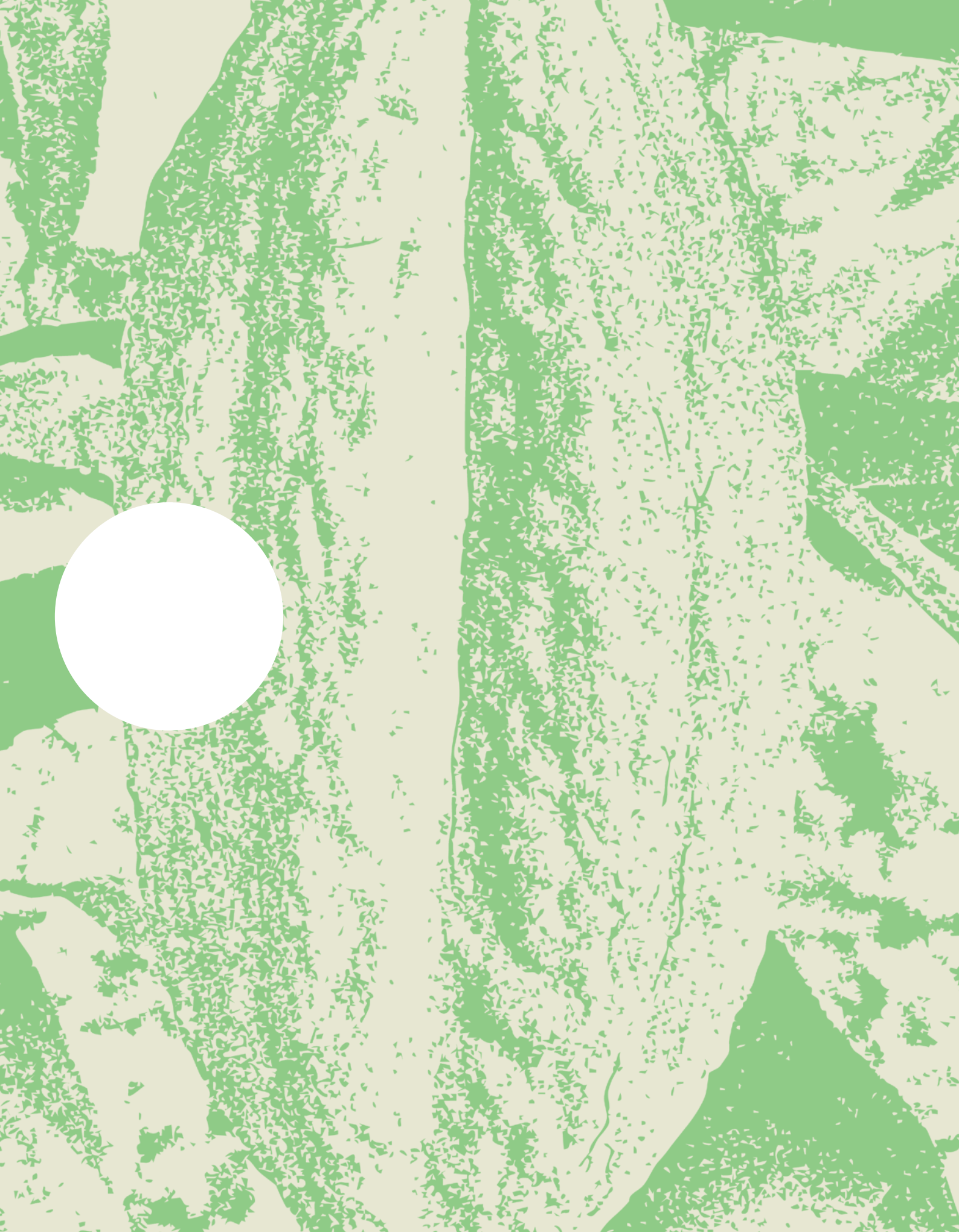
(Khalil y Di Candia, 2023), maintain up-to-date rural cadastres, and apply harmonized methodologies that allow for regional comparability.



Closing infrastructure gaps and promoting territorial integration require strengthening the institutional and management capacities of subnational governments

Consolidating sustainable rural development also requires addressing the expansion of illegal and illicit activities, which increasingly affect rural territories across the region (Dammert & Sampó, 2025). In many areas, illegal gold mining, unauthorized logging, illicit fishing, and other criminal economic activities linked to natural resources have led to environmental degradation, local rent capture, and weakened governance. This is compounded by the growing presence of criminal networks and organizations that, in contexts of limited state presence and weak institutional control, have increased violence, threats, and conflicts over territorial control (Maloney et al., 2025). This combination of illicit economies and insecurity not only hinders investment and service provision, but also undermines rights and erodes the social fabric of rural communities.

Finally, institutional strengthening must be accompanied by deeper regional integration and international cooperation. Many of the challenges and opportunities facing rural areas—such as the energy transition, food security, and productive sustainability—transcend national borders. Regulatory harmonization, information sharing, technical cooperation, and intraregional agreements can reduce costs, enhance regulatory capacities, and expand development opportunities for rural territories (ECLAC et al., 2024). Regional integration also provides a key platform for strengthening LAC's voice in increasingly demanding international markets.



2

**The agricultural
sector in
Latin America
and the Caribbean**



Key messages

The agricultural sector in Latin America and the Caribbean (LAC) continues to account for a substantial share of the region's value added, contributing close to 6% of total value added—and nearly 10% when agro-industry is included—well above the levels observed in OECD countries.

The gap between agricultural yields in LAC and those of higher-income countries is largely explained by differences in the use and allocation of inputs and production factors.

The size distribution of farms in LAC is markedly diverse. Central American and Caribbean countries are dominated by very small farms (under 2 hectares), while most Southern Cone countries have more developed agricultural sectors with a greater prevalence of large farms (100 hectares or more).

Farm size is partly driven by the composition of crops and livestock. Oilseed-producing farms tend to be the largest, followed by grain producers, and then fruit producers. Significant size variation remains across the region and worldwide, even within the same type of activity.

This heterogeneity is also reflected in capital stocks and agricultural employment across regions and among LAC countries. Countries with larger average farms generally show declining agricultural employment and higher capital stocks per worker and per hectare.

Agriculture contributes to GDP not only through direct production but also through its linkages with other sectors. It supplies inputs to agro-industry and hospitality, while demanding inputs from sectors such as chemicals.



Agriculture and agro-industry are also key drivers of LAC's exports. Agriculture alone accounts for 17% of regional exports; when agro-industry is included, the share is 22%.



A broad integration agenda remains to reduce agricultural trade costs, particularly through the harmonization of regulations—such as sanitary and phytosanitary measures—to facilitate access to new markets.



The environmental agenda's requirements to meet new regulations and certifications may pose challenges for the region, but they also create opportunities to differentiate products and add value along the export chain.

The agricultural sector in Latin America and the Caribbean¹

Introduction

The agriculture and livestock sectors play a major role in Latin America and the Caribbean (LAC), where they account for close to 6% of value added (VA), 15% of employment,² and 17% of exports. When the broader agro-industrial complex³ is included, the contribution to value added rises to nearly 10%—well above the 3% recorded in OECD countries. Moreover, the agricultural sector represents roughly 45% of rural employment. Understanding the dynamics and productive challenges of these sectors is therefore essential for designing a rural development strategy that reflects both the opportunities and the constraints facing the region.

This chapter provides a conceptual framework for the factors that drive agricultural production and explains the sector's importance for LAC—not only

through its direct contribution, but also through its linkages across production chains. It presents an overview of the agricultural sector,⁴ starting with recent trends in output and the contributions of key inputs—land, labor, and machinery—to observed changes. The chapter also describes how the sector is composed along multiple dimensions, including the size distribution of farms, the types of crops and livestock involved, the productive linkages in which they participate, and their contribution to exports.

The analysis presented here highlights the considerable diversity that exists across agricultural sectors, both across regions and within countries, as well as their varying roles within national production systems. This assessment, however, abstracts from a crucial determinant of agricultural

1 This chapter was written by Lian Allub with research assistance from María Pía Brugiafreddo.

2 Employment figures include forestry and fishing, as the necessary disaggregation to exclude them is not available.

3 The agro-industrial complex includes the following sectors: cattle meat products; other meat products; vegetable oils and fats; dairy products; processed rice; sugar; and other food products.

4 The chapter focuses on agriculture and livestock and, in some sections, on the agro-industrial complex. Forestry and fishing are examined in greater detail in Chapter 5.

output: the productivity with which the sector operates. The discussion offered in this chapter serves as a starting point for examining agricultural productivity and the policies needed to enhance

it—topics that are explored in depth in Chapter 3, which analyzes the sector's productivity levels and trends, their main drivers, and the policies essential for sustainable development.

Conceptual framework for analyzing agricultural production and productivity

The first step in understanding the agricultural sector is to identify the factors that determine its output and influence its productivity. Figure 2.1 presents a concise conceptual framework highlighting the main determinants of agricultural production. These driving factors fall into three broad categories: the inputs used—both their quantity and quality; total factor productivity (TFP); and short-term shocks, such as climate events or pests, which can significantly affect output. For example, the 2022 drought caused losses equivalent to between 2% and 5% of GDP in Argentina, Brazil, Paraguay, and Uruguay (Perelmuter et al., 2023).



Agricultural output is determined by the inputs used, how productively those inputs are applied, and the short-term shocks that affect the sector

Three of the sector's core production factors are land, labor, and machinery, which represents a major component of physical capital in agriculture.⁵ Perhaps the most distinctive feature of agriculture compared to other economic activities is that land—a critical input for production—is largely

determined by a country's geographic conditions. This does not mean that land productivity cannot be improved. Interventions such as fertilizer application or irrigation can enhance soil quality.⁶ Adamopoulos (2025) finds that current yields—which incorporate the use of inputs such as irrigation and fertilizers—are, on average, 117% higher than under low-input, rainfed conditions.

In addition to land, agricultural production depends on labor, capital, and other inputs such as seeds and fertilizers. Greater and better-quality availability of these production factors makes it possible to achieve higher yields per unit of land.⁷

The quality of inputs and the use of disembodied technology can also affect TFP and, in turn, agricultural output and profitability. Disembodied technology refers to efficiency gains that stem from knowledge and know-how rather than from a particular input—for example, the adoption of agricultural practices, the organization of farms, the use of software, or the incorporation of new skills.

Three cross-cutting elements further influence input quality and TFP levels: 1) innovation, driven by public and private investment in research and development (R&D); 2) the availability of and access to extension services, which facilitate the transfer of knowledge and technology to producers and among them; and 3) infrastructure, which can

⁵ The use of fertilizers, seeds, and irrigation is discussed in detail in Chapter 3, along with other technologies used in agricultural production.

⁶ These topics are covered in Chapter 3.

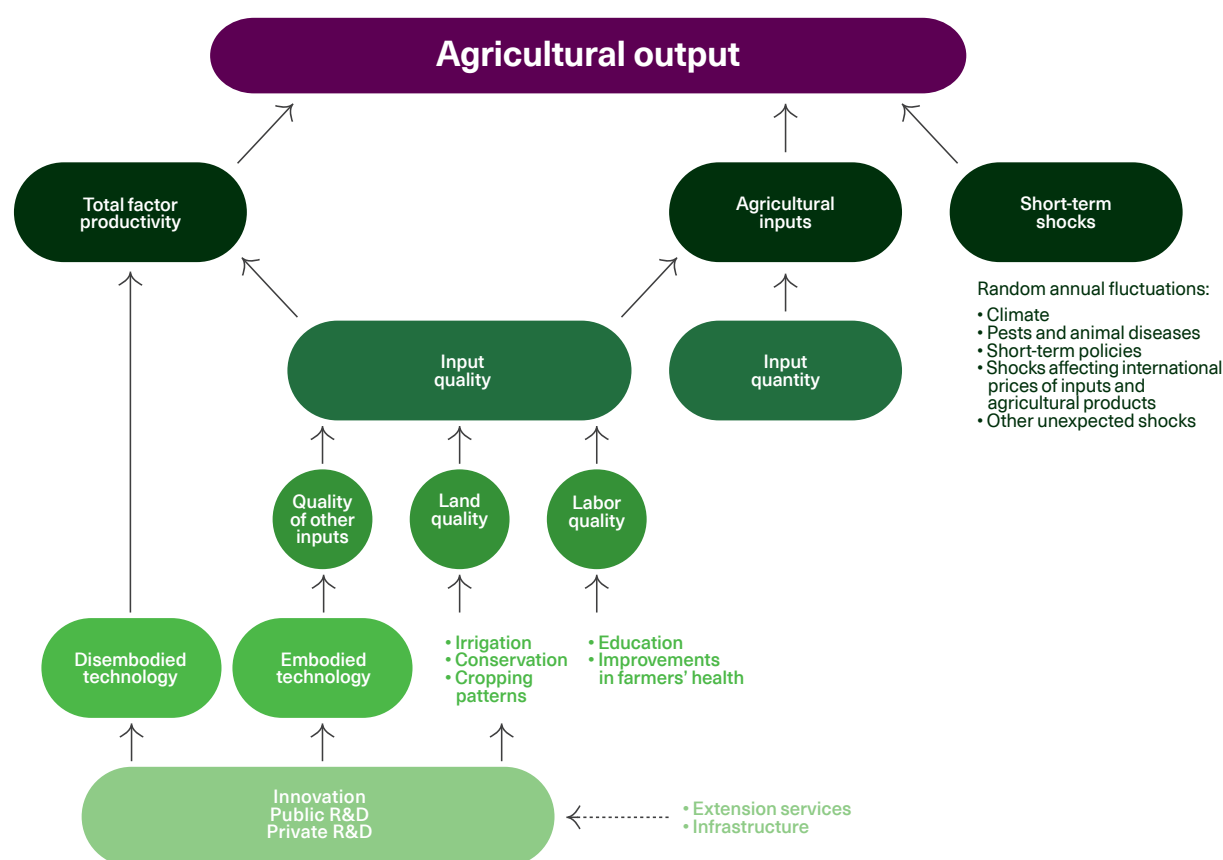
⁷ Embodied technology refers to technical improvements that are physically integrated into inputs or equipment—for example, tractors with more efficient engines, genetically improved seeds, or upgraded irrigation systems.

either support or hinder knowledge diffusion and reinforce productivity gains.⁸

Finally, agricultural performance depends not only on land endowments and factor accumulation, but also on how these resources are distributed among producers. The way production factors are used or combined, the potential to benefit from economies of scale, and the exposure to and response to shocks can all differ across farms of different sizes.⁹

The following sections examine how agricultural production in the region has evolved—measured by its contribution to value added—and describe the characteristics of three key inputs: land, labor, and capital. The role of fertilizers, irrigation, and seeds, as well as the drivers of TFP and the policies needed to strengthen it, are explored in greater depth in Chapter 3.

Figure 2.1
Key drivers of agricultural output



Source: Authors based on Wang et al. (2015)

⁸ Infrastructure can be a determinant of productivity, but productivity improvements can also increase the returns on infrastructure investment, creating incentives to expand it.

⁹ Regulatory frameworks governing access to land also play a central role in determining the existence and operation of land markets and their potential constraints.

Agriculture's contribution to GDP

Across LAC as a whole, the agricultural sector plays a very important role—especially when the agro-industrial complex is included.¹⁰ Panel A of Graph 2.1 shows that the combined contribution of the crop and livestock sectors accounts for more than 5% of value added in LAC, compared with barely 1% in OECD countries. When the agro-industrial complex is added, the figure rises to more than 9% in LAC and to less than 3% in OECD economies. However, despite all LAC countries exceeding the OECD average, the region displays substantial diversity (Panel B of Graph 2.1). In countries such as Paraguay and Guatemala, these sectors contribute more than 20% of value added, whereas in Mexico, Panama, or Trinidad and Tobago, the share falls below 7%. For the most part, the

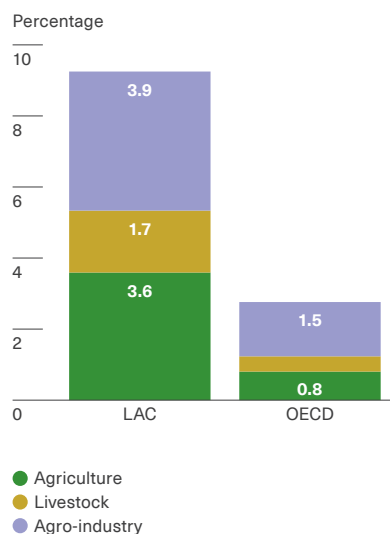
agro-industrial sector is an important contributor across the region. In several countries—such as El Salvador, Mexico, Panama, Paraguay, and Trinidad and Tobago—the agro-industrial sector accounts for a larger share of value added than agriculture itself.

● ●
The agricultural sector accounts for more than 5% of value added in LAC—and over 9% when agro-industry is included—significantly higher than the 1% and 3% observed in OECD countries

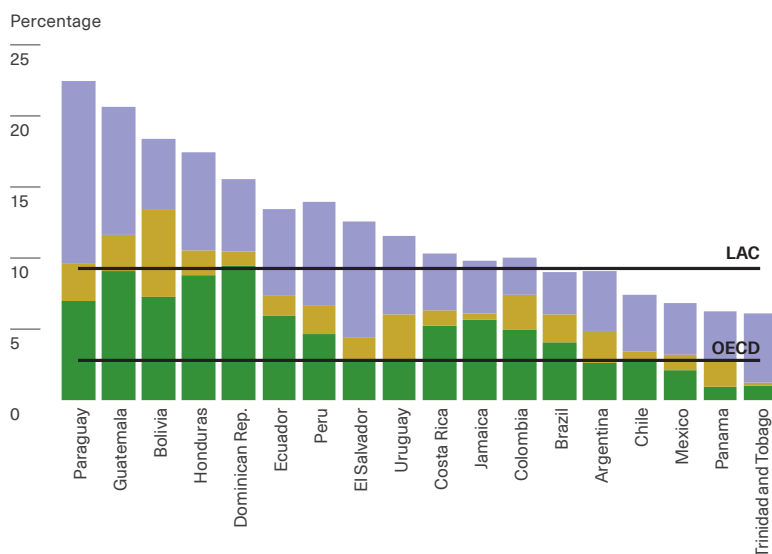
Graph 2.1

Contribution of the agricultural and agro-industrial sectors to value added, 2017

**Panel A.
By region**



**Panel B.
Selected LAC countries**



Source: Authors based on Aguiar et al. (2022).

¹⁰ To analyze contributions to value added, this section uses data from the Global Trade Analysis Project (GTAP), which provides disaggregated information for 65 sectors across 160 countries.

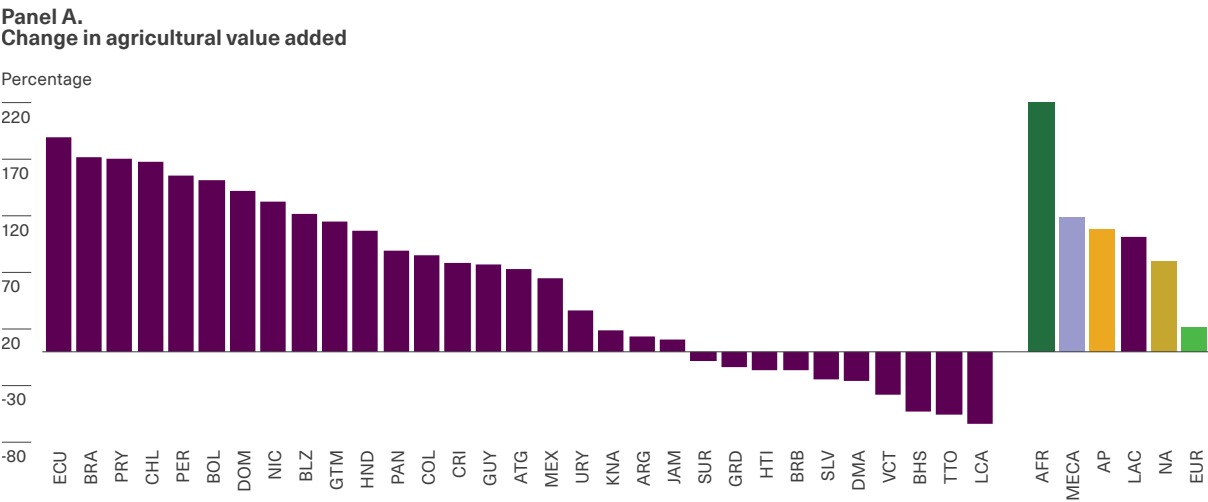
Trends in agricultural value added and its share in GDP¹¹

Agricultural value added in LAC increased by 102% between 1995 and 2023, with growth of 105% in Latin America and 36% in the Caribbean (Panel A of Graph 2.2). This regional diversity is also reflected within each subregion. In Latin America, most countries recorded increases, with Chile, Ecuador, and Peru standing out at over 150%. However, two countries—Suriname and El Salvador—showed declines of 9% and 25%, respectively. In the Caribbean, the pattern is the opposite: most countries experienced decreases, reaching 64% in Saint Lucia, 56% in Trinidad and Tobago, and 53% in The Bahamas. Only four Caribbean countries recorded growth: the Dominican Republic (143%), Guyana (76%), Antigua and Barbuda (73%), and Saint Kitts and Nevis (19%).

● ●
Although agricultural value added increased in nearly all countries in the region, the sector’s share in GDP declined in most of them

To understand whether changes in agricultural value added kept pace with developments in the rest of the economy, these trends must be compared with each country’s overall GDP. Panel B of Graph 2.2 illustrates the structural transformation underway in LAC (see Chapter 1), showing that agriculture’s share of GDP fell from 11.4% in 1995 to 6.6% in 2023—nearly a 5-percentage-point drop. This decline occurred in the vast majority of LAC countries and was widespread across subregions.

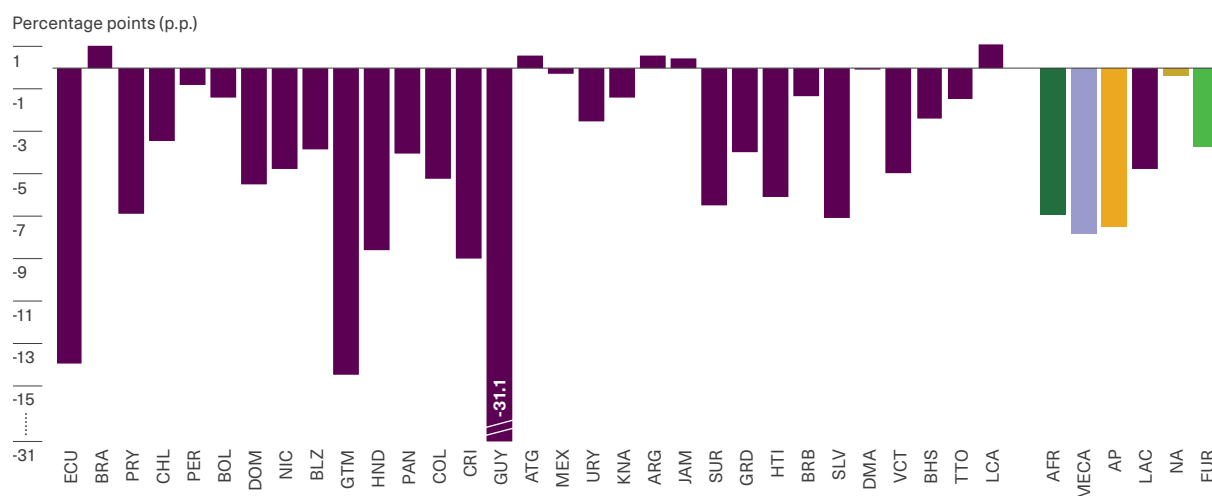
Graph 2.2
Change in agricultural value added and its share in GDP, 1995-2023



Continued on the next page →

11 This section uses value added and GDP data from the World Bank, as they provide longer time coverage than GTAP. The analysis begins in 1995, the first year for which these variables are broadly available.

Panel B.
Change in the share of agricultural value added in GDP



Note: The agricultural sector includes forestry and fishing, as disaggregated subsector data are not available for all countries. Regional value added is calculated as the sum of country-level value added, while the sector's share in GDP is computed as the simple average of the country shares. The regions included are: Africa (AFR), the Middle East and Central Asia (MECA), Asia and the Pacific (AP), Latin America and the Caribbean (LAC), North America (NA), and Europe (EUR).

Source: Authors based on the World Bank (2025b, 2025d).

Actual and potential yields

As noted earlier, land is a critical factor in agricultural production. A country's geographic conditions and land endowments largely shape its productive capacity. One way to assess the extent to which these conditions translate into higher production levels is to compare observed agricultural yields—understood as actual output per unit of land—with estimated potential yields and with selected international benchmarks. This comparison helps determine whether the region is making full use of its land resources or whether substantial room for improvement remains.

In a study conducted specifically for this report, Adamopoulos (2025) estimates effective yields and

potential yields (based on agronomic modeling) for countries in the region and compares them with those of high- and low-income countries.¹² The results show, first, that effective yields in most cases exceed potential yields under a rainfed scenario (that is, one with low investment), underscoring the importance of input use in boosting agricultural production. Second, yields in LAC countries generally lie about 20% below those of high-income countries. This gap can be attributed both to differences in natural resource endowments and to the more intensive and efficient use of production factors and agricultural inputs in high-income economies. To isolate the role of climate and soil conditions,

¹² The "high-income countries" group consists of the 10% of countries with the highest per capita income, and the "low-income countries" group consists of the 10% with the lowest.

the analysis focuses on potential yields under the low-investment scenario. In that case, the region's average potential yield is 20% higher than that of high-income countries, highlighting LAC's comparative advantages in this area.

The observed gaps in effective yields are therefore mainly explained by the use of inputs—such as fertilizers, irrigation, and improved agricultural

practices—and by the sector's productivity levels. The next section describes the main production inputs in agriculture (land, labor, and capital), while Chapter 3 delves deeper into the factors that determine productivity, including the use of fertilizers, irrigation, and seeds; the evolution of productivity in the sector; and the opportunities and risks posed by digitalization and climate change.

The role of land and the distribution of farms by size

The way land is used, the type of production carried out, and agricultural yields are all closely shaped by producers' decisions. Farm size plays a key role in these decisions. How the total area of land devoted to agricultural production is distributed across farms is fundamental for understanding capital intensity,

fertilizer use, irrigation, and labor use, among other conditions that affect production levels. Box 2.1 describes the different ways land can be used, while the following sections examine how farms are distributed by size, crop type, and land tenure.

Distribution of farms by size

The agricultural sector is highly diverse across the region and the world, both in how farms are organized and how production is structured.¹³ Understanding the size distribution of farms offers important clues about productivity and inequality within the agricultural sectors of different countries and regions.

Graph 2.3 illustrates the distribution of farms and their land area in different regions and worldwide. A first point to highlight is that, globally, more than 70% of farms are smaller than two hectares (ha). This pattern is largely driven by the distribution

observed in Asia and the Pacific, where more than 80% of farms fall into this category, and in Africa, where nearly 60% are smaller than 1 ha. By contrast, regions with highly developed agricultural sectors—such as North America¹⁴—show a substantial share of medium and large holdings (over 20 ha and over 50 ha, respectively). LAC occupies an intermediate position: while it has a significant share of small farms (under 2 ha), this share is lower than in Africa or Asia and the Pacific, and the region also has a meaningful presence of large farms.¹⁵

13 Gáfaró et al. (2025) show that the size of farms is positively associated with value added per worker, and that value added per worker is, in turn, inversely associated with the poverty rate—although this does not imply a causal relationship between the variables.

14 Throughout the chapter, North America refers to the United States and Canada.

15 Chapter 3 shows that this distribution of farms is also reflected in agricultural productivity, which lies between that of more and less developed countries, underscoring the relationship between farm size and distribution and sector productivity.

Box 2.1

Classification of agricultural land by use

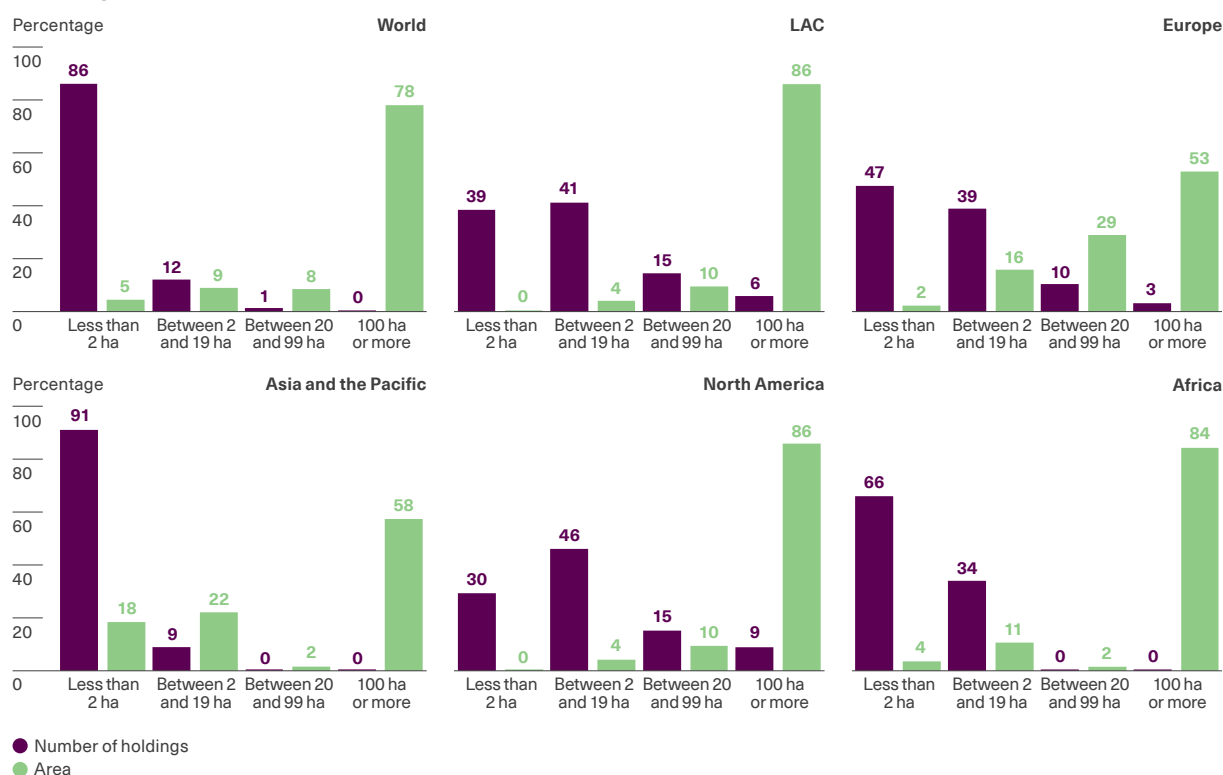
Agricultural land can be classified as follows:

- **Agricultural land.** Land used for agricultural production. This category corresponds to the sum of areas classified as *cropland* and *permanent meadows and pastures*.
- **Cropland.** Land used for crop production. It corresponds to the sum of areas classified as *arable land* and *permanent crops*.
- **Arable land.** Land used for crops grown in rotation with fallow, meadows, and pastures in cycles of up to five years. This category includes *temporary crops*, *temporary meadows and pastures*, and *temporary fallow*. However, it excludes land that is potentially cultivable but not currently cultivated.
- **Temporary crops.** Land used for crops with growing cycles of less than one year, which must be replanted after harvest to continue producing. Some crops that remain in the field for more than a year may also be considered temporary—for example, asparagus, strawberries, pineapples, bananas, and sugarcane. Land cultivated more than once per year is counted only once.
- **Temporary meadows and pastures.** Land used for temporary forage crops of herbaceous species for mowing or grazing, as part of crop-rotation periods of less than five years.
- **Temporary fallow.** Agricultural land left uncultivated for one or more growing seasons. In general, the maximum fallow period is less than five years. Such land may be sown exclusively for green manure. Land left fallow for too long may acquire characteristics that require reclassification—for example, as *permanent meadows and pastures* if used for that purpose.
- **Permanent crops.** Land used for long-term crops that do not require replanting for several years (such as cacao and coffee).
- **Permanent meadows and pastures.** Land used for forage grasses on a permanent basis (five years or more), whether natural (grazing lands or wild grasslands) or cultivated. Permanent meadows and pastures with trees or shrubs should be recorded in this category only if forage production is the primary use of the land. This category includes:
 - pastures in wooded areas (e.g., agroforestry areas);
 - pastures in shrubland areas (grazing land, scrub, thickets);
 - pastures in plains or low mountain regions used for grazing and traversed by transhumant herds, where animals spend part of the year (approximately 100 days) without returning to a corral overnight.
- **Other land.** Land not classified as *agriculture* or *forestry*. It includes the following categories from the System of Environmental-Economic Accounting (SEEA): *land used for aquaculture*, *urban and related land*, *other land not elsewhere classified*, and *land not in use*.

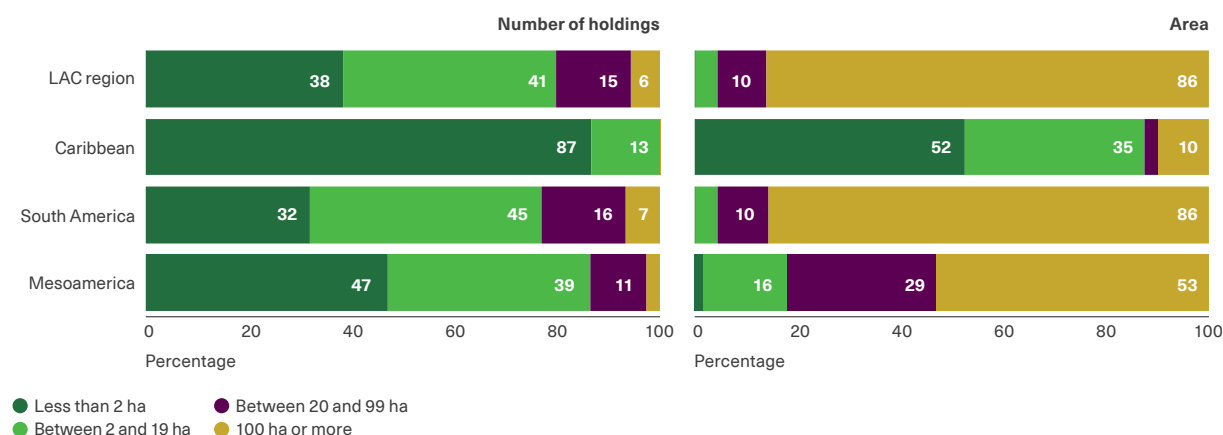
Source: Authors adapted from FAO (2025d).

Graph 2.3
Distribution of farms and total land area by farm size

Panel A.
World regions



Panel B.
Latin America and the Caribbean and their subregions



Note: Values correspond to the latest year with available data for each country from the two most recent rounds of the World Census of Agriculture (2010 and 2020). Appendix Graph A.2.1, available in the online edition of the RED, presents the country-level information shown in Panel B.

Source: Authors based on FAO (2025c).

Panel B of Graph 2.3 shows the distribution of farms and their land area across LAC subregions, which differ markedly from one another. South American countries have a distribution similar to that of North America, with a considerable share of medium and large farms, and a relatively smaller share of farms under 2 ha. In Mesoamerica,¹⁶ farms under 2 ha represent a larger share than in South America—reflecting the greater prevalence of subsistence agriculture—yet the number of medium and large farms is also substantial. In the Caribbean, small farms dominate, while the presence of farms above 20 ha (including those over 100 ha) is nearly insignificant.

Land area, in general, is concentrated in large farms (over 100 ha), even in subregions where farms under 2 ha account for a large share of total farms. Only in the Caribbean is the distribution of land across different farm sizes more even.¹⁷



The size distribution of farms in LAC shows a substantial share of small farms (under 2 ha). Yet the region displays wide variation: the Caribbean has the highest concentration of these farms, while South America has the lowest

This highly diverse size distribution results in very different average farm sizes.¹⁸ Average sizes exceed 100 ha per farm in high-income countries with major agricultural sectors—such as those in North America, Australia, and New Zealand—as well as in middle- and low-income countries with strong comparative advantages in agriculture, such as South Africa or several in Latin America. By contrast, average farm sizes in the Middle East, Central Asia, much of Africa, and the Caribbean are very small, typically below 6 ha per unit. Altogether, these patterns suggest that the size distribution of farms may pose a barrier to expanding agricultural production and productivity.¹⁹

Composition of the agricultural sector by type of crop and livestock

Part of the variation in average farm size can be explained by the type of crops and livestock produced on them. Regarding crops, Panel A of Graph 2.4 shows that, in the Southern Cone (with the exception of Chile), the dominant crops—measured by harvested area—are oilseeds.²⁰ Although oilseeds are also present in other South American and Mesoamerican countries, their relative importance is considerably lower. Cereals

and grains are also highly relevant in these two subregions, while fruits account for a significant share in the Caribbean islands. Finally, vegetables and tubers have a notable presence in the Caribbean islands and in some Mesoamerican and South American countries.²¹

16 Throughout the chapter, Mesoamerica refers to Mexico and the countries of Central America..

17 Graph A.2.1, in the Appendix available in the online edition of the RED, shows the distribution of farms and land area by LAC country.

18 See Table A.2.1 in the chapter appendix of the online edition of RED.

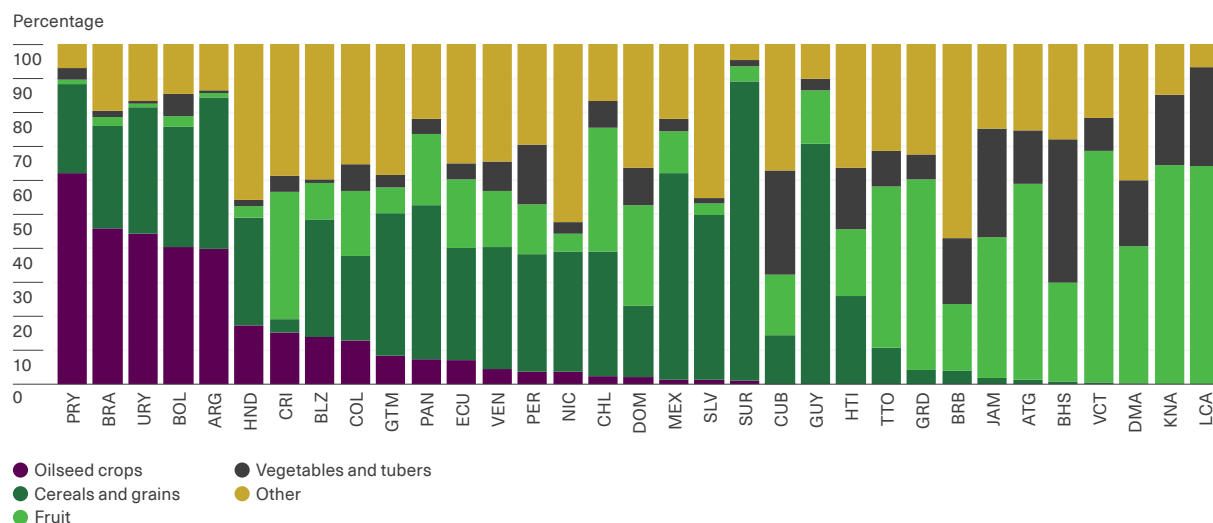
19 While the size distribution of farms may act as a barrier to productivity gains, the causal relationship may also run in the opposite direction, whereby low agricultural productivity results in smaller farm sizes.

20 These are the main crops in terms of the land area used for production and the number of farms engaged in the activity; they are not necessarily the most important in terms of their contribution to economic output.

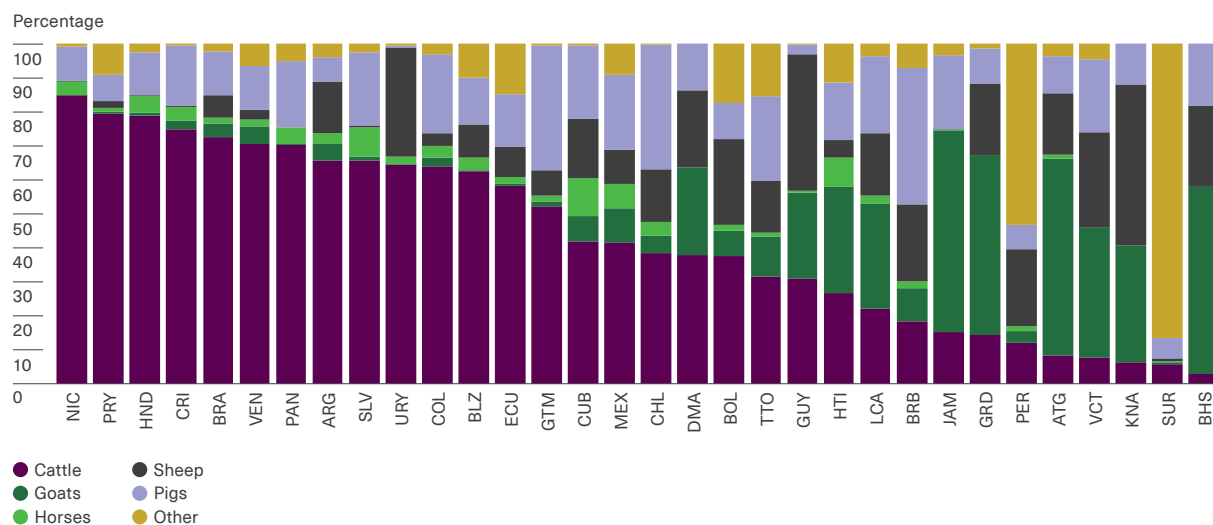
21 The two main crops in LAC as a whole are soybeans and maize. Soybeans are produced primarily in Southern Cone countries—with the exception of Chile—namely Argentina, Bolivia, Brazil, Paraguay, and Uruguay, while maize is the dominant crop in Mesoamerican countries such as Honduras, Guatemala, and Mexico. Coffee production is also notable in Colombia, Guatemala, Honduras, Peru, and Venezuela. Crops such as wheat and rice are present in many countries. Other crops are important only in a smaller group of countries—for example, sorghum in Bolivia and Mexico; grapes in Chile; cacao in Ecuador, Peru, Colombia, and Venezuela; or potatoes in Peru.

Graph 2.4
Composition of the agricultural sector in LAC countries, 2023

Panel A.
Composition of harvested area by crop group



Panel B.
Composition of livestock inventories by type of animal



Note: In Panel A, the category "other" includes legumes, crops for industrial materials (such as sugarcane), plant-based fibers, spices, stimulants (coffee, tea, yerba mate, and tobacco), nuts and seeds, and other unclassified products. Countries are ordered in descending order according to the share of oilseeds, and then by the share of cereals and grains. In Panel B, "other" includes camelids, mules and hinnies; rabbits and hares; geese and ducks; and other rodents used mainly for meat, such as guinea pigs. Countries are shown in descending order according to the share of cattle.

Source: Authors based on FAO (2025b).

Turning to livestock (Panel B of Graph 2.4), and excluding poultry (chickens and turkeys),²² cattle are the predominant type in most countries of the region, especially in continental ones. In several Caribbean islands—such as Antigua and Barbuda, The Bahamas, or Grenada—goats constitute the main livestock category, while sheep and pigs are present in most countries with a meaningful share, although they rarely constitute the dominant category (with the exception of Saint Kitts and Nevis). Equine production is also present across much of the region, though to a more limited extent.

This raises an important question: Are differences in average farm size driven primarily by differences in the composition of crops and livestock?

Globally, although average farm sizes differ somewhat across crops, Table 2.1 shows that there are large cross-country disparities in farm size even for the same activity. The table groups countries into quintiles based on agricultural value added per worker. A generally positive relationship emerges between agricultural value added per worker and average farm size—both for crops and for livestock production.²³ The differences are especially pronounced for grains, oilseeds, and livestock, and smaller for fruits, cocoa, and coffee. Panel B of Table 2.1 presents average farm sizes by activity for LAC countries with available data, sorted in the same way—from lowest to highest agricultural value added per worker. Southern Cone countries display larger average sizes, and this pattern cannot be explained solely by the type of activity undertaken; it appears across most activities.

The way production is organized in lower-income countries—where family farming, particularly subsistence farming, is more prevalent—may contribute to a farm-size distribution skewed toward very small farms. Family farming is widespread across the region: in all countries with available data, it represents more than 75% of farms, and in most cases more than 98% (see Box 2.2). Countries with a smaller share of family farming include Argentina, Brazil, and Uruguay—all of which have highly developed agricultural sectors and large areas of farmland—as well as Costa Rica.



While differences in the size distribution of farms can be explained in part by crop and livestock composition, large disparities remain even within the same activity

The concept of family farming, while useful for classification and analysis, encompasses a broad range of farms that differ along many dimensions: the assets they manage (land size and quality, access to water, livestock, infrastructure, mechanization), the resources available to them (natural, human, and financial), the share of family vs. hired labor, land tenure arrangements, production scale, whether they generate surplus production, and their degree of market integration, among others. Box 2.2 describes what is meant by family farming.²⁴

22 Because chickens and turkeys have stock levels that are significantly higher than those of other types of livestock, they are excluded from the graph to avoid distorting the representation of the livestock structure.

23 Adamopoulos and Restuccia (2014) offer similar evidence using data from the 1990 World Agricultural Census, with countries sorted by GDP per capita.

24 In light of this heterogeneity, the chapter prioritizes the use of farm size as the main unit of analysis rather than classifying farms based on the concept of family farming.

Table 2.1
Average size by crop and livestock type

Panel A. Global

Quintile	Average crop size (ha)								Livestock per holding (head)			
	Total	Wheat	Rice	Maize	Soybeans	Coffee	Cocoa	Fruit	Cattle	Chicken	Sheep	Pigs
Q1	2.1	17.7	1.2	1.7	8.6	1.0	0.5	0.4	10.3	218.6	46.5	113.2
Q2	28.0	12.7	2.1	1.5	8.7	2.5	3.4	0.6	20.3	52.1	23.1	33.4
Q3	45.8	18.8	48.3	3.7	0.1	1.4	1.6	1.5	52.7	182.5	91.5	108.5
Q4	49.6	10.7	25.4	5.6	5.9			6.1	41.0	681.7	87.3	453.6
Q5	438.4	60.2	86.9	32.9	44.0			5.6	119.3	25.433.0	393.1	501.2

Panel B. Selected LAC countries

Country	Average crop size (ha)								Livestock per holding (head)			
	Total	Wheat	Rice	Maize	Soybeans	Coffee	Cocoa	Fruit	Cattle	Chicken	Sheep	Pigs
Guatemala	4.5	0.3	1.7	0.8	1.2	1.6	0.3	0.2	15.2	93.8	8.0	3.8
Ecuador	14.7		0.5	1.7	12.9	2.7	4.2		10.5	15.7	6.3	3.5
Mexico	14.7	2.5	3.9	0.0	15.6	1.6			16.9	69.2	9.5	5.4
Panama	11.7		2.3	1.2	0.1	1.0	0.1		39.1	93.7		11.1
Brazil	72.8	17.6	3.1	3.5		4.8	5.8	0.6	48.1	117.5	36.6	11.2
Chile	83.7	4.5	10.1	3.3				7.2	25.6	200.4	40.7	16.2
Uruguay	287.4	101.1	275.6	11.3					212.4	325.5	448.0	15.5

Note: The table reports the average size of farms—measured as cultivated area per farm in the case of crops, and as the number of animals per ranch in the case of livestock. Countries are shown in ascending order of agricultural value added per worker in 2023 (in constant 2015 dollars) and, in the case of the global sample, grouped into quintiles (Q1: Guatemala, India, Indonesia, Lao PDR, Pakistan, South Africa, Thailand, and Tanzania; Q2: Brazil, China, Comoros, Ecuador, Egypt, Greece, Mexico, and Panama; Q3: Algeria, Chile, Korea, Estonia, Iran, Japan, Malaysia, Türkiye, and Uruguay; Q4: Saudi Arabia, Austria, Denmark, Spain, France, Ireland, Italy, New Zealand, and Portugal; Q5: Germany, Australia, Belgium, Canada, the United States, Israel, the Netherlands, the United Kingdom, and Sweden). The data correspond to the 1990 and 2000 rounds of the World Census of Agriculture, which are the only rounds that report the number of farms by crop or livestock type.

Source: Authors based on the World Bank (2025c) and FAO (2025b, 2025c).

Box 2.2

Family farming

Family farming or family agriculture refers to a way of organizing agricultural, forestry, fisheries, livestock, and aquaculture production that is managed and operated by a family and relies primarily on the labor of its members. The family and the farm^a are closely linked, evolve together, and combine economic, environmental, reproductive, social, and cultural functions.

Although this is the general FAO definition, countries also have their own specific definitions of family farming,^b which reflect their particular social, historical, and political contexts. This is important because the agroecological and territorial characteristics of a region or country—as well as its infrastructure, regulatory environment, sociocultural context, and national conditions (cultural, social, demographic)—shape the activities and functions of agriculture in general, and of family farming in particular. For example, in many countries in the region, labor in family farming is carried out largely by women. Women sustain diverse, resilient, and territorially rooted agrifood systems (Nobre and Hora, 2017; Quesada et al., 2023). In these small-scale and family farming systems, rural women play central roles throughout the entire production process—from land preparation to commercialization. Their work also includes the raising of small and farm animals, which contributes to self-consumption and complementary income generation, alongside agroecological knowledge and skills passed down across generations, which are essential for the sustainability of territories.

Graph 1
Incidence of family farming



Note: Values correspond to the latest year with available data for each country from the two most recent rounds of the World Census of Agriculture (2010 and 2020). The global aggregate includes 81 countries, and the LAC aggregate includes 15. The category “other” includes unregistered partnerships or unspecified tenure types.

Source: Authors based on FAO (2025c).

To measure the incidence of family farming, FAO estimates rely on two core features that are common to all definitions: the type of land management or ownership, and the availability of labor on the farm. Based on information on the legal status of agricultural producers, around 95% of farms worldwide are managed by an individual, a group of individuals, or a family unit—with or without a formal contract—and therefore fall within the definition of family farming. These units account for 72% of agricultural land, since non-family farms tend to be larger.

At the regional level, the share of farms managed by individuals shows a pattern similar to the global one, but these farms represent a much smaller share of total land area—47%.

Table 1 shows the share of family farming holdings in total farms in 15 countries in the region. Family farming is widespread across all of them.

Table 1
Family farms in Latin American and Caribbean countries

Country	N° of family agricultural holdings	Percentage of family holdings over total agricultural holdings
Argentina	210,664	84.4
Bolivia	855,356	98.1
Brazil	5,056,525	77.0
Chile	129,607	93.5
Costa Rica	80,987	87.1
Granada	9,306	99.6
Jamaica	210,853	92.2
Nicaragua	261,791	99.7
Panama	246,820	99.3
Paraguay	286,807	98.6
Peru	2,246,702	99.4
Saint Lucia	9,956	99.8
Suriname	10,188	99.6
Uruguay	37,272	83.2

Source: Authors based on FAO (2025c).



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However, not all family farming is the same. According to FAO (2015b), three segments can be identified within family farming:

- **Large family farms**, which operate essentially as large commercial enterprises, although they are managed by a family and rely primarily on family labor. This segment generally has access to higher-potential land, to markets (technology, capital, and product markets), and generates surpluses that can be reinvested in the farm.
- **Medium or small market-oriented farms**, which are oriented toward markets or have the potential to do so if adequate incentives are in place.
- **Small subsistence farms**, which produce mainly for self-consumption and have little or no potential to generate marketable surpluses.^c

The structural diversity inherent to family farming—ranging from subsistence units to commercially scaled agricultural enterprises—means that broad, one-size-fits-all policies and programs face significant limitations in effectively addressing the differing needs of each segment.

a. An economic unit of agricultural production (farm) under single management. Management may be exercised by one or several individuals or families, by a clan or tribe, or by a legal entity (FAO, 2005).

b. Table A.2.2 in the appendix to this chapter, available in the online edition of the RED, presents each country's national definition of family farming.

c. According to FAO (2014), another commonly used classification to reflect heterogeneity within family farming distinguishes among subsistence farming (focused on self-consumption, with insufficient resources and income for household reproduction), transitional farming (combining self-consumption and sales, with difficulty generating surpluses), and consolidated family farming (with greater access to resources, markets, and capital-building capacity).

Distribution by type of tenure

One of the potential explanations for the prevalence of smaller farms is the type of land tenure, which provides insight into how land markets function. Table 2.2 shows that, across all regions, the main tenure arrangement for farms is “owned or has owner-like possession.” The category “other forms of tenure” has a meaningful presence in some LAC countries and in other parts of the world. In the region, this category includes informal tenure arrangements, which may pose risks for the development of more modern land markets or

limit productive investment due to the uncertainty associated with the absence of formal title.²⁵

Table 2.2 also shows that the share of rented land in LAC is much lower than in North American or European countries. Renting can enable land to be allocated to more efficient agricultural operators, thereby increasing farm size.

25 In developed countries, “other forms of tenure” may include formal arrangements other than leasing or ownership—such as *teeltpacht* (crop-share tenancy) or *erfpacht* (long-term surface rights) in the Netherlands, which are legal agreements but fall outside conventional regulated leases (*pacht*); or life estate, common land, and temporary use contracts for public lands in the United Kingdom, all of which have legal standing.

Table 2.2
Composition of farms by type of land tenure

Country/Region	Agricultural holdings by type of tenure (percentage)			
	Owned or has owner-like possession	Renting	Other forms of tenure	More than one form of tenure
North America				
Canada	63.8	29.0	7.2	
United States	75.7	24.3		
Latin America				
Argentina	55.8	10.4	10.5	23.3
Bolivia	91.5		8.5	
Brazil	77.0	15.5	7.5	
Chile	78.3	8.0	3.5	10.2
Mexico	85.8	6.3	2.5	5.4
Panama	94.1	0.9		5.0
Paraguay	90.7	2.7		6.7
Peru	84.4	4.3	2.3	9.1
Uruguay	61.2	13.6	13.5	11.7
Europe				
Austria	51.7	37.5	10.9	
Belgium	51.2	46.9	1.9	
Bulgaria	42.1	30.1	27.7	
Croatia	79.1	19.8	1.1	
Czech Republic	57.5	42.5		
Denmark	67.0	33.0		
Estonia	52.6	38.8	8.6	
Finland	62.9	37.1		
Germany	50.8	42.5	6.7	
Greece		87.9	12.1	
Hungary		63.9	36.1	
Ireland		100.0		
Italy		59.1	40.9	
Netherlands	48.3	29.2	22.5	
Norway	64.4	35.6		
Poland	79.8	18.3	1.9	
Portugal		44.0	56.0	
Slovakia	72.3	27.7		
Slovenia	65.8	32.7	1.5	
Spain	65.9	23.4	10.7	
Sweden	67.9	32.1		
Switzerland	50.4	46.1	3.6	
United Kingdom		99.8	0.2	
Asia and the Pacific				
Australia	74.8	23.6	1.6	
India	99.2	0.4	0.5	
South Korea	72.8	5.8		21.3

Note: The category "owned or has owner-like possession" refers to the legal possession of land, which grants the owner the right to decide how the land is used (within certain limits) and to sell or rent it. "Rented land" refers to land operated by someone other than the owner. Rental agreements can take various forms: a fixed monetary payment, a share of production, specific products, or even payment in services. In some cases, land may be provided free of charge. "Other forms of tenure" include land operated without a title and without the owner's consent (informal occupation), as well as temporary tenure arrangements such as trusts or other non-permanent modalities. Values correspond to the latest year with available data for each country from the two most recent rounds of the World Census of Agriculture (2010 and 2020).

Source: Authors based on FAO (2025c).



Quinoa harvest in the Urubamba River Valley, Peru.

Agricultural employment

The share of agricultural employment in total employment varies widely across regions and is directly related to income levels. In lower-income countries or regions—such as Africa or India—agricultural employment accounts for more than 40% of total employment, whereas in higher-income regions, such as Europe or North America, it represents less than 10%. In LAC, agricultural employment represents 15% of total employment, placing the region closer to the values observed in higher-income regions than to those of Africa or India.²⁶

From 1995 to 2023, agricultural employment declined significantly in higher-income regions such as North America and Europe, as well as in Asia and the Pacific, as shown in Table 2.3. In contrast, agricultural employment increased substantially in lower-income regions such as Africa, the Middle East, and Central Asia. LAC shows a slight increase overall, though with considerable heterogeneity across countries. However, an analysis of the share of agricultural employment in total employment shows that all regions experienced declines—an evolution consistent with the expected structural transformation process described in Chapter 1, particularly among low- and middle-income countries.



The decline in the share of agricultural employment in total employment is consistent with the structural transformation underway in many countries

In LAC, countries with more developed agricultural sectors and larger average farm sizes—such as Argentina or Brazil—generally experienced declines in agricultural employment levels and in the sector's share of total employment. Countries with less developed agricultural sectors and smaller average farm sizes—such as many Caribbean islands or some Central American countries—show increases in agricultural employment, although most still register a decline in the sector's share of total employment.

Finally, in terms of gender composition, the agricultural sector continues to employ more men (62% on average worldwide) than women (38%). In LAC, this gap is even wider: men account for 77% of agricultural employment.

Agricultural capital

At the global level, between 1995 and 2023, the stock of net capital in the agricultural sector increased. The regions with the largest increases are Asia and the Pacific, followed by Africa, where growth reached around 200% over the period. Among higher-income regions, growth was uneven—significant in North America (107%) and very moderate in Europe (17%). In LAC, increases were closer to the European experience than the North American one, although

with substantial heterogeneity. Countries such as Argentina, Guyana, Paraguay, Peru, and Uruguay, among others, recorded very large increases of more than 100%, with values exceeding 400% in Uruguay and 500% in Guyana. However, the moderate increase for the region as a whole can largely be explained by the lack of growth—or even decline—observed in Brazil and Mexico, two of the region's main countries.

²⁶ Chapter 7 provides a detailed description of employment in rural areas. Employment in the agricultural sector has shown a sustained decline over the past decades and currently accounts for 43% of total rural employment.

Table 2.3

Agricultural employment and its share of total employment, 1995 and 2023

Region/Country	Agricultural employment (thousands of people)			Share of total employment (percentage)		
	1995	2023	Variation (percentage)	1995	2023	Variation (p.p.)
Africa	128,958	219,466	70.2	57.4	42.4	-15.0
North America	3,274	2,606	-20.4	3.0	1.4	-1.5
Asia and the Pacific	705,241	535,635	-24.0	42.3	27.9	-14.4
Europe	26,215	12,393	-52.7	13.8	5.9	-7.9
Middle East and Central Asia	48,388	58,051	20.0	28.8	17.9	-10.9
Latin America and the Caribbean	36,452	37,851	3.8	23.8	15.5	-8.3
Latin America	34,115	35,201	3.2	23.7	16.0	-7.7
Argentina	1,597	1,422	-10.9	1.2	0.6	-0.6
Belize	16	28	79.5	27.2	15.6	-11.5
Bolivia	1,360	1,541	13.3	42.3	24.4	-17.9
Brazil	11,151	8,619	-22.7	17.0	8.2	-8.8
Chile	862	558	-35.3	15.7	6.2	-9.5
Colombia	2,686	3,233	20.3	18.4	14.4	-4.0
Costa Rica	252	299	18.4	18.3	13.4	-4.9
Ecuador	1,204	2,675	122.2	27.7	30.0	2.3
El Salvador	515	412	-20.1	26.8	14.8	-12.0
Guatemala	1,216	1,912	57.3	35.0	26.7	-8.4
Honduras	765	1,028	34.5	37.3	22.6	-14.7
Mexico	7,516	7,128	-5.2	23.5	12.0	-11.5
Nicaragua	494	839	69.8	34.0	27.7	-6.4
Panama	214	288	34.3	20.8	14.7	-6.1
Paraguay	518	553	6.7	28.1	17.2	-11.0
Peru	3,643	4,514	23.9	39.2	24.0	-15.2
Suriname	9	17	93.1	7.3	7.4	0.1
Uruguay	97	135	39.5	7.6	8.7	1.1
Caribbean	2,337	2,650	13.4	24.0	14.0	-10.0
Dominican Republic	542	377	-30.5	20.4	7.4	-13.0
Guyana	78	30	-61.6	31.1	11.3	-19.8
Haiti	1,418	1,998	40.9	54.1	44.7	-9.4
Jamaica	244	219	-10.3	23.2	14.6	-8.6
The Bahamas	6	7	10.2	4.3	2.9	-1.4
Trinidad and Tobago	48	20	-59.3	10.6	2.9	-7.7

Note: The agricultural sector includes forestry and fishing activities, as disaggregated subsector data are not available for all countries. The data correspond to 2023 and cover 153 countries. The percentage share of agricultural employment in total employment is calculated as the simple average of country-level shares.

Source: Authors based on the World Bank (2025e) and FAO (2025f).

Table 2.4
Stock of net agricultural capital, 1995 and 2023

Region/Country	USD millions		Variation (percentage)
	1995	2023	
Africa	132,793	377,875	184.6
North America	406,410	840,211	106.7
Asia and the Pacific	1,087,646	3,405,205	213.1
Europe	1,009,483	1,182,721	17.2
Middle East and Central Asia	232,907	497,021	113.4
Latin America and the Caribbean	248,457	330,559	33.0
Latin America	243,113	323,106	32.9
Argentina	38,492	77,308	100.8
Belize	85	147	72.0
Bolivia	2,324	6,461	178.0
Brazil	84,727	84,760	0.0
Chile	8,191	17,215	110.2
Colombia	10,859	20,645	90.1
Costa Rica	3,330	7,423	122.9
Ecuador	6,076	6,188	1.8
El Salvador	3,565	3,281	-8.0
Guatemala	6,253	10,938	74.9
Honduras	5,506	12,637	129.5
Mexico	54,858	29,291	-46.6
Nicaragua	1,303	2,936	125.3
Panama	1,051	2,318	120.5
Paraguay	3,466	8,495	145.1
Peru	11,207	24,289	116.7
Suriname	228	619	171.3
Uruguay	1,592	8,155	412.1
Caribbean	5,344	7,453	39.5
Dominican Republic	1,891	2,626	38.9
Guyana	136	929	585.1
Haiti	2,586	2,942	13.8
Jamaica	541	706	30.4
The Bahamas	111	190	71.8
Trinidad and Tobago	80	61	-24.0

Note: The stock of net capital measures the value of fixed agricultural capital after deducting depreciation due to use and obsolescence. Fixed capital includes all produced assets used repeatedly in the agricultural production process for more than one year, excluding land. Net agricultural capital per worker is measured in millions of U.S. dollars (USD) at constant 2015 prices, and the value for each region was calculated as the weighted average of the countries it comprises. The data cover 143 countries.

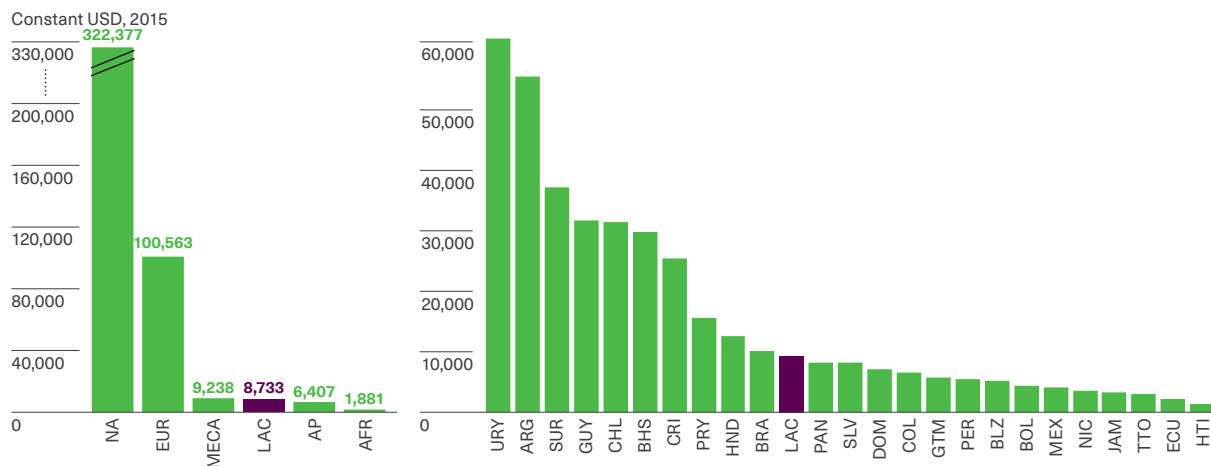
Source: Authors based on FAO (2025i).

Yet this change in the stock of net capital is not very informative without additional context. Panel A of Graph 2.5 presents net capital per worker. In this case, a clear relationship with income levels

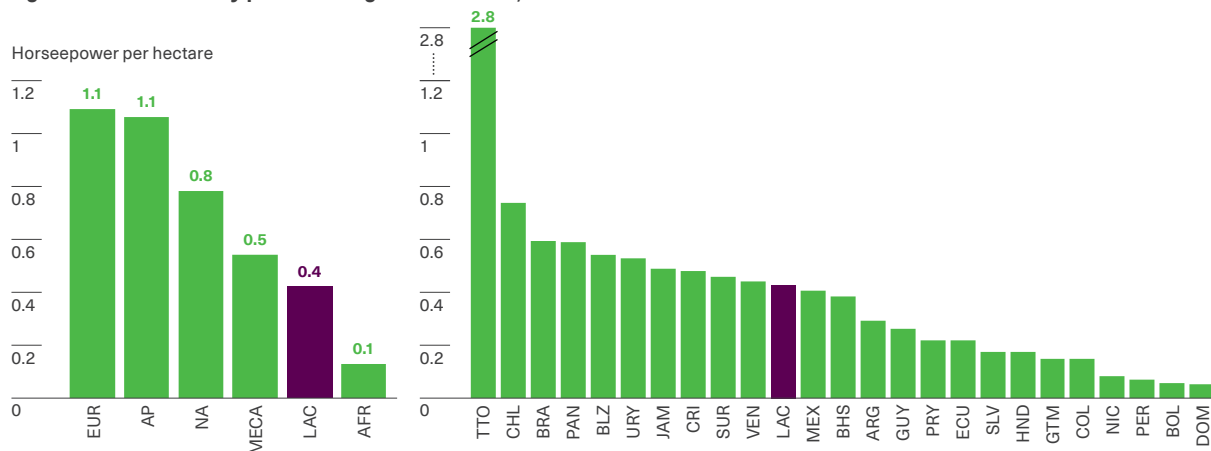
emerges: North America and Europe are the regions with the highest capital per worker and the highest per capita income, with values an order of magnitude higher than in other regions.

Graph 2.5
Agricultural capital

Panel A.
Net agricultural capital stock per worker, 2023



Panel B.
Agricultural machinery per unit of agricultural land, 2019



Note: The regions included are: Africa (AFR), Asia and the Pacific (AP), Latin America and the Caribbean (LAC), Middle East and Central Asia (MECA), North America (NA), and Europe (EUR).

Source: Authors based on FAO (2025f, 2025i) and United States Department of Agriculture data processed by Our World in Data (USDA, n.d.b).

These differences in the stock of net capital are also reflected in agricultural machinery per unit of agricultural land. As shown in Panel B of Graph 2.5, machinery per unit of agricultural land varies significantly across regions and is directly related to their level of wealth and that of their countries. Europe and Asia and the Pacific are the two regions with the highest horsepower per unit of land. North America, although below these two regions, registers levels well above those of LAC. For its part, LAC shows values higher than Africa's, but still low compared with Europe or Asia and the Pacific. There is also substantial heterogeneity within LAC: machinery per unit of land is very low in Nicaragua,

Peru, Bolivia, the Dominican Republic, and Haiti (in descending order), while values closer to the North American average are observed in Chile, Brazil, and Panama.

The level of machinery use is closely related to the distribution of agricultural holdings, as farms must reach a minimum size for certain types of equipment to be economically viable. Machinery per hectare shows a negative relationship with the share of farms under 5 ha—that is, the smaller the proportion of farms under 5 ha, the greater the amount of machinery available per hectare.

Productive linkages between the agricultural sector and other sectors

The contribution of each sector to value added is a relevant indicator, but it does not fully capture its importance to the economy. Agricultural sectors not only produce final consumption goods—they also provide essential inputs for other productive activities. For example, soybeans are a key input in the production of soybean oil.

One way to estimate the broader economic contribution of these sectors is through the productive linkages they generate, which can be reconstructed using input–output matrices. Producing one unit of any good requires inputs that drive production in the supplying sectors. In turn, many products are used as inputs in other processes, driving production in those downstream sectors. These are known respectively as backward linkages (a sector's demand for inputs) and forward linkages (the sectors that use its output as input). Table 2.5 summarizes the main backward and forward linkages of agriculture, livestock, and agro-industry.

Agriculture's main input supplier is the chemical products sector, which accounts for 29% of total inputs used, followed by commerce (17%) and agriculture itself (14%). In terms of forward linkages, agriculture supplies inputs mainly to agro-industry, which absorbs 54% of the value added generated by agriculture, followed by agriculture itself (9%) and beverages and tobacco (9%).

Livestock sources inputs from agro-industry (33%), the livestock sector (19%), and commerce (11%). Its output is used primarily by agro-industry (68%), livestock itself (10%), and the accommodation and food sector (2%).

Finally, the main input suppliers for agro-industry are livestock (28%), agro-industry itself (17%), and agriculture (13%), while its output is used as an input by agro-industry (49%), accommodation and food (27%), and livestock (20%).

Table 2.5

Productive linkages of the agriculture, livestock, and agro-industry sectors in Latin America and the Caribbean, 2017

Sector	Forward linkages	Backward linkages
Agriculture	Agro-industry (54%)	Chemical products (29%)
	Agriculture (9%)	Trade (17%)
	Beverages and tobacco (9%)	Agriculture (14%)
Livestock	Agro-industry (68%)	Agro-industry (33%)
	Livestock (10%)	Livestock (19%)
	Accommodation and food services (2%)	Trade (11%)
Agro-industry	Agro-industry (49%)	Livestock (28%)
	Accommodation and food services (27%)	Agro-industry (17%)
	Livestock (20%)	Agriculture (13%)

Note: The table shows, for each sector analyzed, the three main sectors with which it has forward linkages (the sectors that use it as input) and backward linkages (its input suppliers). Percentages in parentheses indicate each connected sector's share in intermediate consumption: for backward linkages, the share in total input demand of the sector analyzed; for forward linkages, the share of the connected sector as a destination for the sector's output.

Source: Authors based on Aguiar et al. (2022).

These sectors are highly interconnected. For example, livestock relies on certain crops as feed, but it also serves as an input in the production of certain crops.



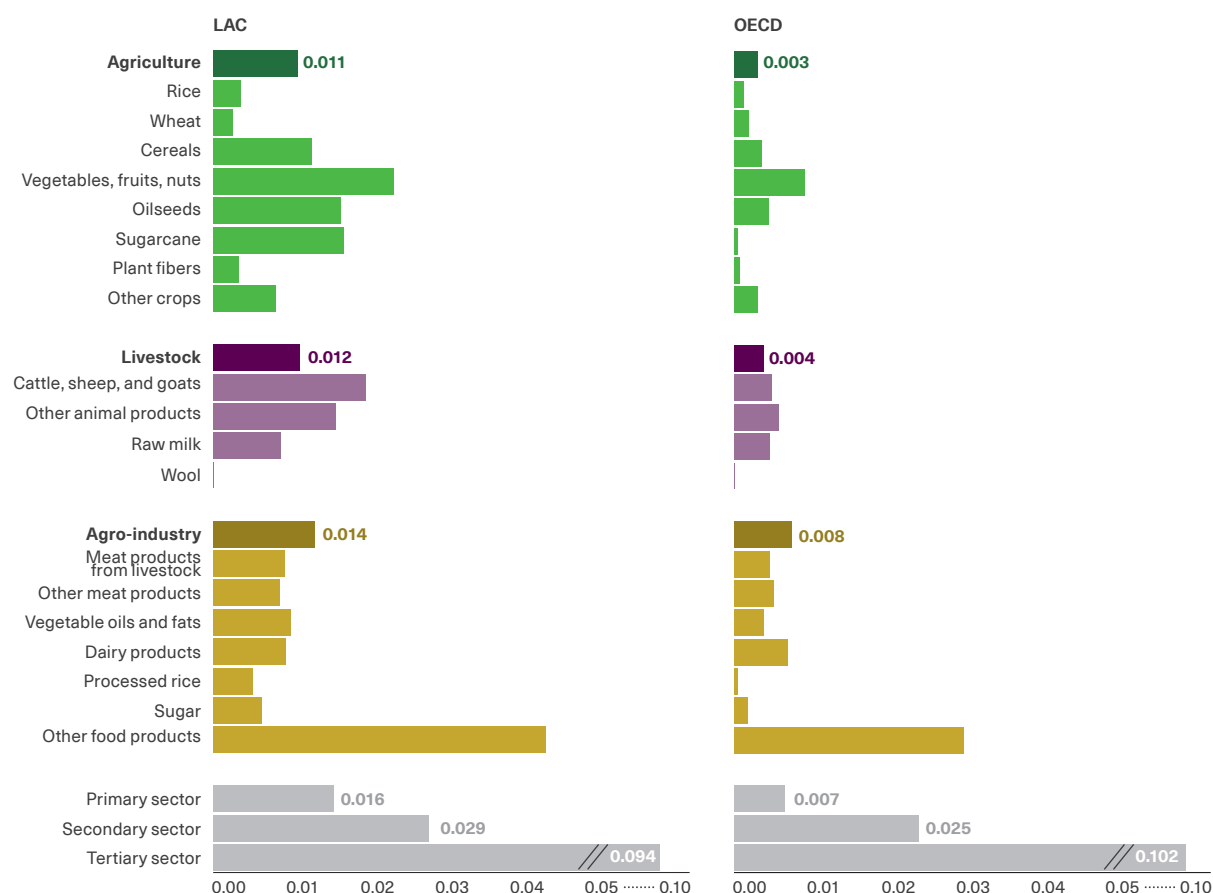
The importance of agricultural sectors—measured by their degree of influence—is considerably higher in LAC than in the OECD

A way to measure the importance of these sectors in the economy is through the degree of influence, which considers the linkages generated by each sector but weights them by the value added of the sector to which they are connected.²⁷ Graph 2.6 shows the degrees of influence of the agriculture, livestock, and agro-industry sectors in LAC and the OECD. The degree of influence is clearly higher in LAC, underscoring the greater importance of these sectors for the region.

²⁷ For a more precise definition of the degree of influence, see Box 4.5 in RED 2018 (Álvarez et al., 2018).

Graph 2.6

Degrees of influence of the agriculture, livestock, and agro-industry sectors in the economy, 2017



Note: Regional values are calculated as the simple average of the countries within each region.

Source: Authors based on Aguiar et al. (2022).

Relationship between the sector, related industries, and international trade

The agricultural and agro-industrial sectors are significant not only because of their contribution to value added and GDP, but also because, for many countries, they constitute one of the main sources of foreign exchange.

Panel A of Graph 2.7 shows the share of agricultural exports in total exports for LAC and the world,

while Panel B presents the region's share of global agricultural exports. Looking at the share of agricultural exports in LAC as a whole, in 2023 it stood at 17%, far above the global average of 5%. This regional average conceals wide differences, with a high share in Latin America (17%) and a much lower one in the Caribbean (4%).



Agriculture accounts for 17% of exports in Latin America and represents 21% of global agricultural exports

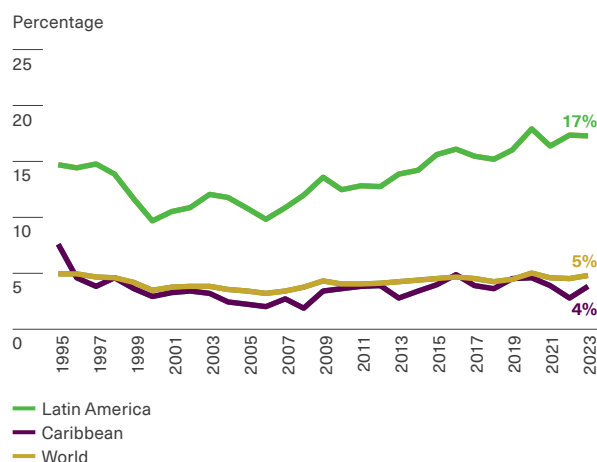
Examining the trend since the mid-1990s, there is an initial decline—to a low of around 9% in 2006—followed by a substantial increase driven by the commodity price boom from that point until 2020. Looking at the region's share of global agricultural exports, Latin America shows a steady rise—from 13% to nearly 21%—while the Caribbean exhibits a continuous decline, from 0.4% to 0.1% between 1995 and 2023. These trends underscore Latin America's role as a global supplier of food.

Turning to the composition of exports from these sectors, there is considerable heterogeneity within the region (see Graph A.2.2 in the appendix to this chapter, available in the online edition of the RED). In Belize, Paraguay, and Uruguay, agricultural, livestock, and agro-industrial products account for more than 60% of total goods exports. These are followed by countries where the sector represents between 40% and 50% of goods exports, including Argentina, Brazil, and several Central American countries such as Costa Rica, Guatemala, Honduras, and Nicaragua. In many other countries in the region, these sectors account for 10% to 40% of exports. Finally, in hydrocarbon-exporting economies (such as Trinidad and Tobago or Venezuela) and in countries highly integrated into global value chains—such as Mexico—these sectors account for less than 10% of goods exports.

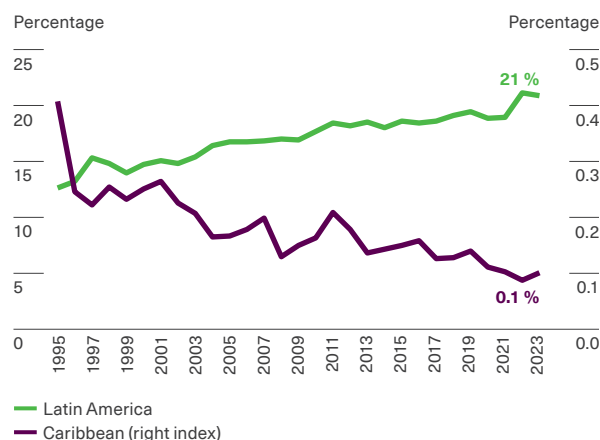
Graph 2.7

Share of agricultural exports in Latin America and the Caribbean, 1995-2023

Panel A.
Share of agricultural exports
in total exports



Panel B.
Share of LAC's agricultural exports
in global agricultural exports



Source: Authors based on UNCTAD (2025a).



Cattle in Uruguay.

Applied tariffs and trade policy

Agricultural goods typically face high trading costs. On one hand, these are low-value-per-weight goods, many of which require special handling during transport and have limited shelf life. For example, many fruits require cold-chain logistics and must be consumed within a short time frame to avoid losing quality. All of this means that transport costs often represent a significant share of the product's value at port.

On the other hand, these goods are often subject to protectionist measures for two reasons. First, food is commonly treated as a strategic good, leading countries to seek some degree of food sovereignty—frequently through restrictive tariff or non-tariff measures. Second, beyond food sovereignty considerations, many countries have long-standing agricultural sectors that they seek to preserve through protectionist policies. All of this negatively affects countries with comparative advantages in food production, as is the case for much of LAC. In addition to these measures, some governments introduce non-tariff regulations for safety reasons, both to protect the population and to safeguard local flora and fauna.

Graph 2.8 presents the average applied tariffs for regional trade agreements in LAC and for selected reference agreements in the rest of the world. In South American trade agreements, applied tariffs on primary goods tend to be lower than those applied to manufactured goods. In contrast, Central American and Caribbean Community (CARICOM) countries apply higher tariffs to primary goods than to manufactures. In reference regions such as the European Union (EU), USMCA countries (United States, Mexico and Canada), and ASEAN+3 (ASEAN plus China, Japan, and Korea), lower protection is also observed for manufactured goods relative to primary goods—consistent with the hypothesis introduced earlier in this section: countries seek to protect their agricultural sectors for reasons related to food sovereignty and local producer protection.

Beyond average tariffs, it is useful to examine bilateral tariffs across regions (see Table A.2.3 in the appendix of this chapter, available in the online edition of the RED). A first observation is that the three major trade agreements among South American countries establish trade that is virtually tariff-free for primary goods, as tariffs never exceed 2%. In contrast, Central American and Caribbean countries apply low tariffs only to members of their intraregional agreements. Particularly notable is CARICOM: while tariffs among its members are around 2%, it applies tariffs of approximately 18% to non-members—with the exception of the EU, to which it applies tariffs of around 13%. Among LAC's external trade partners, ASEAN+3 exhibits a tariff structure similar to CARICOM's, offering low tariffs only to member countries, while tariffs for non-members hover around 10%. The EU is a special case: its tariffs are low both for its own members and for other LAC blocs with which it has agreements—with the exception of Mercosur, to which it applies a tariff close to 6%.²⁸

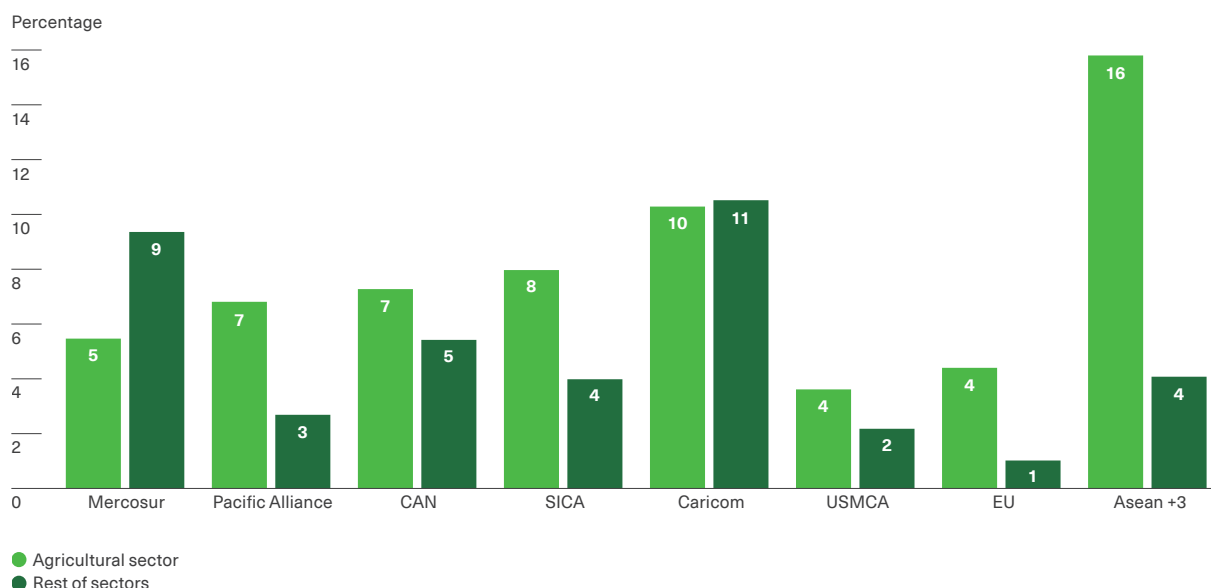


The agricultural sector faces higher non-tariff barriers than other sectors—and these barriers correspond to tariff equivalents far above the applied tariff levels

28 The agricultural chapter of the agreement is one of the most contentious areas in the trade negotiations between the EU and Mercosur.

Graph 2.8

Average applied tariffs by sector and region



Note: The graph shows average tariffs applied by each trade bloc to primary goods and to the rest of the economy. Values represent the average of the last three available years (2021–2023). Mercosur: Southern Common Market; CAN: Andean Community; SICA: Central American Integration System; CARICOM: Caribbean Community; USMCA: United States–Mexico–Canada Agreement; ASEAN+3: Association of Southeast Asian Nations plus China, Japan, and Korea.

Source: Authors based on UNCTAD's Trade Analysis and Information System (TRAINS) using WITS (2025).

Trade policy involves more than tariffs; it also includes non-tariff measures (NTMs). These may be technical—for example, sanitary and phytosanitary standards—which are justified from a trade-policy perspective because they aim to protect local flora and fauna, ensure consumer safety, or guarantee that imported products meet minimum quality standards. Other measures are non-technical, such as quotas or price controls. These measures lack a trade-policy justification and are purely protectionist. In many cases, this latter group of measures can impose barriers or costs greater than tariffs themselves.

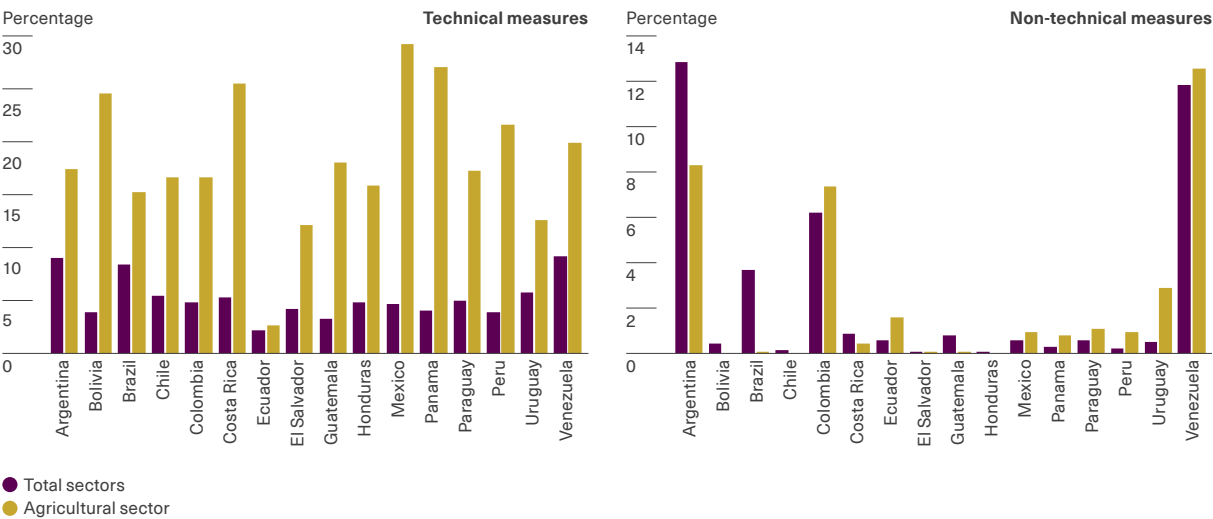
The World Bank estimates the tariff equivalent of both types of measures for each country. Panel A of Graph 2.9 illustrates the tariff-equivalent level represented by technical and non-technical barriers to trade for the primary sector and for the economy as a whole. Panel B shows the tariff equivalents

implied by these non-tariff measures for the primary sector, as well as the level of applied tariffs on agricultural products for a set of countries in the region.

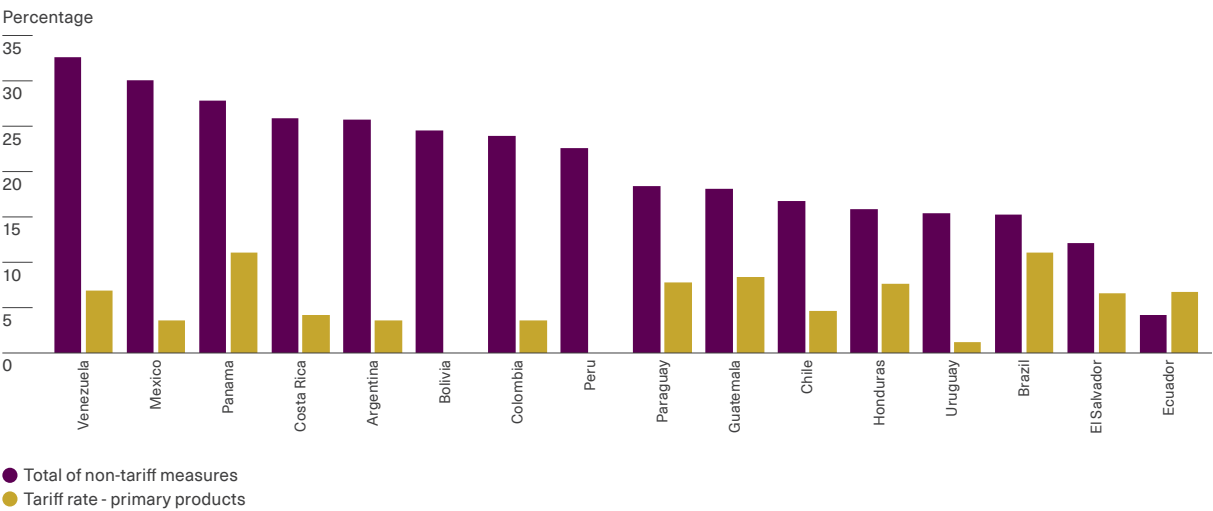
First, tariff equivalents associated with technical measures affecting trade in the primary sector are much higher than those for the economy as a whole. This is unsurprising given their ecological and sanitary protection objectives. Non-technical measures are used to a lesser extent, although some countries—such as Argentina, Colombia, and Venezuela—continue to make significant use of them for both primary goods and the broader economy. Second, the level of tariff equivalents associated with these non-tariff measures is generally much higher than applied tariff levels in LAC (Panel B of Graph 2.9).

Graph 2.9
Tariff equivalent of non-tariff barriers in the agricultural sector

Panel A.
Comparison of the agricultural sector with the rest of the economy



Panel B.
Comparison of non-tariff measures with applied tariff rates in the agricultural sector



Note: The graph presents average estimates for 2012–2016 of the ad-valorem equivalent of non-tariff measures (NTM) for all sectors of the economy and for the agricultural sector. These are calculated as the equivalent tariff that would generate the same change in import quantities as the observed non-tariff barrier. Total ad-valorem equivalents and their breakdown into technical measures (sanitary and phytosanitary measures, labeling requirements, etc.) and non-technical measures (trade measures, quantitative restrictions, price controls, financial measures, etc.) are shown. Applied tariffs on primary products in 2022 are also included.

Source: Authors based on the World Bank (2025a).

Impacts of the EU's CBAM and EUDR mechanisms on agricultural and agro-industrial exports from Latin America and the Caribbean

In its efforts to combat climate change and reduce global greenhouse gas emissions, the EU is implementing two regulatory mechanisms that will significantly affect exports from LAC: the Carbon Border Adjustment Mechanism (CBAM) and the EU Regulation on Deforestation-Free Products (EUDR). Although these instruments differ in scope and design, both require greater traceability and sustainability, reshaping the criteria for access to the European market. Their impact, however, will not be uniform and will vary across countries and

industries. The following sections describe each regulation in greater detail.²⁹



The region's agricultural exports will need to adjust to new regulations introduced by high-income countries to combat climate change—such as the EU's Carbon Border Adjustment Mechanism and the EU Regulation on Deforestation-Free Products

Carbon Border Adjustment Mechanism

CBAM aims to ensure that goods imported into the European market internalize a cost equivalent to the carbon emissions embedded in their production—similar to what they would pay if they had been produced under EU regulations. The measure's main objective is to prevent “carbon leakage,” meaning the relocation of production toward countries with laxer environmental standards in order to avoid stricter regulations. This type of policy is designed to safeguard the broader goal of reducing global emissions by preventing a shift in where those emissions are generated. During its transitional phase (2023–2025), importers had to report the embedded emissions of the goods they brought into the EU. Beginning in 2026, the regime becomes fully operational, and importers will need to purchase CBAM certificates aligned with the carbon price under the EU Emissions Trading System (EU ETS),

the European emissions market in which firms must buy allowances for each ton of CO₂ they emit. CBAM currently covers sectors such as steel, iron, aluminum, cement, fertilizers, electricity, and hydrogen.

Although CBAM does not currently regulate agricultural products directly, it may generate indirect impacts on the agricultural and agro-industrial sectors in LAC. The main ones include:

- Higher costs for critical inputs, such as fertilizers and electricity, which are covered by the mechanism.
- Greater pressure to adopt cleaner and more efficient production processes to reduce carbon footprints and maintain access to demanding markets.

²⁹ In addition, certifications that recognize good gender practices (such as fair trade labels with a gender focus) can be promoted, and women-led products can be positioned as differentiators in international markets.



Yellow, green, and red bananas hanging on the tree
in Punta Arenas, Costa Rica.

- New reporting and certification costs related to emissions along the value chain.
- A potential loss of competitiveness vis-à-vis international suppliers whose products have lower embedded emissions.
- The possibility of CBAM being extended to agricultural products in the future, which would have direct implications for LAC by increasing the cost of agricultural exports to the EU and requiring more stringent sustainability standards, with consequences for production costs as well as preferential market access.

EU Regulation on Deforestation-Free Products

The EUDR prohibits certain goods from entering the European market if they are linked to areas that were deforested after December 2020. It aims to ensure that European demand does not contribute to global deforestation, granting market access only to verifiably deforestation-free products. The regulation covers raw materials such as cattle, cocoa, coffee, palm oil, rubber, soy, and timber and timber-based products. Exporters must demonstrate due diligence to ensure that products originate from land not subject to recent deforestation, supported by traceability, geolocation, and full documentation of the supply chain.³⁰ In September 2025, the European Commission announced that implementation would be postponed until December 2026.

The regulation has a more direct impact on LAC's agricultural exports—particularly soy, beef, coffee, cocoa, palm oil, timber, and related products. In Argentina, for example, De la Vega (2025) estimates that EUDR would significantly affect the soy and beef value chains, with an average GDP impact ranging between –0.1% and –0.5% over 2025–2030. This reduction in output would be accompanied by a decrease in deforested hectares (–6.6%) and a decline in GHG emissions (–0.4%).

The regulation raises compliance costs related to traceability, geolocation of plots, and auditing requirements. It may also create risks of exclusion—particularly for small producers—who often face greater challenges in adapting to the new standards.

The combined effect of these mechanisms generates both challenges and opportunities, which will differ across LAC countries depending on their production structures and export specialization. Although these mechanisms impose significant demands, they also encourage a transition toward more sustainable production systems, strengthening comparative advantages for those countries able to adapt and capitalize on these changes. This underscores the importance of acting swiftly to prepare the sector for the new requirements—both to lead the transition and to avoid being sidelined from these markets.

Under the broader framework of the European Green Deal, further requirements are expected to increase gradually—such as reporting on the absence of child labor and maximum pesticide residue thresholds, among others. Additionally, other major markets and trading blocs relevant to LAC may align their regulations with these measures or adopt similar frameworks. It is therefore important to consider the progress made by some countries—such as Uruguay, which has robust traceability systems in place. Others, including Colombia, Ecuador, and Peru, which have been advancing in georeferencing and digital traceability systems since the EUDR was announced in 2023, may be better positioned to incorporate new requirements and prepare their productive sectors proactively to comply with these standards.

30 Chapter 3 examines how technological progress, especially digitalization, can contribute to lowering certification and traceability costs.



3

**Agricultural
productivity**



Key messages

Over the past six decades, agricultural output in Latin America and the Caribbean (LAC) has grown at an annualized rate of 2.8%, increasing the region's share of global production from 9.4% in 1961 to 12.3% in 2022.

Input accumulation and use explain 53% of the increase in agricultural output between 1961 and 2022, while total factor productivity (TFP) accounted for the remaining 43%.

TFP growth has been uneven across LAC subregions. Since 1961, TFP nearly tripled in Brazil and increased by a factor of 2.2 in Mesoamerica, while in the Andean countries and the Southern Cone it grew by 91% and 72%, respectively. In the Caribbean, TFP was stagnant over the period.

Labor-productivity gaps with higher-income countries—and even within LAC—reflect lower land endowments per worker, limited agricultural capital, and the region's TFP lag.

Poorly functioning land markets—marked by widespread informality—lead to misallocation of resources across farms and a size distribution skewed toward smaller ones. These conditions hinder economies of scale, restrict access to credit, and discourage mechanization.

Irrigation is essential for raising agricultural yields and will become even more critical under climate change. While the region has expanded irrigation access and adopted more advanced systems (such as sprinkler and drip irrigation), there is room for improvement.



Digitalization is a key enabler of better production practices. By expanding data generation and processing, it strengthens decision-making and enables process automation—reducing costs and improving input efficiency.



Climate change threatens to reduce agricultural productivity in the region. However, spatial relocation of production and shifts in crop composition can help mitigate—and potentially fully offset—the negative impacts.



Policy priorities to boost agricultural productivity include improving land-market functioning through property formalization; expanding access to financial instruments—particularly developing the agricultural insurance market; upgrading infrastructure (transport, electricity, irrigation and digital); promoting innovation and mechanization; and reducing trade barriers.

Agricultural productivity¹

Introduction

The agricultural sector plays a central role in the region due to its contribution to overall production, its linkages with other sectors through input-output relationships, and its importance as a source of foreign exchange, as shown in Chapter 2 of this report. That chapter also examined the evolution of three key determinants of production: land, labor, and capital.

This third chapter focuses on analyzing the evolution of productivity in the agricultural sector, its main determinants, and the policies that could help raise it. It also explores how two major global forces may significantly affect agricultural productivity in the region: the Fourth Industrial Revolution and climate change.

Digitalization and artificial intelligence (AI) can be powerful tools for increasing output and productivity. By enabling the use and processing of large volumes of data generated through digital devices—such as drones, soil sensors, and satellite

imagery—they support process automation and improvement.

Climate change is altering average temperatures and rainfall and drought patterns, with direct implications for agricultural productivity. These impacts, however, are heterogeneous: negative in some areas but beneficial in others. Given this heterogeneity, the ability to reallocate production away from areas that will lose productivity toward those likely to gain—and to adjust the mix of cultivated products—will be crucial to limiting losses or maximizing potential gains.

The final section of the chapter addresses the set of policies needed to promote agricultural productivity. Key priorities include improving land-property regimes, expanding access to financial markets and infrastructure, and fostering innovation and digitalization in the sector.

¹ This chapter was written by Lian Allub and Manuel Toledo with research assistance from María Pía Brugiafreddo.

The evolution of agricultural output and productivity

Agricultural production in Latin America and the Caribbean (LAC) has grown substantially over the past six decades, increasing by a factor of more than five—equivalent to an annualized growth rate of 2.8%. In contrast, global agricultural output merely quadrupled over the same period. As a result, the region's share of global production rose from 9.4% in 1961 to 12.3% in 2022.²

This growth, however, has not been uniform across the region. Output increased eightfold in Brazil, while in Mesoamerica and the Andean³ countries it rose by factors of 5.5 and 5.8, respectively. In the Southern Cone, production grew by a factor

of 3.7, and in the Caribbean, by 1.9. At the country level, beyond Brazil, strong performers include Guatemala, Bolivia, Belize, and Costa Rica, with output increases ranging from a factor of 8.8 in Guatemala to 7.1 in Costa Rica.



Agricultural output in LAC increased fivefold over six decades—outpacing global growth—but performance varied markedly across countries and subregions

Drivers of agricultural output growth

A natural question that emerges is what drove this growth. To answer this question, a growth-accounting exercise is used to separate the contribution of inputs (capital, labor, land, and intermediate inputs) from that of total factor productivity (TFP), which measures how efficiently these inputs are combined to produce agricultural goods.⁴ This distinction is essential, as it helps assess the nature of growth—whether it stems from greater accumulation and use of inputs or from using them more efficiently. Graph 3.1 presents the results for the region as a whole and for each subregion. The exercise shows that input growth—including land, employment, the stock of physical capital, and intermediate inputs⁵ used—accounted for 57% of the increase in agricultural output over 1961–2022, while TFP contributed the remaining 43%.

TFP growth and, to a lesser extent, increased use of intermediate inputs and capital accumulation have been the main drivers of the substantial rise in agricultural output in the region since the 1960s.

There are marked differences across subregions. In the Caribbean, TFP contributed only marginally; output growth was almost entirely explained by inputs—especially capital, which accounted for 53% of the increase—followed by intermediate inputs (23%) and land expansion (17%).

2 These figures are based on data from the United States Department of Agriculture (USDA), which report the total value of crop, livestock, and aquaculture production using constant 2015 global agricultural prices, expressed in thousands of purchasing power parity (PPP) dollars.

3 This category includes Bolivia, Colombia, Ecuador, Peru, and Venezuela. It does not include Argentina and Chile, which are part of the Southern Cone.

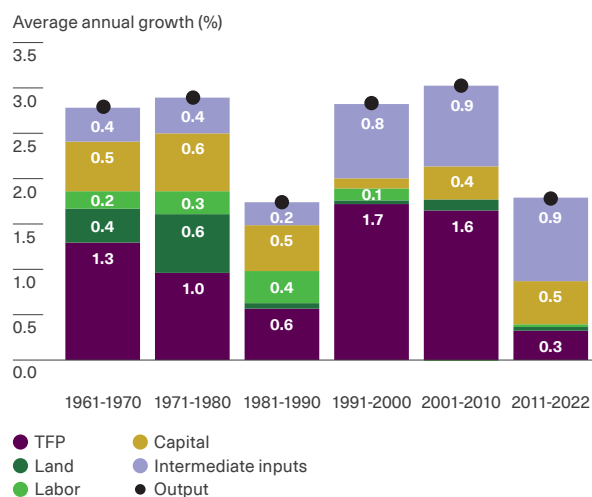
4 This indicator of production efficiency captures intangible elements such as technology, management practices, and the allocation of land both across farms and across agricultural activities and crops. TFP may increase as a result of technological progress, improved management practices, or better allocation of inputs.

5 These include inputs used in production, such as fertilizers and feed.

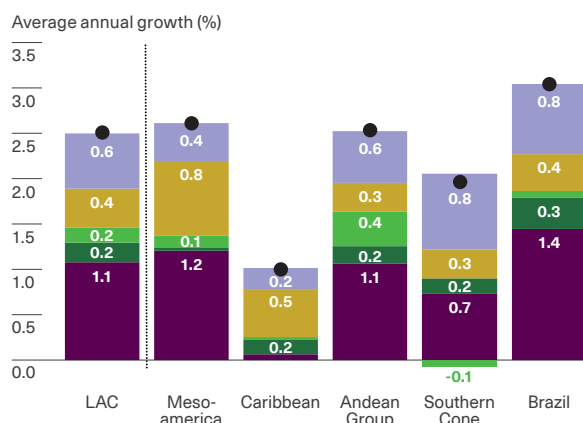
Graph 3.1

Growth accounting of agricultural output in Latin America and the Caribbean, 1961–2022

Panel A.
By decade



Panel B.
By world subregions, 1961–2022



Source: Authors based on data from the USDA (2025).

In the Southern Cone, although TFP made a significant contribution of 38%, intermediate inputs were the primary driver of production growth, accounting for 42%. In contrast, in Mesoamerica, capital accumulation explained nearly one-third of growth—double the contribution of intermediate inputs—while TFP played a central role, contributing 46%. Finally, in the Andean countries, labor stood out, contributing 15%, exceeding the contribution of capital at 12%.

Given the importance of TFP in driving agricultural output growth in the region, it is useful to examine its trajectory more closely. Between 1961 and 2022, agricultural TFP increased by 122%—a higher rate than in major agricultural producers such as Australia, Canada, and the United States, where it doubled. Compared with other world regions, LAC's TFP growth also surpassed that of Oceania, Europe, and Africa, where increases reached 69%, 62%, and 31%, respectively.

However, it remained below Asia's 155% increase, driven largely by China, where productivity rose by a factor of 3.3 (Graph 3.2).

Agricultural output growth since 1961 has been driven largely by input accumulation and use, although total factor productivity accounted for 43% of the increase

The expansion of agricultural TFP in the region is explained primarily by technological change. This progress largely reflects the transfer of technology from developed countries, including the adoption of genetically modified crops and zero-tillage or no-till systems, as well as investment in research and

development (R&D).⁶ However, between 1990 and 2010—when TFP growth accelerated (1.8% annually compared with 1.1% in 1961–1990)—the increase in this indicator was driven mainly by efficiency gains (Ludeña, 2010).

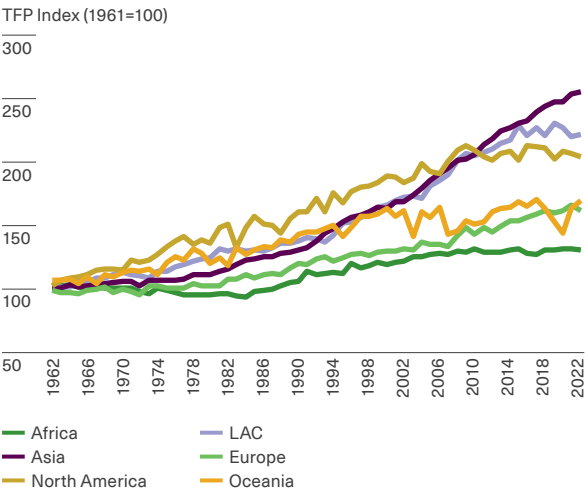
After 2010, when TFP growth stalled at 0.3% per year and accounted for only 18% of agricultural production growth (the lowest contribution in the past six decades), both technological progress and efficiency improvements slowed due to a combination of factors. These include the limited adoption of precision agriculture, the effects of climate change, and the expansion of the agricultural frontier into less suitable land. This led

to more intensive use of agricultural materials—such as fertilizers and agrochemicals—to sustain output growth, raising long-term environmental sustainability concerns, including soil degradation and biodiversity loss (Salazar et al., 2024).

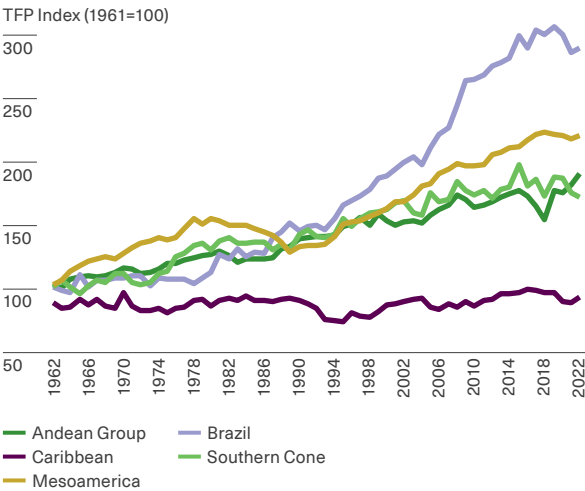
At the subregional level, TFP performance has been far from uniform. In Brazil, TFP nearly tripled since 1961, increasing by a factor of 2.9, which accounts for much of the region’s overall productivity trajectory. In Mesoamerica, TFP doubled by a factor of 2.2, while in the Andean countries and the Southern Cone it grew by 91% and 72%, respectively. In stark contrast, TFP in the Caribbean remained stagnant over the period analyzed.

Graph 3.2
Trends in total factor productivity, 1961–2022

Panel A.
Latin America and the Caribbean compared with other world regions



Panel B.
Subregions of Latin America and the Caribbean



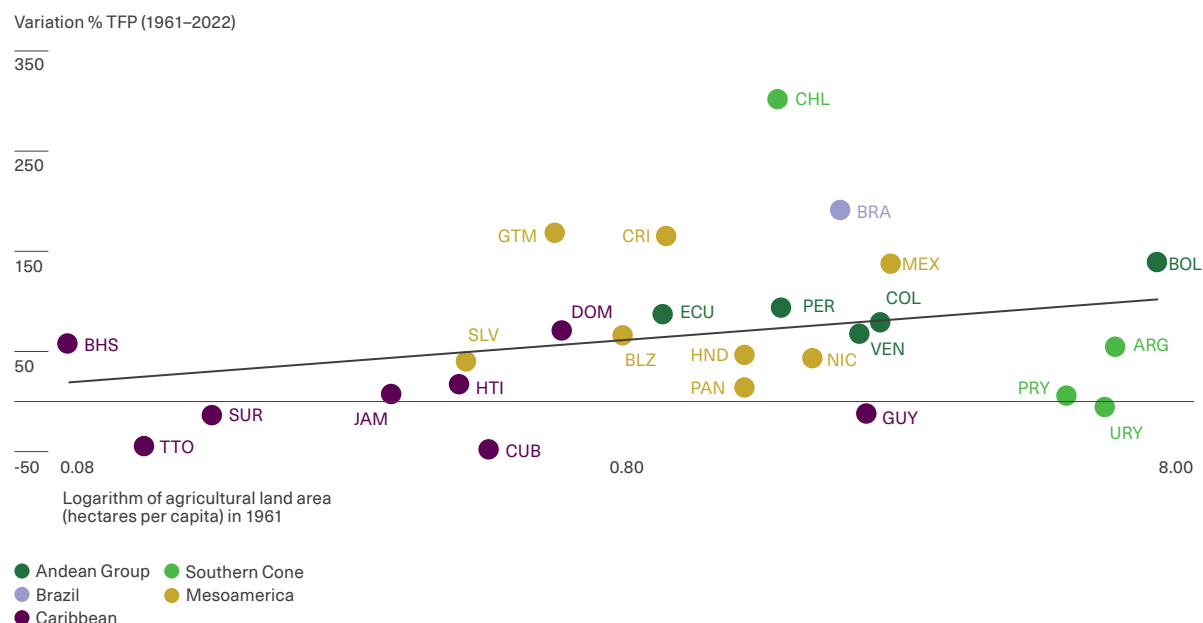
Source: Authors based on data from the USDA (2025).

6 An example of R&D investment as a key driver of productivity growth is Brazil’s experience with Embrapa, a public scientific research corporation established in 1973 to develop locally relevant science and technology. Akerman et al. (2025) show the significant impact on agricultural productivity in municipalities with greater exposure to Embrapa. The authors also estimate that public investment in R&D increased national agricultural productivity by 110% (see Box 3.7 for further details).

The substantial heterogeneity across LAC countries and subregions in agricultural TFP growth rates is explained largely by differences in per-capita agricultural land abundance. This positive relationship between TFP growth and land abundance is shown in Graph 3.3. In countries with abundant land,⁷ TFP grew at an average annual rate of 1.1% between 1961 and 2022, compared with 0.6% in land-constrained countries. This suggests

that a wider availability of land—and the larger scale of production it enables—supports greater agricultural productivity gains in the region.⁸ This pattern has important implications for food security and poverty reduction: slower productivity growth in land-scarce countries, most of which are already net food importers, may exacerbate food insecurity and limit reductions in rural poverty (Ludeña, 2010).

Graph 3.3
Growth in total factor productivity relative to land abundance



Source: Authors based on data from the FAO (2025I) and USDA (2025).

7 Countries are defined as land-abundant when they have more than 1.4 hectares (ha) of agricultural land per capita in 1961, the regional median. This group includes Argentina, Bolivia, Brazil, Chile, Colombia, Guyana, Mexico, Nicaragua, Peru, Uruguay, and Venezuela. Using the median of agricultural land per worker as the criterion (in this case, in 1991, due to the lack of agricultural employment data for 1961) yields similar results.

8 This pattern, however, is not observed in the rest of the world, particularly in Asia, where TFP grew at a lower rate in land-abundant countries.

Beyond these country-level differences, it is important to underscore the sharp contrast between TFP growth in the agricultural sector and TFP performance in LAC's overall economy. Although the region's aggregate TFP grew at a pace similar to that of developed countries until the late 1970s, it experienced a steep decline during the 1980s, followed by stagnation beginning in the 1990s. As a result, aggregate TFP in LAC fell by roughly

10% between 1961 and 2023, implying a negative contribution of TFP to regional economic growth over this period (Álvarez et al., 2018).

Despite the significant increase in agricultural TFP in recent decades, this indicator does not provide information on LAC's productivity level relative to other countries or regions. The following sections focus on conducting this comparative analysis.

Labor productivity

Before examining regional TFP levels, it is useful to focus on agricultural labor productivity. The most common metric is agricultural value added per worker, which captures the total value of production after deducting the value of intermediate inputs. This measure reveals a large gap relative to more developed countries and regions. On average, value added per worker in LAC amounts to only 14% of the level observed in the United States, 31% of the European average, and 22% of the OECD average.⁹ When the metric used is gross output per worker—which does not net out intermediate inputs—the gap is even wider: on average, LAC reaches just 9%, 27%, and 18% of the productivity levels of the United States, Europe, and the OECD, respectively. This reflects the greater share of intermediate inputs in production in more developed countries, particularly in the United States.

Graph 3.4 shows cross-regional labor-productivity differences as well as within-region heterogeneity. LAC displays productivity levels similar to those of Asia and three times higher than those of Africa (Panel A). Within the region, however, differences are substantial (Panel B). For example, the ratio between the 75th and 25th percentiles is 3.7 (USD 12,300 in The Bahamas versus USD 3,300 in Peru). Nonetheless, intraregional dispersion is smaller than in Africa, Asia, and Oceania, and broadly similar to that of Europe.

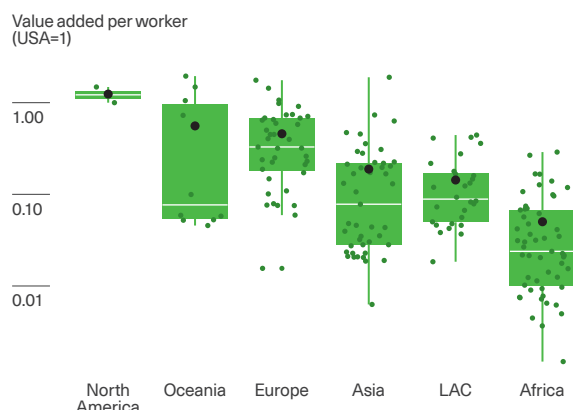
Underlying these gaps is a deep internal heterogeneity, characterized by the coexistence of highly efficient production systems alongside large segments of subsistence or low-capital agriculture. At the aggregate level, labor productivity is inherently linked to structural factors that determine the endowment and allocation of production inputs. In LAC, the agricultural sector still accounts for a relatively high share of total employment, farms tend to operate at smaller scales (in terms of land area), and—critically—the amount of land available per worker is limited.

● ●
Labor productivity in the region is low due to structural factors, including limited land available per worker

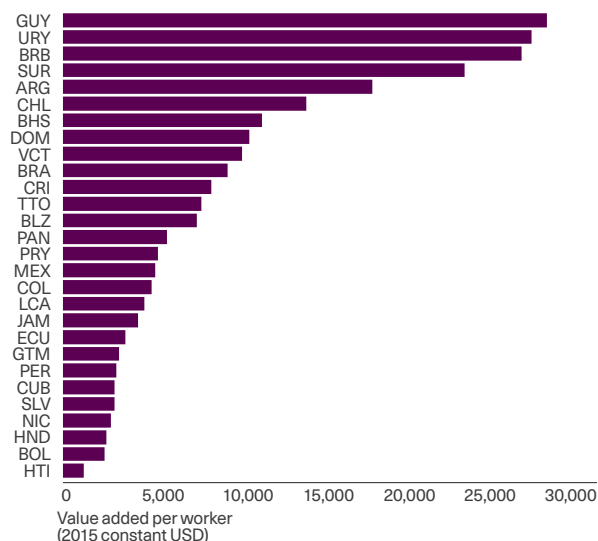
⁹ These figures, as well as those presented in the remainder of this subsection, are based on FAO data and are calculated as averages over the most recent 10 years available (2014–2023). Value added is expressed in constant 2015 U.S. dollars (USD). Due to data limitations, both value added and employment include agriculture, forestry, and fishing (ISIC code A). Gross output refers to the gross value of agricultural production, expressed in constant 2014–2016 purchasing power parity (PPP) dollars.

Graph 3.4
Agricultural labor productivity, average 2014–2023

Panel A.
Latin America and the Caribbean compared
with other world regions



Panel B.
Countries in Latin America and the Caribbean



Note: Panel A reports value added per worker (relative to the United States) on a logarithmic scale. The boxplot shows, for each region, the median (white line), the interquartile range (IQR), the whiskers defined by $Q1 - 1.5 \times IQR$ and $Q3 + 1.5 \times IQR$, and outliers. The black dot indicates the mean for each region.

Source: Authors based on data from the FAO (2025f, 2025g).

Total factor productivity

To better understand the sources of productivity differences between LAC and higher-income countries, as well as among countries within the region, it is necessary to look beyond labor productivity and decompose it into its fundamental components. The gap in value added per worker can be attributed to two main factors: differences in the endowment of production inputs (physical capital per worker and land per worker) and differences in TFP.

On the one hand, land endowment per worker in the region is very low. The average agricultural worker in LAC has access to roughly 14 hectares

(ha), equivalent to only 9% of the level observed in the United States and around 20% of the OECD average. These figures, however, conceal substantial intraregional heterogeneity. In the Southern Cone and Brazil, land per worker averages 52 ha, whereas in the Andean countries it falls to around 11 ha, in Mesoamerica to 6 ha, and in the Caribbean to just 5 ha. At the country level, Uruguay leads the region with 105 ha per worker, followed by Argentina with 73 ha. At the opposite end of the spectrum, in addition to Caribbean countries, Ecuador, El Salvador, and Guatemala all have fewer than 3 ha per worker.¹⁰

¹⁰ This heterogeneity is compounded by significant gender inequality. On average, the land area held by women amounts to 42% of that registered to men in Brazil, 80% in Chile, 40% in Costa Rica, 34% in Ecuador, 57% in Nicaragua, and 67% in Peru (Nobre & Hora, 2017).



Worker recording agricultural data on a tablet during avocado harvest in Colombia.

On the other hand, LAC also has low levels of agricultural capital (machinery, irrigation infrastructure, etc.) per worker. On average, capital per worker represents only about 5% of the level observed in the United States, nearly 6% of the OECD average, and around 8% of the European average. There are, again, notable differences within the region. Uruguay and Argentina have capital per worker levels equivalent to 20% and 17% of those in the United States, followed by Suriname, The Bahamas, and Chile at 15%, 13%, and 10%, respectively. At the lower end, Haiti's capital per worker does not reach 1% of the U.S. level. Moreover, nine countries fall between 1% and 2%, including Bolivia, Colombia, Cuba, Ecuador, Jamaica, Mexico, Nicaragua, Peru, and Trinidad and Tobago.

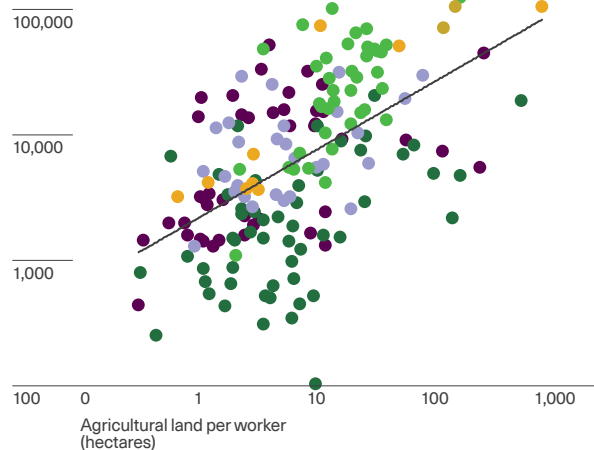
Graph 3.5 confirms the close positive correlation between these factor endowments and labor productivity. Countries with abundant land and capital per worker, such as Uruguay and Argentina, consistently appear in the upper productivity quadrants, while those with greater constraints in both inputs—including Haiti and several Caribbean and Central American countries—cluster at the bottom. This evidence underscores that a significant share of the region's agricultural productivity gap can be traced to these structural shortages in production inputs.

Graph 3.5

Factor endowments and agricultural labor productivity, average 2014–2023

Panel A. Land per worker

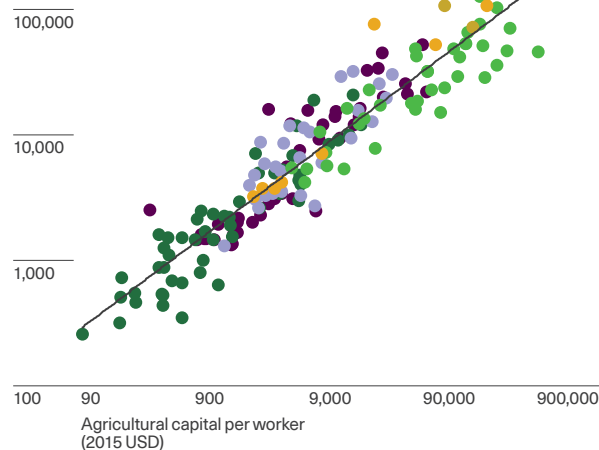
Value added per worker
(2015 USD)



● Asia ● Europe
● Africa ● North America
● LAC ● Oceania

Panel B. Capital per worker

Value added per worker
(2015 USD)



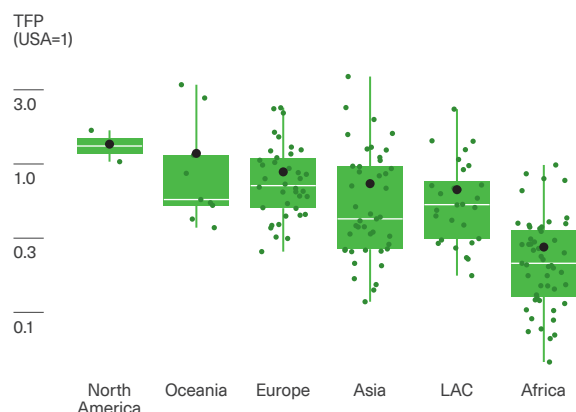
Note: In both graphs, the axes are shown on a logarithmic scale.

Source: Authors based on data from the FAO (2025f, 2025g, 2025i, 2025l).

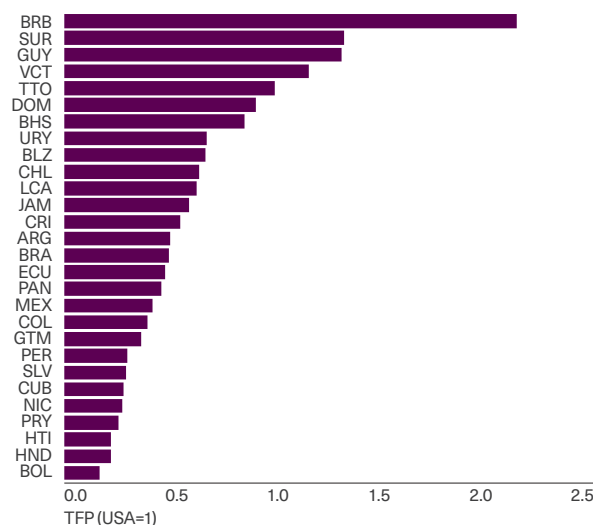
Graph 3.6

Total factor productivity in the agricultural sector, average 2014–2023

Panel A.
Latin America and the Caribbean compared
with other world regions



Panel B.
In Latin American and Caribbean countries



Note: Panel A shows TFP, relative to the United States, on a logarithmic scale. The boxplot shows, for each region, the median (white line), the interquartile range (IQR), the whiskers defined by $Q1 - 1.5 \times IQR$ and $Q3 + 1.5 \times IQR$, and outliers. The black dot indicates the mean for each region.

Source: Authors based on data from the FAO (2025f, 2025g, 2025i, 2025l).

The labor-productivity gap is also meaningfully driven by the region's TFP lag (Adamopoulos & Restuccia, 2014). Estimates based on FAO data on value added, employment, capital, and agricultural land for 2014–2023—using a standard production function—show that agricultural TFP in the region lags behind that of high-income countries (panel A of Graph 3.6). On average, it stands at around 65% of the level observed in the United States, 76% of the European average, and 62% of the OECD average.¹¹

This analysis reveals substantial disparities within LAC. Countries such as Barbados, Guyana, Saint Vincent and the Grenadines, Suriname, and Trinidad and Tobago exhibit levels of TFP comparable to those of high-income economies. In contrast,

Bolivia, Cuba, El Salvador, Haiti, Honduras, Nicaragua, and Paraguay lie in the bottom quartile of the distribution, with TFP levels of 30% or less relative to the United States—reaching a low of 18% in Bolivia (panel B of Graph 3.6).

A natural question is how much of the labor-productivity gap documented above is explained by differences in TFP, capital per worker, and land per worker. To answer this, a development-accounting exercise is applied. In the case of LAC, the exercise indicates that, on average, 56% of the gap in value added per worker relative to the United States is explained by low TFP. The capital gap accounts for 21%, while the low land endowment per worker represents the remaining 23%. This implies that if countries in the region were able to close the TFP

¹¹ These percentages are calculated using each country's average TFP over the 2014–2023 period. Ten-year country averages are then used to compute the regional and OECD averages.

gap entirely, labor productivity would reach 45% of the U.S. level, rather than the current 14%.¹²

It is important to emphasize that TFP affects production not only directly, but also indirectly through its influence on capital and land per worker. Lower TFP is associated with both smaller agricultural land areas per worker and lower levels of capital per worker. This reflects weaker capital accumulation and a greater absorption of workers into agricultural activities—patterns illustrated in Graph 3.7, which shows the positive relationship

between TFP and capital and its negative relationship with agricultural employment as a share of the population.

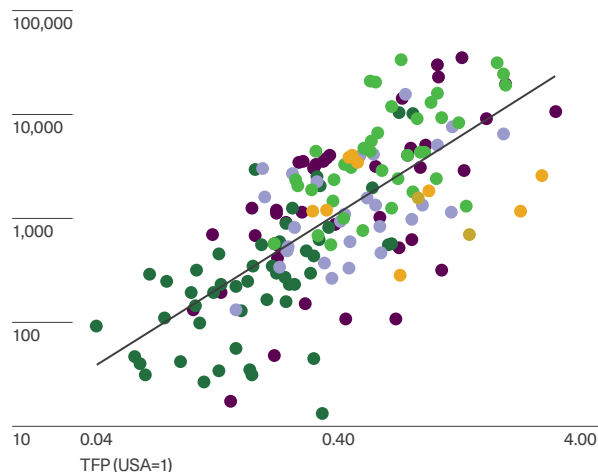
● ●
The productivity gap with developed countries reflects both lower capital and land per worker and a lag in production efficiency

Graph 3.7

Total factor productivity and factor endowments in the agricultural sector, average 2014–2023

Panel A. Capital–land ratio

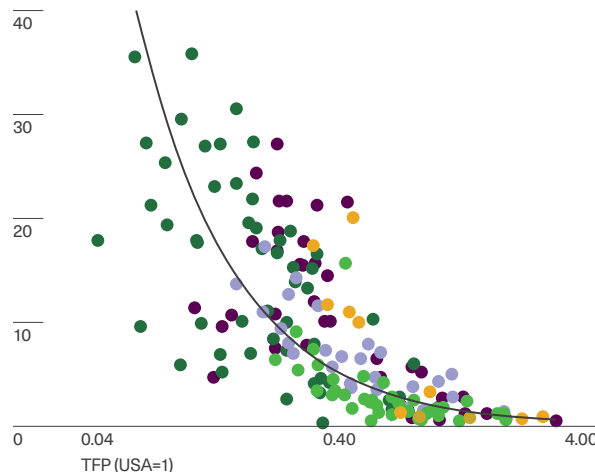
Agricultural capital per unit of land (2015 USD/ha)



● Asia
 ● Europe
 ● Africa
 ● North America
 ● LAC
 ● Oceania

Panel B. Employment–population ratio

Agricultural employment as a share of the population (%)



Note: In both panels, the horizontal axis shows total factor productivity (TFP), relative to the United States, on a logarithmic scale. In Panel A, the vertical axis shows agricultural capital stock per hectare of agricultural land, on a logarithmic scale. In Panel B, the vertical axis shows agricultural employment as a percentage of the total population.

Source: Authors based on data from the FAO (2025f, 2025i, 2025j, 2025l).

¹² It is important to note that this analysis does not account for differences in human capital among agricultural workers. As a result, these differences are implicitly captured in the calculation of TFP.

The role of intermediate inputs

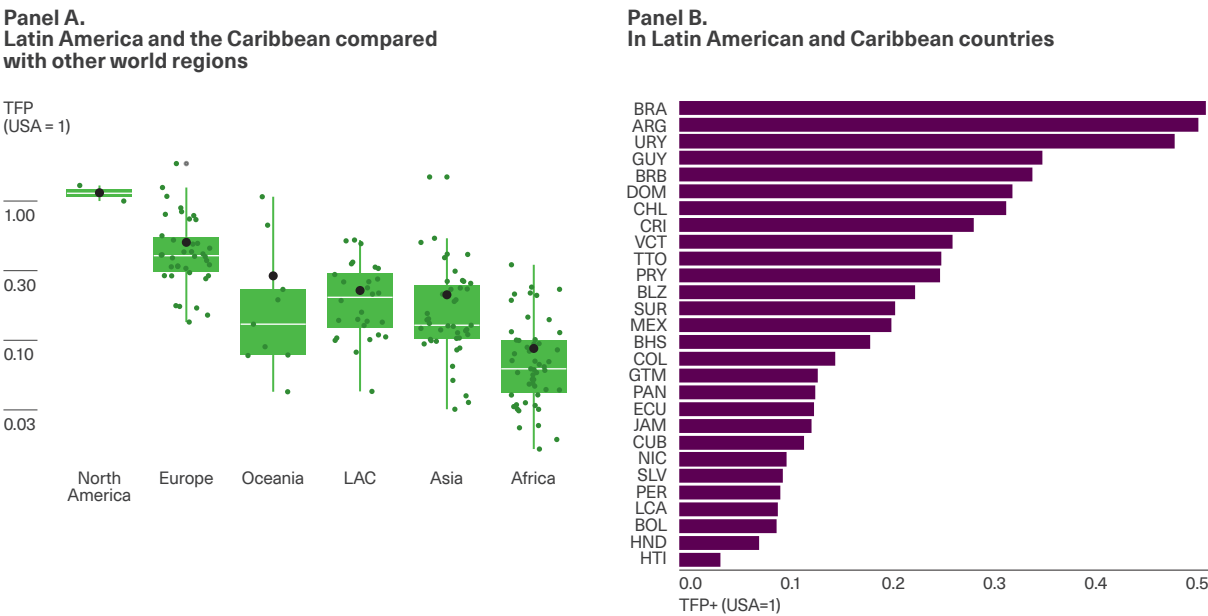
The preceding analysis, based on value added, overlooks the impact of intermediate inputs on production—a key component of agricultural output growth in the region. To address this limitation, a similar analysis is carried out using gross agricultural production.¹³

This approach allows for the derivation of a productivity measure that, while adjusted for land and capital endowments per worker, captures both TFP and the intensity of intermediate-input use. This expanded metric is referred to as TFP+. When this measure is applied, the productivity gap in LAC is even clearer: the regional average of TFP+ reaches only 22% of the level observed in the United States,

45% of the European average, and 34% of the OECD average, revealing a substantial lag, as shown in Graph 3.8.

The wider productivity gap captured by TFP+ is largely explained by the lower share of intermediate inputs in agricultural production across the region. Available data (discussed in more detail below) confirm that their use in LAC is below that of advanced economies. As a result, the observed productivity gap reflects not only lower efficiency in the use of primary factors (capital, land, and labor) but also limited use of intermediate inputs, which further constrains production.

Graph 3.8
Agricultural productivity (TFP+), average 2014–2023



Note: Panel A shows TFP+, relative to the United States, on a logarithmic scale. The boxplot shows, for each region, the median (white line), the interquartile range (IQR), the whiskers defined by $Q1 - 1.5 \times IQR$ and $Q3 + 1.5 \times IQR$, and outliers. The black dot indicates the mean for each region.

Source: Authors based on data from the FAO (2025f, 2025i, 2025l, 2025m).

13 Unlike value added, gross agricultural output is adjusted for PPP and excludes forestry and fishing production.

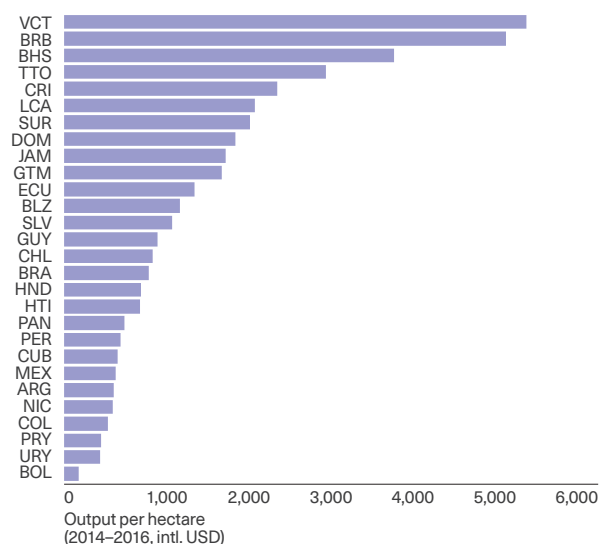
To examine more closely the role played by intermediate inputs in the agricultural productivity gap, it is useful to analyze differences in agricultural yields, measured as the gross value of production per hectare of agricultural land.

As shown in Graph 3.9 (panel A), yield disparities across countries in the region are substantial and are explained primarily by differences in per-capita

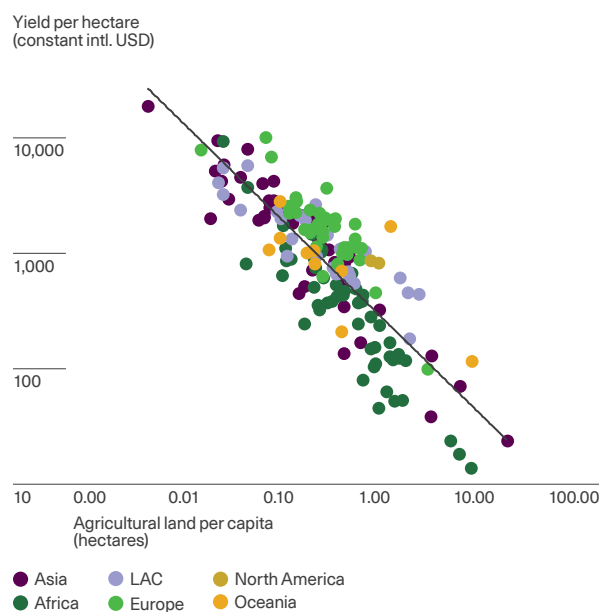
land abundance (panel B). Caribbean countries such as The Bahamas, Barbados, and Trinidad and Tobago—with the lowest agricultural land endowment per capita (around 0.03 ha)—record the highest yields in the region, while countries such as Bolivia, Paraguay, and Uruguay—with the largest agricultural land area per capita (between 3 ha and 4 ha)—record the lowest yields.

Graph 3.9
Agricultural yields, average 2014–2023

Panel A.
Yield per hectare



Panel B.
Yields relative to agricultural land per capita



Note: In Panel B, both axes are shown on a logarithmic scale.

Source: Authors based on data from the FAO (2025j, 2025i, 2025m).

However, when controlling for land abundance—that is, holding agricultural land per capita constant across countries—the Southern Cone and Brazil not only record the highest land-adjusted yields

in the region, but also rank among the highest globally (Graph 3.10).¹⁴ Caribbean countries, by contrast, tend to have the lowest adjusted yields in the region, with the notable exception of Guyana.

14 This land-adjusted yield corresponds to the residual from a regression of yields per hectare on agricultural land per capita.

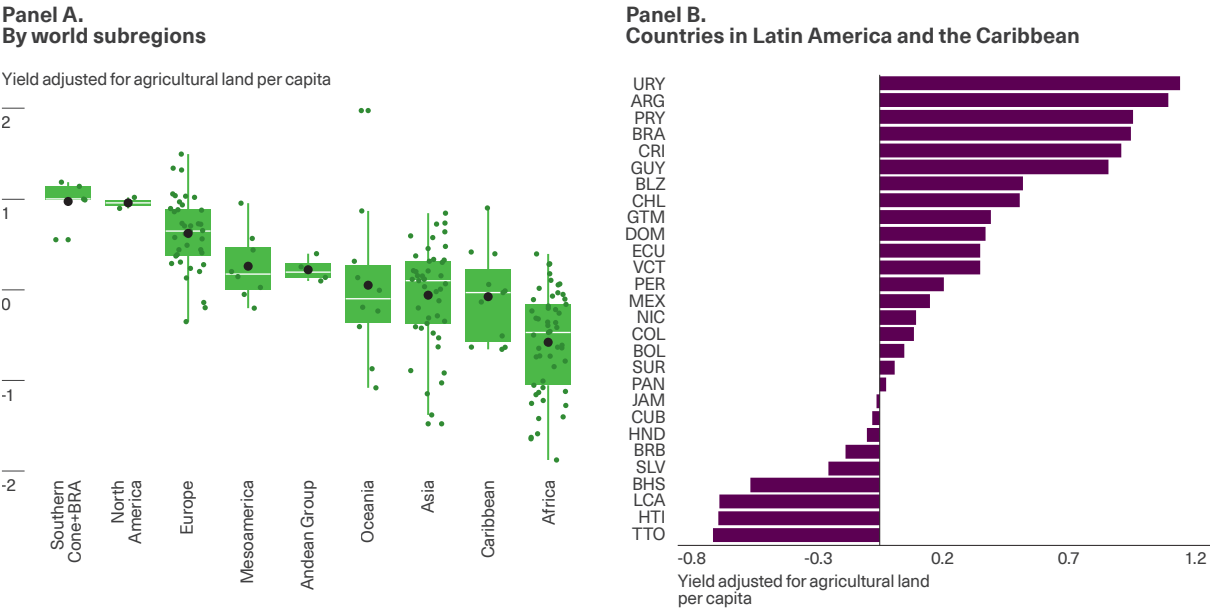
Countries in the Andean group and Mesoamerica generally fall in the middle of the distribution, except for Belize and Costa Rica, which are in the top quartile.

This suggests that the Southern Cone, Belize, Brazil, Costa Rica, and Guyana either have higher-quality land, make more intensive use of inputs, or apply better agricultural practices and technologies than the rest of the region. Indeed, the data show a strong positive relationship

between land-adjusted yields and inputs such as capital and fertilizer use.¹⁵

● ●
The productivity gap widens once intermediate inputs are taken into account, as their intensity of use in the region remains below that of advanced economies

Graph 3.10
Agricultural yields adjusted for land abundance, average 2014–2023



Note: Panel A shows yields adjusted for agricultural land per capita on a logarithmic scale. The boxplot shows, for each region, the median (white line), the interquartile range (IQR), the whiskers defined by $Q1 - 1.5 \times IQR$ and $Q3 + 1.5 \times IQR$, and outliers. The black dot indicates the mean for each region.

Source: Authors based on data from the FAO (2025j, 2025l, 2025m).

¹⁵ In a regression of yield per hectare on agricultural land per capita, capital per unit of land, the intensity of fertilizer and pesticide use, and the area under irrigation, the results show that—beyond the negative effect of land endowment—only the level of capital per unit of land and fertilizer use have statistically significant (positive) effects on yields. The remaining estimated coefficients are not statistically different from zero, which may reflect correlation among explanatory variables, such as between fertilizer use and irrigation.

In summary, the analysis in this subsection shows that the deep agricultural productivity gap facing LAC has multiple dimensions. Beyond the clear—though heterogeneous—shortfalls in capital per worker and low levels of land per worker, the evidence indicates that cross-country productivity differences are explained largely by the intensity of input use. While the lag in pure efficiency (TFP) remains a critical factor, accounting for more than

half of the gap in value added per worker, this gap is magnified when the low use of intermediate inputs is taken into account. Understanding the determinants of—and barriers to—the adoption of improved agricultural practices and more modern technologies in the region is essential to closing the gap with global leaders and consolidating the agricultural sector as a pillar of regional development.

Structural and technological drivers of agricultural productivity in Latin America and the Caribbean

The region has favorable endowments for agriculture—with the potential to exceed those of more developed countries—yet there is a notable lack of correlation between a country's actual output per hectare and its potential yield based purely on natural suitability. This disconnect indicates that factors beyond geography play a more decisive role in shaping current productivity outcomes, suggesting that countries exploit their natural advantages with varying degrees of effectiveness (Adamopoulos, 2025). The sizeable yield gap—the difference between current observed yields and those that could be achieved with improved inputs—points to substantial untapped potential in many LAC countries, driven by differences in the adoption and efficiency of modern agricultural techniques.¹⁶

Inefficiencies in the spatial allocation of production and suboptimal crop choices within countries also contribute to productivity disparities. These decisions regarding input use, the location of agricultural activity, and crop selection are, in turn, shaped by broader factors such as institutional quality, market access, infrastructure constraints, and other economic frictions, all of which vary widely across the region.

The enabling environment, which encompasses a broad set of conditions, also influences farmers' technological choices and directly affects productivity. Access to markets and support institutions plays a critical role: participation in output markets, access to credit (particularly from private sources), and formal land tenure through titling are all associated with higher productivity. These challenges are more pronounced for women farmers, who face greater barriers to land ownership and access to agricultural capital. By contrast, natural factors such as adverse climatic conditions and susceptibility to soil erosion have a negative impact on production. Risk management—related, for example, to rainfall variability—also affects productivity outcomes, sometimes leading farmers to adopt less productive but safer strategies. Household characteristics, including farmers' education levels and support from sectoral associations, further contribute to the observed productivity differences.

Ultimately, productivity levels are determined by the interaction between inputs, the enabling environment, and resulting technological choices, as well as by the degree of technical efficiency achieved by farmers. The evidence points to the existence of a technological frontier, with farms operating at varying distances from it, reflecting

16 Adamopoulos (2025) finds that improved input use would result in potential yields that are 2.4 times higher than current yields on average across LAC countries, and 1.65 times higher in high-income countries.

differences in technical efficiency. Larger farms tend to operate closer to this frontier, exhibiting higher technical efficiency, possibly due to fewer constraints or better access to optimal practices.

In contrast, smaller farms are more sensitive to environmental and institutional constraints, leading to wider productivity variation linked to their specific initial conditions.

Informal land tenure, land markets, and their (mis)allocation

Latin America and the Caribbean is one of the regions with the highest levels of inequality in land distribution and tenure worldwide, a situation compounded by widespread legal insecurity. As shown in Chapter 2, land ownership in the region is highly concentrated in large agricultural farms, alongside a high prevalence of small farms.

This agrarian structure, polarized between large estates and smallholdings, conceals a highly inefficient allocation of land, reflected in its low level of utilization. Fossati (2025), in a study covering Argentina, Colombia, and Panama, finds that the harvested area represents only 23%, 20%, and 12% of total land area in these countries, respectively, well below the 43% observed in the United States.

One explanation is that vast portions of land within large farms remain idle or are devoted to low-productivity activities, such as extensive livestock farming, despite being suitable for more profitable and labor-intensive crops. At the other end of the spectrum, smallholdings concentrate large numbers of workers on plots that are too small to achieve economies of scale or adopt modern technologies. As a result, land misallocation is accompanied by an inefficient allocation of labor within the agricultural sector.

The distribution of farms by size is closely linked to the high level of informality in land tenure that characterizes the region. This informality contributes significantly to the malfunctioning of land markets and creates barriers to a more efficient allocation of land. In this context, the lack of formal land titles and the predominance of small producers are not isolated phenomena.

One of the most significant consequences of informal land tenure is its restrictive effect on land market transactions. This limits the ability to exploit economies of scale, particularly in settings where mechanization and capital-intensive agriculture could substantially raise productivity. As a result, land remains fragmented into suboptimal plots, undermining productivity. In addition, informal producers who are unwilling or unable to cultivate their land are often compelled to continue using it solely to preserve their rights, preventing its transfer to more productive users. This dynamic is reflected, for example, in the extremely low rates of agricultural land renting in LAC—clear evidence of the dysfunctions affecting land markets in the region, as shown in Graph 3.11.

The implications for labor allocation are also significant. Informal land tenure creates a form of labor attachment to land, as noted by De Janvry et al. (2015), which discourages households from seeking employment outside the agricultural sector or migrating—even when returns outside agriculture are higher—due to the risk of losing land rights through absence. This rigidity leads to an excess supply of labor in low-productivity agricultural activities and an underutilization of human capital in more profitable sectors. It also limits the ability of rural households to diversify their income sources and adapt to market opportunities.

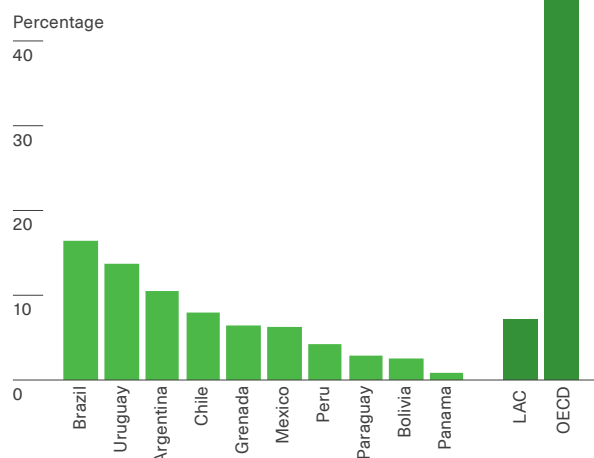


Center-pivot irrigation over a corn field in Argentina.

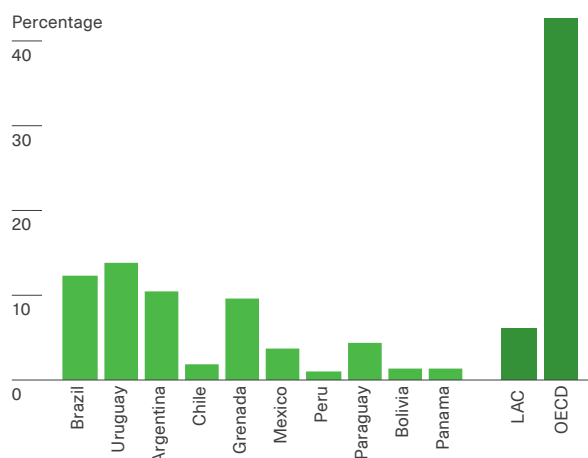
Graph 3.11

Share of farms and land under rental arrangements

Panel A.
Farms under rental arrangement



Panel B.
Land under rental arrangement



Source: Authors based on data from the FAO (2025c).

●● High levels of tenure informality hinder land markets, discourage long-term investment, and restrict access to credit, perpetuating low productivity

Informality also discourages investment in capital. Insecure tenure weakens incentives to undertake

long-term investments in land, such as building irrigation systems, planting perennial crops (coffee, cocoa, fruit trees), or improving soil health, since those working the land cannot be certain they will reap the returns from these investments. More critically, the absence of formal land titles prevents land from being used as collateral, restricting access to credit from the formal financial system and, in turn, limiting the ability to acquire technology and other inputs needed to raise productivity.

Machinery use and quality

Motorized mechanization in LAC began with a substantial delay relative to North America and Europe, where the transition from animal traction to tractors was largely completed in the first half of the twentieth century. In the region, this process accelerated during the second half of the century. For example, “the number of tractors per 1,000 hectares of arable land nearly tripled, rising from

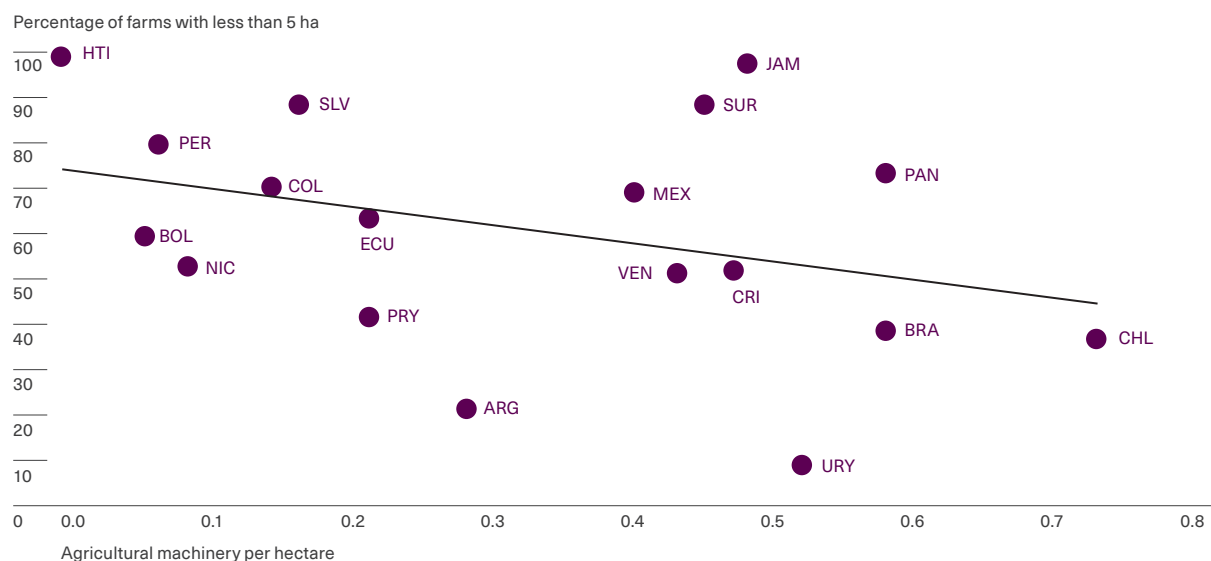
5 in the 1960s to 14 in the 2000s” (FAO, 2022b). This modernization was critical, as the tractor not only replaced animal power but also catalyzed innovation across a wide range of implements, such as seeders, harvesters, and threshers, reducing physical labor demands and improving the timeliness of agricultural operations.

Despite this progress, the region as a whole continues to lag behind. Chapter 2 of this RED shows that LAC has significantly lower levels of agricultural machinery. This finding is confirmed by Fossati (2025), who reports that only 38% of farms in Argentina have tractors, compared with 79% in the United States. In Colombia, 15% of farms report owning machinery, while in Panama the figure is around 20%. This lag is further reflected in the fact that the marginal returns to adopting machinery in LAC are higher than in most other regions of the

world (Bravo Ortega & Lederman, 2004; Elverdin et al., 2018).

Machinery adoption also varies widely within the region, both across countries and across farms of different sizes (ECLAC et al., 2017; FAO, 2022b). Countries where farms are smaller on average tend to have lower machinery stocks per worker, as noted by Elverdin et al. (2018). In addition, as shown in Graph 3.12, countries with a higher share of small farms (below 5 ha) make less intensive use of machinery per hectare.

Graph 3.12
Machinery use and farm size, 2019



Note: Agricultural machinery is measured in horsepower. This figure is divided by total agricultural land to obtain average agricultural machinery use per hectare.

Source: Authors based on data from the FAO (2025c) and the U.S. Department of Agriculture processed by Our World in Data (USDA, n. d.b).

The high cost of modern machinery, along with designs often tailored to large-scale farms, makes it inaccessible or unprofitable for most small farmers in the region, who lack the minimum scale needed to justify such investments. For example, in a study of the state of Piauí in Brazil, Da Silva et al. (2018) find that the use of agricultural

machinery among small producers is almost nonexistent due to their limited purchasing power and small farm size.

Another key factor behind low levels of agricultural mechanization in the region is limited access to financing. Small producers, who account for a

substantial share of the regional agricultural sector, face significant barriers to accessing formal credit due to their limited ability to provide collateral, the informality of their operations, and the lack of financial instruments tailored to the agricultural production cycle. As a result, investment in machinery is often out of reach, even when it could significantly raise productivity and reduce reliance on labor.

This constraint is even more acute for women farmers: their access to credit is extremely limited, with rates of 4% in Peru, 5% in Ecuador, 11% in Nicaragua, 12% in Brazil, and 13% in Chile. In addition, many of their productive activities are oriented toward subsistence or are marketed through community channels without formal records, preventing them from systematically demonstrating income in ways that financial institutions require (Nobre & Hora, 2017).

These limitations are compounded by inadequate rural infrastructure and limited digital connectivity, as shown in Chapter 8 of this report. Many farmers—especially in remote areas—have restricted access to road networks, electricity, and internet services, all of which are critical for the installation and effective operation of modern agricultural machinery.

The lack of specialized support and logistics services for machinery maintenance and repair, along with the limited availability of trained technicians and appropriate spare parts, further discourages the adoption of mechanized technologies. In addition, in several countries in the region, rental or shared-use machinery services are scarce, forcing small farmers to consider

individual ownership as the only option despite the high costs involved.



The region lags behind in agricultural mechanization, constrained by the high cost of machinery, the limited scale of small farmers, and restricted access to financing

Another major obstacle is the low level of technical education and limited access to agricultural extension services. Many producers lack the knowledge required to select, operate, and properly maintain agricultural machinery, leading to inefficient use, higher risks of premature deterioration, and in some cases, complete abandonment of these technologies. This situation is exacerbated by the limited availability of targeted training and technical assistance programs to support farmers throughout the technology adoption process.

Finally, public policies aimed at promoting agricultural mechanization tend to be weak, fragmented, or altogether absent. Where initiatives do exist, they are often implemented in an uncoordinated manner across different government agencies, without a long-term vision or effective coordination. This lack of an integrated approach limits the ability to overcome existing barriers and to create an enabling environment for inclusive and sustainable mechanization in the agricultural sector.

Irrigation

Water is a fundamental input for agricultural activity. As shown in Graph 3.13, yields under irrigation are higher than rainfed yields across all regions.¹⁷

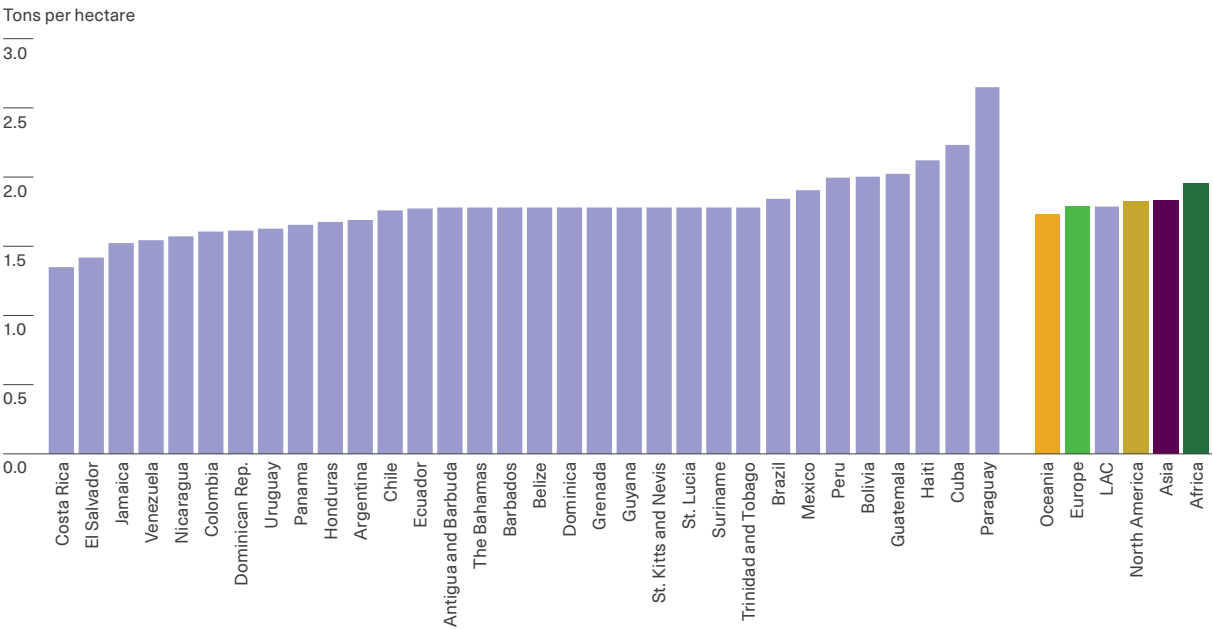
17 CAF estimated an infrastructure gap for climate-resilient agriculture and irrigation of USD 56 billion between 2020 and 2030, and USD 60 billion between 2030 and 2040 (CAF–VCPE–GDUAEC, 2023).

The development of irrigation systems first requires access to a water source—such as rivers, reservoirs, or groundwater. A significant share of public investment in irrigation infrastructure is devoted to off-farm (inter-farm) infrastructure, which enables water to be conveyed from these sources to farms. Box 3.1 describes CAF initiatives aimed at promoting this type of irrigation infrastructure.

Once access to water resources is secured, different on-farm irrigation systems can be deployed, with varying levels of efficiency and cost depending

on rainfall patterns, climate conditions, water availability, and crop type, among other factors. This dependence on multiple variables makes comparisons of irrigation availability and intensity across regions less straightforward. For example, in the Atacama Desert in Chile, in arid areas of Peru, or in North Africa and the Middle East, agricultural activity would be almost unviable without some form of irrigation, whereas in northern Europe, where rainfall is abundant, artificial irrigation systems are less necessary.¹⁸

Graph 3.13
Ratio of irrigated to rainfed crop yields, 2022



Source: Authors based on data from the FAO (2025k).

18 Correlating precipitation levels with agriculture-related water stress results in a negative relationship, reinforcing the idea that irrigation availability has multiple determinants and is difficult to analyze in a comparative framework.

Box 3.1

CAF initiatives in off-farm irrigation

Off-farm irrigation infrastructure is an essential component of sustainable agricultural development. These investments make it possible to store water during the rainy season and distribute it efficiently during dry periods, improving access to water resources and optimizing their use. In doing so, they strengthen productivity, sustainability, and the resilience of crop and livestock systems to climate variability. CAF -Development Bank of Latin America and the Caribbean- supports governments across the region in the design, financing, and implementation of this type of strategic infrastructure.

The projects described below illustrate the potential and benefits of these initiatives for promoting rural development and strengthening food security in the region.

Alto Mao Irrigation Canal, Valverde Province (Dominican Republic)

Overview and objectives. This project, scheduled for implementation in the municipality of Mao (Valverde Province), aims to expand the area under irrigation, improve productivity, and strengthen the competitiveness of the agricultural sector. It includes the construction of hydraulic works to enable efficient and controlled water distribution to areas currently not under cultivation, as well as improvements in water management within the existing Mao–Gurabo irrigation system. The project forms part of an integrated approach that combines infrastructure with capacity-building activities and environmentally sustainable watershed management.

Irrigation infrastructure components. The physical component is implemented through three lines of investment:

- Main conveyance network. Approximately 14 km of gravity-fed pressurized piping designed to convey a flow of 10 m³/s to the transfer system.
- Transfer system consisting of a 1 km pipeline transporting a flow of 6 m³/s to the existing Mao–Gurabo canal, strengthening its hydraulic capacity.
- Secondary conveyance network and reservoir connection. Approximately 18 km, linking the transfer system to reservoirs from which water is distributed to different agricultural subsectors.

The project also includes complementary components accompanying the infrastructure investment, such as beneficiary capacity building and actions aimed at sustainable watershed management.

Scope and beneficiaries. The project will benefit 10,550 hectares, of which 40% correspond to newly irrigated areas and 60% to areas with improved irrigation.

Program for the Development of New Irrigated Areas (Argentina)

Overview and objectives. This completed program aimed to develop new irrigated areas by sustainably increasing the availability and quality of water resources. Its objectives included expanding agricultural supply, improving productivity, and strengthening the sustainability of water use. In addition to infrastructure investments, the program included training activities for beneficiary farmers.

Irrigation infrastructure components. The physical component was implemented through two lines of investment:

- Productive conversion in the Toro River tobacco-growing area (Salta): Improvements to treatment works (filters and desanders), water intake (intake structure on the Toro River), and conveyance (gravity-fed canal networks). These works expanded regulation capacity, increased system efficiency, significantly reduced groundwater extraction, and strengthened productive sustainability.
- Improvements in the Guaycurú-Iné basin (Chaco): Construction of regulation and storage works through a lagoon-based irrigation system, rehabilitation of existing canals, installation of gates, and construction of lined canals to enable new irrigated areas.

The program also included complementary components that accompany the infrastructure investment, such as training activities for beneficiaries of the financed irrigation works, as well as institutional strengthening of the entities responsible for ensuring the sustainability of investments and the proper operation of collective irrigation systems.

Scope and beneficiaries. The program benefited 10,500 hectares, of which 34% correspond to newly irrigated areas in Chaco and 66% to areas with improved irrigation in Salta.

Dam Program (Bolivia)

Overview and objectives. This program, currently under implementation, aims to increase agricultural production and productivity per hectare and per beneficiary household by expanding the volume of water available through the construction of reservoirs, conveyance works, and the deployment of technified irrigation systems. It also seeks to contribute to the structural reduction of rural poverty by expanding irrigated areas for small producers.

Irrigation infrastructure components. The physical component is being implemented through the construction of dams and associated systems. The program includes three completed dams and three additional dams scheduled for completion by 2026. It encompasses the optimization of studies, supervision, and construction of dams, as well as conveyance and distribution systems, together with the implementation of environmental management measures.

The program also includes complementary components alongside the infrastructure investment, such as the development of structural and non-structural measures to protect water sources within watersheds, institutional strengthening, technical assistance for beneficiaries, and support for data processing and the implementation of the National Dam Safety Plan.

Scope and beneficiaries. The program will benefit approximately 10,000 families in communities with high poverty rates and will expand the irrigated area by an additional 8,000 hectares beyond those already under irrigation.

Source: Prepared by Jorge Ecurra.



CAF Action.
Scan the QR code to learn more about irrigation projects supported by CAF.

There are several methods for irrigating crops. The oldest and least capital-intensive is surface irrigation, such as flood or furrow irrigation. This method—mainly for rice, cereals, and forage crops—tends to be less efficient (around 40%),¹⁹ due to losses from evaporation, percolation, and runoff.²⁰ Sprinkler irrigation is the next method and consists of systems that simulate rainfall. It is more efficient (between 50% and 70%), as it allows for greater control over the irrigated area and can be automated, reducing the losses described above, although it requires higher upfront investment. Sprinkler irrigation is used mainly for tubers, such as potatoes, and for legumes. Finally, localized irrigation—either drip or subsurface—represents the most water-efficient method (between 80% and 90%) and can also be automated. Its main drawback is the high initial cost. This system is commonly used for fruit trees, olive groves, and vineyards, as well as for some horticultural crops and greenhouse production.²¹

Technified irrigation systems (sprinkler and drip) significantly increase agricultural yields relative to surface irrigation. Their effectiveness lies in more efficient water distribution and use, the possibility of fertigation,²² and the reduction of water stress and crop diseases. Although these systems require higher investment and more technical management, the gains in yields and water-use efficiency often far exceed the costs when applied to high-value crops. In Latin America and the Caribbean, surface irrigation (traditional or flood irrigation) remains the most widely used system, although the adoption of technified irrigation is expanding.

As shown in Graph 3.14, LAC is the region of the world that has experienced the largest increase in irrigated area over recent decades, with the area equipped for irrigation expanding by a factor of 3.5 between 1961 and 2022. This trend is observed

across all subregions, albeit at different speeds. While the share of irrigated area increased fivefold in the Southern Cone and Brazil, it rose by a factor of 2.5 in Mesoamerica. When measured as a share of cultivated land, the irrigated area increased from 8% to 17% over this period, making LAC the region with the second-highest proportion of irrigated land after Asia. Within LAC, the Andean subregion shows the highest share of irrigated land relative to cultivated area (30%), while the Southern Cone and Brazil display the lowest (10%). In terms of water stress, LAC is the region with the second-lowest contribution of agriculture to overall water stress, at 13.6%. Although this indicator has been rising steadily, it remains below the levels observed in North America (16%), Europe (17%), and Asia and the Pacific (24%).

Looking ahead, irrigation will play an increasingly central role. Rising temperatures and greater temperature volatility associated with climate change will increase water demand for agricultural production. Meeting this higher demand will require the adoption of efficient and sustainable irrigation systems.



LAC has led global growth in irrigated area in recent decades, although surface irrigation still predominates, and further progress toward more efficient technified systems is needed

19 Irrigation efficiency is measured as the share of applied water that effectively reaches the crop root zone. The efficiency values are taken from Nikolaou et al. (2020).

20 Runoff refers to water that flows over the soil surface without being absorbed by crops, while percolation refers to water that infiltrates beyond the crop root zone.

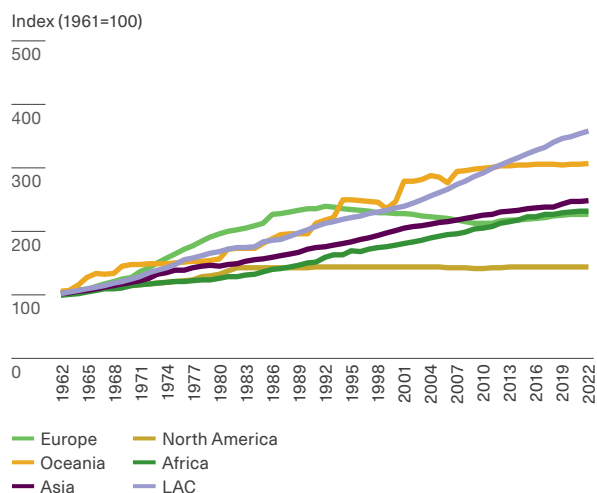
21 For example, Garriga (2022) shows that in Spain more than 90% of irrigated olive groves and non-citrus fruit use drip irrigation; nearly 80% of irrigated tubers and legumes use sprinkler irrigation; and more than 50% of forage crops rely on surface irrigation.

22 Fertigation is a technique that allows soluble fertilizers and nutrients to be applied directly to crops through the irrigation system, increasing input-use efficiency and enabling more uniform application.

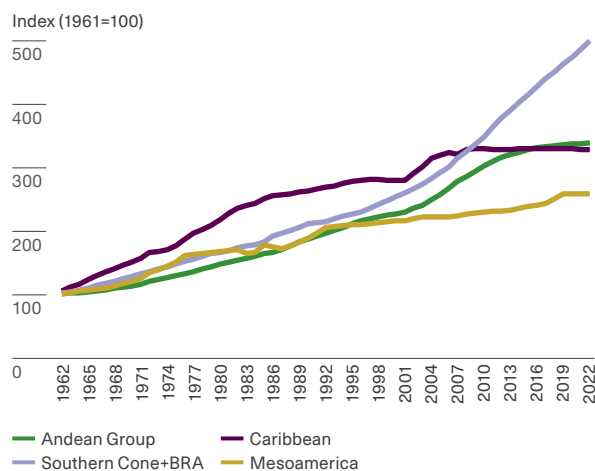
Graph 3.14

Area equipped for irrigation, 1961–2022

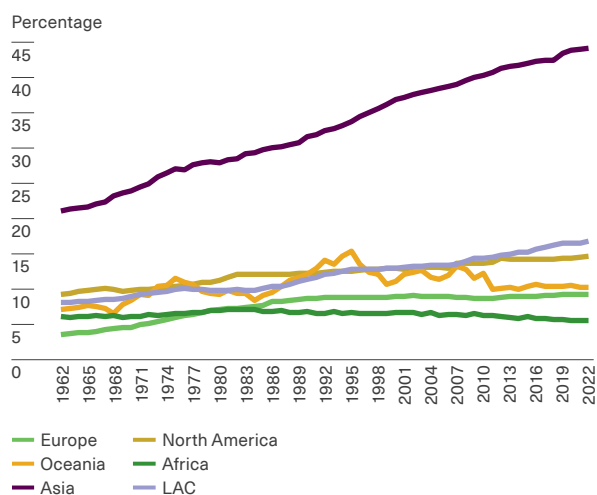
Panel A.
Index values in Latin America and the Caribbean compared with other regions



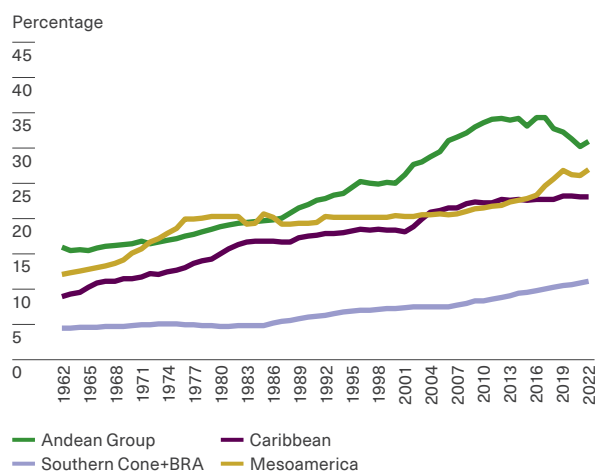
Panel B.
Index values in subregions of Latin America and the Caribbean



Panel C.
Percentage of cultivated area in Latin America and the Caribbean compared with other regions



Panel D.
Percentage of cultivated area in subregions of Latin America and the Caribbean



Note: Graph A.3.1 in the appendix to this chapter, available in the online edition of RED, presents the values of area equipped for irrigation in thousands of hectares and as a percentage of cultivated area for each LAC country in 2022.

Source: Authors based on data from the USDA (2025).

Use of high-quality intermediate inputs

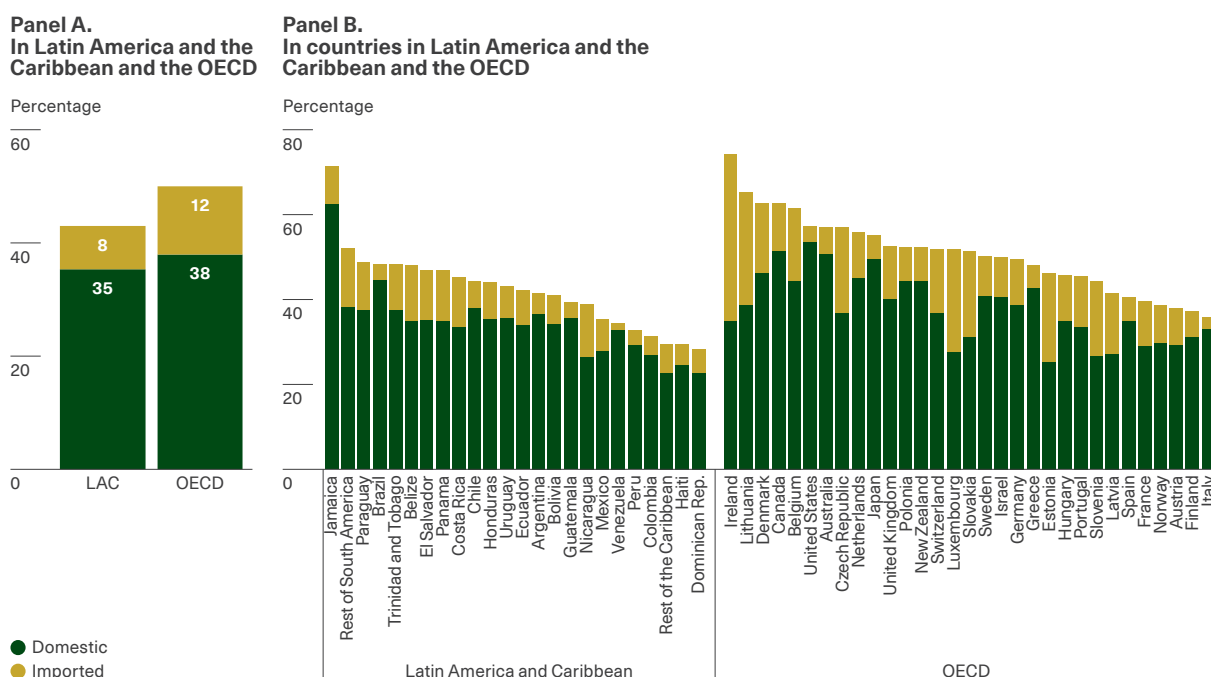
Compared with the OECD, the agricultural sector in LAC makes less intensive use of inputs. Graph 3.15 shows that intermediate input consumption, measured as a share of agricultural output, stands at 43% in LAC, compared with 50% in the OECD. This gap is driven mainly by lower use of imported inputs, which may reflect distortions such as trade barriers. At the same time, there is substantial heterogeneity within the region. In some countries, such as Jamaica and Paraguay, intermediate input use is comparable to that of the best-performing

OECD countries, while in others—such as Haiti and the Dominican Republic—it is significantly lower.

As shown in Graph 3.16, the ratio of intermediate inputs (as a share of output) between LAC and the OECD is below one in almost all agricultural subsectors. This not only indicates that the lower intensity of intermediate input use is widespread but also points to larger distortions relative to the OECD, as documented by Álvarez et al. (2018) for the full set of economic subsectors.

Graph 3.15

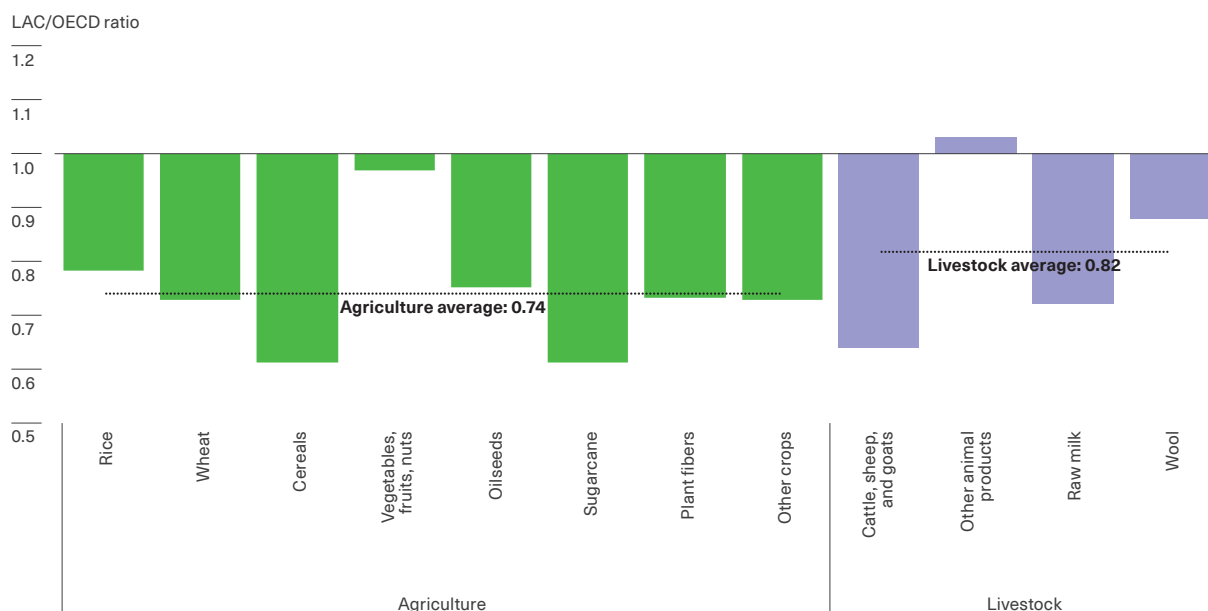
Intermediate consumption as a share of agricultural output, 2017



Note: The graph shows the share of the value of agricultural output accounted for by intermediate consumption, broken down into domestic and imported components. Regional values are calculated as the simple average of the countries in each region.

Source: Authors based on data from Aguiar et. al (2022).

Graph 3.16
Sectoral intermediate consumption, 2017



Note: The ratio of intermediate input consumption (domestic and imported) to output is calculated for each sector and country. Simple averages are then computed for LAC and the OECD for each sector. Finally, the ratio between LAC and the OECD is calculated for each sector.

Source: Authors based on data from Aguiar et. al (2022).

Fertilizers and pesticides

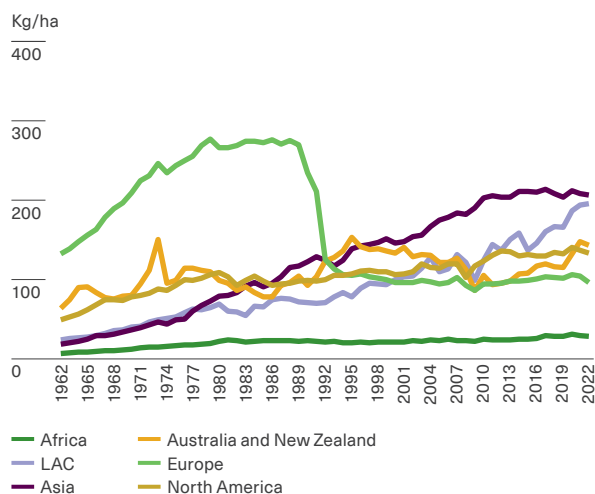
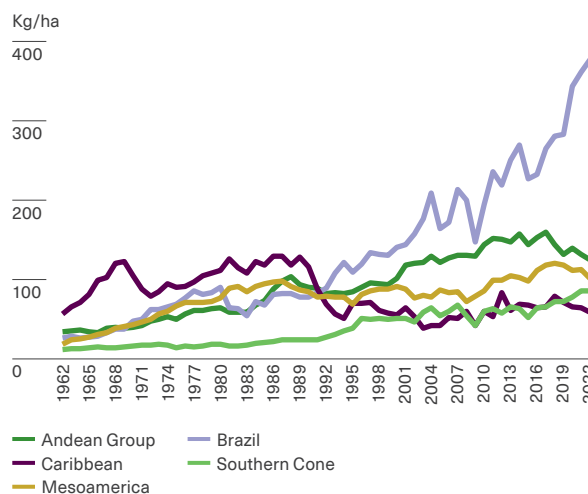
A large body of research identifies fertilizer application as one of the key drivers of the wide yield gaps observed across crops (Aramburu Merlos et al., 2015; Guilpart et al., 2017). As shown in Graph 3.17, fertilizer use—measured in kilograms per hectare (kg/ha)—has increased substantially since the early 1960s in all regions of the world except Europe. In LAC, fertilizer use (inorganic plus organic nitrogen) increased roughly ninefold, rising from 22 kg/ha in 1961 to about 200 kg/ha today. This increase is driven primarily by inorganic fertilizers, whose use rose from 9 kg/ha to approximately 160 kg/ha over the period.

Relative to other regions, fertilizer use growth in LAC is surpassed only by Asia, where fertilizer application increased twelvefold. The expansion observed in LAC is explained to a large extent by Brazil, where fertilizer intensity rose by approximately fourteen times between 1961 and 2022, with particularly rapid growth after 2009, when it increased by more than 2.5 times.

Within the region, fertilizer use declined sharply in the Caribbean after 1990, leaving current levels close to those observed in 1961. Fertilizer use has also remained relatively stagnant over the past two decades in the Andean Group and over the past three decades in Mesoamerica. By contrast, fertilizer use in the Southern Cone has increased nearly eightfold since 1961.

Graph 3.17

Evolution of fertilizer use in agriculture, 1961-2022

Panel A.
Latin America and the Caribbean compared
with other world regions**Panel B.**
Subregions of Latin America and the Caribbean**Source:** Authors based on data from the USDA (2025).

Although fertilizer use in LAC displays substantial dispersion, this variability is not especially large relative to other regions such as Asia or Europe. Within LAC, the countries with the highest fertilizer intensity (ranked in descending order) are Costa Rica, Colombia, Trinidad and Tobago, Brazil, and Belize, with application rates close to or above 300 kg/ha—well above those observed in Argentina, Cuba, Haiti, and Bolivia, where fertilizer use remains below 50 kg/ha (Graph A.3.2 in the appendix to this chapter, available in the online edition of RED).

With respect to inputs used for pest and weed control, LAC records significantly higher pesticide use per hectare than other regions. While pesticide use in LAC has followed a clearly increasing and volatile trend over time, it has remained more stable elsewhere, with the exception of Australia and Oceania since 2018. These patterns reflect differences in agricultural intensification strategies, regulatory frameworks, and the adoption of more sustainable practices.

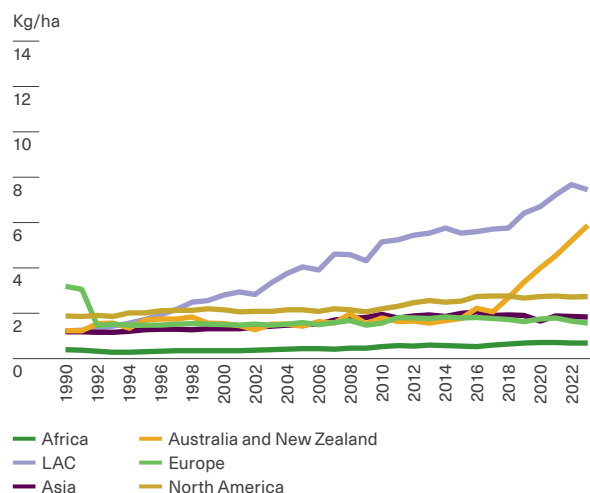
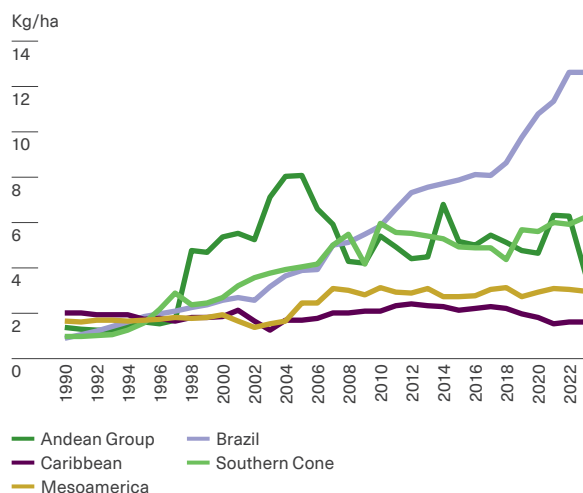


Fertilizer use increased substantially—driven largely by Brazil—while the region stands out for pesticide use that is higher than in other parts of the world

Once again, heterogeneity within the region is striking. In the Caribbean—excluding Cuba and Haiti—pesticide use is intensive, exceeding 20 kg/ha, whereas in the rest of the region, most countries record values below 10 kg/ha. Higher pesticide use in the Caribbean may be partly explained by the region's temperature and humidity conditions, which favor the spread of pests and crop diseases, although it may also point to less efficient agricultural practices (Graph A.3.3 in the appendix to this chapter, available in the online edition of RED).

Graph 3.18

Evolution of pesticide use ,1990-2023

Panel A.
Latin America and the Caribbean compared
with other world regions**Panel B.**
Subregions of Latin America and the Caribbean**Source:** Authors based on data from the FAO (2025h).

One practice that has expanded in recent decades is organic agriculture, which reduces reliance on synthetic pesticides and fertilizers. Although its share in total agricultural production remains

small, it is expected to continue growing over time. Box 3.2 provides further details on organic agriculture in the region.

Box 3.2

Organic agriculture

Organic agriculture is based on production systems that seek to maintain the health of soils, ecosystems, and people by avoiding the use of synthetic inputs. By prioritizing ecological processes, biodiversity, and natural cycles, this approach to land management makes a significant contribution to environmental sustainability.

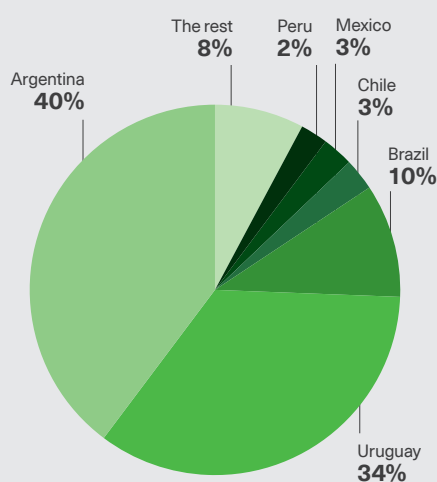
Globally, organic agriculture has expanded steadily over recent decades. According to FAO land-use data, between 2004 and 2023, the area devoted to organic agriculture increased fivefold, reaching 98.8 million hectares. This expansion was driven largely by Australia, which accounts for 54% of the world's total organic agricultural land.

In Latin America and the Caribbean, growth has also been substantial. The area under organic agriculture quadrupled over the same period, reaching 10.3 million hectares—more than 10% of the global total. Within the region, the countries with the largest areas devoted to organic agriculture are Argentina (4.1 million ha), Uruguay (3.6 million ha), and Brazil (1 million ha), which together account for 84% of the regional total (panel A of Graph 1).

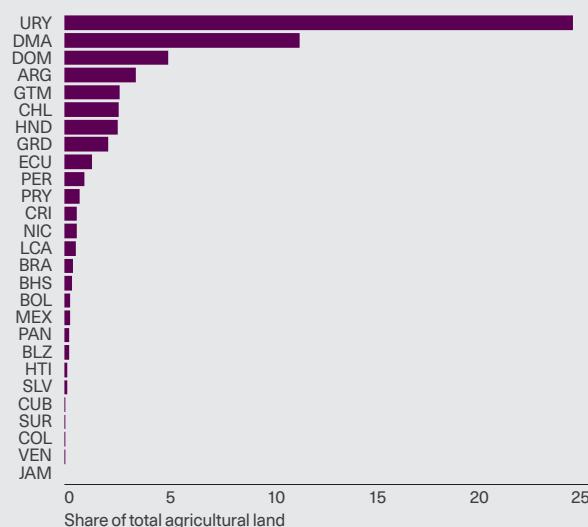
Organic agriculture currently accounts for 2.1% of global agricultural land, while in LAC the share is similar, at 2.3%. Uruguay has the highest share of organic agricultural land in the region (25%), followed by Dominica (12%), the Dominican Republic (5%), and Argentina (4%) (panel B of Graph 1).

Graph 1
Organic agriculture in Latin America and the Caribbean

Panel A.
Distribution of organic agricultural land
across countries



Panel B.
Share of organic agricultural land
in total agricultural land



Source: Authors based on data from the FAO (2025I).

With respect to land use under organic agriculture in LAC, permanent pastures dominate, accounting for nearly 75% of organically managed agricultural land and located primarily in Argentina, Uruguay, and Brazil (Graph 1). Permanent crops—such as coffee, cocoa, and tropical fruits—represent approximately 11% of organic agricultural land, with the largest areas found, in descending order, in Peru, Mexico, Colombia, the Dominican Republic, and Ecuador. Annual crops account for only about 5% of organic land, led—also in descending order—by Bolivia, Paraguay, Argentina, and Mexico, mainly in the production of cereals, sugarcane, and oilseeds (Willer et al., 2024).

Biotechnology and the use of improved seeds

Biotechnology encompasses a set of techniques and tools that use living organisms or substances derived from them to understand and manipulate genetic structures for various purposes. These include genetic improvement of plants and animals to raise yields; the characterization and conservation of genetic resources for food and agriculture; the diagnosis of plant and animal diseases; vaccine development; and the production of fermented foods (FAO, n. d.a.; 2004).

Modern biotechnology incorporates genetic engineering tools that allow the direct modification of an organism's DNA through the insertion, deletion, or alteration of specific genes in order to confer desired traits, such as pest resistance, herbicide tolerance, or improved nutritional quality.

Box 3.3

Key advances in agricultural biotechnology

Genetic engineering and genetically modified (GM) crops: insertion of genes that confer herbicide tolerance, insect resistance, or enhanced nutritional traits.

Gene editing (CRISPR-Cas^a and others): enables precise modification of DNA without introducing foreign genes, accelerating the development of improved crop varieties or animal breeds.

Marker-assisted selection and genomic selection: application of molecular tools to accelerate plant and animal genetic improvement programs.

Reproductive biotechnology in livestock: advances in artificial insemination, embryo transfer, cloning, and the production of transgenic or genetically edited animals.

Use of microorganisms and bioproducts: development of biofertilizers, biopesticides, inoculants, and probiotics that improve crop and animal nutrition and health.

Molecular diagnostics and next-generation vaccines: rapid disease detection using polymerase chain reaction (PCR) or sequencing techniques, and the development of recombinant or DNA-based vaccines for veterinary use.

Tissue culture and in vitro propagation: production of healthy, virus-free plants with uniform characteristics for rapid multiplication.

Bioinformatics and applied genomics: use of high-throughput sequencing, data analysis, and computational biology to identify genes of interest and understand their function in plants and animals.

Biotechnology applied to sustainability: development of crops resistant to drought, salinity, and heat stress; production of biofuels; and the valorization of agro-industrial residues.

a. CRISPR stands for Clustered Regularly Interspaced Short Palindromic Repeats; Cas proteins are enzymes that cut DNA.

Source: Authors based on the FAO (n. d.a) and the USDA (n. d.a).



Advanced-technology agricultural seeder in Brazil.



The adoption of genetically modified seeds—led by Brazil and Argentina—has played a key role in boosting yields and strengthening the resilience of strategic crops such as soybeans and maize

In agriculture, these techniques are applied to the development of improved seeds that embed genetic innovations aimed at enhancing crop productivity and resilience. Seeds developed through biotechnology—including genetically modified (GM) seeds—result from the application of genetic engineering tools and marker-assisted breeding techniques (see Box 3.3). Their use contributes to higher agricultural productivity,

lower losses, and more efficient use of natural resources (USDA, n. d.a).

Globally, the main GM crops (also referred to as transgenic crops) are soybeans, maize, canola (rapeseed), and cotton, although crop selection varies across regions and countries. For example, insect-resistant cotton is the most commercially significant transgenic crop in Asia and Africa, while in Latin America, herbicide-tolerant soybeans and insect-resistant maize predominate (Halford, 2003).

In Latin America, several countries show high adoption rates of GM seeds, particularly for soybeans, maize, and cotton. Brazil and Argentina stand out as major producers, ranking second and third globally—after the United States—in the production of biotech crops.²³

Digitalization as a technological ally for the agricultural sector

Digitalization in the agricultural sector refers to the adoption of information and communication technologies (ICT) to transform and optimize production practices, resource management, and decision-making. This process encompasses the generation, collection, exchange, aggregation, combination, analysis, access to, and presentation of digital content, as well as the development of new digital services and applications.

The agricultural sector is undergoing a set of transformative trends driven directly by digitalization. These include a growing emphasis on precision agriculture, the application of the Internet of Things (IoT) in farm operations, and the extensive use of big data to enhance both production and business efficiency. These technologies are already being deployed in several countries in the region. In Brazil, the Brazilian Agricultural Research Corporation (Embrapa) is

developing systems based on IoT and artificial intelligence (AI) algorithms to monitor crops and predict agricultural yields. More recently, it has launched research initiatives on the application of quantum computing to agriculture, with potential benefits for climate modeling, early detection of plant diseases, and genomic analysis (Embrapa, 2024). In Argentina, the National Institute of Agricultural Technology (INTA), through its AgTech Program, is advancing innovations such as 3D biomass sensors, monitoring drones, robotic milking systems, and AI applications in agricultural machinery (Ministry of Economy, 2025).

²³ Table A.3.1 in the appendix to this chapter, available in the online edition of RED, presents the main genetically modified crops and their adoption rates by country.

More broadly, digitalization can generate significant productivity and sustainability gains across all stages of the production process—from access to inputs and primary production to storage, logistics, industrial processing, and the distribution and final sale of products. Box 3.4 outlines some of the main digital tools available to the agricultural sector.



Developments such as the Internet of Things and the extensive use of big data are helping boost production and productivity

Box 3.4

Key digital tools for the agricultural sector

- 1. Internet of Things (IoT).** This refers to a network of physical objects connected to the internet that collect, exchange, and analyze data through sensors, software, and other technologies. In the agricultural sector, examples include soil sensors that measure moisture and nutrient levels, weather stations, GPS-enabled collars for livestock, autonomous agricultural robots, as well as mobile phones and computers, among other devices. This connectivity enables the automation of routine processes—such as irrigation and fertilization—and the generation and analysis of large datasets (FAO, 2022b).
- 2. Big data and artificial intelligence (AI).** In agriculture, the growing availability of digital data—from sensors, IoT-equipped machinery, satellite imagery, drones, harvest records, and other sources—makes it possible to train AI algorithms and optimize production decisions. For example, using machine-learning techniques, AI can predict yields based on satellite images, diagnose plant diseases from photographs of leaves, or recommend optimal planting times by combining historical climate and market data.
- 3. Blockchain.** This is a digital data registry organized into sequentially growing sets (blocks) that form a chronological chain, secured through cryptographic links to ensure protection and integrity. This technology enables the secure transaction, storage, and recording of data blocks, ensuring traceability throughout the production process. It also streamlines transactions and secures payments by reducing intermediaries, and facilitates the recording of information—such as the carbon emissions of a plot of land or compliance with organic standards—thus enabling the creation of digital assets.
- 4. Biotechnology and genetics.** These can be considered part of the technological modernization of agriculture, as advances such as gene editing are producing new crop varieties that are more resistant to pests, diseases, and water stress. These innovations complement the broader set of technological solutions needed to address climate change and increase agricultural productivity.

Source: Finkelstein and Odriozola (2025).

At the input acquisition stage, digitalization provides agricultural producers with tools to compare prices and characteristics of essential inputs—such as fertilizers, seeds, and veterinary medicines—through web portals or mobile applications. These digital platforms are often developed by agrifintech companies and frequently integrate credit application options within the same interface. This promotes competition in input markets, increases transparency, and can lead to significant cost reductions for farmers.

The primary production stage is where a wide range of digital tools is deployed to enhance productivity. Platforms such as advanced weather services aim to improve yields by using reliable, up-to-date data processed through AI. Global positioning system (GPS) technologies and geographic information systems (GIS) allow farmers to collect and analyze spatial data to precisely identify optimal planting times and the most suitable locations for crops based on site-specific conditions. A particularly illustrative example of these advances is precision agriculture, which is reshaping farming practices by combining advanced machinery with information technologies. This production approach relies on tools such as GPS, drones, and IoT sensors to monitor key indicators of crop health, soil quality, and water use in real time. The result is more efficient resource management and, ultimately, higher yields.

Sensors and drones enable the collection of precise, real-time information, improving the efficiency of land management (IDB Invest, 2023). For instance, soil sensors measure moisture levels, pH, and nutrient content, allowing for targeted fertilization and irrigation that reduce resource waste and improve overall crop health. Data gathered through these tools also support the monitoring of pests, weeds, and diseases and serve as the basis for AI-driven predictive models. Drones, meanwhile, play a key role in aerial surveillance by providing high-resolution images that allow for the rapid detection of issues such as pest outbreaks or water stress in crops.

The vast volume of data generated by these technologies can be processed using big data analytics tools, which deliver clear and actionable insights to agricultural producers, enabling more informed decision-making. For example, advanced weather forecasts support timely operational decisions, while yield prediction models, by combining historical data with current conditions, help fine-tune practices to maximize output.



New digital tools enable greater collection and analysis of agricultural data, supporting more informed decision-making

Complementing these developments are automation and agricultural robotics. The use of automated machinery—such as autonomous tractors and harvesters equipped with AI—reduces labor costs and increases efficiency by enabling highly precise operations over longer periods without direct human intervention. Agricultural robots can automate a wide range of activities, including planting, spraying, plant counting, and fruit sorting, among others.

Countries such as Argentina and Brazil have positioned themselves as leaders in the adoption and development of these technologies. In Argentina, precision agriculture has been instrumental in increasing productivity and reducing costs by enabling georeferenced resource management (AgroSpray, 2020). In Mexico, the export-oriented horticultural sector—particularly in the state of Sonora—has adopted digital agricultural technologies such as drones, agroclimatic and soil moisture monitoring systems, and GPS-enabled “smart” machinery. These innovations have improved production efficiency and have been a key factor in the region’s recognition as a benchmark for agricultural competitiveness (Hernández-Pérez, 2019).

Box 3.5

Initiatives to promote agricultural digitalization among women

Rural women continue to face particularly disadvantaged conditions with respect to access to and use of digital and adaptive technologies. Several recent initiatives seek to address this gap. Since 2024, FAO's Programme to Accelerate the Empowerment of Rural Women and Environmental Sustainability has promoted the use of digital technologies and productive innovations in Jamaica, Honduras, and the Dominican Republic, with the aim of improving agricultural production and strengthening the integration of rural women into agricultural value chains (FAO, 2024c).

The FAO–China Cooperation Programme on Digital Transformation and Innovation in Agriculture provides technical and financial support for digital projects in twelve countries in Latin America and the Caribbean (Argentina, Barbados, Chile, Costa Rica, Guyana, Jamaica, Mexico, Panama, Suriname, Trinidad and Tobago, and Uruguay). Its objective is to reduce the digital gaps that became evident during the COVID-19 pandemic (SELA, 2024).

In Chile, under the United Nations' Connected Communities project, rural women participated in training programs on digital tools aimed at facilitating access to government services, strengthening their digital literacy and autonomy in managing administrative procedures and accessing public benefits (United Nations Chile, 2024).

Source: Barbara Auricchio.

Digitalization also delivers substantial gains in storage, logistics, and agroindustrial processing. Notable applications include the use of IoT technologies in silos, warehouses, and transport vehicles to monitor variables such as temperature and humidity, ensuring optimal transport conditions. Digital technologies also support the development of electronic inventories, improving management, transparency, and control of stored products. Digital logistics platforms connect agricultural producers with transport services, streamlining distribution and reducing costs. In addition, smart packaging offers opportunities to enhance food safety and quality by monitoring freshness, temperature, and expiration dates. A concrete example is the use of QR codes, which provide end consumers with detailed information on harvest dates and locations, production practices, and organic certifications.

In the distribution and sales phase, online trading platforms expand producers' market reach and help reduce the number of intermediaries. Digital

marketplaces allow agricultural producers to sell directly to consumers, enabling them to retain a larger share of profits. These platforms are complemented by digital payment and delivery services that help consolidate online sales. Mobile applications providing real-time market prices further empower producers to make better selling decisions. The adoption of digital payments also brings additional benefits by creating transaction records that can facilitate access to credit, generating valuable information for potential lenders.

All of these technologies converge toward a broader goal: sustainability and the reduction of environmental impacts. Improved management of resources such as water and nutrients lowers their use, while data-driven agricultural practices make it possible to adopt more sustainable methods that protect soil health and biodiversity. Taken together, digitalization promotes sustainable agricultural practices, improves efficiency, and supports economic growth in the sector, ultimately

contributing to food security and resilience to challenges such as climate change.

Despite this substantial potential, the adoption of digital solutions faces significant barriers, particularly in rural areas. Key constraints include limited basic infrastructure—such as electricity and connectivity—a workforce that is not always prepared to adopt and use digital tools, difficulties in accessing technology and information, and limited access to financing.

It is also important to recognize that not all technologies are universally applicable. In many cases, technologies must be adapted to local conditions, or entirely new solutions must be developed to respond to the specific needs of a given territory. Achieving this requires investment in research and development (R&D), driven by public, private, or public–private initiatives, to foster the development of relevant, accessible technologies.

Climate change: Challenges and opportunities for the sector

Ortiz-Bobea et al. (2021) estimate that, since 1961, climate change has reduced agricultural total factor productivity (TFP) by 21%, with more severe impacts in Latin America and Africa. According to calculations by Deng et al. (2023), each one-degree Celsius increase in global warming between 2000 and 2020 led to declines in global yields of maize (–3.4%), wheat (–2.4%), rice (–0.3%), and soybeans (–5.0%), although with substantial regional variation.

Rising average temperatures are expected to reduce agricultural productivity in regions that are already warm, while increasing productive potential in high-latitude areas closer to the poles, where historically low temperatures have constrained agricultural activity. In warm regions such as northern Mexico, Aragón et al. (2018) project that, under future warming scenarios, maize yields could decline by between 7% and 20%. By contrast, in temperate-cold areas such as Argentina's Pampas region, a moderate increase in temperature and precipitation is expected to raise soybean productivity by 5% to 10%, as a result of a longer growing season (FAO, 2015a).

Changes in temperature, precipitation, and humidity may also alter soil conditions and the suitability of different crops across regions. Countries' ability to

adjust and reallocate agricultural production across territories—particularly by shifting production away from areas that may lose productivity toward those that may gain from climate change—will be critical in determining whether the effects of this phenomenon can be mitigated or even turned to advantage.

To assess the potential impact of climate change on agricultural production, Adamopoulos (2025) analyzes the effects of a climate change scenario on potential yields and incorporates into his analysis a counterfactual involving spatial reallocation and crop mix adjustment.²⁴ Table 3.1 summarizes the results.²⁵ Focusing first on the effects of climate change without spatial reallocation, two patterns emerge. In general, countries in the region—many of which are characterized by warm climates—are expected to experience losses in potential yields due to climate change. For the region as a whole, these losses are estimated at around 22%. However, the effects are highly heterogeneous, with countries such as Antigua and Barbuda facing substantial losses (potentially up to 65%), while others, such as Jamaica or Canada, could experience increases in potential yields (of around 40%).

24 The climate change model is GFLD-ESM2M (Geophysical Fluid Dynamics Laboratory-Earth System Model 2M).

25 Table A.3.2 in the appendix to this chapter, available in the online edition of RED, provides detailed country-level results.

The second experiment allows for spatial reallocation and changes in crop composition. Spatial reallocation alone could generate gains of 30% relative to the scenario without reallocation, nearly offsetting the aggregate negative effects of climate change for LAC (1,469 versus 1,477). Allowing for changes in crop composition would generate an additional gain of 70% relative to the scenario with reallocation. Once again, these gains are unevenly distributed. In the United States, for example, gains from both channels are similar, at around 20% (19% from reallocation and 23% from crop recomposition). In Antigua and Barbuda, by contrast, spatial reallocation contributes little to improving yields, while changes in crop composition raise yields above current potential levels.

● ●

Spatial reallocation of production and changes in crop composition can help counteract the negative effects of climate change

Overall, climate change is likely to have adverse effects on potential agricultural yields in the region. However, spatial reallocation and changes in crop composition could help attenuate—or even reverse—these effects. These findings highlight the central role of governments in supporting the transformation of agricultural production, both in its geographic distribution and in its crop mix, to address the challenges posed by climate change.

Table 3.1
Effects of climate change and spatial reallocation

	Potential yield						
	Current (1)	Under climate change (2)	Ratio (2)/(1)	With spatial reallocation of crops (3)	Ratio (3)/(2)	With spatial reallocation and changes in crop composition (4)	Ratio (4)/(3)
LAC	1,477	1,140	0.8	1,469	1.3	2,493	1.7
Antigua and Barbuda	2,879	1,285	0.4	1,310	1.0	3,454	2.6
Canada	648	829	1.3	948	1.1	1,618	1.7
Jamaica	1,242	1,763	1.4	1,924	1.1	2,364	1.2
United States	1,457	1,183	0.8	1,410	1.2	1,728	1.2

Note: Yields are measured as the value of production at international prices per hectare.
Source: Authors based on Adamopoulos (2025).

Policies to improve agricultural productivity

Agricultural productivity growth in LAC has been similar—or even higher than—levels observed in high-income countries where the sector plays an important role, such as the United States. However, this growth has not been sufficient to close the deep productivity gap the region continues to face—a gap with multiple dimensions. Aside from the clear, though uneven, shortfalls in capital per worker and low land endowments per worker, the evidence is clear: productivity differences are explained to a large extent by the intensity of input use. While the lag in pure efficiency is a critical factor—accounting for more than half of the gap in

value added per worker—the gap widens further once the low use of intermediate inputs is taken into account.

The policy agenda to boost agricultural productivity in the region is therefore multifaceted. It includes public investment in public goods (such as updated cadastre systems and road infrastructure), private investment in advanced technologies, and improved access to financial and insurance services for producers. The following sections discuss several of these policy dimensions.

Land ownership and cadastre

Land is not only the main factor of production in agriculture; it is also a core asset whose legal status shapes investment incentives, access to finance, efficient land use, and social stability in rural areas. In LAC, structural problems related to land tenure and land administration represent one of the main constraints on productivity. This section outlines policies aimed at strengthening tenure security and modernizing cadastre systems as essential pillars of agricultural development.

substantial increases in investment and agricultural productivity. In Peru, for example, the Programa Especial de Titulación de Tierras (PETT), launched in 1993, had positive effects on land-related investment, land market values, and the reallocation of household labor toward agricultural activities. In Nicaragua, parcel regularization significantly increased the likelihood that farmers would invest in on-farm improvements.²⁶

Land tenure security

Policies to formalize property rights—primarily through large-scale titling and tenure regularization programs—are critical for agricultural and broader rural development. Their objective is to legally recognize and register the property rights of those who occupy and work the land, providing the legal certainty needed to catalyze investment and agricultural development. Evidence from the region shows that land certification or titling can lead to

The experience of Mexico's PROCEDE program, which converted *ejido* (communal land) use rights into certified property rights, shows that separating tenure from use can improve efficiency. Certification facilitated migration, promoted modest land consolidation, and improved household welfare without reducing cultivated area. These outcomes suggest that secure and transferable rights enable a more efficient allocation of land, labor, and capital (De Janvry et al., 2015).

26 For a more detailed and systematic review of these land-regularization cases, see López et al. (2017).

For these policies to be effective, they must be backed by strong political and financial commitment from the government. They must also be designed to reflect the diverse economic, social, and cultural realities of beneficiaries, with particular attention to securing the land rights of Indigenous peoples, a historically marginalized group.



Formalization and titling of land ownership are key to encouraging long-term investment, facilitating access to credit, and improving productive efficiency

Modernization of land administration and cadastre systems

Modernizing land administration and cadastre systems is a cornerstone of rural development in LAC. The region faces the dual challenge of having one of the most unequal land distributions in the world and some of the lowest levels of land registration and cadastre coverage, with irregular tenure exceeding 50% in some countries. Addressing this situation requires a transformation of land administration systems (LAS), guided by comprehensive policies and supported by technological adoption.

A first priority is investment in technological innovation for LAS. Modern, integrated, and secure systems are associated with greater access to credit, lower income inequality, reduced corruption, and a more favorable investment climate. Modernization is particularly critical in a region where, according to a survey covering 16 countries, only one—Uruguay—has a complete cadastre.

Key elements of this modernization include digitizing records and collecting data through global navigation satellite systems (GNSS) and geographic information systems (GIS). These technologies are especially important in rural areas, where they help unlock economic capital immobilized in land without legal security. A major challenge in the region is the traditional separation between land registries and cadastre institutions; promoting online services and institutional and electronic interoperability across government agencies is therefore essential. The creation of a unified information system (UIS), based on international standards such as the Land Administration Domain Model (LADM), can help avoid fragmented efforts and inefficient use of resources. Cadastre modernization can also generate substantial fiscal gains. In Colombia, for example, cities that updated their cadastres between 2014 and 2018 increased property tax revenues by 60%—more than twice the increase observed in cities that did not (Cerrato et al., 2022).

Second, investment should prioritize the development of modern, multipurpose cadastres conceived as comprehensive inventories of real estate wealth that serve fiscal, legal, planning, and development purposes. The transition toward multipurpose cadastres—still progressing slowly in the region—requires coordinated policies and actions. These include legal reforms to establish a unified framework for urban and rural cadastres and the decentralization of cadastre management. Delegating updating and maintenance to municipalities or “associated centers,” which have deeper knowledge of local territories, is a key step, provided their technical and operational capacity is strengthened. Building spatial data infrastructures (SDIs) is essential to ensure interoperability among cadastre, registry, planning, and other institutions. Innovative methodologies—such as fit-for-purpose approaches and social mapping—are also needed to expand cadastre coverage, particularly in rural areas where coverage remains limited. To strengthen legal security, specialized land courts should be established and alternative dispute resolution mechanisms reinforced, making them faster and less costly (FAO, 2022b).



Investing in technological innovation for cadastre systems—making them multipurpose and interoperable—can improve fiscal revenues, planning capacity, and access to credit

Finally, cadastre investment should prioritize historically marginalized rural areas and

environmentally critical zones for climate change mitigation and adaptation. These include water basins, Indigenous forests and tribal lands, and national protected area systems, which paradoxically are often among the least regularized territories with the most outdated tenure information. To prevent phenomena such as “digital land grabbing,” these processes must be transparent, participatory, and grounded in a rights-based approach.

Access to financial instruments

Access to financial instruments is critical for the agricultural sector. This is true both on the credit side, which enables larger investments and longer maturities, and on the insurance side, given that agricultural activity is exposed to a wide range of risks—primarily, though not exclusively, climatic.

Compared with Canada and Australia—two developed countries with highly dynamic agricultural sectors—LAC has, on average, a level of agricultural credit relative to GDP that is broadly in line with Canada’s, but far below Australia’s. Within the region, however, realities are highly heterogeneous. In Belize and Bolivia, for example, agricultural credit represents about 4% and 8% of GDP, respectively, while in most countries this share is close to 0%, particularly in Caribbean island economies.

Examining the evolution of this indicator between 2003 and 2023 shows that in a small group of countries—including Bolivia, Nicaragua, Panama, and Uruguay—agricultural credit as a share of GDP increased, whereas it declined in most others. Several Caribbean islands stand out once again, such as Saint Lucia, Barbados, Dominica, and Saint Vincent and the Grenadines, where the share fell from around 1% in 2003 to close to 0% in 2023.

Another way to assess the relevance of agricultural credit is by examining its share of total credit. On this measure, LAC again posts values well below those observed in Canada and Australia. This low share likely reflects the difficulties agricultural producers in the region face in accessing credit. As before, heterogeneity across countries is substantial. In some countries with large agricultural sectors, such as Argentina and Uruguay, agricultural credit accounts for roughly 14% of total credit, levels that even exceed those of Australia and Canada. In contrast, in many Caribbean island economies, this share is virtually zero.

When designing policies to expand access to financial services in the agricultural sector, it is useful to distinguish among different target groups. On the one hand, small producers make limited or no use of financial instruments; for them, policies should focus on financial inclusion, aimed at expanding access to and use of services. On the other hand, medium and large producers—or technologically advanced small producers—are likely already frequent users of financial instruments; for these groups, the focus should be on expanding or improving existing products and reducing their costs.

Financial inclusion and access to credit

In recent years, there has been significant progress in financial inclusion. Microfinance—originally developed in the 1980s as a tool to combat poverty by providing small loans to small-scale producers—has been widely used as a financial inclusion instrument in developing regions. However, despite some successes, the results of microfinance initiatives have often fallen short of expectations. Banerjee et al. (2015) show that the impact on credit demand was smaller than anticipated, with limited or no effects on beneficiaries' profits. Moreover, outcomes have been highly heterogeneous, underscoring the critical importance of beneficiary selection—an aspect frequently overlooked in credit policies. Identifying producers with the greatest potential for success is inherently difficult. In addition, extending subsidized credit without rigorous targeting criteria can be costly and may lead to resource misallocation, sustaining low-productivity producers rather than fostering the expansion of more dynamic ones.

In response to these limitations, recent years have seen the emergence of key innovations in the microfinance sector aimed at tailoring products more closely to clients' realities. On the one hand, contractual terms have been adjusted through the inclusion of grace periods that allow for greater investment, more flexible repayment schedules, performance-based incentives that adjust conditions according to early outcomes, and the acceptance of assets as collateral. On the other hand, renewed emphasis has been placed on improving beneficiary selection processes. These adaptations are particularly relevant for the agricultural sector, which has distinctive characteristics: a production cycle with a longer lag between investment and sales, and high exposure to climate risk—an inherently random factor, but one that is easily verifiable by lenders. Designing credit lines that account for these features is therefore essential if microfinance instruments are to be truly effective in rural areas.

Governments have a broad range of instruments at their disposal to promote access to credit for agricultural producers. These include the

promotion of special credit lines and guarantee funds for both family and commercial agriculture. In addition, governments can implement subsidized interest-rate policies to reduce the financial cost of borrowing, a strategy that is central to Brazil's Program for Strengthening Family Farming (PRONAF). Another approach involves providing direct incentives for capitalization, whereby the State co-finances part of the investment in technology or infrastructure—as in the case of Colombia's Fund for the Financing of the Agricultural Sector (Finagro)—thereby reducing producers' indebtedness. Equally important is linking credit to technical assistance and rural extension programs, ensuring that financial resources are complemented by the knowledge needed to maximize their impact, as implemented by Mexico's Trust Funds for Rural Development (FIRA).

Access to credit can be an even greater constraint for women producers with informal incomes and without traditional forms of collateral. In many cases, the lack of formal land ownership prevents them from meeting standard banking requirements. To address this challenge, it is essential to develop instruments that accept alternative forms of collateral, such as group guarantees, savings histories, or community recognition. Credit products specifically targeted at rural women—such as those developed by Agrobanco in Peru, Fundación de la Mujer in Colombia, and Fundación Microfinanzas BBVA in five Latin American countries (all operating under the name Agromujer)—demonstrate that adapting financial offerings can strengthen both women's economic autonomy and food security.

Finally, promoting digitalization is a key priority, as it serves as a powerful enabler for overcoming physical barriers in rural areas, reducing costs and fees, and expanding the range of financial instruments available to producers. In this context, alternative mechanisms are being developed to build credit scores for individuals without a formal banking history. For example, the IDB and the financial institution Confianza conducted a pilot project in Peru using psychometric tools to assess the credit risk of micro, small, and medium-sized enterprises without credit histories. The results showed that these tools made it possible



Greenhouse worker in Mexico.

to extend credit to entrepreneurs without prior credit records without deteriorating portfolio performance (Klinger et al., 2013). Although this pilot was not applied specifically to rural producers, it represents an important precedent in financial inclusion innovation in the region and has been adopted elsewhere. In Africa, for instance, AI-based credit-scoring models for smallholder farmers in Kenya have been implemented using alternative data sources such as crop yields, sales, and payment behavior (Mengede, 2025).



Digitalization can help improve access to financial instruments by reducing costs and fees and expanding the range of financial services available

Insurance

Agricultural activity is inherently risky—a condition exacerbated by the growing uncertainty associated with climate change, which intensifies both production and market risks. Faced with this, producers, especially lower-income family farmers, often resort to costly coping strategies: inefficiently diversifying production, depleting savings, or even being forced into migration or child labor. These responses not only undermine their well-being but also constrain their productive potential.

Against this backdrop, agricultural insurance emerges as a key financial instrument. In addition to stabilizing farm income in the face of adverse events, agricultural insurance can also improve access to other financial instruments—particularly credit—by substantially reducing default risk. Box 3.6 briefly describes the main types of agricultural insurance.

Box 3.6 Agricultural insurance

Within agricultural insurance, four main types of products can be identified:

- Single-peril insurance covers losses from a specific event, such as hail.
- Multi-peril insurance, the most commonly used type in the region, covers a range of natural and biological risks.
- Revenue insurance guarantees producers a certain income level regardless of the cause of the income loss.
- Parametric or index insurance covers production losses based on variables that are highly correlated with output and easy to verify, such as rainfall levels or extreme temperatures.

As expected, broader coverage and a higher likelihood of the insured event are associated with higher insurance premiums.

For small producers, these benefits can translate into a virtuous cycle of growth. Insurance provides the confidence needed to innovate, enabling the adoption of more profitable—albeit riskier—crops or technologies. By spreading risk and improving creditworthiness, insurance strengthens investment capacity, an effect that can be transformative. Indeed, studies such as Karlan et al. (2014) show that insurance uptake can increase investment and productivity on small farms even more effectively than direct credit lines. Finally, by easing financial stress, insurance also helps producers make better decisions (Mullainathan and Shafir, 2013).

Promoting a dynamic and accessible agricultural insurance market is therefore not only a social protection measure; it is also a strategic policy tool to boost productivity, innovation, and resilience in the agricultural sector.

It is striking, then, that agricultural insurance coverage remains low. According to Montes et al. (2020), 81% of small farmers (with less than 2 ha) in lower-income countries (excluding China) lacked agricultural insurance in 2019; in LAC, the figure was 67%. Kapsambelis et al. (2019) attribute this low coverage to both demand- and supply-side constraints. On the demand side, these include inadequate risk perception; premiums that are too costly for low-income households; limited financial literacy, which hampers understanding of insurance products; and the perception that insurance is not a worthwhile investment. On the supply side, constraints include the inherently high risk of agricultural activity and governments' tendency to promote market development through subsidies and disaster-relief funds, which can affect the design and pricing of insurance programs; the need for increasingly large investments to offer high-quality products; and the costs of education campaigns required for potential users to understand them. These challenges are further compounded by the need for low-cost sales and claims-verification channels, as well as by the information asymmetries inherent in these instruments.

Governments can play an active role in addressing several of these constraints. On the one hand, they can provide the information needed to measure, assess, and monitor risks, either by developing

agencies to collect such data or by making information already gathered by public entities more accessible. On the other hand, they can promote the development of agricultural insurance markets by designing appropriate regulatory and supervisory frameworks; acting as reinsurers or providers of last-resort support in the face of catastrophic events beyond the capacity of private insurers; and offering technical assistance and training to private insurance providers.

Drawing on a review of multiple initiatives in the region, the International Fund for Agricultural Development (IFAD) (Montes et al., 2020) identifies several key lessons for strengthening agricultural insurance. A central one relates to product design: insurance policies must be affordable, financially sustainable, and tailored to the specific needs of agricultural producers. In this regard, parametric or index-based insurance schemes emerge as a particularly promising option for small producers, as payouts are triggered by easily verifiable variables—such as rainfall levels—thereby eliminating the need for individual loss assessments.



Agricultural insurance policies must be affordable, sustainable, and tailored to farmers' needs

More broadly, market development requires a robust ecosystem based on collaboration among insurers, reinsurers, regulators, and technology firms, where the presence of a coordinating entity can be critical to organizing supply. Fostering innovation and competition is also essential, including through the use of digital technologies to reduce costs and regulatory sandboxes to test new models. Above all, a mission-oriented approach should prevail—one that prioritizes the well-being of agricultural producers while maintaining financial sustainability. When these conditions are met, the impact extends beyond the insurance policy itself: insured producers face a lower risk of default, improving their access to other financial instruments, such as credit.

Agricultural infrastructure

The development and strengthening of robust agricultural infrastructure should be a core policy priority for the agricultural sector. Such strategic investment is essential to enhance competitiveness, reduce post-harvest losses, and improve farmers' quality of life. A comprehensive agricultural policy must go beyond direct support to production and encompass the entire value chain. In this regard, priority areas for action include road connectivity and telecommunications, irrigation infrastructure, storage facilities, and cold-chain logistics.

An adequate road network helps reduce the costs and time associated with transporting inputs and products, facilitating linkages between rural areas, consumption centers, and ports. Expanding telecommunications and internet coverage in rural areas also enables access to information on weather conditions, market prices, and farming technologies, as well as the remote management of operations, thereby improving resource efficiency.

Irrigation infrastructure is likewise critical to reducing risks associated with climate variability and water scarcity. Investment in drip irrigation, sprinkler systems, and other precision technologies can contribute to more stable and efficient production while promoting the sustainable use of water resources. This, in turn, requires the availability of off-farm irrigation infrastructure to ensure reliable access to water supplies.

Finally, the establishment of adequate storage facilities enables the handling and temporary storage of primary products, helping to reduce post-harvest losses. Strengthening cold-chain infrastructure—through refrigeration facilities at the farm level, in storage centers, and during transport—is also essential to preserve quality and extend the shelf life of fruits, vegetables, and other perishable products, facilitating their access to a wider range of markets.

Innovation and digitalization of agriculture

To catalyze a deep and sustainable transformation of the agricultural sector, it is essential to develop and coordinate public policies that promote strategic investment and the inclusive adoption of technology. The success of these policies rests on four interconnected pillars: strengthening human capital, fostering local innovation, creating accessible financing mechanisms, and improving digital connectivity infrastructure. To close the region's technological gap and unlock its full potential, these policies must explicitly include small and medium-sized producers, who are central to rural development.

The first pillar is strengthening human capital, beginning with digital literacy. This strategy requires a dual approach. On the one hand, digital skills must be formally and systematically integrated into rural education and training programs to prepare new generations. On the other hand, with more immediate impact, agricultural extension services

must be modernized. This entails complementing traditional methods with digital tools, such as the dissemination of key information via SMS and hands-on training in the use of specific technologies. Modernized extension services help democratize access to knowledge, enabling small producers to make informed decisions and reduce gaps that constrain their development. The creation of online learning platforms and agricultural forums can further strengthen human capital by fostering the exchange of best practices and collaborative learning.



Local innovation and dynamic agritech ecosystems enable the development of technologies better suited to the region's needs

Box 3.7

The Embrapa case in Brazil

Part of the economic literature argues that technological advances and innovation should take place in high-income and frontier countries, where returns on such investments are higher, while other countries should focus on adopting and adapting frontier technologies to local conditions. However, several studies have warned that these adaptation strategies may have limited effects, particularly when innovations are not easily transferable or well-suited to local contexts. Agricultural production—where climatic, geological, and other conditions play a decisive role in adaptation and yields—is perhaps the clearest example of this challenge.

In 1973, Brazil established the Brazilian Agricultural Research Corporation (Embrapa) to “promote, stimulate, coordinate, and carry out research activities aimed at generating knowledge and technology for the development of the country’s agricultural sector” (Law No. 5,851 of December 7, 1972). Embrapa researchers achieved major breakthroughs in agricultural production, including the development of soil management techniques adapted to the acidic soils of Brazil’s central region; the identification of genetic traits that made crops resistant to local pests; and the creation of hundreds of new crop varieties, including the first soybean variety suitable for tropical climates. These advances enabled Brazil to transition from a recipient of food aid to one of the world’s leading food exporters.

In a recent study, Akerman et al. (2025) analyzed the impact of Embrapa on local agricultural production and found that it increased productivity in the sector by 110% and achieved a benefit–cost ratio of 17. This effect is explained primarily by the geographic dissemination of research centers across the country, which enabled the development of technologies better tailored to specific local contexts. These findings provide strong evidence that public R&D can help developing countries escape the technological mismatch trap.

Source: Based on the article written by Akerman et al. (2025).

With more capable producers, the second pillar is the promotion of local innovation to develop relevant, context-specific technological solutions. This requires supporting a dynamic agritech ecosystem that generates advances—digital, biotechnological, and genetic—designed by and for the region. Such an ecosystem can be fostered through the financing of incubation and acceleration programs, the organization of open innovation challenges to address sectoral needs, and the dissemination of success stories that inspire new entrepreneurs. In this process, universities and local research centers must be positioned as key drivers of R&D. The articulation of public–private partnerships, with governments acting as catalysts, is essential to enable startups, cooperatives, and research institutes to co-develop technologies

alongside agricultural producers, ensuring their relevance and adoption.

The third pillar is financing, as technology and training are insufficient without access to capital. It is imperative to design inclusive financial instruments tailored to the digitalization of agriculture. These solutions include targeted credit lines with subsidized interest rates and repayment terms aligned with investment returns; guarantee funds that back small producers in their dealings with commercial banks; and the use of agrifintech platforms to channel resources in an agile and flexible manner. In addition, promoting associative models—such as cooperatives—allows producers to share the costs of acquiring or renting technology, thereby democratizing access to innovation. Ultimately, providing appropriate

financing to support the modernization of small producers is key to improving regional productivity and reducing the deep socioeconomic inequalities that persist in rural areas.

Finally, improving digital connectivity in rural areas requires a combination of investment, public policies that ensure affordable and high-quality

service, and the coordination of public–private efforts to expand the necessary infrastructure. Access to electricity and reliable internet connectivity are indispensable conditions for the digital transformation of the sector. The policies and strategies needed to close these infrastructure gaps are discussed in detail in Chapter 8 of this report.

Trade policy

The region's low level of trade openness is reflected in a relatively modest volume of international trade given the size of its economies, as well as in insufficient regional integration. To promote greater trade openness, countries in the region need to reduce or remove tariff and non-tariff barriers, while taking care not to dismantle sanitary and phytosanitary measures that protect human and animal health in LAC. For example, Mercosur countries, which maintain relatively high tariffs, should consider reducing them gradually.

Among non-tariff measures, improvements in logistics systems and the simplification of customs procedures would have a direct impact on trade by reducing restrictions and trade costs. Finally, one of the region's major shortcomings is the limited progress in regional integration. Addressing this challenge will also require improvements in transport infrastructure—particularly roads (Álvarez et al., 2025).

Mechanization

In LAC, although agricultural mechanization has traditionally been promoted through credit and tax exemptions, a growing trend is the provision of machinery services (FAO, 2022b). Under this model, producers rent equipment through short-term contracts, which may include technical advice and other complementary services. This approach is particularly beneficial for small agricultural producers, as it provides access to modern technology at an affordable cost while relieving them of the financial burden associated with purchasing and maintaining machinery—an investment that is often not viable (FAO, 2022b; Van Loon et al., 2020).

The success and expansion of this model—of which Argentina is a clear example (Elverdin et al., 2018)—depend critically on government support. To this end, the public sector must move beyond traditional incentives and offer a comprehensive support package that directly fosters the supply of these services, including tailored financing, rural infrastructure, and specialized technical assistance. This creates a synergy in which the private sector supplies the machinery, while the public sector acts as a facilitator, ensuring the public goods and enabling conditions needed for the mechanization services market to thrive and benefit small and medium-sized farmers.

Box 3.8

CAF's Strategy for agricultural prosperity

As the green development bank of Latin America and the Caribbean, CAF promotes the transformation of the agricultural sector toward a productive, resilient, and sustainable model.

Between 2014 and 2024, this strategy was implemented through the following core pillars:

- Technology and knowledge transfer, through agricultural extension, biotechnology, and sustainable practices, to boost productivity and climate adaptation.
- Enabling infrastructure, promoting irrigation and the development of connectivity, digitalization, and logistics infrastructure to improve efficiency and market access.
- Sustainable financing, through credit and capital lines to support the adoption of low-carbon and climate adaptation practices and technologies.
- Institutional strengthening, providing technical assistance and cooperation to support public policy formulation and the integrated management of natural resources.

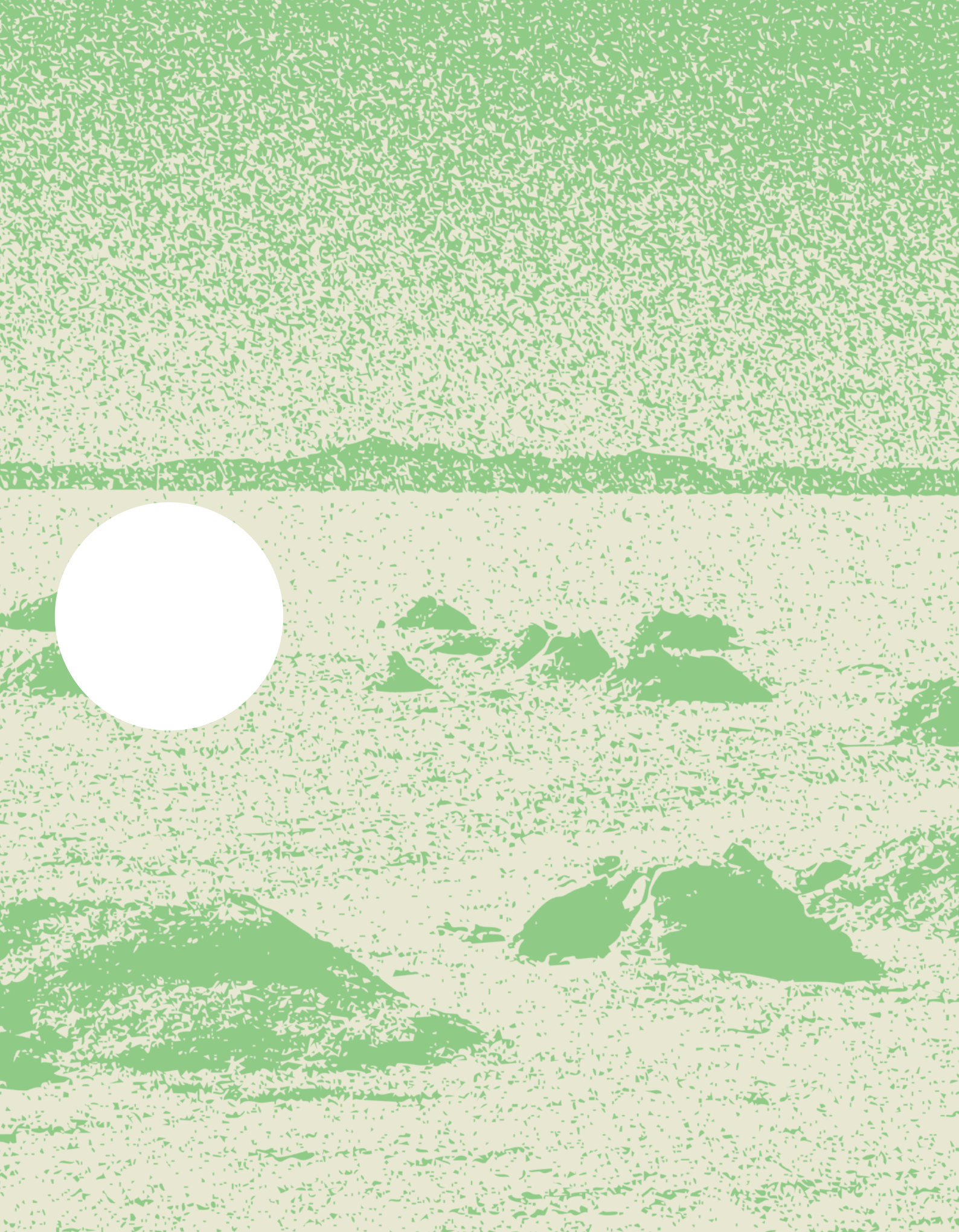
Between 2014 and 2024, this strategy involved investments totaling USD 1.81 billion in lending operations, equity investments, and technical cooperation, complemented by the administration of USD 140 million from the Global Environment Facility and the Green Climate Fund for projects in the agribusiness sector.

This support was channeled through 22 sovereign lending operations, three equity investment operations, and 31 technical cooperation initiatives, directly benefiting 16 countries in the region and helping foster a more productive, sustainable, and inclusive agricultural sector.

Source: Authors based on Maris (2025).

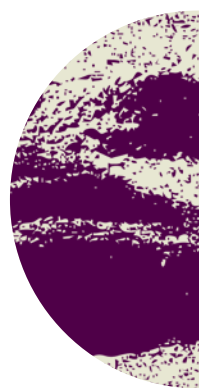


CAF Action.
Scan this QR code to learn more about
CAF's support for resilient, sustainable,
and regenerative agriculture.



4

**Strategic sectors
for the energy
transition**



Key messages

Rural areas concentrate natural resources—including critical minerals, hydrocarbons, water, land, and renewable energy potential—that the world needs to decarbonize. The global energy transition necessarily runs through the region's rural territories.

Critical minerals represent an opportunity to move beyond the traditional extractive model. Countries in the region, already well-positioned in these markets, must advance toward refining, processing, and manufacturing activities associated with these resources.

Low-carbon fuels open a parallel pathway for energy and productive diversification. Hydrogen and its derivatives, together with biofuels, can serve hard-to-abate sectors and give rise to new industrial value chains.

The expansion of distributed generation and renewable technologies facilitates access to electricity in isolated areas and reduces reliance on biomass. This brings direct benefits for health, productivity, and well-being, while also helping to close territorial gaps.

Regulatory instability, socioenvironmental conflicts, institutional weakness, and transparency gaps can deter investment and exacerbate environmental impacts. Governance and sustainability in extractive sectors are closely intertwined and constitute the main challenge for their development.

To seize the window of opportunity created by the energy transition, stable regulatory frameworks, environmental, social, and governance (ESG) standards, revenue-redistribution mechanisms, technological innovation, and cross-country coordination are essential.



Local supplier development, local-content requirements, workforce training, and technological upgrading help ensure that the rents generated by extractive sectors translate into tangible local impacts in rural areas.



Digital tools, electrification, automation, and monitoring systems enable more efficient and safer processes, while also opening space for new types of rural employment. Technology adoption is a key driver of productivity and of the reduction of environmental impacts.

Strategic sectors for the energy transition¹

Introduction

Rural areas in Latin America and the Caribbean (LAC) occupy a strategic position in the current global context, mainly due to two factors: their capacity to supply essential inputs for the energy transition and their potential contribution to achieving the Sustainable Development Goals (SDGs) and international commitments on climate mitigation and adaptation.

Current energy markets are largely dominated by a small group of oil-producing countries. The energy transition—already underway in most economies—is reshaping the relative importance of key energy inputs, replacing oil and coal with solar, wind, hydropower, natural gas, low-carbon fuels (such as biofuels), and, in the medium term, green and blue hydrogen. These technologies rely on two main inputs: (i) renewable natural resources, such as solar irradiation, wind, water, and land; and (ii) critical minerals, among them copper and lithium, used in the production of key components for electricity grids, solar panels, and batteries.

LAC in general, and its rural areas in particular, are endowed with abundant natural resources. In several rural territories, critical minerals essential to the energy transition are especially prevalent. This endowment positions the region as a potential key player in the ongoing reconfiguration of global energy markets. At the same time, technological advances associated with the energy transition offer last-mile solutions for rural households, enabling countries in the region to progressively close gaps in service provision and infrastructure. These advances can improve the quality of life of rural populations while contributing to the achievement of the SDGs.

This chapter makes two key contributions. First, it provides an overview of LAC's current endowment of natural resources that are critical to the energy transition and their geographic distribution, and analyzes the role of extractive sectors in regional economies, identifying the countries where these sectors are most significant. Second, it highlights the main opportunities and challenges facing

¹ This chapter was written by Juan Odriozola with research assistance from Belén Cañuelo, Delfina Silva, and Emilse Vargas.

LAC countries and proposes policy actions to harness these opportunities along two dimensions. On the one hand, it focuses on positioning the region as an indispensable actor in the global energy transition—a process that is essential for

development and that can facilitate greater and more diversified income flows in rural areas. On the other hand, it examines how the energy transition can be leveraged to improve the quality of life of rural populations.

Strategic resources for the energy transition

Climate change and countries' SDG commitments put mining, hydrocarbons, and energy generation in a strategic position for the region. On the one hand, major global economies are advancing toward decarbonization, posing significant challenges for hydrocarbon-producing countries. On the other hand, demand is rising for critical minerals required for clean technologies—such as solar panels and batteries—as well as for lower-emission hydrocarbons, particularly natural gas. Many of these resources are abundant in the region and, by their nature, are located in rural areas. At the same time, growing demand for low-emission energy is increasing interest in energy inputs such as biofuels and low-carbon hydrogen. Hydrogen and its derivatives are particularly versatile, as they can be used as an energy carrier, a transport fuel, and an input for heavy industry, while also offering storage potential. Finally, as countries move away from coal, natural gas is emerging as a key input for the energy transition, given its lower emissions intensity and reduced local pollution compared with coal.

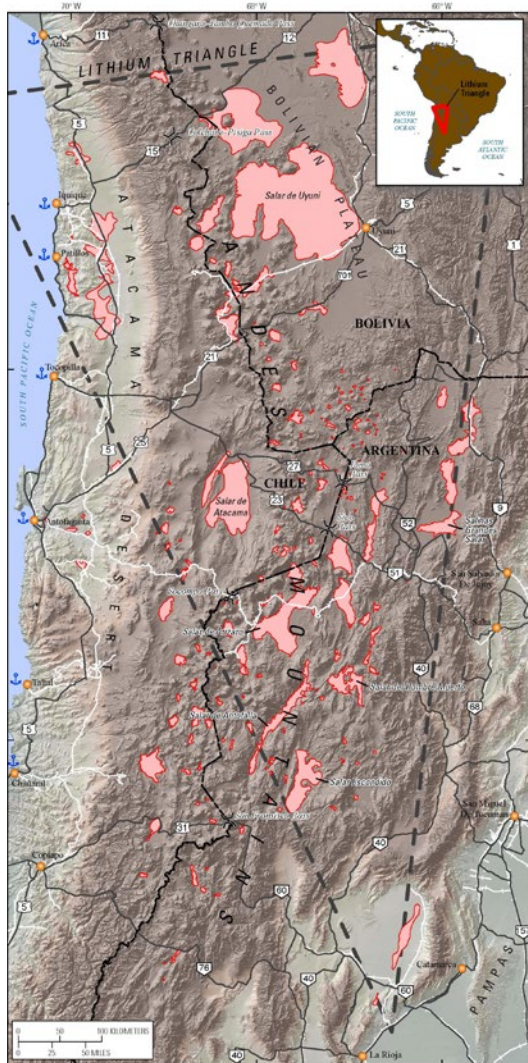


Some LAC countries are global leaders in reserves, extraction, and exports of critical minerals for the energy transition

LAC is a global leader in the extraction, export, and reserves of several critical minerals essential for the energy transition. Chile, Mexico, and Peru together account for around 45% of global copper production, with Chile being the world's leading producer. In addition, the so-called lithium triangle—comprising regions of Argentina, Bolivia, and Chile (Figure 4.1)—concentrates more than 60% of the world's lithium resources (IDB Invest, 2025). This mineral wealth offers a unique opportunity for rural economies to integrate into new global value chains, for example, through lithium refining or component manufacturing.

There are no data that allow for precise identification of the share of mining operations located in rural areas. However, as an activity dependent on natural resource deposits, mining is typically located in remote areas with low population density and therefore tends to have a strong rural presence. In the case of the lithium triangle, reserves are primarily concentrated in salt flats located in arid, high-altitude regions of the three countries.

Figure 4.1
The lithium triangle



Source: Mihalasky et al. (2020).

●●
Argentina, Bolivia, and Chile form the lithium triangle, which holds the world's largest lithium reserves, while Venezuela has the largest proven oil reserves

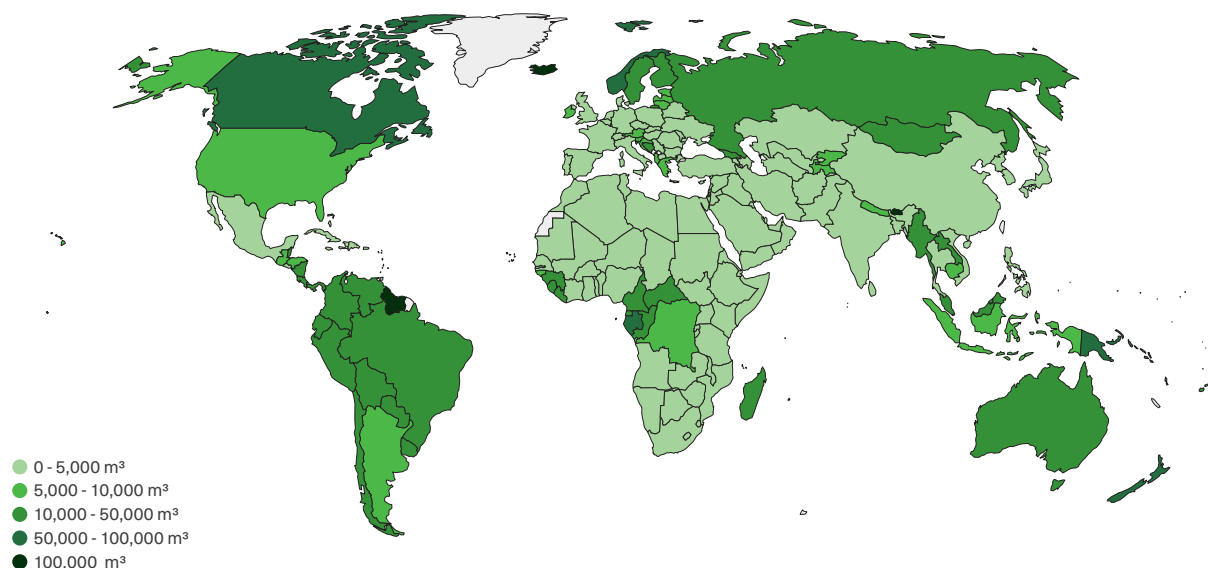
LAC accounts for more than 18% of the world's proven oil reserves and over 4% of global natural gas reserves. Within the region, close to 90% of oil reserves and 70% of gas reserves are located in Venezuela (Olade, 2024). Venezuela holds the world's largest proven crude oil reserves, representing approximately 17% of the global total (IEA, 2024). The transition toward a new economic configuration, characterized by rising demand for electricity generated from renewable sources, introduces considerable uncertainty regarding medium- and long-term demand for fossil fuels. These shifts are already becoming visible in LAC, through growing investment in non-conventional renewable energy (NCRE), public transport electrification, low-carbon hydrogen production, and changes in extraction plans by large mining companies seeking to reduce their carbon footprint (Allub et al., 2024). Natural gas can act as an ally for the region in the energy transition, as it has a lower emissions factor than oil and coal and produces fewer local pollutants than coal. In addition, natural gas is the main input for the production of blue hydrogen, and its reservoirs can be used for storing carbon dioxide (CO₂) captured during the hydrogen production process.

Biofuels stand out as key pillars of the energy transition in transport, particularly in hard-to-abate sectors such as aviation, maritime transport, and heavy-duty road freight (IEA, 2024). Biofuels require organic inputs with high energy density, most commonly sugarcane, maize, sorghum, residues, and organic waste. Their production generally competes with agriculture for land use, and their emissions-mitigation efficiency depends on the feedstock used: waste-based biofuels are the most carbon-efficient, while palm oil and soy are among the least efficient (Brassiolo et al., 2023). A particularly attractive feature for LAC is that biofuels can be produced from organic waste, which is abundant in the region due to the widespread presence of agriculture.

Low-carbon hydrogen is emerging as a medium-term solution for decarbonizing transport and other sectors. Efficient production of green hydrogen requires abundant resources, particularly water, and the capacity to generate renewable energy at low cost and with high reliability. The region has

ample renewable freshwater resources (Figure 4.2) and enormous potential for solar and wind energy generation (see Chapter 1). For blue hydrogen, in addition to access to freshwater, natural gas reserves are required—an input that, as noted above, is abundant in the region.

Figure 4.2
Renewable freshwater sources, 2021



Source: Author based on the FAO (2025a).

The importance of extractive and energy sectors for LAC economies

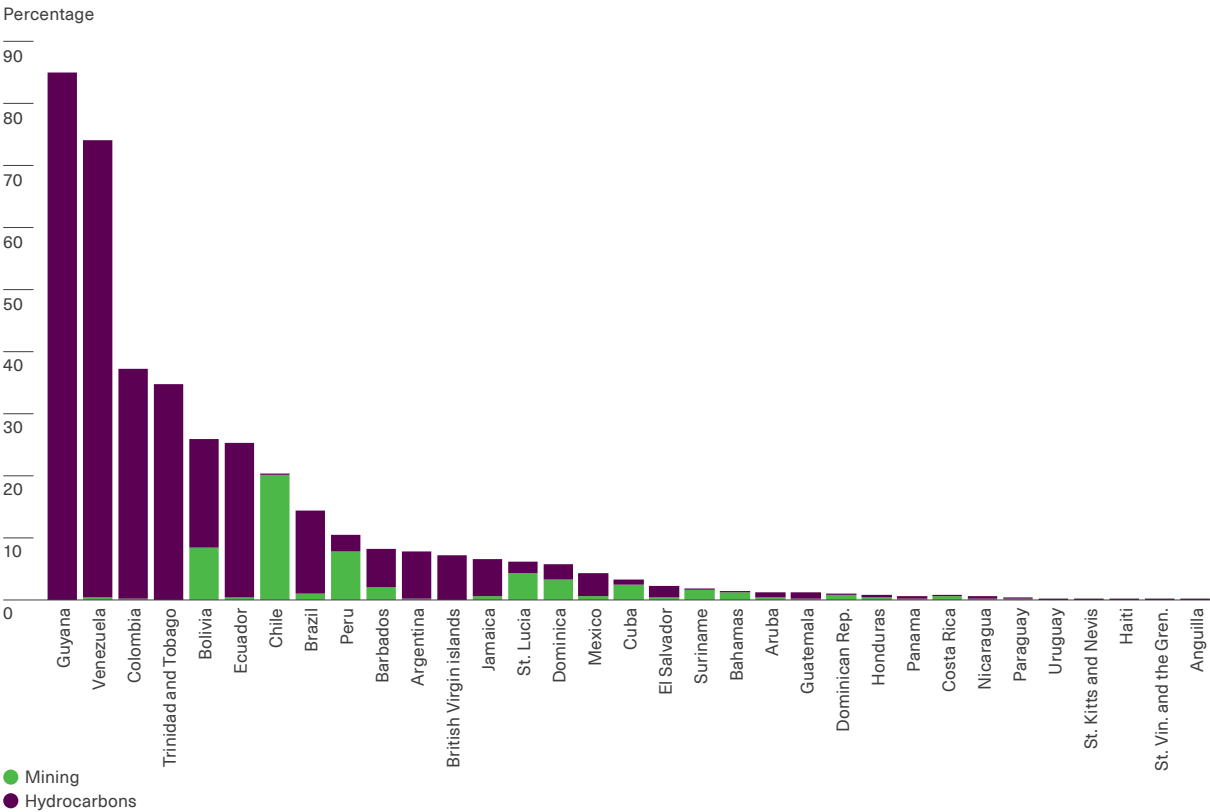
Extractive and energy sectors play a strategic role in several economies in the region, particularly in rural areas, where many of these resources are located. Taken together, the extractive sector (mining and hydrocarbons) accounts for approximately 4% of regional GDP, a share slightly below the average contribution of agriculture at the regional level

(Milano, 2018). Unlike agriculture, whose economic weight is significant in most countries in the region (see Chapter 2), the importance of these subsectors is unevenly distributed across groups of countries. Graph 4.1 shows the share of mining and hydrocarbons in exports across LAC countries. It clearly highlights the export role of mining in Bolivia,

Peru, and especially Chile, where mining exports accounted for 20% of total national exports in 2023. In the case of hydrocarbons, countries in northern South America stand out, particularly Guyana and Venezuela, where hydrocarbons represent close to 85% and 73% of exports, respectively.

In Central America and the Caribbean, although reserves and production are not on the scale observed in Andean countries, valuable mineral resources are nevertheless present. Table 4.1 presents the main exported mineral resources, together with other mined resources, in six countries with available data.

Graph 4.1
Share of mining and hydrocarbons in exports, 2023



Source: Author based on UNCTAD (2025b).

Table 4.1
Main mineral resources in selected Central American and Caribbean countries

Country	Main exported resources	Other important mineral resources
Jamaica	Aluminum oxide	Bauxite, alumina, gypsum, limestone, copper, gold
Nicaragua	Gold	Silver, copper
Panama	Copper ore	Copper, gold, iron
Dominican Republic	Gold	Nickel, silver, copper
Suriname	Gold, bauxite	Alumina

Source: Stancu et al. (2025) and USGS (2024b).

Despite favorable natural conditions and the potential to use agricultural residues, biofuel production is not widespread in LAC, with the notable exception of Brazil. This South American country is the region’s leading producer and the second largest globally, accounting for close to 20% of global production. Moreover, the sector has expanded significantly in the country, growing by 41% over the past decade (Torroba & Chiara, 2024). Brazil also exhibits biofuel use well above the global average: approximately 80% of new vehicles operate on gasoline blended with high proportions of ethanol (Sousa et al., 2023), reflecting mandatory ethanol-blending policies.

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Brazil is the world’s second-largest producer of biofuels, accounting for 20% of global production

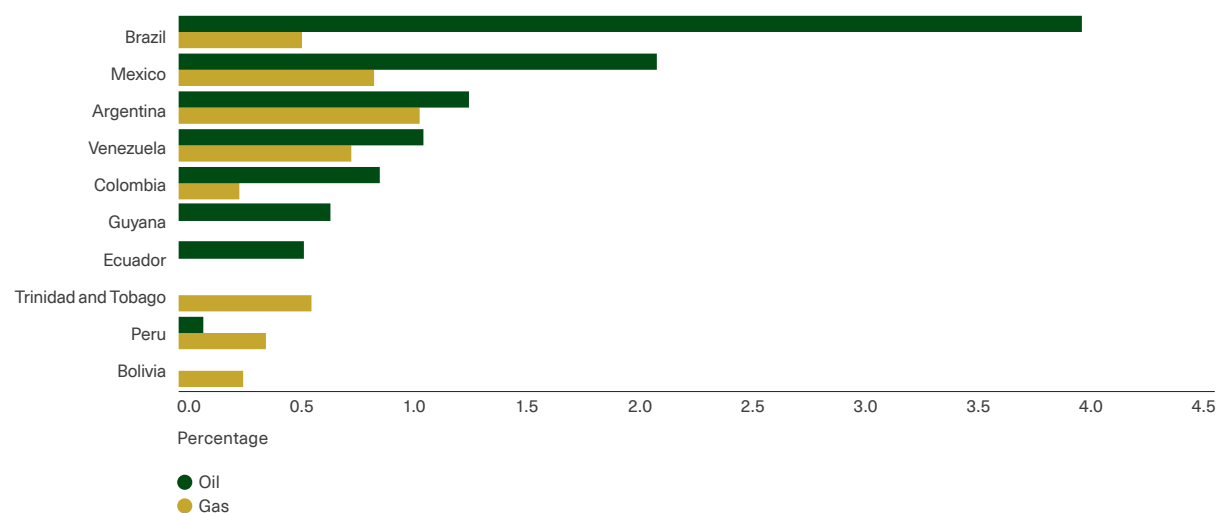
Bioenergy supplies close to one-fifth of total energy consumption in LAC, mainly through the use of biomass. Around one-sixth of this energy is used in households—predominantly rural—for cooking or heating, exposing residents to harmful particulate matter (Allub et al., 2024). In LAC, nearly 75 million people—11% of the population—lack access to clean cooking energy (IEA, 2023b).

Although most of the region’s oil and gas reserves are located in Venezuela, LAC countries play a significant role in global markets, accounting for about 11% of global oil production and nearly 5% of natural gas production (Graph 4.2). More than 60% of regional oil and gas production is consumed within LAC itself (IEA, 2023b). Coal production in the region is largely concentrated in Colombia, where coal and oil together accounted for 55% of the country’s exported goods in 2022 (IMF, 2023).

Extractive sectors are also important sources of national and subnational fiscal revenues through taxes, royalties, and other levies. This has direct implications for financing rural development projects via national budgets and transfers to producing regions. Table 4.2 shows mining-related fiscal revenues as a share of GDP in 12 LAC countries. These revenues can reach close to 3% of GDP, as in Chile, although the regional average is below 1%. Table 4.3 presents fiscal revenues from oil and gas exploitation and production as a percentage of GDP: in 2023, they reached 11.7% in Trinidad and Tobago and 9.4% in Guyana, with a regional average close to 4%.

Graph 4.2

Share of Latin American and Caribbean countries in global oil and natural gas production, 2024



Note: The bars represent the percentage of global production for each hydrocarbon.

Source: Author based on Energy Institute and Smil (2025; 2017), with major processing of Our World in Data.

Table 4.2

Mining fiscal revenues as a percentage of GDP, 2023

Country	Tax revenues	Non-tax revenues
Argentina	0.02%	0.01%
Bolivia	0.44%	0.54%
Brazil	0.10%	0.09%
Chile	0.90%	1.41%
Colombia	0.91%	0.59%
Dominican Republic	0.32%	0.27%
Ecuador	0.17%	0.16%
Guatemala	0.01%	0.00%
Jamaica	-	0.07%
Mexico	0.19%	-
Nicaragua	0.39%	0.18%
Peru	0.66%	0.23%
LAC	0.32%	0.27%

Note: Non-tax revenues are revenues that do not meet the OECD definition of "taxes." This category includes grants from foreign governments or international organizations, rents and royalties, other property income, sales of goods and services, fines and penalties, and miscellaneous and unidentified revenues (OECD et al., 2025).

Source: Author based on ECLAC (2025b).



Refinery in operation in Lujan de Cuyo,
Mendoza, Argentina.

Table 4.3
Oil and gas fiscal revenues as a percentage of GDP, 2023

Country	Tax revenues	Non-tax revenues
Argentina	0.06%	0.40%
Bolivia	0.13%	2.85%
Brazil	0.61%	1.16%
Colombia	1.25%	2.15%
Ecuador	-	7.64%
Guatemala	0.02%	0.01%
Guyana	-	9.43%
Mexico	0.02%	1.08%
Peru	0.32%	0.46%
Trinidad and Tobago	6.68%	5.01%
LAC	0.91%	3.02%

Note: Non-tax revenues are revenues that do not meet the OECD definition of “taxes.” This category includes grants from foreign governments or international organizations, rents and royalties, other property income, sales of goods and services, fines and penalties, and miscellaneous and unidentified revenues (OECD et al., 2025).

Source: Author based on ECLAC (2025b).

While these sectors generate high value added and are crucial for foreign exchange earnings and fiscal revenues, they are not labor-intensive. As shown in Graph 4.3, the share of employment generated by mining in Andean countries is notably low—below 2%, and below 1% in some countries with large mining sectors, such as Bolivia and Peru. Employment in hydrocarbons is consistently below 1%. These figures generally underestimate artisanal and small-scale mining due to its high levels of informality and underreporting. This data gap also obscures other sector-specific heterogeneities, such as the masculinization of mining employment and the growth of informal female employment and its implications for rural women’s incomes (see Box 4.1).



Mining remains a traditionally male-dominated sector, although gradual changes are underway. Access to mining employment plays an important role in the economic independence of rural women

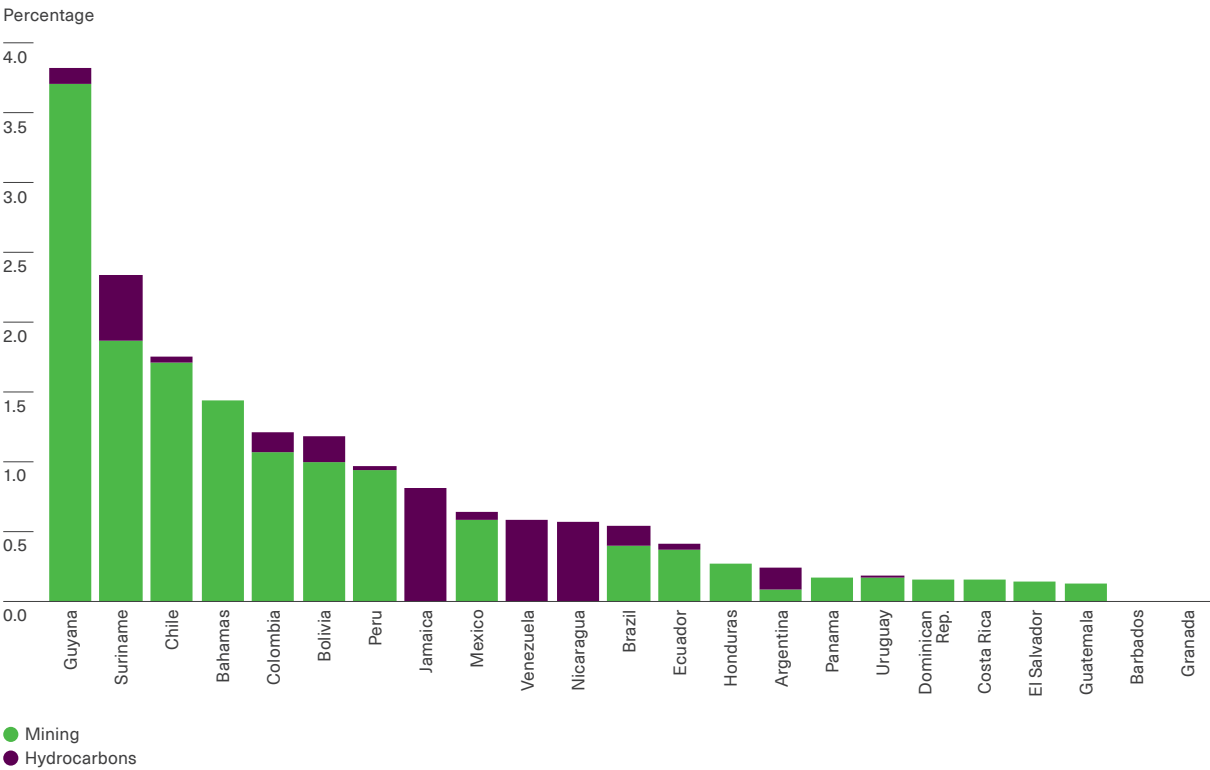
Part of this heterogeneity reflects the differing roles of large-scale mining and artisanal or small-scale mining. Large-scale mining is typically carried out by multinational firms that are highly productive, capital-intensive, and technologically advanced, offering formal jobs with above-average wages, better working conditions, and relatively low labor demand. Artisanal and small-scale mining includes a more diverse set of actors, ranging from small formal firms with low capital intensity to informal independent miners, and often coexists with illegal mining. Illegal mining is more prevalent in gold extraction and less so in resources critical to the energy transition, such as lithium—which

requires more capital-intensive and technologically advanced extraction—or copper, where illegal activities tend to occur on lower-yield veins with less environmental impact than illegal gold mining (Pachas, 2024).

Household survey data allow identification of rural employment within mining, as shown in Graph 4.4.

The region displays considerable heterogeneity: in Chile, with large mining operations, rural employment represents around 10% of total mining employment, whereas in Central American countries such as Costa Rica and El Salvador, it has fluctuated between 50% and 80% over the past two decades.

Graph 4.3
Share of mining and hydrocarbons in total national employment, 2023



Source: Author based on ILO (n.d.).

Box 4.1

The situation of women in mining in LAC

Mining is a traditionally male-dominated sector. Although data limitations prevent a comprehensive characterization, it is estimated that in countries with a strong mining presence, women account for roughly one in ten mining jobs. In recent years, however, there has been a gradual increase in women's participation in the sector.

This trend is mainly driven by three factors. First, sector modernization has reduced tasks involving high physical demands and risk. Second, demand for skilled labor has increased—a segment where women have higher labor force participation. Third, companies have adopted formal gender-equality commitments and public policies promoting gender equity have been implemented.

Nevertheless, significant frictions remain. These include requirements for specific training or prior experience that limit women's ability to compete for positions and perpetuate sectoral masculinization. Another major barrier is the sector's androcentric culture, which exposes women workers to discriminatory practices, abuses of power, exclusion, and so-called “camouflage strategies”—behaviors aimed at going unnoticed, such as changes in dress or self-invisibilization at the workplace—further deepening exclusion.

Although masculinization is gradually declining, the largest growth in female employment has occurred in artisanal and small-scale mining. This segment is characterized by poorer working conditions, lower incomes, and even more androcentric cultures. At the same time, it provides rural women with economic independence and flexibility to manage household responsibilities, where women remain overrepresented (Marchionni et al., 2025).

Source: Author based on Puglia et al. (2024).



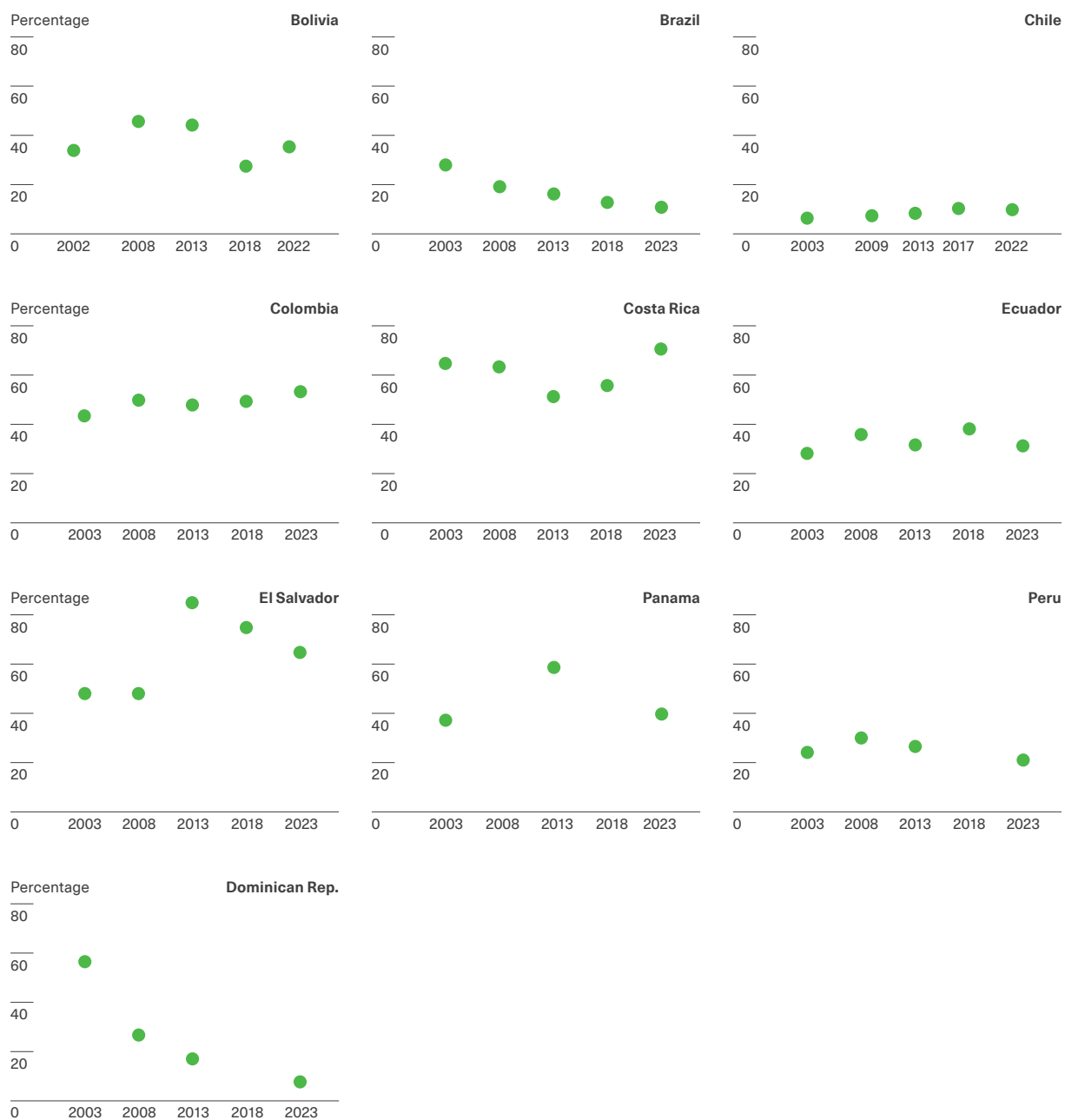
Mining wages are generally higher than average rural wages, reflecting higher demand for skilled labor, but also the presence of unskilled jobs with more precarious and unsafe working conditions

Low labor demand in these sectors reflects their high capital intensity. In contrast, average wages are high relative to rural averages. As shown in Graph 4.5, mining wages in all South American

countries are significantly higher than average rural wages over at least the past 20 years. In Central America, this pattern holds for Panama, but not consistently for other countries, partly due to the greater presence of artisanal or small-scale mining. This may reflect the creation of skilled jobs, but also the prevalence of unskilled jobs with more precarious and unsafe working conditions.

Graph 4.4

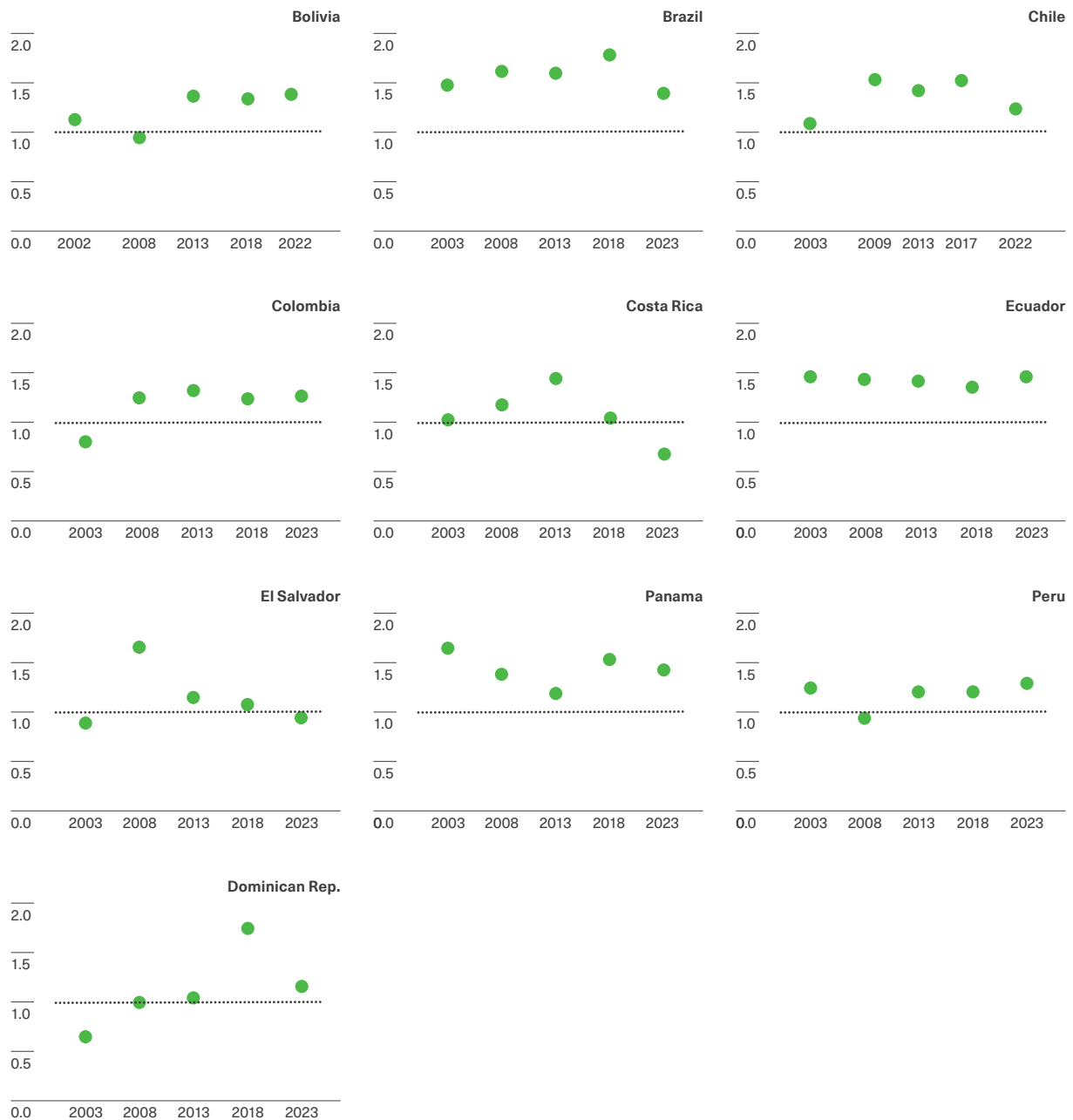
Rural employment in mining relative to total mining employment



Source: Author based on CEDLAS (2025).

Graph 4.5

Rural mining wages relative to average rural wages



Source: Author based on CEDLAS (2025).

Opportunities and challenges

Rural areas in LAC will be central to the energy transition, given their abundance of natural resources. At the same time, the energy transition will play an important role in rural areas, primarily by

improving living conditions. The former is essential for the development of regional economies, while the latter is key to closing gaps in living standards and advancing progress toward the SDGs.

Rural areas as suppliers of inputs for the energy transition

Two main opportunities stand out that could allow the region to position itself as a key player in energy markets over the medium term. The first lies in the extraction, production, and development of value chains for critical minerals required for the energy transition. The second involves the production of low-carbon fuels. Advancing along these two paths would enable the region not only to play a decisive role in global energy markets, but also to accelerate its own energy transition and meet its nationally determined contributions (NDCs).²

These opportunities, however, are not without challenges. In the case of critical minerals, two closely related constraints stand out. The first concerns the environmental impacts of mining activities, particularly the degradation and overexploitation of water resources and damage to landscapes and ecosystems. The second relates to governance challenges, including regulatory uncertainty, resource nationalism, unstable institutional frameworks, and climate-driven opposition to mining activities. For low-carbon fuels, the main constraints stem from tensions with other key sectors—most notably agriculture—due to competition for land and, in the case of freshwater, potential threats to local consumption. Finally, harnessing both opportunities will require substantial investment. The region will need to act to create the right incentives, while also ensuring the effective capture of resource rents.

Critical minerals, governance, and sustainability

According to the most recent Critical Minerals Report by the International Energy Agency (IEA, 2025b), demand for critical minerals has already increased sharply. In 2024 alone, global demand for lithium rose by nearly 30%, while demand for nickel, cobalt, graphite, and rare earths increased by between 6% and 8%, accompanied by higher production that remains concentrated among a limited number of suppliers. Graph 4.6 presents projected demand for critical minerals under three IEA decarbonization scenarios. Over the next 25 years, total demand for these minerals could nearly double, with particularly strong growth for lithium—almost five times its 2024 level—and increases of 50–60% for other minerals such as cobalt and rare earths by 2040.

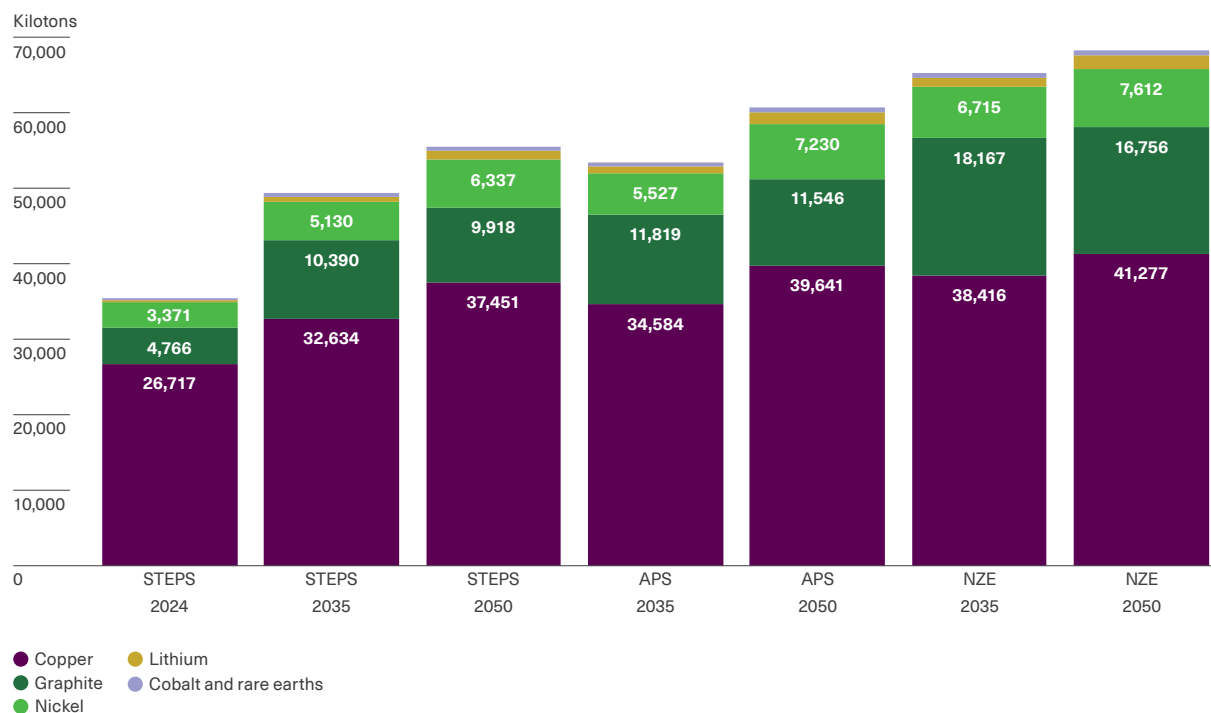


Over the next 25 years, demand for critical minerals could double, with lithium expected to see the largest increase

² The Paris Agreement requires countries to submit nationally determined contributions every five years, reflecting progressively greater ambition in their mitigation targets while taking into account each country's capacities and specific circumstances.

Graph 4.6

Projected demand for critical minerals under alternative scenarios



Note: Demand is expressed in kilotons. STEPS refers to the Stated Policies Scenario, which includes existing policies and those under development or implementation. APS refers to the Announced Pledges Scenario, which incorporates policies that have been announced but not yet implemented. NZE refers to the Net Zero Emissions by 2050 Scenario.

Source: Author based on IEA (2025a).

LAC has the reserves required to ensure a reliable supply of critical minerals for the global energy transition. Countries such as Chile and Peru are already key players in mineral markets. However, when comparing countries' shares of global reserves and production of copper and lithium (Graph 4.7), there remains significant untapped potential to expand production. Lithium provides a notable example: the market is currently dominated by Australia, despite the fact that Australia has smaller reserves than Chile and Bolivia.³

This outcome reflects two main factors. First, deposit characteristics differ. Australia's lithium is primarily found in hard rock (spodumene), which allows the use of traditional mining methods and shorter development timelines. In contrast, lithium reserves in Chile and Bolivia are located in brine deposits, which require newer technologies and chemical processes with much longer development times. Second, governance models vary. Australia has a highly developed private mining sector and service providers, whereas lithium in Bolivia is under strong state control, limiting foreign investment and

³ Reserve data do not include Bolivia. Although Bolivia has been identified as the country with the world's largest lithium resources, these are not yet considered economically, technically, or legally exploitable (USGS, 2024a).

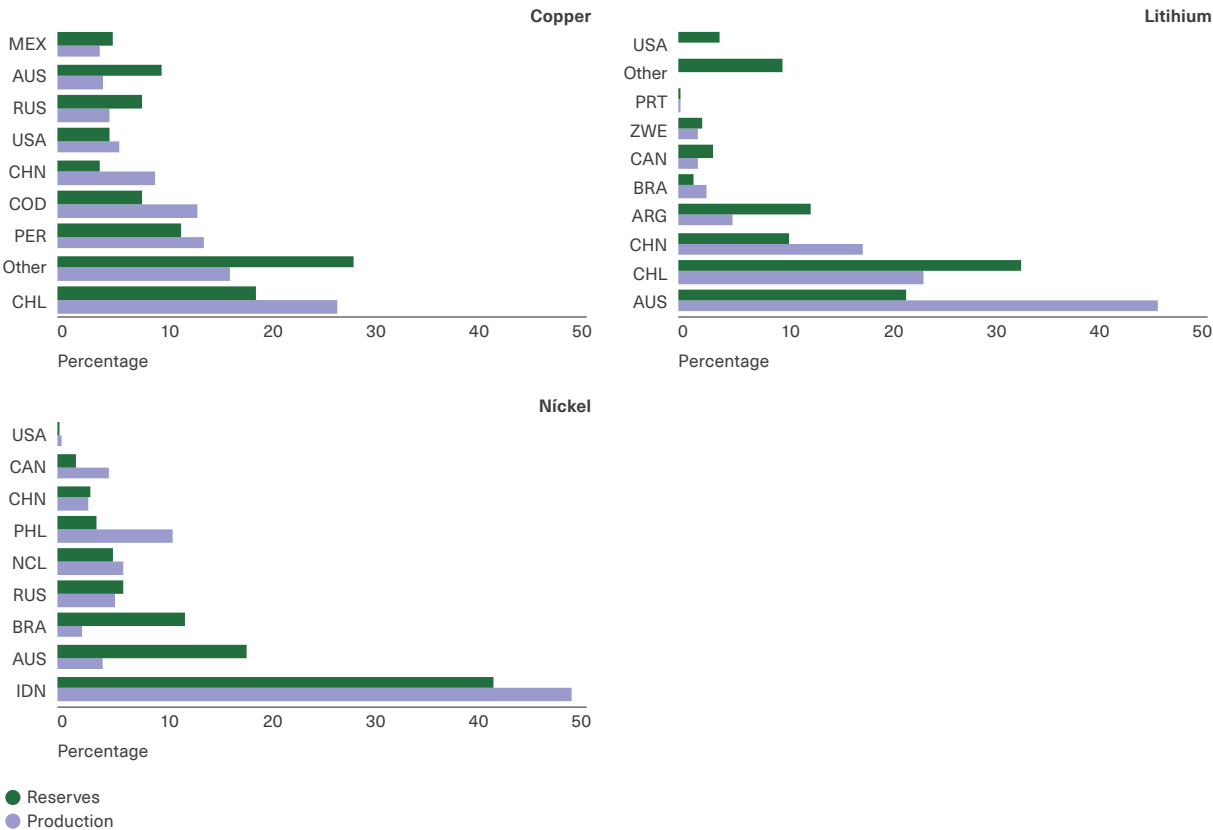
leading to political or contractual delays. In Chile, public and private actors coexist, but regulatory constraints, debates over state participation, and environmental litigation have slowed some projects.

Another relevant mineral is nickel. Brazil holds the largest nickel reserves in the region and the third largest globally, accounting for 12% of global reserves, yet it contributes only 2% of global production (USGS, 2024a).

Lithium presents a particularly complex case for the region. As noted earlier, deposit characteristics strongly influence development timelines and

extraction costs. Brine-based lithium projects are capital-intensive, with initial costs ranging from USD 300 million to USD 900 million (Razmjou, 2024) and estimated development periods of 5–12 years. As a result, even in the absence of governance constraints, the region’s response to global demand is inherently slower. The discovery of hard-rock deposits in other economies and the rapid expansion of production in those sites erode LAC’s dominance and diversify global supply, reducing geopolitical pressure on buyers. Although LAC still holds the world’s largest lithium reserves, it is gradually losing its comparative advantage.

Graph 4.7
Shares of global copper, lithium and nickel production and reserves, 2023



Source: Author based on Ritchie and Rosado (2024).



LAC countries that lead in lithium reserves and production will need to move up the value chain, particularly in refining and battery manufacturing

To remain competitive, the region must move up the lithium value chain, particularly in refining and battery production (ECLAC, 2023; López et al., 2019). Refining activities have shorter development timelines and generate more employment and value added than extraction alone. Additional investment in this segment could create opportunities for growth and economic diversification, including the development of local processing capabilities and the manufacture of components for clean-energy technologies (IEA, 2023b). Some countries, such as Chile, have already taken steps in this direction by financing research and development linked to lithium industrialization (ECLAC, 2023). However, significant challenges remain, including limited access to technology and specialized skills, cost-competitiveness constraints, the geographic concentration of demand, and market barriers for new entrants (IEA, 2023c).

In many cases, the region has the technical capacity and infrastructure required to exploit critical minerals for the energy transition. Nonetheless, political, economic, and regulatory instability, and social resistance, are associated with governance challenges, potentially weakening environmental protection, rent capture and distribution, and incentives for innovation. In this regard, LAC is the region with the highest number of reported environmental, social, and governance complaints raised by local communities (IEA, 2023b). The proliferation of mining conflicts in Chile, Peru, and Bolivia further illustrates the tensions surrounding some projects (Lagos et al., 2022). For example, Peru's Office of the Ombudsman reported 123 socioenvironmental conflicts related to the mining industry in 2016, representing 65% of all conflicts recorded in the country that year (FIO et al., 2020).

These challenges are not unique to mining. In the hydrocarbons sector, beyond well-documented oil spills, protests have emerged around hydraulic fracturing (fracking). One example is the conflict with Mapuche communities opposing this practice in Vaca Muerta, Argentina (Acacio & Wyczykier, 2021). In some cases, even non-conventional renewable energy projects face resistance due to visual impacts and potential land devaluation associated with wind or solar farms (Dröes & Koster, 2021; Gaur & Lang, 2020).

Low-carbon fuels

Low-carbon fuels whose production benefits from the abundance of natural resources found in rural areas of LAC include hydrogen and its derivatives, as well as fuels of agricultural origin. Low-carbon hydrogen represents a particular case, given its current cost structure, which makes it relatively expensive compared with other petroleum-based energy products (Allub et al., 2024; IEA, 2024). However, these costs are trending downward, and in the case of LAC, conditions are in place to produce green hydrogen at the lower end of the global cost range (IEA, 2024).



The production of low-carbon fuels in Latin America and the Caribbean benefits from the abundance of natural resources in rural areas

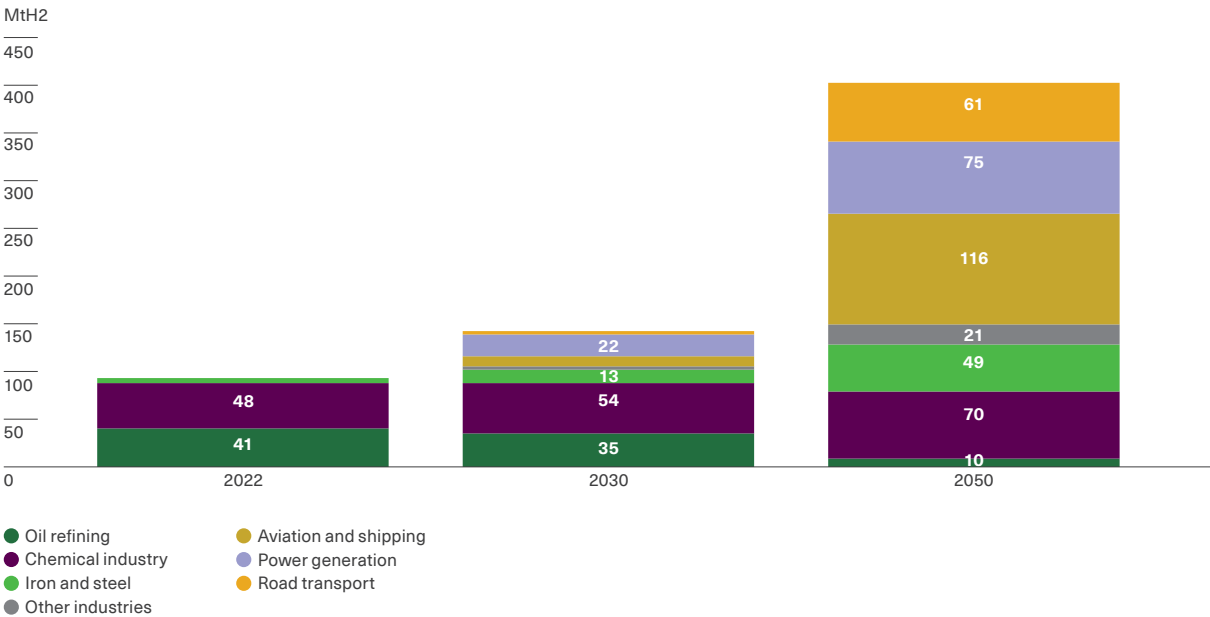
Hydrogen and its derivatives, such as ammonia and methanol, are attractive because they are versatile energy carriers that can be used as fuels for aviation, maritime, and land transport, as well as for heat generation in hard-to-abate industrial processes, including steel and cement production (Allub et al., 2024). Another important feature of hydrogen is its potential for energy storage, although its handling and transport pose technological challenges specific to the industry. These aspects are illustrated in Graph 4.8, which

shows current uses of green hydrogen in 2022 and projected uses under the IEA's Net Zero Emissions scenario (left axis).

The graph also shows, on the right axis, the projected share of green hydrogen in total hydrogen demand under the same scenarios for 2030 and 2050. In the Net Zero scenario, hydrogen production would need to increase by more than 300%, with green hydrogen accounting for a significant share—reaching 97% by 2050. The advantages already identified position LAC as a potential key player in these markets. To do so, however, the region must overcome challenges related to financing capacity, private investment attraction, and the regulation of water resources.

Production costs are one of the main constraints on accelerating low-carbon hydrogen production. The IEA (2024) estimates global levelized costs of green hydrogen production by 2030. Based on these projections, Latin America and Australia together could supply close to 50% of the hydrogen required under decarbonization scenarios, with production falling within the lowest cost range. These projections do not account for the cost or availability of freshwater—dimensions that further strengthen LAC's position relative to other potential suppliers, such as Middle Eastern countries, where access to freshwater is more limited.

Graph 4.8
Uses of green hydrogen under the Net Zero Emissions scenario for 2050



Note: The 2022 data correspond to actual use, while 2030 and 2050 figures are IEA projections under the Net Zero Emissions scenario (IEA, 2023c).
Source: Allub et al. (2024) based on IEA (2023c).

Most hydrogen projects announced in LAC rely on water electrolysis (green hydrogen), a technology that requires intensive use of freshwater.⁴ However, the volume of water needed to produce an amount of green hydrogen consistent with net-zero targets—through partial substitution of hydrocarbons—would represent only between 0.06% and 0.12% of current agricultural water withdrawals (IEA, 2023b). For this reason, such projects must be located in areas without water stress, ensuring adequate access to freshwater for both production and human consumption. It is worth noting that most of the large-scale hydrogen projects announced in the region and located in coastal countries (Chile, Colombia, and Brazil) plan to use desalinated seawater, thereby avoiding competition for freshwater resources.



Latin America and Australia could supply nearly half of the hydrogen required under decarbonization scenarios, at the lowest production cost range

The potential for biofuels remains largely untapped in LAC, with the clear exception of Brazil. According to the IEA (2023b) the region could produce nearly 200 billion cubic meters equivalent

(m³e) of biogas and biomethane from agricultural residues and waste, of which at least 10% would be located within 20 kilometers of major gas pipelines. This proximity makes large-scale production and injection into gas networks feasible. In addition, nearly half of this potential would be close to road networks, facilitating transport for refining and use in transport. While more than half of this potential would be concentrated in Brazil, the study also identifies production opportunities in Argentina, Chile, Costa Rica, and Mexico.

The potential of these biofuels is significant for three main reasons. First, biomethane can directly substitute fossil fuels in transport without requiring vehicle modifications. Second, biogas has multiple applications, including electricity generation, heat production, injection into natural gas networks, or conversion into biomethane for transport use. Third, by using agricultural residues, biofuel production fosters local linkages and provides a source of productive diversification and new income opportunities for rural populations.

One of the main constraints on the development of low-carbon fuels overall is access to financing. With the exception of large-scale renewable energy projects, local banks often lack the capacity to assess the risks of clean energy investments. In addition, data availability and reliability—identified throughout this report as a key shortcoming—are essential for improving transparency and enabling access to credit for these projects.

The contribution of the energy transition to local development

Beyond the two major opportunities offered by critical minerals and low-carbon fuels for rural development in the region, energy markets provide two additional pathways with the potential to improve living conditions. The first stems from the sharp decline in the costs of residential solar panels and distributed generation, which makes it possible to reach rural households and producers

in isolated areas without the need for large-scale infrastructure investments. The second relates to the ability of rural households to replace the use of biomass for cooking and heating—an important source of indoor air pollution due to particulate matter released during combustion—with cleaner alternatives. These include electricity (for air conditioning and electric stoves or ovens) or

4 Approximately 10 liters of water per kilogram of hydrogen (L/kg H₂) as an input, plus an additional 30–70 L/kg H₂ of water for cooling processes (IEA, 2023b).

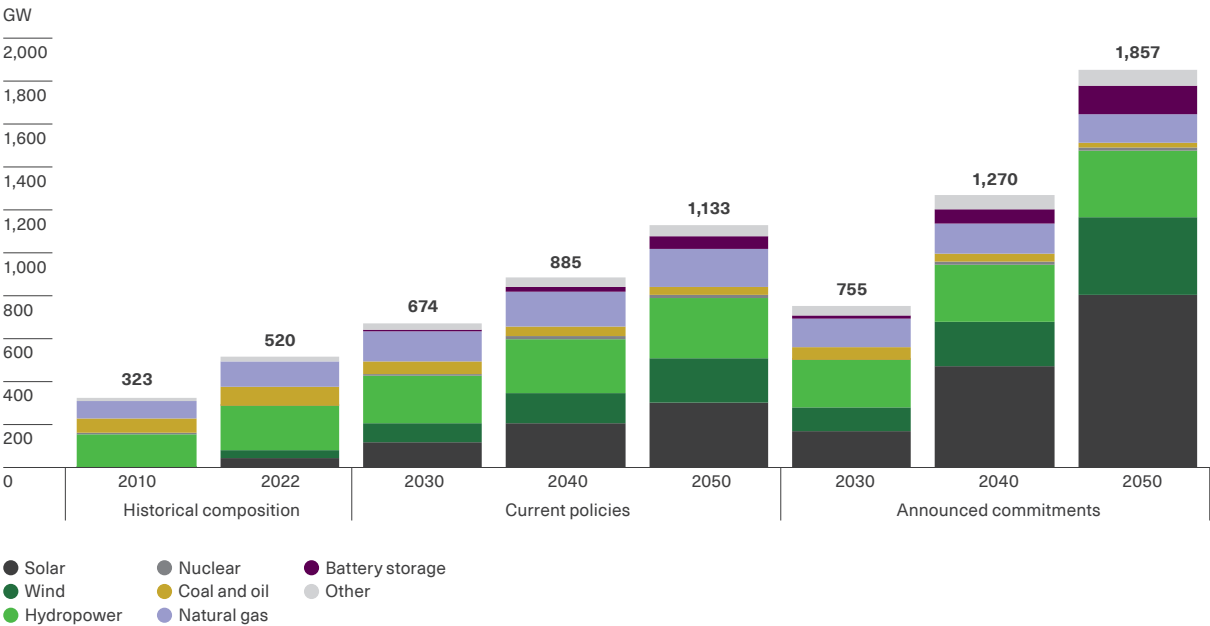
natural gas (for heaters and cooking appliances). In addition, investment in and development of energy and mining projects in rural areas can generate spillover effects on local infrastructure and employment.

Projected electricity capacity in LAC over the coming years, shown in Graph 4.9, points to significant increases across all scenarios, driven primarily by non-conventional renewable energy (NCRE), with solar power playing a dominant role. As shown in Chapter 8, part of the recent expansion of distributed solar energy has

accompanied the process of extending electricity networks into rural areas.

● ●
The decline in distributed generation costs and the resulting improvement in electricity access enable the replacement of biomass for cooking and heating, improving indoor air quality in rural homes

Graph 4.9
Current and projected electricity capacity



Source: Allub et al. (2024) based on IEA (2023b).



Salar de Uyuni, Bolivia.

Leaving aside artisanal and small-scale mining and the private installation of solar panels, large firms dominate most of the activities discussed in this chapter. From a social perspective, this translates into the creation of formal employment—both skilled and unskilled—with wages that are generally higher than average rural wages (Graph 4.4). The establishment of large facilities also increases demand for local goods and services, such as food, transport, and housing, thereby stimulating private investment and job creation. However, these benefits depend critically on the extent to which extractive and energy companies integrate with local economies (Bainton, 2020; Remy & McMahon, 2001). In the case of large mining operations, it is not uncommon for most inputs and skilled labor to be sourced externally, limiting potential benefits for rural communities while also introducing cultural frictions (Addison & Roe, 2024; Aragón & Rud, 2013). Moreover, increases in demand that are not matched by income growth can generate local inflation, gentrification, and rising inequality, potentially displacing local communities (Arellano-Yanguas, 2011a).

Large companies can also generate significant sociocultural changes, some of which may pose challenges for rural communities. The arrival of non-local workers may represent a cultural shock for communities with long-standing rural livelihoods (Romero-Toledo, 2019). Such reconfigurations can, in some contexts, be associated with increases in

sex work—often linked to human trafficking—and heightened insecurity (Eftimi et al., 2009). Additional impacts may arise from changes in land use, particularly when industrial operations are developed in areas previously used for agriculture or holding cultural or heritage value for Indigenous or local communities.



The development of large projects driven by the energy transition can generate new dynamics in rural employment and have positive spillovers for local infrastructure

At the same time, growing demand for both minerals and renewable energy can give rise to new dynamics in rural employment, shifting jobs from traditional extractive activities toward those linked to emerging technologies. These include construction of hydrogen or biofuel production facilities (where located in rural areas), installation of enabling infrastructure, and operation and maintenance of solar and wind parks. In addition, the energy transition can create permanent, high-quality jobs, particularly in hydrogen and biofuel plants and in large-scale mining operations.

Policies for rural-led and rural-inclusive development

The global energy transition is still at an early stage, although it has already made significant progress in areas such as NCRE and electric vehicles. This makes it crucial for LAC countries to seize the current window of opportunity to deepen the diversification of rural economies. To do so, the region must address the constraints discussed

earlier, including those that are intrinsic to some countries—such as higher political, economic, and regulatory instability or the need to attract private investment—as well as challenges that are specific to these sectors, such as mineral governance and the mitigation of environmental impacts.



CAF Action.

Scan the QR code to learn more about CAF's actions in just energy transition.

Governance and sustainability of extractive sectors

A common challenge across extractive activities is the need to strengthen natural resource governance. This requires clear legal frameworks, strong institutions, and effective anti-corruption measures. Transparency in the management of extractive rents is critical. Initiatives such as the global standard of the Extractive Industries Transparency Initiative (EITI), to which ten LAC countries⁵ have already adhered, commit participating countries to disclose information along the entire value chain of the industry (Chêne, 2017; EITI, 2023). Prudent fiscal rules are also recommended to manage the volatility of revenues generated by extractive industries—for example, through the creation of stabilization funds or sovereign wealth funds that accumulate savings during boom periods. Peru's Fiscal Stabilization Fund is one such example (Sy et al., 2012; MEF, 2025). Equally important is ensuring compliance with existing laws and the effective monitoring and sanctioning of illegal activities. This helps increase investor confidence, reduce risks to private investment, and lower levels of social conflict. Achieving these objectives requires strengthening monitoring capacity, particularly environmental monitoring, reinforcing labor regulation and supervision to prevent abuses and informality, and improving coordination across different levels of government.



Governance and sustainability in extractive sectors are closely intertwined and represent the main challenge for countries in Latin America and the Caribbean

The private sector plays a fundamental role in the exploitation and development of natural resources, given both its technical capacity and its financial contribution. In mining countries across LAC, a substantial share of foreign direct investment (FDI) is already directed toward strategic sectors such as mining, hydrocarbons, and, more recently, critical minerals. Examples include offshore discoveries and exploration in Guyana, large-scale investments in Vaca Muerta in Argentina, and FDI in traditional mining in Peru.

Leveraging this FDI requires clear, stable, and long-term state policies that recognize that comparative advantages derived from natural resource endowments translate into development only when predictable rules are in place. However, in several countries, tensions linked to resource nationalism and perceptions of legal uncertainty persist, shaping investment decisions and limiting sectoral potential. Overcoming these barriers requires strengthening institutions, ensuring predictable regulatory frameworks, and promoting public–private partnership mechanisms that facilitate responsible and sustainable private-sector participation.

In this context, governments can contribute by establishing and prioritizing long-term state policies to attract investment in mining and processing activities, defining clear regulations and incentives, and ensuring compliance with environmental, social, and governance (ESG) standards.⁶ Governments must also strengthen existing legal frameworks to ensure that mineral and hydrocarbon extraction minimizes environmental and social impacts. Sector sustainability is essential to effective governance. This also requires dialogue with stakeholders, including investors and local communities, as well as greater regional cooperation. Prioritizing rural communities' access to safe drinking water is a clear example. If a project requires large volumes of water, it should include investments to improve

⁵ They are Argentina, Colombia, the Dominican Republic, Ecuador, Guatemala, Guyana, Mexico, Peru, Suriname, and Trinidad and Tobago. At the time this chapter was written, the participation of Guatemala and Mexico was suspended.

⁶ ESG criteria are used to assess whether a company's investments are socially responsible.

local water efficiency, such as support for the modernization of agricultural irrigation systems or the installation of drinking-water treatment plants. In water-stressed regions, regulations should include provisions requiring companies to reuse water, rely on desalinated seawater, and prioritize human consumption.

The adoption and enforcement of ESG standards are essential to protect the environment and the rights of local communities, as well as to strengthen governance around critical minerals. In recent years, several countries in the region have made progress in implementing environmental licensing frameworks and regulations aimed at raising these standards. For example, Chile's National Mining Strategy sets ambitious targets, including reducing water use in the mining industry, achieving carbon neutrality by 2040, and eliminating tailings disposal by 2050. A robust regulatory framework and adequate monitoring of risks and waste are essential to prevent accidents and mitigate environmental contamination. In this regard, effectively identifying and managing risks requires the allocation of sufficient resources to local governments and regulatory agencies.

● ● **Clear regulatory frameworks, long-term national policies, the adoption of ESG standards, rent-redistribution mechanisms, and participatory approaches can help build sustainable governance of natural resources**

Even in the absence of catastrophic accidents, extractive activities can lead to significant landscape transformation, such as in open-pit mining, and to alterations of watercourses, particularly in the case of illegal and artisanal mining, which often rely on rudimentary and highly polluting methods. These impacts affect traditional livelihoods, including those of small-scale farmers. Communities located downstream may experience reduced fishing or irrigation capacity, while Indigenous peoples may lose sacred sites or

hunting grounds (Rebolledo Monsalve et al., 2022; Scheidel et al., 2023). Water is frequently at the center of these conflicts. Mining and oil extraction compete with agriculture and human consumption for this resource. Several studies indicate that in arid regions of Chile and Peru, mining activities have exacerbated water scarcity, triggering protests and restrictions on new projects (Bebbington & Bury, 2009; Lagos et al., 2022). As a result, companies increasingly face demands to implement rigorous environmental management plans, participatory monitoring with communities (see Box 4.2), and, where impacts are unavoidable, compensation mechanisms such as alternative development projects.

● ● **Well-designed revenue-redistribution mechanisms enable local impacts from extractive projects and, in turn, help ease the social tensions associated with these activities**

A key strategy for ensuring that extractive activities promote rural development and mitigate social conflict is the adoption of revenue-redistribution mechanisms. In LAC countries with extractive sectors, governments allocate a share of royalties or extractive taxes to local governments in producing areas. In Peru, for example, the *canon minero* transfers 50% of the corporate income tax paid by mining companies to the regions and municipalities where extraction takes place, financing local public works. This mechanism has resulted in substantial annual infrastructure investment in Andean regions, although in some cases it has been accompanied by challenges related to spending effectiveness (see Box 4.3). In Colombia, the General Royalties System ensures that a share of oil, gas, and mineral royalties is allocated to regional development and science and technology funds, with local authorities participating in their management (DNP, 2024). While these mechanisms tend to increase social acceptance of projects by distributing part of the wealth generated and delivering tangible local impacts, they can also generate frustration when communities perceive that funds are misused

or that bureaucratic constraints hinder concrete outcomes (Arellano-Yanguas, 2011a). It is therefore important to accompany these mechanisms with strengthened subnational management capacities,

so that resources are invested effectively in projects that diversify rural economies (Alves et al., 2025; OECD, 2016).

Box 4.2

Participatory Environmental Monitoring Committees (PEMCs) in the mining sector in Latin America and the Caribbean

Participatory Environmental Monitoring Committees (PEMCs) are environmental governance instruments that enable communities, companies, and governments to jointly monitor and mitigate environmental impacts in mining areas, while maintaining continuous dialogue among stakeholders. Beyond facilitating mining governance, these committees contribute to the achievement of multiple development objectives, including SDG 6 (clean water and sanitation) and SDG 15 (life on land), among others.

These committees are not without challenges. Participatory logistics—which involve multiple actors often dispersed across rural areas—can complicate implementation and sustained engagement. This is compounded by high participant turnover and initial reluctance or mistrust on the part of both communities and companies. Other recurring limitations include a lack of consensus on which environmental aspects should be prioritized, heterogeneity in monitoring techniques, and weaknesses in communicating results to communities or relevant authorities.

The main requirement for these committees to function effectively is trust among all actors involved—the committee itself, the community, companies, and government authorities. Given the innovative nature of these mechanisms, such trust must be built progressively. To this end, participants' capabilities are critical, not only in technical terms but also their capacity for communication, leadership, and knowledge generation.

Where PEMCs have been implemented, tangible improvements have been observed, including better detection of pollution sources, the generation of early-warning alerts, and improvements in corporate practices. These committees have also generated positive spillovers, such as the identification of pollution originating from non-mining productive activities, including those carried out by the communities themselves.

Key recommendations for the effective implementation and functioning of these committees focus on institutionally consolidating PEMCs within legal and environmental management frameworks, so that their operation extends beyond the life cycle of individual mining projects. Additional priorities include strengthening the inclusion of women, youth, and Indigenous peoples in their governance structures; ensuring sustainable and transparent financing mechanisms; and reinforcing the technical, legal, and communication capacities of committee members. It is also essential that companies maintain open channels of communication and respond promptly to committee findings, and that public authorities incorporate these findings into environmental decision-making processes, thereby promoting more participatory and effective governance.

Source: Author based on Pareja et al. (2019), a document drawing on lessons learned from nine case studies in Argentina, Bolivia, Panama, and Peru.

Box 4.3

Royalties from the exploitation of non-renewable natural resources

Revenues from royalties, fees, or canon associated with the exploitation of non-renewable natural resources constitute an important source of financing for subnational governments in several LAC countries. In cases such as Bolivia and Peru, these revenues can account for up to 60% and 35% of total regional or local revenues, respectively. However, following the commodity price boom of the 2000s, royalty-derived revenues have remained volatile and have exhibited limited growth over the past decade (Alves et al., 2025). In most countries, revenues are collected by the national government and subsequently transferred, in part, to subnational jurisdictions. Argentina constitutes an exception, as this authority is vested directly in provincial governments.

The distribution of royalties raises tensions between equity and efficiency. On the one hand, allocating revenues to producing regions is justified, as these areas bear the environmental and infrastructure costs associated with the exploitation of non-renewable natural resources. On the other hand, concentrating resources in these areas can exacerbate territorial inequalities and generate distortive fiscal incentives. Striking a balance is therefore critical, particularly in the context of the energy transition. To harness extractive resources effectively, sector governance must promote responsible development while avoiding situations in which local governments become obstacles to investment.

Studies in Brazil and Colombia have shown that royalties have had a limited impact on the quality of public services and that local spending is highly sensitive to changes in transfers (Martínez, 2025; Monteiro & Ferraz, 2010). In addition, volatility in international hydrocarbon and mineral prices generates financial instability and risks of unsustainable spending. As a result, many countries earmark royalty revenues for capital investment; however, this mechanism does not always prevent the diversion of resources toward current expenditure or eliminate investment volatility. In this context, the establishment of stabilization funds emerges as a key tool for smoothing revenue cycles and strengthening subnational fiscal sustainability.

Mining royalties in LAC have not always translated into local economic development or poverty reduction. For example, in Colombia, Moyano and Wright (2016) find that direct royalty payments have produced only modest improvements in poverty reduction, while Saavedra and Romero (2017) show that reductions in transfers may coincide with an increase in illegal mining and adverse health outcomes. In the Brazilian state of Minas Gerais, regression analyses indicate that greater dependence on mining royalties is associated with lower human development and negligible employment gains (De Cássio Rodrigues et al., 2016). In Peru, statistical studies link substantial inflows of mining revenues to increased social conflict and poor fiscal allocation in contexts characterized by weak local government capacity (Arellano-Yanguas, 2011a, 2011b; Ponce & McClintock, 2014). By contrast, a qualitative study in Brazil highlights that community-based management can foster local autonomy and social cohesion (Demeda & de Carvalho, 2018). More recently, Bancalari and Rud (2025), analyzing transfers received by non-mining municipalities, find that these transfers boosted productive public spending, employment, and local incomes—particularly in rural areas—while reducing poverty and territorial gaps. They also show that each dollar transferred generated between USD 2.8 and USD 3.9 in local economic activity.

In the case of hydrocarbon rents, Acuna et al. (2024) examine the impact of a 2008 reform of Law 010 in Ecuador, which modified the allocation of royalties. The authors find positive effects in education, including higher completion rates at the primary and secondary levels, as well as improvements in income, accessibility, and school infrastructure. They also observe increases in labor demand; however, this rise is associated with a decline in tertiary education enrollment. In Brazil, Castro (2020) and Postali et al. (2025) document improvements in selected health indicators resulting from transfers of municipal oil royalties.

In sum, there is substantial evidence of the positive impacts of extractive-resource royalties on local development, and that these impacts depend primarily on three factors:

1. The strength and effectiveness of local institutions.
2. The design and targeting of revenue-transfer mechanisms.
3. The model used to manage royalties, whether state-led or community-based.

One mechanism that can help reduce social conflict and incorporate social demands is the public prior consultation process, which must include Indigenous and tribal peoples in accordance with international law (ILO, 2015; Oxfam, 2019). Beyond legal formalities, this requires dialogue in local languages, respect for community deliberation timelines, and good-faith negotiation of project adjustments. When a project is rejected by a clear majority within a community, governments should consider alternative locations or less intrusive designs, avoiding coercive imposition, which often leads to prolonged conflict.

Despite implementation shortcomings in some of these schemes, governments can also promote market-based mechanisms that allow extractive activities to generate positive impacts for local communities. Examples include local employment quotas, established through percentage targets (with exceptions for highly specialized positions or senior management roles), as well as workforce training and apprenticeship programs for rural labor and youth in mining or energy-related trades. Additional measures include establishing preferences or quotas for local suppliers of goods and services, incentivizing companies to source locally, and organizing supplier fairs to integrate

local SMEs into value chains (Hira & Busumtwi-Sam, 2021; IGF, 2017).

Some countries, such as Brazil and Argentina in the oil sector and Chile in mining, have implemented local content policies requiring companies to invest in training small local firms and integrating them as suppliers (e.g., transport, catering, basic maintenance). Aragón and Rud (2013) find positive effects of gold mining in Peru on income and infrastructure, driven precisely by these market mechanisms. Increases in local demand raise labor and land incomes and indirectly improve rural living conditions. Community development programs that include investments in health, education, or scholarships should form part of long-term state policy. For instance, requiring community development plans as part of licensing processes helps align private investment with local priorities (Hira & Busumtwi-Sam, 2021).

The adoption of new technologies can simultaneously make the extractive sector more efficient and environmentally sustainable. Many companies are deploying Industry 4.0 tools—such as sensors, artificial intelligence, and remote monitoring—to optimize processes and reduce waste. For example, optimizing truck routes lowers

diesel consumption and emissions; pipeline sensors enable early leak detection, preventing fugitive emissions and accidents; drones and satellites support surveillance of illegal activities; and electrification of motors or heat generation reduces CO₂ emissions (Cacciuttolo et al., 2023; Egbumokei et al., 2021; Karimipour et al., 2021). In addition, automating hazardous tasks improves miners' health and safety, although in some cases it may displace local labor (Long et al., 2024).



Modernization of the extractive sector enables improvements in sustainability as well as in workers' health and safety

A major shift in recent years is that mining companies and energy producers are investing in renewable self-generation. Examples include copper mines in Chile partially powered by solar parks, or Argentina's state-owned oil company YPF, which has installed wind farms to supply its operations. These initiatives not only reduce carbon footprints, but can also deliver surplus energy to neighboring communities. The spread of satellite internet has even enabled the operation of large mining projects in remote areas of the Andes. While such actions are primarily driven by the private sector, policies that facilitate access to these technologies—such as concessional financing, promotional campaigns, or targeted subsidies in cases of regulatory priority—can help accelerate the sector's transition toward sustainability.

Because many challenges transcend national borders—such as shared river basins affected by illegal mining—regional cooperation is unavoidable. Although progress has been made in mining-related coordination, collaboration remains a pending task for the region as a whole. Examples include the exchange of good practices in regulation and rural extractive development, such as the Andean Committee Against Illegal Mining, formed by Bolivia, Colombia, Ecuador, and Peru. In this context, countries should seize the

current momentum to advance the 2030 Agenda, as several SDG targets are directly linked to these sectors (SDG 7 on affordable energy; SDG 8 on decent work in mining; SDG 13 on climate action; and SDG 15 on terrestrial ecosystems and mining-related deforestation, among others).

Diversification of rural economies

In countries with abundant strategic minerals for the energy transition, there is a clear opportunity to develop domestic value chains. For example, Chile and Argentina are debating policies aimed not only at exporting raw lithium, but also at producing batteries locally. Brazil is seeking to attract investment in the refining of its critical metals. Jamaica and Guyana could develop aluminum industries based on their bauxite resources, rather than focusing primarily on raw exports (IDB Invest, 2025). If implemented, these initiatives could foster industrial hubs in rural areas or in intermediate cities near extraction sites, generating more employment and technological capabilities. However, they require improvements in the investment climate, human capital, and technology transfer agreements.

In the case of green and blue hydrogen, promoting production hubs would help address one of the main current constraints on its use: transport. The region's strong potential to produce green and blue hydrogen at low cost (IEA, 2024) could become a source of comparative advantage, strengthening downstream manufacturing activities—for example, in iron and steel production, among others (Allub et al., 2024).

With respect to biofuels, LAC countries can draw on the lessons learned from Brazil's successful experience. Brazil adopted an early, planned, and long-term policy approach, with the dual objective of diversifying sugarcane incomes and ensuring energy security. This strategy included mandatory biofuel blending with conventional fuels, with blending requirements updated multiple times over the years. These measures were accompanied by the introduction and expansion of flex-fuel vehicles—capable of running on gasoline,

ethanol, or blends—along with fiscal incentives and credit programs for both biofuel production and the purchase of such vehicles. Brazil also has dedicated financial institutions and credit lines for bioenergy and its research and development. Finally, the country applies import tariffs on ethanol to protect its domestic market. Elsewhere in the region, some progress has been made along similar lines. Countries such as Argentina, Colombia, Peru, and Uruguay have blending mandates in place, although with lower ethanol shares than those observed in Brazil.

●● **Brazil's track record of policies promoting biofuel production and use can serve as a valuable asset for advancing biofuel production across the region**

Finally, in anticipation of a potential reconfiguration of energy markets, countries should adopt proactive strategies to reduce the risk of stranded assets resulting from the phase-out of coal mines, refineries, pipelines, and related infrastructure. Possible alternatives include using existing wells for carbon storage, repurposing oil platforms for offshore wind generation, adapting refineries for hydrogen or biofuel production, and converting pipelines for biofuel transport (Allub et al., 2024; ESMAP, 2024; Saussay et al., 2024; Vona et al., 2018). As noted earlier, although these industries are not labor-intensive, it will be essential to invest in training and education to help redirect rural labor toward emerging jobs linked to the energy transition (Bray et al., 2022; Lim et al., 2023).

Investment for rural well-being

From an infrastructure perspective, extractive activities can have positive effects on rural communities. Large-scale extractive projects place substantial demands on infrastructure, including roads, electricity, and water and sanitation systems. In many cases, companies themselves—often as part of contractual arrangements—assume responsibility for investing in this infrastructure through corporate social responsibility (CSR) programs. However, such infrastructure projects must be properly regulated, as they can increase deforestation and further alter landscapes if not adequately planned (Bebbington et al., 2018). Large extractive firms may also invest in the construction of schools or health centers as part of their CSR strategies. Some governments have established frameworks to align corporate social investments with local development plans, seeking to avoid duplication or clientelism (see Box 4.4). ECLAC, the OECD, and the United Nations have published good-practice guidelines to support coordination among governments, companies, and social organizations, with the aim of generating mutual benefits (FIO et al., 2020; IRP, 2020; OECD, 2020).

●● **Several countries in the region have established frameworks to align corporate social investments with local development plans**

Although illegal mining is currently only weakly linked to minerals critical for the energy transition and is primarily associated with gold extraction, combating this practice is essential for the well-being of rural populations and for curbing the loss of high-value resources in rural areas of LAC (see Box 4.5).

Box 4.4

Regulatory mechanisms in Latin American and Caribbean countries

Argentina. Resolution 47/2020 approved Argentina's Plan Estratégico Minero (Strategic Mining Plan), aimed at building a shared vision for sustainable mining development that contributes to socioeconomic development. Its objectives are increasing mining's contribution to GDP, reviewing the cost of fiscal incentives, generating local opportunities, communicating and legitimizing mining activity, ensuring transparency, protecting the environment in accordance with Law 24,585, promoting the sustainable use of resources, and strengthening sector governance and international integration. In addition, a memorandum of understanding was signed with the European Union under the Global Gateway initiative, which envisages up to EUR 300 billion in investments to develop sustainable raw-materials value chains. The agreement seeks to promote a competitive mining sector aligned with the energy and digital transitions, fostering quality employment, innovation, ESG standards, and workforce training.

Brazil. Brazil's framework for critical and strategic minerals was developed in several stages. The National Mining Plan 2030 (adopted in 2011) defined 11 strategic objectives and three groups of minerals: those imported on a large scale, those linked to advanced technologies, and those in which the country has comparative advantages. In 2020, the Mining and Development Program translated these guidelines into targets related to geological knowledge, the circular economy, investment, and socioenvironmental responsibility. In 2021, the national policy Prominerais Estratégicos (Decree 10,657) and Resolution No. 2 established a list of priority minerals and an interministerial committee to accelerate projects, promoting lithium plants, the expansion of rare earths, and sustainable programs in the Amazon. In 2022, Decree 11,108 consolidated the Brazilian Mining Policy with a focus on sustainability, value added, and regional development. In 2024, a National Policy on Critical and Strategic Minerals was proposed, centered on supply security, the circular economy, digitalization, and regional integration.

The National Bank for Economic and Social Development (BNDES) has launched initiatives to promote these minerals, including a BRL 5 billion call for proposals targeting lithium, rare earths, and silicon value chains, as well as an investment fund—together with Vale, one of the world's largest mining companies—of up to BRL 250 million.

Chile. This Andean country has one of the most advanced mining strategies in the region, integrating innovation, sustainability, inclusion, and a long-term vision. Fundación Chile, a public–private partnership created in 1976, has become a catalyst for innovation through initiatives such as the Mining Skills Council (created in 2010) and the Expande program (launched in 2013), focused on open innovation and the development of technological suppliers. The Mesa Nacional Mujer y Minería (National Roundtable on Women and Mining) (established in 2018) promoted commitments to increase female participation and foster diverse leadership. In 2022, the National Mining Policy 2050 set out a roadmap for sustainable, competitive, and inclusive mining, with targets including carbon neutrality by 2040, institutional strengthening, and female participation of 20% by 2030 and 35% by 2050. Finally, the National Lithium Strategy (2023) established a public–private model with the future National Lithium Company, prioritizing rent capture, technological development, and the protection of salt flats, at least 30% of which are to be designated as protected areas by 2030.

Colombia. In 2016, Colombia adopted its National Mining Policy as a roadmap for a more competitive, orderly, and inclusive industry, based on legal certainty, improved conditions and infrastructure, expanded geological information, and institutional strengthening.

In 2023, the policy *Una Nueva Visión de la Minería en Colombia* (A New Vision for Mining in Colombia) was presented (aligned with the 2022–2026 National Development Plan and with a 2035 horizon). This new policy incorporates human rights, gender, ethnic diversity, climate change management, and a transition from an extractive to a productive model. It identifies ten structural problems, ranging from institutional weaknesses and deficiencies in title oversight to informality and poor environmental practices. It also proposes measures to address them, including the formalization of small-scale mining, industrialization of strategic minerals, the creation of a public mining company, enhanced traceability (particularly for gold), responsible mine-closure plans, and mechanisms to combat illegal mining. The objective is to reorient mining toward a competitive, sustainable, and inclusive model that contributes to economic and territorial development with social legitimacy.

Dominican Republic. The Dominican Mining Company (EMIDOM) was recently created to carry out exploration and, in the future, exploit rare-earth deposits, with the aim of positioning the country in the global market for critical minerals. The development of this sector will depend on international cooperation, technical training, technological innovation, and the implementation of public policies that promote sustainability and supply security.

Ecuador. In 2021, through Decree 151, Ecuador approved an Action Plan for efficient and socially and environmentally responsible mining. The strategy seeks to assess geological potential, attract investment, and apply best practices in resource use. To this end, it establishes transparency obligations—the Ministry of Energy and Non-Renewable Resources must publish statistics and projections within 100 days, based on a long-term economic model (profitability, contribution to GDP, exports, investment, production, and socioenvironmental costs)—and declares transparency in mining revenues a state policy. It also reforms the permitting process, introducing guidelines for fair allocations (including expired areas) that ensure equal access for domestic and foreign companies.

Mexico. A presidential decree created LitioMx, a state-owned company under the Ministry of Energy, to control all lithium projects in the country. Its mandate includes the exploration, extraction, processing, and utilization of lithium, as well as the management of value chains, in compliance with the Mining Law, environmental regulations, and the rights of Indigenous peoples. LitioMx is tasked with developing strategic plans, executing engineering and research projects, coordinating with the Mexican Geological Service to register reserves, and developing domestic technology. It also aims to promote the sustainable use of lithium in the energy transition and to manage the production, transformation, and distribution of derivative products in coordination with public and private institutions.

Peru. Law 31,283 of 2021 declares the exploration, extraction, and industrialization of lithium and its derivatives activities of public necessity, national interest, and strategic importance, in order to ensure their sustainable development. The law also recognizes lithium commercialization as a key resource for national development and mandates the Executive Branch to issue regulations governing its sale, promote a domestic battery industry, and establish processes for lithium-battery recycling.

Source: Prepared by Luisa Rivas.

Box 4.5

Illegal gold mining

A particularly concerning phenomenon in the extractive sector is the proliferation of illicit mining activities, especially illegal gold mining. The term illegal mining refers to extraction carried out outside the law, without permits, often in prohibited areas (such as natural reserves and Indigenous lands), and using extraction methods that are highly harmful to both the environment and people, typically involving the use of mercury. Over the past decade, driven by record-high gold prices and weak enforcement, illegal mining has expanded across several countries, bringing with it severe socioenvironmental and security consequences (UNODC, 2025c; Wagner, 2016).

South America has become one of the global epicenters of illegal gold mining. Some estimates suggest that in countries such as Colombia, Ecuador, and Venezuela, illegal production may account for well over 70% of total gold output (Wagner, 2016). The Amazon region, in particular, has been affected by a clandestine gold rush.

A recent report by the United Nations Office on Drugs and Crime (UNODC, 2025c) warns that criminal organizations, including drug-trafficking groups, have increasingly turned to illegal gold extraction due to its high value and the possibility of laundering proceeds through the legal gold supply chain. Unlike drug trafficking, where the product itself is illicit, illegally extracted gold can be introduced into formal markets by mixing it with legally produced gold, using falsified documentation, and operating through shell companies. This feature has made gold particularly attractive to illicit groups, which view it as a means to diversify income sources while facing lower risks (UNODC, 2025c).

Illegal mining has devastating effects on rural communities and the ecosystems in which it occurs. It generates informal economies and violence, establishes extortion structures and the collection of “illegal taxes” from small-scale miners by armed groups, and is frequently associated with increased prevalence of human trafficking, labor and sexual exploitation, and child labor in rural areas (Heck, 2014; UNODC, 2025c). UNODC highlights that these activities fuel other serious crimes in the same territories, intertwining with drug and arms trafficking.

From an environmental perspective, illegal mining causes irreversible damage. It typically relies on alluvial techniques (using dredges in rivers) or land excavation with heavy machinery, resulting in the destruction of native forests. It is estimated that in countries such as Brazil, Peru, and Venezuela, illegal mining has deforested hundreds of thousands of hectares of the Amazon over the past decade (Heck, 2014; UNODC, 2025c). In addition, illegal miners use prohibited substances such as mercury to amalgamate gold, discharging large quantities into rivers. This contaminates food chains (with mercury-tainted fish) and affects the health of Indigenous populations that depend on fishing and water resources, causing neurological diseases (UNODC, 2025c). Soil and water degradation is also severe: abandoned pits and trenches disrupt drainage patterns, while sediments cloud rivers and affect downstream water quality and aquatic fauna.

From an economic standpoint, illegal mining leads to tax evasion and undermines rural development. The expansion of illegal gold implies that states and communities potentially lose billions of dollars in revenue, particularly in a context of record prices and high profitability of this precious metal (UNODC, 2025c). By contrast, gold mining remains an important source of income for rural populations in some contexts; however, where organized crime is involved, these revenues accrue to illegal groups that do not reinvest in local communities. Artisanal miners generally capture only a small share of these rents, perpetuating rural poverty. Moreover, the mixing of illegal and legal gold depresses prices paid to formal producers and damages the international reputation of Latin American gold, as it becomes associated with deforestation and human rights violations (UNODC, 2025c).

Coordination among the public sector, private companies, and security forces is vital to prevent the expansion of illegal economies. Governments in the region have pursued a range of strategies to combat illegal mining, with mixed results. In Colombia, efforts have focused on prosecuting money laundering linked to gold and deploying innovative technologies—such as satellite imagery and machine-learning tools—to identify new unregistered mining operations (Saavedra, 2025). However, as long as profitability remains high and alternative economic opportunities for rural populations are limited, illegal mining tends to reemerge. A complementary approach has been the creation of formalization programs for artisanal mining, which help small-scale miners obtain licenses, technical training, and access to legal markets in exchange for compliance with environmental standards (IGF, 2017). International cooperation is also crucial given the transnational nature of the gold trade. Coordinated efforts are required to trace supply chains, impose due-diligence requirements on refineries and buyer markets, and close channels for the commercialization of illicit gold (UNODC, 2025c).

NCRE sources have played a significant role in improving access to electricity in rural areas (see Chapter 8). To sustain and deepen this progress—while also improving service quality—the region will require substantial investment not only in generation assets such as solar panels and wind turbines, but also in electricity infrastructure, including transmission and distribution networks. The energy transition, together with demographic change, compels the region to expand its electricity infrastructure overall, with new capacity largely supplied by renewable sources. At the same time, the intermittency of NCRE generation underscores the need for robust backup mechanisms to meet demand during periods when renewables are not producing. In this context, hydropower—widely available across the region—will play a key role. Significant investment in battery storage will also be required (Allub et al., 2024), alongside upgrades to existing hydropower infrastructure (see Box 4.6).

Finally, improvements in electricity and natural gas connectivity enable rural households to replace biomass with cleaner energy sources for cooking and heating. Beyond efficiency gains and potential cost reductions, this transition delivers substantial health benefits by reducing exposure to air pollutants generated by biomass combustion. To ensure these positive health impacts, governments can implement awareness-raising campaigns and support the purchase of electric or gas appliances through subsidies or financing schemes, prioritizing those with higher energy efficiency (Allub et al., 2024).



Access to electricity through distributed generation can result in lower energy costs, higher levels of productive efficiency, and a reduction in local pollution

Box 4.6

Resilience of hydroelectric infrastructure in LAC

Hydropower accounts for nearly half of electricity generation in LAC (Allub et al., 2024). This form of energy is expected to play an even more prominent role in the coming decades, operating in tandem with nonconventional renewable sources, such as solar and wind, and helping to ensure grid continuity and reliability.

Changes in hydrological regimes have caused many hydropower plants to operate outside the conditions for which they were originally designed, resulting in greater operational variability and lower energy efficiency. This has led to accelerated wear of electromechanical equipment, efficiency losses due to low-load operation, deterioration of electrical insulation, and damage to discharge pipelines caused by operating beyond recommended limits (Ubierna & Alarcón Rodríguez, 2022).

In the face of climate change, many hydropower plants will need to adapt to hydrological conditions that differ from those anticipated in their original designs. Modernizing these facilities requires assessing future hydrological scenarios and ensuring robust designs capable of withstanding climatic uncertainty. This process also presents an opportunity to incorporate advanced monitoring, measurement, and forecasting technologies that can improve operational management. Ubierna et al. (2020) estimate that total investment needs to modernize the region's existing hydropower fleet amount to USD 33 billion, a figure that is expected to rise as infrastructure continues to age.

CAF -Development bank of Latin America and the Caribbean- promotes the resilience of hydropower infrastructure through the financing of climate-adapted infrastructure projects, technical assistance to strengthen risk management, and support for regulatory frameworks aimed at reducing the vulnerability of the water sector to climate impacts and natural disasters. CAF also provides technical support to ministries and governments to enhance disaster risk management and improve public investment planning for infrastructure.

Increasing financing for adaptation projects is essential not only to strengthen resilience to climate change, but also to promote inclusive and sustainable growth. Investment in climate-resilient infrastructure not only helps avoid future losses, but also reduces risks associated with existing infrastructure and preserves social and environmental benefits, thereby generating the so-called triple dividend.

Roadmap for the development of key sectors for the energy transition

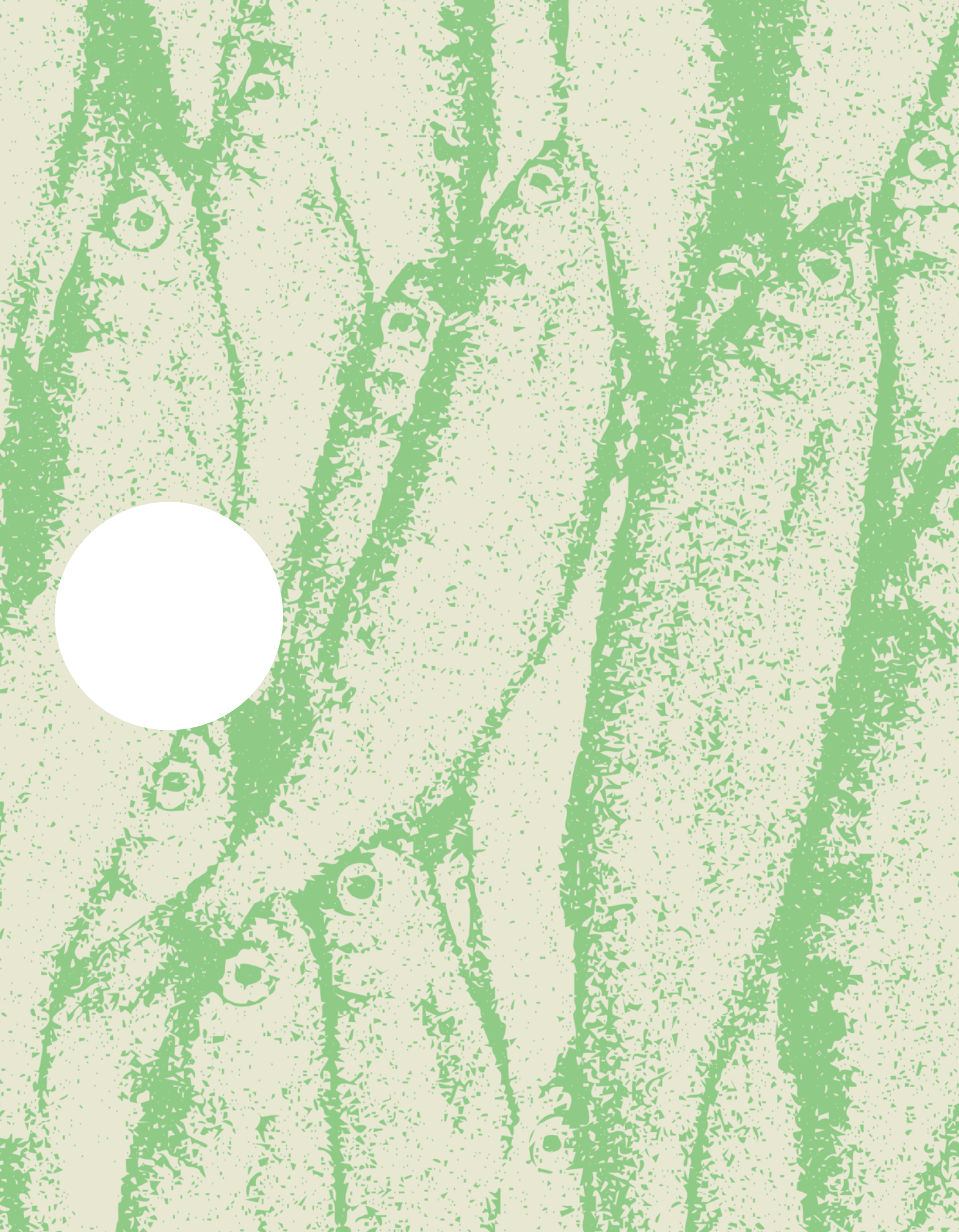
Throughout this chapter, the main challenges and opportunities facing sectors linked to the energy transition have been identified. A set of policy actions can help strengthen the development of these sectors while improving living conditions for rural workers. Figure 4.3 presents a roadmap that

synthesizes the current situation and outlines key measures that can be adopted.

Figure 4.3
Opportunities, challenges, and policy recommendations

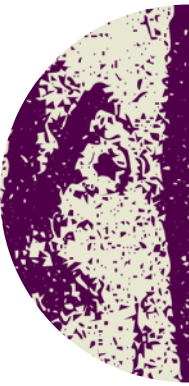
Critical minerals for the energy transition	Development of low-carbon fuels: biofuels and hydrogen
Development of value chains in extractive sectors	Modernization and digitalization: efficiency gains and improved working conditions
Infrastructure investment driven by rising extractive rents	NCRE for households and enterprises in isolated rural areas
Green local employment	Electric or gas appliances for cooking and heating in rural households
Environmental governance and sustainability	Access to financing
Legal and regulatory frameworks	Conditions in artisanal and small-scale employment
Adoption of good mining practices and international standards	Non-conventional renewable energy as a driver of electricity expansion
Support for value-chain development	Promotion of investment in low-carbon fuels and the introduction of fuel-blending mandates
Support for the formalization and training of small-scale miners	Programs to promote the adoption of electric or gas stoves and appliances in households
Mechanisms for redistributing rents and royalties from extractive sectors	Professional and technical training for green jobs
Support for and promotion of digitalization	Regulatory frameworks for water resources

- Opportunities
- Challenges
- Policies



5

**Forestry, fisheries,
aquaculture,
and tourism
as engines of local
development**



Key messages

The forestry, fisheries, aquaculture, and tourism sectors are essential for diversifying rural incomes, creating employment in specific territories—such as forested, coastal, and riverine areas—and integrating women into rural economies.



The income generated by these activities and their products—including non-timber forest resources and aquatic fauna and flora—is crucial for the food security of rural communities, especially in the most isolated areas.



The forestry sector requires consistent, long-term policies to achieve its full development. In addition, forestry enterprises need financing conditions that account for the long growth cycles of trees.



Certification of both timber and non-timber products adds value and helps improve the socioeconomic conditions of workers in the sector.



Sustainable aquaculture has emerged as a dynamic sector in which the region is advancing rapidly, with strong potential to meet the expected rise in food demand.

The sustainability of fishing zones in Latin America and the Caribbean (LAC) is in decline, with the South Pacific showing the lowest sustainability values. This is mainly due to illegal, unreported, and unregulated (IUU) fishing, and to a lesser extent, to the impacts of climate change.



There is a growing demand for tourism experiences linked to culture and nature. The abundance of ecological resources and cultural diversity in LAC offers the region a competitive advantage in this sector.



The main challenges for rural tourism—such as limited infrastructure and basic services—coincide with the needs of local populations. Public investment in these areas should therefore take into account the potential benefits of tourism when setting priorities and evaluating outcomes.

Forestry, fisheries, aquaculture, and tourism as engines of local development¹

Introduction

Forestry, fisheries, and aquaculture activities account for a smaller share of exports, employment, and value added across the region's economies than agriculture, yet they remain vital for rural communities. These sectors provide local employment with relatively low human and physical capital requirements, allowing rural communities to diversify their sources of income, while also supplying essential goods such as fish and non-timber forest products.

In the case of tourism, its role in the region's economies is even smaller, with Caribbean states standing out—where tourism revenues can

represent more than 20% of GDP. The growing demand for nature- and culture-based tourism offers countries an opportunity to develop rural tourism experiences that engage local communities.

This chapter examines these three sectors within the economies of Latin America and the Caribbean (LAC), emphasizing their rural dimension, their contributions to local economies, and their potential. It also analyzes the main opportunities and challenges these sectors face in improving local living conditions and provides policy recommendations to strengthen them.

¹ This chapter was written by Guillermo Cabral and Juan Odriozola. Belén Cañuelo, Delfina Silva, and Emilse Vargas provided research assistance.

Forestry sector

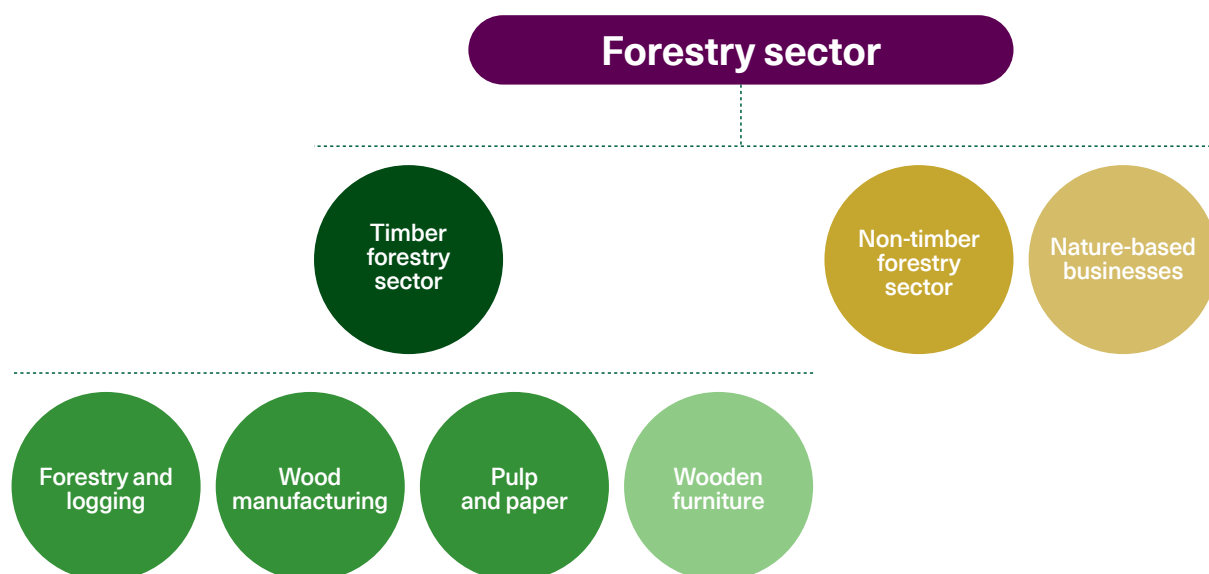
The timber forestry sector comprises four subsectors: (1) forestry and logging, (2) wood manufacturing, (3) pulp and paper, and (4) wooden furniture.

For the purposes of this document, the term “timber forestry sector” refers to the first three subsectors, unless otherwise indicated. The exclusion of the wooden furniture subsector is due to its activity being largely concentrated in urban areas and to the lack of disaggregated data.

The non-timber forestry sector,² in turn, encompasses a wide range of products such as nuts, mushrooms, herbs, spices, aromatic plants, rubber, and others. Its importance in the economy tends to be underestimated because it is poorly represented in public statistics, as much of its trade occurs in the informal sector (Sorrenti, 2017).

Nature-based businesses within the forestry sector sustainably harness forest resources and services to generate income—for instance, through carbon credits.

Figure 5.1
Diagram of forestry subsectors



² The FAO defines non-timber forest products as “goods of biological origin other than wood, derived from forests and that are tangible and physical in nature” (Sorrenti, 2017).

The relevance of the forestry sector in Latin America and the Caribbean

The region has one of the largest areas of forest cover in the world, with approximately 935 million hectares (ha) of forests—around 22% of the planet's total forested area (FAO, 2021a). However, this abundance comes with serious threats. Deforestation, wildfires, and land-use change, especially due to agricultural and livestock expansion, are the main causes of forest loss in the region (WRI, 2025). Although the net rate of forest loss has declined in some countries, degradation remains significant, affecting not only biodiversity but also the livelihoods of rural and Indigenous communities.

As of 2022, LAC had approximately 22.5 million ha of forest plantations (FAO, 2024d), mainly of eucalyptus and pine. Between 1990 and 2022, the region saw a 195% increase in planted area, compared to a 71% global increase over the same period. Argentina, Brazil, Chile, and Uruguay account for 81% of LAC's forest plantations.

●● Latin America and the Caribbean has recorded the fastest growth in forest plantations of any region in the world over the past 22 years

The distribution of forest plantations by property size shows a strong concentration among large landholders. In Chile, for example, three major companies (with more than 30,000 ha of plantations) account for 55.4% of the planted area; ten medium-sized companies (5,000–30,000 ha) represent 10.1%; 683 medium landowners (200–5,000 ha) hold 10.6%; and 22,830 small producers (less than 200 ha) account for 23.9% (World Bank, 2020b).

Brazil's 2017 agricultural census shows the amount of wood produced in cubic meters (m³) by purpose and holding size. The 99,718 farms under 200 ha produced 29.8% of the total; the 4,731 farms between 200 and 2,500 ha accounted for 25.2%; and the remaining 779 farms over 2,500 ha produced 45.3%.

●● Countries in the region show strong potential for forestry development

Several countries in the region stand out for high forestry productivity. Cubbage et al. (2022) measured output in cubic meters of wood per hectare per year (m³/ha/year) for various tree species (see Table 5.1). They also estimated the internal rate of return (IRR) of plantations, factoring in production costs and sales prices. Argentina, Brazil, Colombia, Chile, Paraguay, and Uruguay show high productivity levels, comparable to those of Asian countries and higher than those of Europe or the United States.

The projected growth in global demand for forest-based products together with the comparative advantages of some LAC countries in production, points to significant potential for the sector. According to FAO (2022d), demand for industrial wood-based products is expected to rise by 37% by 2050, in roundwood equivalent—the main input for such products—from 2.1 billion to 3.1 billion cubic meters. Growing demand for sustainably sourced forest products has also made certification an increasingly important factor (see Box 5.1).

Table 5.1

Rotation, average annual increment, and internal rate of return by country and species, 2022

Country	Species	Rotation (years)	Average annual increment (m ³ /ha)	Internal rate of return (IRR, %)
China	<i>Eucalyptus</i> sp. (Pingxiang, Guangxi)	6	20.0	28.6
Vietnam	<i>Acacia</i> (smallholders, northeast)	7	13.5	26.0
Paraguay	<i>Eucalyptus grandis</i> (urograndis clones)	12	25.0	22.0
Vietnam	<i>Eucalyptus urophylla</i> (northeast)	7	12.8	21.9
Laos	<i>Tectona grandis</i> (fast-growing)	18	12.4	21.2
Laos	<i>Eucalyptus</i> sp. (industrial)	7	33.0	20.9
Argentina	<i>Eucalyptus grandis</i> (average)	13	25.0	20.6
Chile	<i>Eucalyptus globulus</i> (pulp)	16	25.0	14.9
Uruguay	<i>Eucalyptus smitthii</i>	10	22.0	14.6
Colombia	<i>Pinus tecunumanii</i>	16	28.0	14.2
Chile	<i>Pinus radiata</i> (sawn wood, good soil)	22	30.0	14.1
Uruguay	<i>Eucalyptus grandis</i> (pulp)	10	25.0	14.1
Uruguay	<i>Eucalyptus grandis</i> (sawn wood)	16	27.0	12.4
Chile	<i>Eucalyptus nitens</i> (pulp)	14	30.0	12.3
Brazil	<i>Pinus taeda</i> (sawn wood)	21	30.0	11.8
Ecuador	<i>Eucalyptus globulus</i> (4 cutting cycles)	38	22.0	11.7
Uruguay	<i>Eucalyptus dunnii</i>	10	22.0	11.6
Chile	<i>Pinus radiata</i> (pulp, poor soil)	16	20.0	11.5
Ecuador	<i>Tectona grandis</i>	20	18.0	11.4
Colombia	<i>Pinus patula</i> (sawn wood)	18	18.0	11.0
Spain	<i>Eucalyptus globulus</i>	12	19.8	10.6
United States	<i>Pinus taeda</i> (average growth, South)	25	11.3	4.8
Finland	<i>Picea abies</i>	63	6.5	4.4
Finland	<i>Pinus sylvestris</i>	66	7.5	4.2
Poland	<i>Pinus sylvestris</i> (state or private forest)	100	9.3	2.9
United States	Mixed hardwoods, same-age plantation	60	6.2	2.9

Note: Countries and species are ordered by internal rate of return (IRR).**Source:** Cubbage et al. (2022).

Box 5.1

The role of certification in the forestry sector

The sustainable development of the forestry sector in LAC largely depends on robust and coherent legal frameworks that safeguard property rights, regulate access, and promote the sustainable management of forest resources. In recent decades, many countries in the region have reformed their regulatory frameworks to align forestry legislation with the principles of environmental sustainability, community participation, recognition of Indigenous rights, and systems to ensure legal compliance.

In this context, voluntary certification systems, such as the Forest Stewardship Council (FSC), have gained prominence as mechanisms that promote forest sustainability and improve traceability in international markets. In 2023, more than 7 million ha^a were certified under FSC standards in LAC—mainly in Bolivia, Brazil, Chile, Mexico, Uruguay, and Peru—the countries leading the region in forest area under responsible management (FSC, 2025).

FSC certification not only adds value to production by opening up access to niche markets (such as sustainable construction and responsible public procurement), but also requires compliance with social, environmental, and labor standards, encouraging fairer relationships with workers and local communities.

In one study, Mo et al. (2015)^b found that the benefits of certification outweigh its costs, estimating financial benefits at USD 6.05 per cubic meter of roundwood-equivalent production, compared to a cost of USD 3.71 per cubic meter. The benefits stem from several factors, including price premiums, operational efficiencies gained through improved planning and waste management, and tax incentives.

FSC certification can play a key role in meeting specific requirements in certain jurisdictions, such as Regulation (EU) 2023/1115, which the European Union (EU) applies to forest products (see Chapter 1). Although FSC certification does not automatically ensure compliance with EU regulations, the FSC has developed a specific complementary module to support alignment. Integrating these certifications into national and regional public policies could amplify their benefits, provided they are accompanied by technical assistance, inclusive financing, traceability systems adapted to local capacities, and eco-efficiency assessment and implementation.

For non-timber forest products (NTFPs), certification by the Union for Ethical BioTrade (UEBT) has been progressively consolidated. It ensures that these products are sourced in line with principles of biodiversity conservation, the sustainable use of natural resources, and ethical working conditions throughout the value chain. Unlike the FSC, which focuses mainly on forest management for timber production, the UEBT targets bioeconomy value chains, often linked to Indigenous, Afro-descendant, and rural communities. This certification has been successfully implemented in Brazil, Colombia, and Peru, contributing to the formalization of NTFP harvesting and improving small producers' access to high-value cosmetic, food, and pharmaceutical markets (UEBT, 2022).

In this context, rural women play a key role, as they often possess highly specialized knowledge of trees and forests, as well as of the diversity of forest species, their management, conservation, and uses for food, medicine, and energy (RedLAC, 2024; FAO, 2025e). This traditional knowledge is not only essential for the sustainability of harvesting practices, but also of strategic value for forest management and governance (CIFOR and ICRAF, 2013), underscoring the importance of their active participation in certification initiatives such as UEBT.

a. According to FAO (2024d), there were approximately 22 million ha of forest plantations in 2022, meaning FSC certification covers nearly one-third of the total.

b. The study examined eleven companies and producers across seven countries: Cameroon, Colombia, Indonesia, Malaysia, Peru, Portugal, and Russia.

A recent assessment covering 62 countries,³ which combined account for 72% of the world's forest area and 94% of global GDP, indicates that the timber forestry sector made a direct formal contribution of USD 661 billion (0.9% of global GDP) at constant 2015 prices (FAO, 2022d). When indirect contributions are included, the total rises to USD 1.52 trillion. In LAC, Li et al. (2022) estimate the sector's contribution at 0.8% of GDP, as shown in Table 5.2.

These estimates understate the sector's real value because they exclude informal economic activity. Based on data from three forestry subsectors—forestry and logging, wood manufacturing, and pulp and paper—that include informal activity, it is found that in Argentina, Chile, and Uruguay, the sector accounts for between 1% and 2% of GDP (Table 5.2). Both Li et al. (2022) and national accounts data show that the pulp and paper subsector generates the highest value added.

Table 5.2
Value added of the forestry complex, 2015 (USD million)

Region	Forestry	Wood manufacturing	Pulp & paper	Wood furniture	Total forestry	Share of GDP
Africa	13,457	2,170	2,651	4,206	22,483	0.9%
Latin America and the Caribbean	10,322	6,996	19,875	8,834	46,027	0.8%
Asia	81,474	88,984	108,045	59,452	337,955	1.3%
Europe	30,505	47,188	58,741	48,818	185,252	1.0%
North America	29,356	11,402	11,827	6,579	59,165	0.3%
Oceania	2,365	3,742	2,636	1,454	10,197	0.6%
Total	167,479	160,482	203,775	129,343	661,079	0.9%

Source: Li et al. (2022) and World Bank (2025g).

Table 5.3
Value added by timber forestry subsector according to national accounts

Country	Year	Forestry & logging	Wood manufacturing	Pulp & paper	Total
Argentina	2024	0.2%	0.2%	0.8%	1.2%
Chile	2022	0.4%	0.7%	0.6%	1.7%
Uruguay	2023	0.6%	0.2%	1.1%	1.9%

Source: Authors based on countries' national accounts (see details in Table A.5.1 in the appendix to this chapter, available in the online edition of the RED).

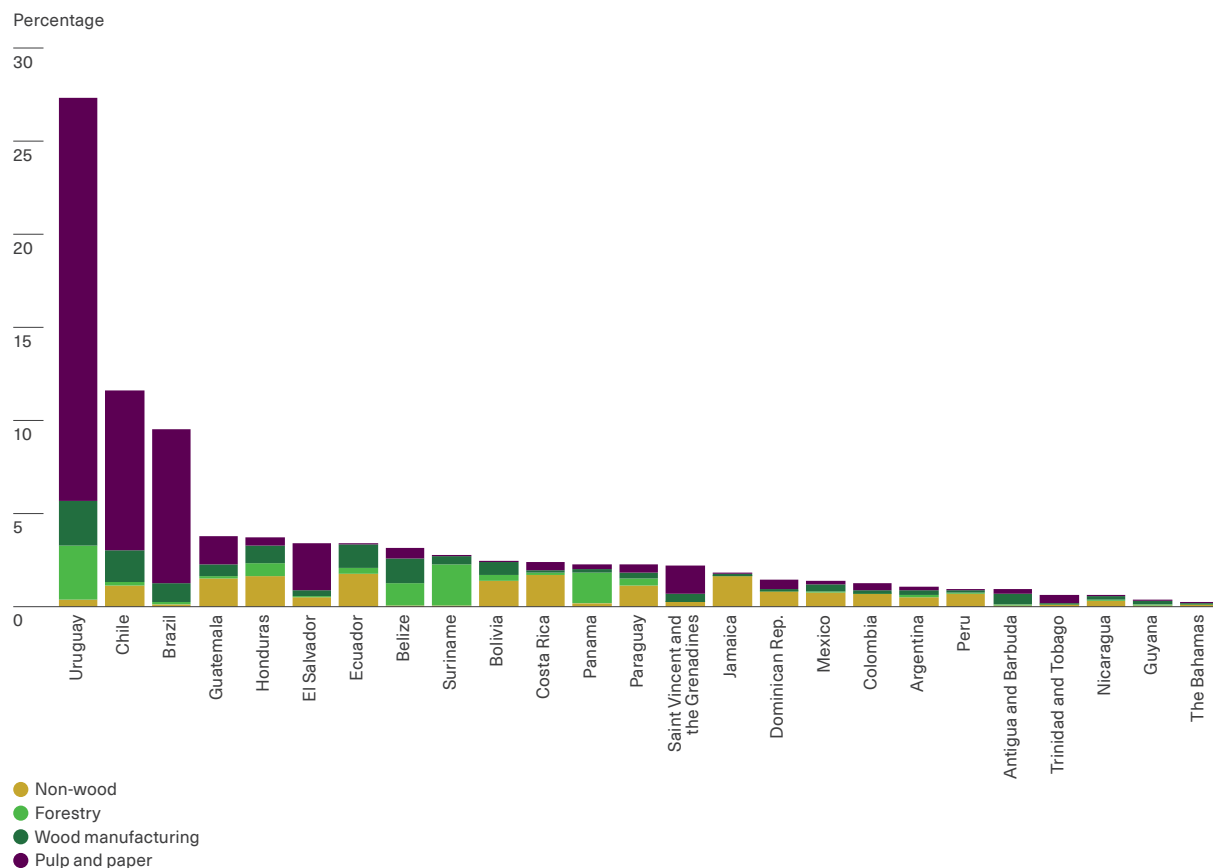
³ The LAC countries included in the assessment are Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, and Peru.

In terms of trade, the forestry sector accounts for an average of 3.6% of the region's total exports, with considerable variation across countries (Graph 5.1). In Uruguay, which has three large-scale pulp mills, forestry exports represent more than 25% of total national exports, surpassing even the country's

long-established livestock sector. Brazil and Chile follow, with 10.5% and 9.4% of total exports, respectively. Other countries where forestry exports account for at least 1% of total exports include Belize, Ecuador, El Salvador, Guatemala, Honduras, Panama, Paraguay, and Suriname.

Graph 5.1

Forest product exports as a share of total exports in Latin America and the Caribbean, 2023

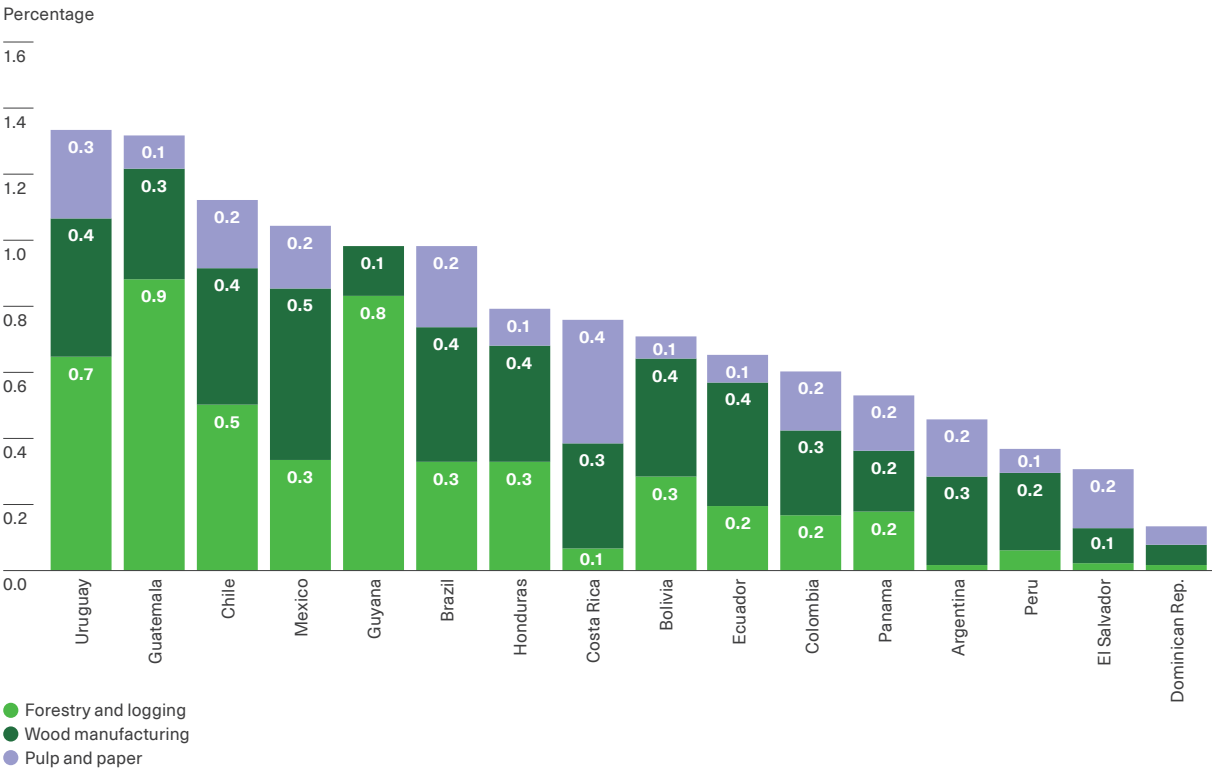


Source: Authors based on United Nations data (n.d.b).

The three timber forestry subsectors, typically rural in nature, account for around 1% of total global employment (Lippe et al., 2022). Informal employment in the sector stands at 77% in countries for which data are available, and only 23% of forestry jobs are held by women. Female employment is highest in the pulp and paper subsector (28%), which also has the lowest level of informality.

In LAC, about 0.86% of total employment is in the timber forestry sector, with wood manufacturing employing the largest share of workers, followed by forestry and logging, and pulp and paper (see Graph 5.2).

Graph 5.2
Employment in the forestry production sector as a share of total employment in Latin America and the Caribbean



Note: The most recent available data are used for each country (2024 for Mexico, Brazil, Costa Rica, Ecuador, Colombia, Panama, and Peru; 2023 for Uruguay, Guatemala, Honduras, Argentina, El Salvador, and the Dominican Republic; 2020 for Chile; and 2019 for Guyana).
Source: Authors based on ILO data (n.d.).

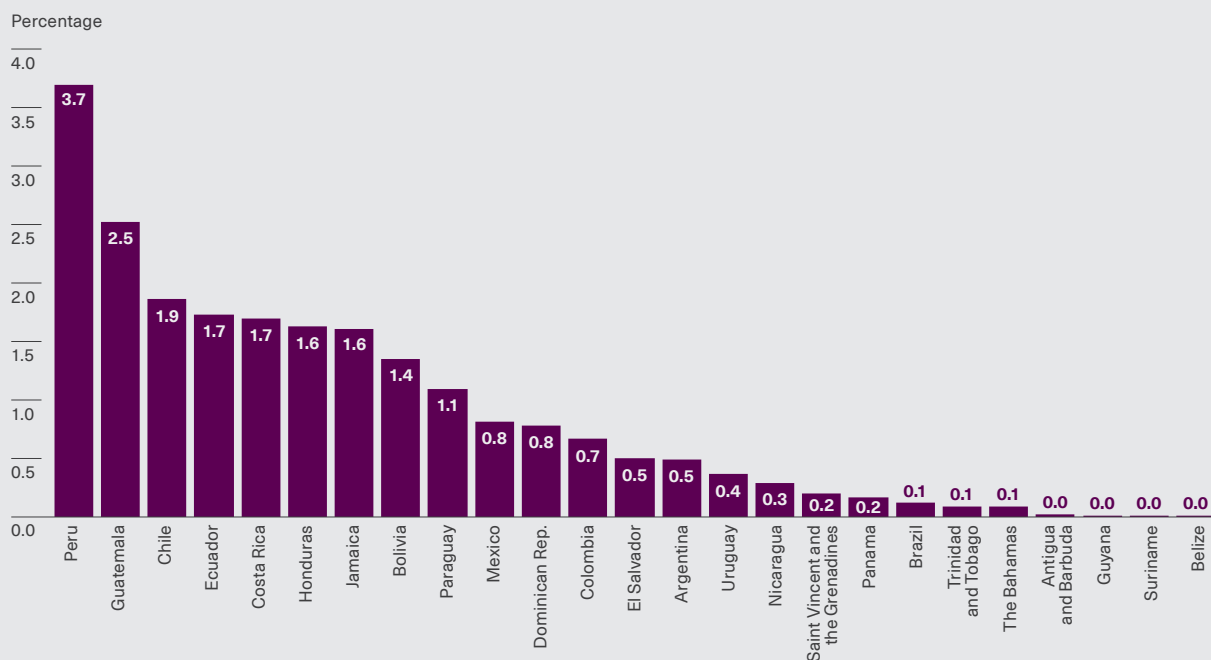
Box 5.2

Non-timber forest products

Measuring the value generated by the non-timber forestry sector presents multiple challenges—from defining which products should be included, to the lack of data on products consumed outside the market, the prevalence of informal trade, and the absence of standardized, comparable statistical information. The wide range of products classified as non-timber forest products includes mushrooms and truffles, forest fruits, edible wild berries, maple syrup, rubber, leaves, ginger roots, bark, flowers, latex, gums, resins, bamboo, ornamental plants, and dyeing materials, among others.

Sorrenti (2017) identifies several of these products within the international trade statistical classification system. The World Customs Organization's Harmonized System allows for greater detail and is used to estimate exports of these products, which account for 0.87% of the region's total exports (Graph 1). Peru stands out, with 3.7% of total exports corresponding to these products—mainly blueberries. Other countries where non-timber forest products represent a relatively high share include Guatemala (2.5%), Chile (1.9%), Ecuador (1.7%), Costa Rica (1.7%), Honduras (1.6%), Jamaica (1.6%), Bolivia (1.4%), Paraguay (1.1%), Mexico (0.8%), Dominican Rep. (0.8%), Colombia (0.7%), El Salvador (0.5%), Argentina (0.5%), Uruguay (0.4%), Nicaragua (0.3%), Saint Vincent and the Grenadines (0.2%), Panama (0.2%), Brazil (0.1%), Trinidad and Tobago (0.1%), The Bahamas (0.1%), Antigua and Barbuda (0.0%), Guyana (0.0%), Suriname (0.0%), and Belize (0.0%).

Graph 1
Non-timber forest product exports as a share of total exports in Latin America and the Caribbean, 2023



Source: Authors based on United Nations data (n.d.b).

Linkages between the forestry sector, agriculture, and other sectors

Agriculture sector

Forest conservation provides key benefits to agriculture, such as water regulation, erosion control, pollination, and soil fertility, while deforestation has reduced the productivity and resilience of agricultural systems in LAC. In this context, agroforestry and silvopastoral systems offer strategic pathways to combine production with conservation.

There are successful experiences in the region that integrate the forestry and agricultural sectors. In Colombia, the Agroforestry Systems Incentive Program, promoted by Fedecacao, has encouraged cocoa cultivation alongside timber and fruit trees, improving productivity and reducing pressure on natural forests (Castillo Ledesma, 2019). In Honduras and Nicaragua, the Fundación Madera Verde promotes silvopastoral systems using native species that restore degraded land, increase carbon sequestration, and generate timber and forage products (Sepúlveda et al., 2020).

Silvopastoral systems constitute a type of agroforestry in which forage crops, including grasses and leguminous species, are cultivated alongside trees and shrubs to support livestock feeding and other complementary functions (Murgueitio et al., 2011). These systems have demonstrated multiple economic and environmental benefits. Chará et al. (2020) analyze ten case studies in Argentina, Colombia, and Mexico spanning a ten-year implementation period and report improvements in pastures, higher milk and meat yields per hectare, lower greenhouse gas emissions per 100 kilograms (kg) of milk or live weight, and improved animal welfare. The authors found that benefits outweighed costs across all farms, although initial cash flow was negative, underscoring the importance of adequate financing.

Energy

Nearly 50% of global wood production is used to generate energy (FAO, 2018). The forestry sector accounts for about 40% of renewable energy in the form of biomass, and it is estimated that one-third of the world's population uses forest-based energy sources (FAO, 2022a). As noted in RED 2024, biomass accounts for 18.4% of the energy matrix in LAC (Allub et al., 2024).

Biomass plays an important role in decarbonization. This organic material can substitute up to 20% of the fuel used in the cement industry without requiring capital investment (Rahman et al., 2016). In addition, biomass ash can replace up to 80% of clinker in cement (Campos Teixeira et al., 2020).



Fifty percent of the world's wood production is used for energy generation

Biomass is also a major source of residential energy (Allub et al., 2024). In countries such as Chile, Colombia, Haiti, Honduras, Guatemala, Nicaragua, Paraguay, and Peru, firewood and charcoal are the main household energy sources (averaging 61% of total residential energy consumption), surpassing electricity and gas. This heavy reliance on solid biomass has negative health impacts on rural populations.

Tourism

It is estimated that 7% of global tourism is nature-based (WTTC, 2019).

Costa Rica has been internationally recognized as a model for restoration and conservation,

successfully reversing rapid deforestation in the 1980s through public policies such as payments for ecosystem services, the promotion of ecotourism, and the strengthening of the National System of Conservation Areas. The country maintains over 50% of its territory under forest cover and has managed to combine economic growth with effective conservation (Porrás et al., 2013).

Illicit activities

One of the most persistent risks is deforestation and forest degradation, driven by agricultural expansion, illegal mining and logging, and unplanned infrastructure development. These factors generate severe environmental and social impacts and weaken the resource base on which sustainable forest development depends. They also threaten the livelihoods of nearly one billion people who depend on forests (Lawson & MacFaul, 2010).

Between 15% and 30% of all wood produced worldwide is estimated to come from illegal logging, with an annual value ranging between USD 51 billion and USD 153 billion, significantly affecting tax revenues (Interpol, 2021). In addition, illegal timber depresses global prices by an average of 7% to 16% (Seneca Creek Associates & World Resources International, 2004).



It is estimated that between 15% and 30% of all wood produced globally comes from illegal logging

In many cases, illegal logging is not an end in itself, but rather a byproduct of broader processes aimed at land capture for commercial agriculture. This helps explain why activities such as logging or mining may appear to have a limited impact on permanent land conversion, when in fact they act as key precursors of degradation (UNODC, 2025b). In LAC, about 77% of tropical forest loss between 2013 and 2019 resulted from commercial agriculture, and of that, approximately 88% was illegal (Dummett et al., 2021).

Latin American and Caribbean countries with a comparative advantage in the forestry sector

Success stories: Brazil, Chile, and Uruguay

The case of Uruguay is emblematic. In 2024, forestry products became the country's leading export category, surpassing the long-dominant livestock sector. The development of the forestry industry was underpinned by two key factors: institutional and legal stability, which ensured the security needed for long-term investment, and consistent productive development policies that spanned successive administrations.

The Forestry Law (Law 15,939 of 1987) granted the sector a special status compared to other economic activities, offering economic incentives for primary production, including tax exemptions, investment subsidies, and improved access to credit. As a result, forest plantations expanded from fewer than 50,000 ha prior to the law to more than 1.1 million ha today (CERES, 2023). The Free Zone Law (Law 15,921 of 1987) further encouraged the establishment of three large pulp mills in the country. This model serves as an international benchmark for vertical integration and can be adapted to other contexts in the region,



Eucalyptus forest in Río Negro, Uruguay.

provided there are stable legal frameworks, long-term incentives, and sustainability-oriented policies in place.

In Chile, the development of the forestry sector was also marked by strong public-sector support, including long-term policies, a solid institutional framework, and financial incentives provided by the government. Specifically, Decree Law 701 of 1974 established a set of economic incentives for forestry activities, including subsidies for plantations. Although the law initially favored large plantations, it was amended in 1998 to include small landowners (World Bank, 2020b).

The public sector also contributed to the creation of the Chilean System for the Certification of Sustainable Forest Management (CERTFOR). Established in 2002, this certification system was recognized and endorsed by the Programme for the Endorsement of Forest Certification (PEFC) in 2004.

Brazil has one of the highest forest growth rates in the world (Cubbage et al., 2022). The sector's expansion has been supported by a broad set of public policies. Between the 1960s and 1980s, the federal government implemented three reforestation incentive programs that provided rural producers with either financial grants or material donations (Bacha, 2008). These programs enabled the expansion of reforested areas by 4.3 million ha between 1970 and 1985 (Bacha, 1995).

● ● Forestry incentive programs evolved from tax benefits to long-term, low-interest credit schemes

Federal tax incentive programs were phased out in the 1990s, giving way to long-term, low-interest credit mechanisms. Among these, the PROFLORE Program of the National Bank for Economic and Social Development (BNDES) stands out (Bacha, 2008).

High-potential cases: Argentina and Paraguay

The internal rate of return (IRR) for forest plantations in Argentina and Paraguay exceeds 20% (see Table 5.1). Yet, unlike Brazil, Chile, and Uruguay, these countries did not experience the same level of forestry development. What held them back?

Argentina has approximately 1.28 million ha of forest plantations (Secretariat of Agriculture, Livestock, and Fishing, 2024).⁴ In addition, at least 3.7 million ha of forest-suitable land are available for plantation expansion without affecting high-conservation-value areas or competing with native forests or croplands (Breard et al., 2024).

Argentina's forest product exports have remained stagnant, with a value of around USD 600 million in 2022, roughly the same as in 2013 (Breard et al., 2024). The country's trade balance in forest products has been negative. However, it is important to note that domestic demand is significant: 88% of particleboard (wood panel) production and 80% of pulp output are destined for the internal market.

In his analysis of Argentina's forestry sector, Mora Alfonsín (2023) concludes that the country's forest industry holds great potential but faces three main challenges. The first is macroeconomic instability: forestry is a long-term business, and recurring financial and economic crises—most notably the 2001 debt default and its lasting impact on access to international markets—have prevented the sector from fully taking off. The second challenge is what the author calls “social license”—the result of public opposition to Metsä Fibre's proposed investment in Entre Ríos, which ultimately relocated to Uruguay, a turning point that proved decisive for the sector's limited development. The third has to do with rural land availability, since Law 26.737 restricts foreign ownership of rural property, making it difficult to establish large-scale projects that require company-owned plantations.

4 The area covered by forest plantations represents approximately 0.55% of the country's total land area, excluding inland water bodies.

Box 5.3

Recent changes in Paraguay driving forestry sector development

Paraguay has reached nearly 340,000 ha of forest plantations (0.9% of its territory). Forestry development has lagged behind neighboring countries due to limited access to credit adapted to the forestry cycle, weak implementation of fiscal and financial incentive policies, institutional fragility, insufficient logistics infrastructure, high transportation costs, the absence of large-scale forestry industries, and Law No. 515, which had prohibited the export of roundwood.

In recent years, however, several key changes have taken place. In 2013, the Real Right of Forestry Surface was regulated, allowing the use of “forest canopy rights” (ownership of the tree volume in a plantation) as collateral for credit access. In 2020, the ban on roundwood exports for exotic species was lifted, and Law No. 6676 was enacted, establishing fiscal incentives for the conservation of native forests.

Institutional modernization included the launch of the Forestry Public Registry Portal, which digitalized administrative procedures, offering 24/7 online services, enabling electronic payments, reducing bureaucracy, and improving transparency. The National Forestry Monitoring System was strengthened through satellite technology and early-warning deforestation alerts, enhancing enforcement capacity.

Integrated fire management has also become more professionalized under Law No. 6818 of 2021 and the creation of the Integrated Fire Management Network, which introduced early-warning systems, monitoring, training, and specialized equipment for firefighters and forestry technicians.

Financing has historically been a challenge, particularly for small producers, though state banks have created special credit lines for the sector.

Large-scale projects, such as the establishment of pulp mills, also play a key role by driving sustained, large-scale demand for raw materials, attracting investment, creating quality jobs, and fostering knowledge and technology transfer.

The National Forestry Institute (INFONA) has begun developing Paraguay’s first National Forestry Policy, with a sustainability-based approach that integrates conservation and productivity. The policy seeks to promote forest plantations, responsible industrialization, and decent rural employment. It also aims to increase the provision of forest goods and services, enhance value added and competitiveness, and strengthen the resilience of forest ecosystems. The strategy includes proactive management of fires, pests, waterways, and biodiversity, ensuring the future availability of timber and non-timber forest products and the ecosystem services they provide.

Source: Authors based on an interview with Cristina Goralewski, President of the National Forestry Institute (INFONA) of Paraguay, conducted specifically for this report.

In Paraguay, the forestry sector experienced steady growth until 2020, after which expansion accelerated. The country went from about 50,000 ha

of forest plantations in 2010 (Davis et al., 2024) to 204,631 ha in 2022 (Infona, 2023a). By the end of 2024, the total plantation area was estimated at

340,000 ha—a surge driven mainly by the Paracel pulp mill project and other private initiatives.⁵ Paracel alone planted more than 25,000 ha in 2024 on its own land (Paracel, 2025).

The National Forestry Institute of Paraguay (INFONA) estimates that there are around 5.9 million ha with “high” or “very high” potential for forest plantations (Infona, 2023b). The estimate is based on biophysical, accessibility, logistics, market, demand, and socioeconomic criteria.

A key limitation to sector expansion in Paraguay was Law No. 515 of 1994, which prohibited the export of roundwood of any species. This law was amended

in 2020 (Law No. 6616), maintaining the ban only for native forest species while allowing exports of exotic plantation species, including eucalyptus and pine.

Davis et al. (2024) identify several factors that help explain Paraguay’s relatively limited forestry development, including logistical challenges stemming from its landlocked geography, lengthy bureaucratic procedures, a complex regulatory framework, potential land tenure conflicts, and high fire risk. Masiero and Massarenti (2023), together with Breard et al. (2024), also point to institutional weaknesses, such as overlapping mandates and fragmented responsibilities.

Opportunities for development and forestry policies

The forestry business is inherently long-term, and as such requires long-term policies and legal certainty. Successful countries share a set of consistent and stable policies over time, supported by dedicated national institutions that oversee sector development, ensure legal security, and streamline administrative procedures. They also feature clear regulatory frameworks and national policies promoting the sector’s growth. It is equally important to review key laws that may hinder sector development, as seen in the cases of Argentina and Paraguay.

Financial support policies and lending instruments tailored to the sector are also essential. Forestry requires loans that defer partial principal or interest payments until the end of the production cycle (8 to 15 years). Since private banks do not typically

offer such terms, the public sector plays a key role in facilitating financing. These incentives must, however, be carefully designed, as the sector tends to be highly concentrated in large operations, and subsidies could otherwise result in public resources being concentrated in few hands.

Certification systems should be promoted as a tool to access better markets and add value to production. Governments can help facilitate certification access, particularly for small producers. There are successful experiences in the region, such as CERTFOR in Chile and INFONA’s partnership with the FSC in Paraguay.

Access to carbon credit markets should also be expanded, allowing more plantations to obtain additional income that encourages sustainable



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⁵ In 2024, the Silvifar Astarte Impact Forestry Fund (SAIFF) was launched—a USD 325 million investment fund aimed at establishing around 60,000 hectares of forest plantations. The project received financial support from CAF. More information is available at <https://www.silvipar.com/post/astarte-capital-partners-and-silvipar-ab-close-inaugural-impact-forestry-fund-at-325m>

forest management. The emergence of new carbon markets creates opportunities to mobilize resources for conservation, afforestation, and reforestation (see Box 5.4). These funds could help finance forestry projects and create jobs in conservation areas. However, for small-scale forestry projects, carbon markets do not always cover the costs of verification and transaction, which can be high. In these cases, governments could play an important role in facilitating market access and reducing entry barriers.

Finally, it is important to foster integration between the forestry sector and others, such as agriculture and livestock, given their economic and environmental synergies. The combination of forest plantations with other productive activities can yield significant economic, environmental, and social benefits. The silvopastoral systems model, in particular, holds strong potential in Southern Cone countries, where forestry and livestock are both highly productive sectors.

Box 5.4

Carbon credits

Carbon credits^a are an additional source of income that can help ease the financial barriers faced by the forestry sector. In the voluntary carbon market, 36.8% of all carbon credits issued to date have resulted from the implementation of conservation and deforestation-avoidance activities (specifically, the UN-backed framework called REDD, for Reducing Emissions from Deforestation and Forest Degradation) and reforestation activities (forest plantations), both belonging to the category of nature-based solutions (Climate Focus, 2025b).

In 2024, five Latin American and Caribbean countries—Brazil, Colombia, Guyana, Mexico, and Peru—were among the largest contributors of projects generating these types of mitigation actions (REDD and reforestation) (Climate Focus, 2025a).

For reforestation activities, the most widely used and successful mechanism in the region has been the so-called “umbrella” or “grouped project” approach. This model brings together multiple forest plantations under a single mitigation initiative, allowing for cost-sharing in credit generation while ensuring a minimum level of profitability for all participants. It has been adopted by most voluntary carbon programs in the region (Verra, GS, Cercarbono, Biocarbon, among others) and has gained broad technical and financial recognition as a viable mechanism to integrate small-scale reforesters into carbon markets at low cost.

It is also worth noting that, despite their environmental, social, and financial benefits, REDD-type initiatives have not been free from criticism. Press reports—both regional (e.g., *La Silla Vacía*) and international (e.g., *The Guardian*)—have questioned the integrity of their mitigation results, arguing that many REDD projects have failed to deliver the reported impact (Greenfield, 2023). Concerns include overestimated mitigation potential, lack of compliance with environmental and social safeguards, and double counting of benefits within the same geographic area. These issues have had a negative effect on the voluntary carbon market, affecting not only REDD projects but also other types of initiatives—including reforestation, which was not subject to integrity concerns— and leading to a significant decline in carbon credit issuance beginning in 2021. However, multiple organizations—both from the Global North (IC-VMC, IETA, VCMi) and the Global South (CAF, FSC Indigenous Foundation)—have defended this mechanism and developed strategies to strengthen its integrity, impact, institutional framework, and transparency. Their efforts have helped renew interest among productive sectors in using carbon credits to offset GHG emissions and have restored confidence in the market.

a. Tradable certificates representing the reduction or removal of carbon dioxide (CO₂) emissions released into the atmosphere.

Fisheries and aquaculture

The importance of fisheries and aquaculture for Latin America and the Caribbean

Fisheries and aquaculture play an essential role in the income, employment, and food security of rural coastal populations across LAC. The sector holds strong growth potential, driven by population growth, rising global food demand, and the expansion of sustainable aquaculture worldwide. The region's share of global aquaculture production increased from 2.6% in 2000 to 4.6% in 2022 (Table 5.4), a growth led mainly by the rapid expansion of marine aquaculture (FAO, 2024b). Brazil, Chile, and Ecuador, the regional leaders in this sector, account for nearly 80% of LAC's aquaculture output and rank among the top 15 producers worldwide (FAO, n.d.b).

●● Latin America and the Caribbean has recorded the fastest aquaculture growth worldwide over the past 25 years

The contribution of fisheries and aquaculture to national value added varies widely across the region, although in most countries these sectors account for only a modest share of total output (Graph 5.3). In Peru, where fishing has long been a key industry, fisheries and aquaculture (including processing) represented about 0.3% of national value added in 2024. In Chile, these sectors account for roughly 0.5% of GDP—a relatively small share compared to mining but significant in terms of value chain linkages and local development.

The value added per ton (t) of production in LAC tends to be high compared with other regions, reflecting the region's focus on high-value commercial species such as shrimp, salmon, and lobster. Latin America ranks as the second region globally in average value per kilogram produced, just behind Oceania (De las Mercedes Jaime Muñiz & Jimber del Río, 2025). This underscores the quality and market value of Latin American products and points to opportunities to further increase value added through processing and sustainable origin certification.

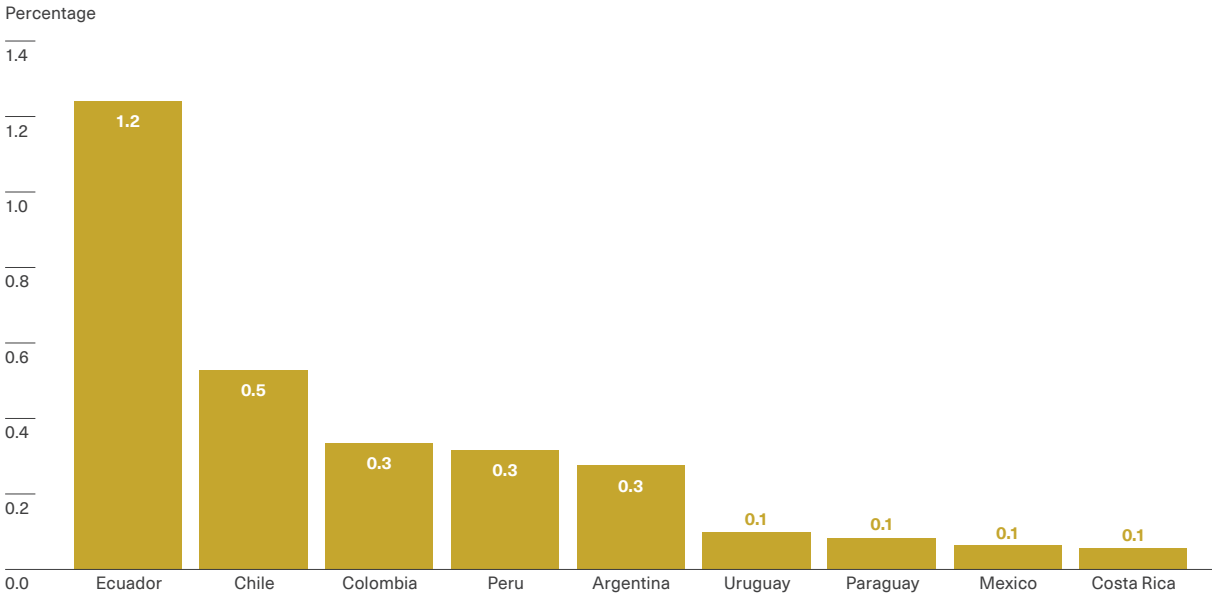
More than 2 million people work in fisheries and aquaculture across the region (FAO, 2024b). Graph 5.4 shows their share in total employment by country. The relatively low participation rates in countries such as Peru and Chile, despite their large industries, reflect both the capital-intensive nature of industrial fishing and underreporting of employment in the sector. Graph 5.5, based on household survey data, shows the share of fishing jobs located in rural areas. Countries dominated by industrial fishing show relatively low rural shares (20%–30%), while in Colombia, El Salvador, and Panama, rural fishing represents between 60% and 80% of employment in the sector.

Table 5.4
Share of aquaculture by region

	Africa	Latin America & Caribbean	North America	Asia	Europe	Oceania	Global
2000	399,622	838,939	584,495	28,422,489	2,052,889	121,824	32,420,258
2022	2,316,825	4,313,508	644,547	83,399,172	3,503,440	235,231	94,412,723
Share in 2000	1.2%	2.6%	1.8%	87.7%	6.3%	0.4%	
Share in 2022	2.5%	4.6%	0.7%	88.3%	3.7%	0.2%	

Note: Production values are expressed in thousand tonnes, in live weight equivalent terms.
Source: Authors based on FAO (2024b).

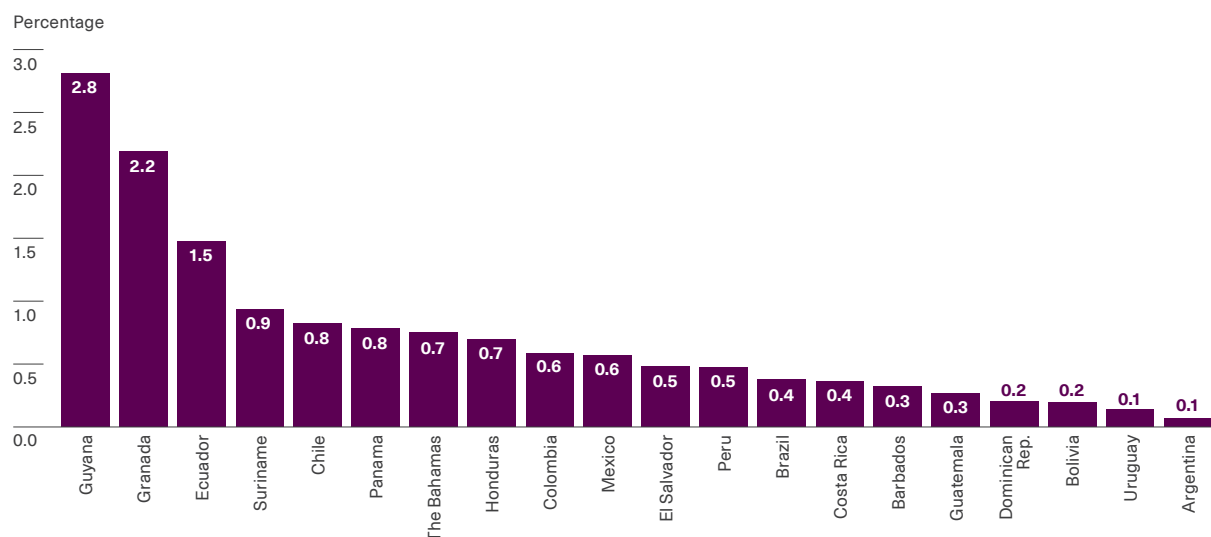
Graph 5.3
Share of fisheries and aquaculture in total value added in Latin American and Caribbean countries, 2023



Note: The data do not distinguish between fisheries and aquaculture; therefore, the figure represents the aggregate total for both sectors.
Source: Authors based on countries' national accounts (see details in Table A.5.1 in the appendix to this chapter, available in the online edition of the RED).

Graph 5.4

Share of fisheries and aquaculture in total employment in Latin American and Caribbean countries



Note: The data do not distinguish between fisheries and aquaculture; therefore, the figure represents the aggregate total for both sectors. The most recent data available for each country were used (2025 for Mexico; 2024 for Argentina, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Honduras, Panama, Peru, the Dominican Republic, and Uruguay; 2023 for Barbados, El Salvador, Grenada, and Guatemala; 2020 for Chile; 2019 for the Bahamas and Guyana; and 2016 for Suriname).

Source: Authors based on ILO data (n.d.).

More than 2 million people work in fisheries and aquaculture across the region

In terms of wages, Graph 5.6 shows significant variation across the region. In South America, wages in rural fisheries and aquaculture are generally below the rural average, except in Peru, while in Central America, they tend to be more varied, with levels closer to the overall rural average.

Much of the available data—based on surveys and official records—underestimate employment related to fisheries, as they exclude post-harvest activities. It is estimated that for every person directly employed in fisheries or aquaculture, there are up to three additional jobs in related activities such as processing, transportation, and trade (Flores-Nava, 2019).

Many of these secondary jobs are found in rural areas or small fishing towns, strengthening local economies. Women in coastal communities often work in artisanal fish processing (cleaning, filleting, drying) or in local market sales, thus forming part of the value chain. In fact, between 40% and 90% of post-harvest jobs (processing and commercialization) in LAC are held by women (Flores-Nava, 2019), underscoring the key role of fisheries in promoting women's economic inclusion (see Box 5.5).

Additionally, artisanal fishing often serves as a safety net in rural employment. It functions as a form of self-employment and food security for small farmers or forestry workers during periods of poor harvests, low prices, or off-seasons (Coomes et al., 2010).

Graph 5.5
 Share of rural fisheries and aquaculture in total fisheries employment in Latin American and Caribbean countries, 2003–2023



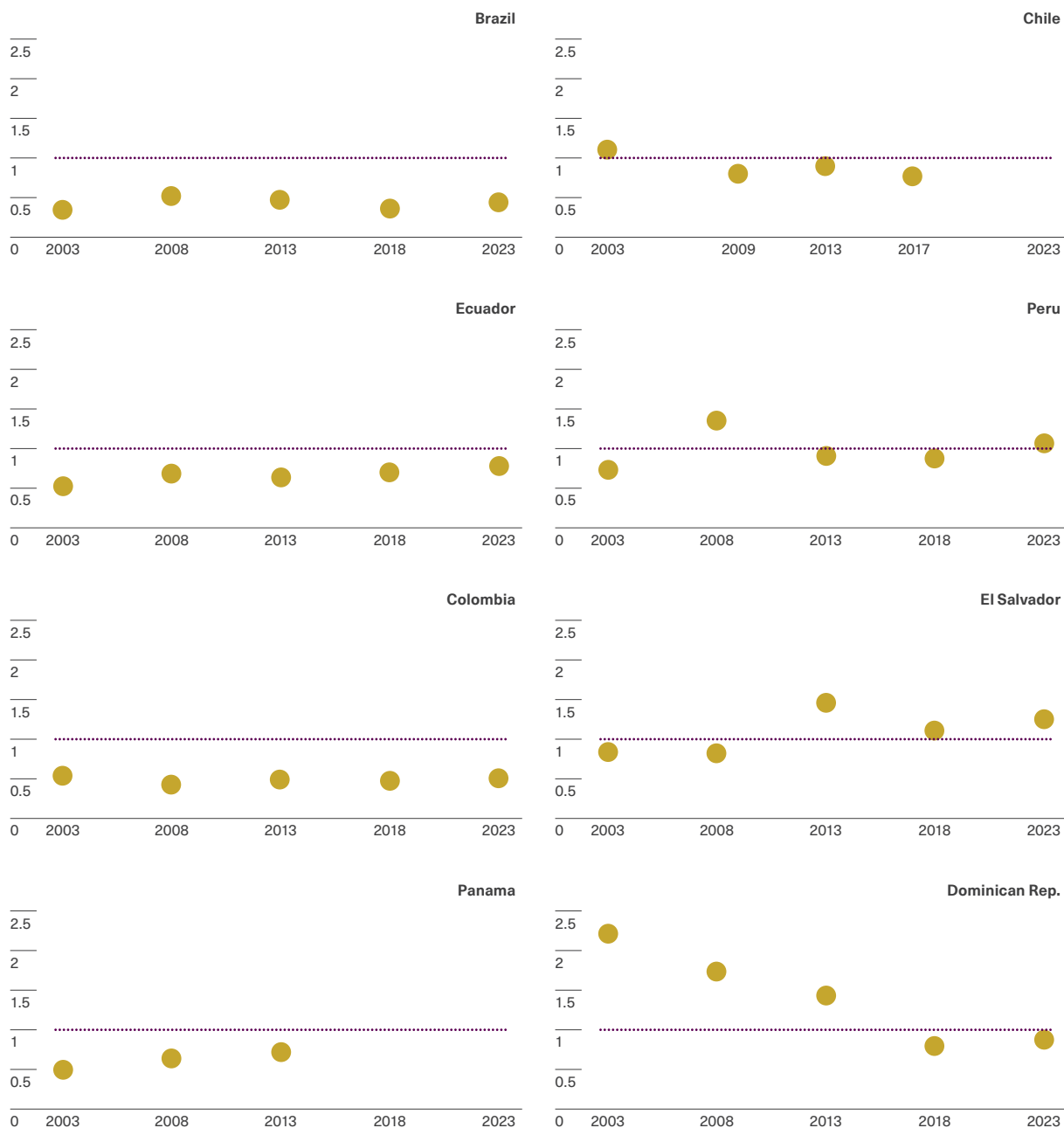
Note: The data do not distinguish between fisheries and aquaculture; therefore, the figure represents the aggregate total for both sectors.
Source: Authors based on CEDLAS (2025).



Caribbean fishing community in Maracas Bay,
Trinidad and Tobago.

Graph 5.6

Hourly wage in rural fisheries and aquaculture relative to the average rural hourly wage in Latin American and Caribbean countries, 2003–2023



Note: Each value represents the ratio between the hourly wage in rural fisheries and aquaculture and the average rural hourly wage. Missing points are due to a lack of data in surveys for those years. The data do not distinguish between fisheries and aquaculture; therefore, the figure represents the aggregate total for both sectors.

Source: Authors based on CEDLAS (2025).

Box 5.5

Rural women and artisanal fisheries in Latin America and the Caribbean

Rural women from coastal and riverine communities have a longstanding and active presence in artisanal fisheries across Latin America and the Caribbean (LAC). Their work spans the entire value chain—from capture and collection, where women represent around 25% of the regional fishing workforce, to post-harvest processing (cleaning, filleting, salting, smoking, and drying), manufacturing, food preparation, and direct marketing. They are also involved in net-making and repair, community-based tourism, and small-scale aquaculture (Guedes et al., 2021; Nobre & Hora, 2017; Quesada et al., 2023).

These women face structural barriers that limit their autonomy and the recognition of their work. Fishing is traditionally viewed as a male-dominated activity, which excludes women from legal frameworks and fisheries management and makes it harder for them to access formal rights, credit, and productive assets, such as boats or engines. Another challenge lies in the presence of intermediaries in value chains, which creates dependency and reduces their profit margins.

Beyond their key economic role in post-harvest stages, these women also play a crucial role in environmental protection. They are recognized as guardians of water and territory, actively participating in the protection of wetlands and mangroves, environmental education and conservation projects, monitoring of water sources, and reporting of threats linked to extractive or polluting activities (RedLAC, 2023).

Source: Authors based on RedLAC and CAF (2025).



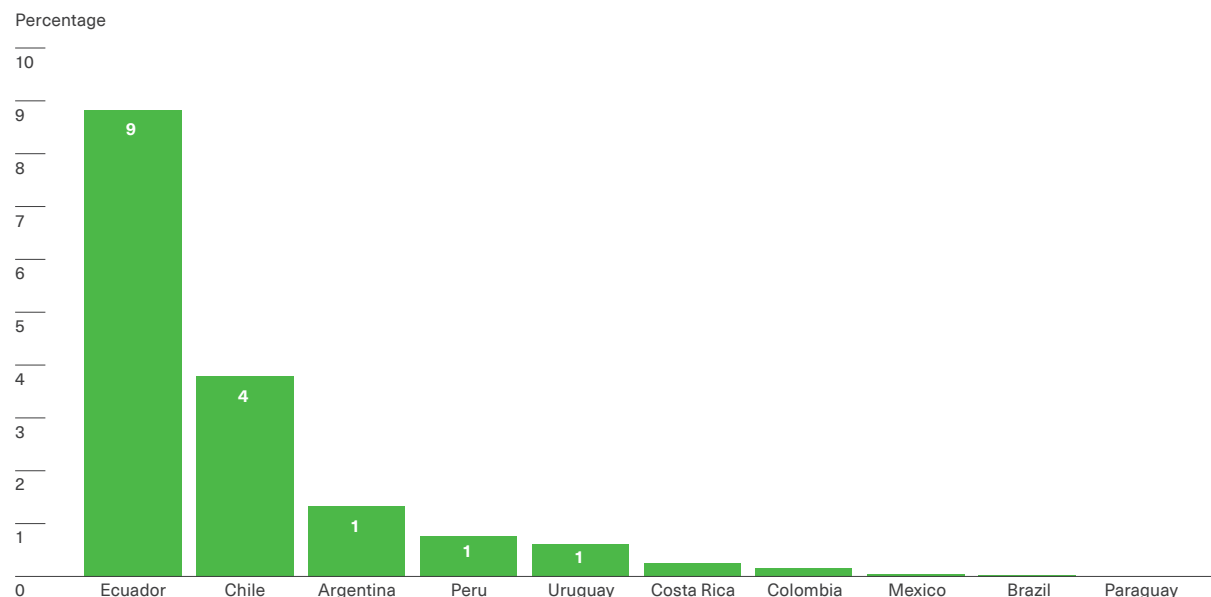
Rural women play a vital role in post-harvest stages and in environmental protection

The fisheries sector contributes to public revenues and national economies through various channels, including foreign exchange from exports, taxes, fees, and licenses, and resource access royalties. Graph 5.7 shows the share of fisheries and aquaculture in LAC exports. Ecuador stands out: thanks to its developed aquaculture industry, fisheries and aquaculture exports account for nearly 9% of its value added.

The commercialization of fishing rights and licenses also generates fiscal revenues. Countries charge fees for commercial fishing permits (e.g., anchoveta quota auctions in Peru, industrial fleet licenses in Chile), which go to the central government. Some countries also obtain income through fishing vessel flag registration. However, the design of these systems can create negative externalities associated with illegal, unreported, and unregulated (IUU) fishing (CLALS American University & InSight Crime, 2022).

Graph 5.7

Share of fisheries and aquaculture in total exports in Latin American and Caribbean countries, 2023



Note: The data do not distinguish between fisheries and aquaculture; therefore, the figure represents the aggregate total for both sectors.

Source: Authors based on UNCTAD data (2025b).

Economic drivers of fisheries in Latin America and the Caribbean

Together, five countries account for 90% of the volume and value of the region's fisheries and aquaculture exports. Chile and Ecuador top the list, each contributing roughly one-third of total export value and over one-fourth of total volume—Chile primarily through salmon, trout, and mussel exports, and Ecuador through farmed shrimp and tuna. They are followed by Peru, which contributes 11% of export value and 20% of volume, while Argentina and Mexico represent approximately 8% and 6% of total volume, and 6% and 5% of export value, respectively (FAO, n.d.b).



Together, Chile, Ecuador, Peru, Argentina, and Mexico account for 90% of the region's fisheries and aquaculture export volume and value

In Chile, seafood products are the second-largest export category after mining. In 2023 alone, salmon and trout sales accounted for 6.7% of total exports (Santander Trade, 2025). In Ecuador, shrimp leads non-oil exports, and the country's aquaculture industry has positioned it among the world's top exporters of aquatic products (FAO, 2024b).

Peru has long maintained a thriving anchoveta industry, with fishmeal as its key product. With the rise of aquaculture, demand for fishmeal has increased, as it is used as an input in aquaculture feed production. Despite its smaller export share compared with Chile and Ecuador, Peru leads the region in total fisheries production, accounting for 40% of LAC's total catch and 6% of global production—a reflection of both its high per capita fish consumption and strong culinary tradition.

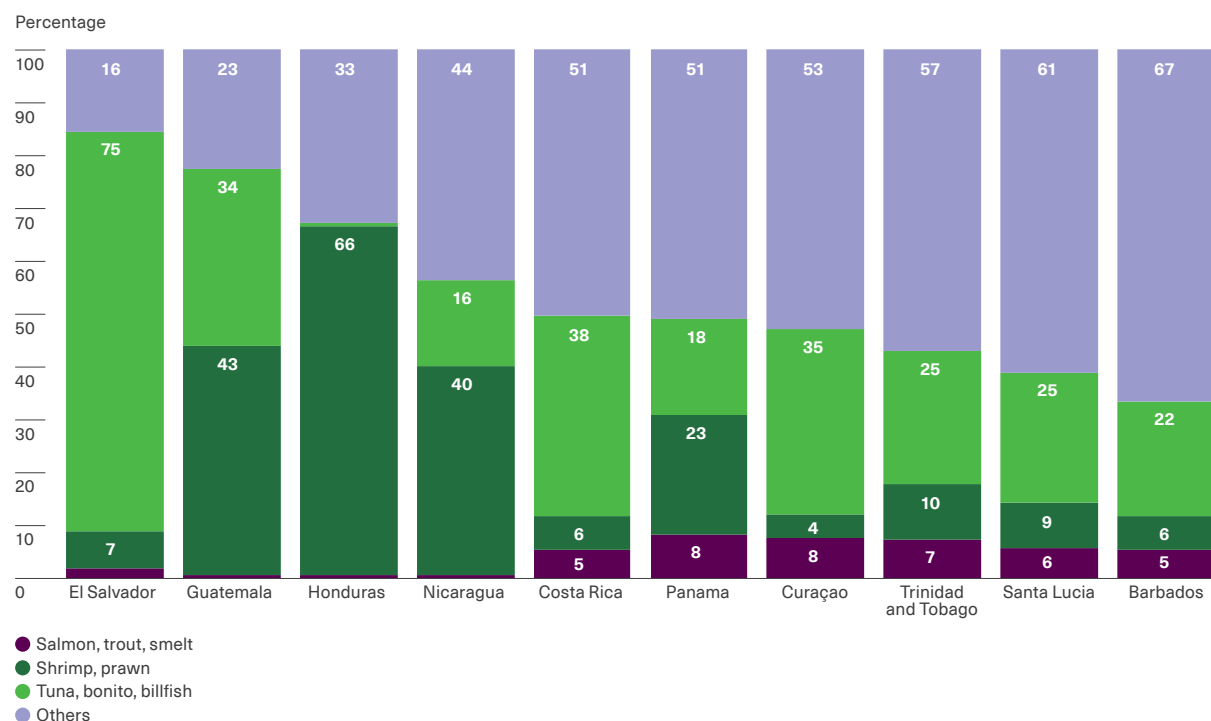
In Central America, only Honduras and Nicaragua report fisheries exports exceeding 1% of GDP (1.2% and 1.6%, respectively). While the sector's output in Central American and Caribbean economies is primarily geared toward domestic markets, they do export high-value products such as shrimp, prawn, tuna, salmon, and trout.

Graph 5.8 presents the countries in the subregion with the highest share of high-value species in their total fisheries exports. El Salvador and Guatemala stand out, with more than 70% of their exports consisting of salmon, trout, smelt, shrimp, and prawn. Honduras and Nicaragua also show a high share of high-value exports, mainly consisting of shrimp and prawn.

● ●
While production in Central American and Caribbean countries is mainly for domestic consumption, they do export high-value seafood products

Graph 5.8

Share of high-value products in fisheries exports in Latin American and Caribbean countries, 2023



Source: Authors, based on FAO (n.d.b) data.

The rural dimension of the fisheries sector

A large share of fishing activity takes place in small coastal communities, riverine towns, and rural areas far from major urban centers. Small-scale artisanal fisheries involve people who operate small boats or fish from the shore, using traditional gear and working relatively close to their communities, often within family-based economies. Artisanal fishing is deeply rooted in local cultures and is often organized through cooperatives, unions, or family networks, where knowledge and techniques are passed down through generations. Small-scale fisheries account for approximately 90% of fishing operations and 40% of total production (FAO, 2024b).



Most fishing activity takes place in small coastal communities, riverine towns, and rural areas far from major urban centers.

A significant share of the fish and seafood consumed in Latin America comes from local artisanal fisheries. Many isolated communities depend on locally caught fish as an affordable source of animal protein (FAO, 2020a; Pedroza-Gutiérrez & Hernández, 2020). This gives artisanal fisheries a strategic role in supporting rural nutrition and health, complementing subsistence agriculture and livestock farming, especially in remote coastal areas.

Although the average per capita consumption of fishery products in LAC (around 10 kg per year) is well below the global average (about 20 kg per year), in many coastal and riverine communities fish remains the main source of animal protein available. Peru is an exception, with consumption exceeding 20 kg per capita per year, reflecting both its strong fishing industry and its internationally recognized culinary tradition closely tied to the sector. The rural fisheries landscape also includes inland activities in rivers, lakes, and wetlands. While their overall volume is smaller—around 3–4% of regional catches (FAO, 2021b)—they are crucial for the livelihoods of

Indigenous and peasant riverine communities. Brazil and Mexico have the highest inland fishing volumes in the region (each exceeding 100,000 tons per year). In Brazil, inland aquaculture accounts for 86% of total aquaculture production, while in Argentina, Bolivia, Colombia, Jamaica, Paraguay, and Uruguay, the share is close to 100%. (FAO, 2021b).

From a sociocultural perspective, rural fisheries sustain traditional ways of life. Artisanal fishing techniques often reflect deep ecological knowledge and ancestral practices. Many Mesoamerican and Caribbean coastal communities combine fishing with handicrafts, community tourism (such as sport fishing), or local festivals. Sustainable fishing tourism, or pescaturism, offers multiple opportunities for rural communities, from preserving cultural heritage of small-scale fishers and marine resources to diversifying income sources for rural producers (Gomei & Bellia, 2019).



A large share of fish and seafood consumed in Latin America comes from local artisanal fisheries

The rural fisheries sector maintains strong interconnections with agriculture and other primary activities across LAC. In many rural communities, fishing forms part of a diversified subsistence system: families alternate or combine fishing with crop farming, small livestock rearing, forest gathering, or other forms of rural labor. This multifunctionality is common in coastal rural areas, where households may engage in coastal fishing during part of the year and farming during another. This countercyclical role often intensifies in regions where primary activities are increasingly affected by climate change impacts.

Another key link between fishing and agriculture lies in productive value chains—for example, the use of fishery by-products in animal feed and crop production. A notable case is fishmeal, largely derived from industrial fisheries in Peru and Chile, traditionally used as a protein supplement in poultry, pig, and livestock feed. With the rise of aquaculture, much of the fishmeal and fish oil produced in LAC is now exported as feed for farmed fish, mainly to Asia (FAO, 2024b). Conversely, agriculture provides key inputs for aquaculture: grains such as soy, maize, and wheat grown in Argentina, Brazil, and Paraguay are essential components of feed used for shrimp and farmed fish across the region.

Externalities and conflicts also arise between fisheries and other primary sectors, mainly due to competition over natural resources. Both shrimp farming and agriculture have contributed to mangrove loss in LAC. In addition, agricultural runoff can pollute rivers, lakes, and coastal areas,

leading to eutrophication,⁶ which harms aquatic ecosystems. These cross-sector environmental impacts call for integrated watershed and coastal zone management to promote coordination between farmers and fishers and encourage more sustainable practices.

Finally, it is important to note that artisanal fisheries—like other small-scale primary activities—face common challenges in rural development, including high informality, limited bargaining power in value chains, and vulnerability to climate change. This suggests that rural development policies should address these groups jointly. Income diversification programs, microcredit, agricultural insurance, and extension services could have a greater impact if they include components tailored to both farmers and fishers, recognizing that in many communities, the same families alternate between agriculture and fishing depending on the season and available opportunities.

Overexploitation of natural resources and illicit activities

The fisheries sector in LAC faces serious challenges from illicit activities and overexploitation, which threaten the sustainability of aquatic ecosystems, their productivity, and the well-being of rural communities that depend on them. In recent decades, pressure on fishery resources—stemming from both legal and illegal activities—has grown alarmingly. Globally, around one-third of marine fish stocks are overexploited or depleted due to excessive fishing (FAO, 2024b). LAC encompasses four major FAO-defined fishing areas. In the Southeast Pacific, only about one-third of marine stocks were within sustainable levels as of 2021, compared to roughly 60% in both Atlantic regions, while the Eastern Central Pacific showed the highest sustainability rate, close to 85% (FAO, 2024b).

Overexploitation is closely linked to IUU fishing. Foreign fleets have been detected fishing illegally along or within the exclusive economic zones (EEZs) of several Latin American countries, particularly in the South Pacific and South Atlantic. These IUU activities undermine national conservation efforts and generate massive economic losses, estimated at up to USD 2.3 billion, including lost tax revenue, foregone catches, and environmental damage (CLALS American University & InSight Crime, 2022). In capture fisheries, IUU fishing can severely reduce productivity and even lead to the collapse of fish stocks.

Although to a lesser extent, informal fishing also affects ecosystem sustainability. Some artisanal and commercial fishers continue to catch prohibited or regulated species due to weak enforcement mechanisms. Others, lacking proper fishing gear, use harmful techniques that damage habitats,

6 Excessive enrichment of nutrients—mainly nitrogen and phosphorus—in an aquatic ecosystem, which leads to uncontrolled growth of algae and plants, reduces oxygen levels in the water, and decreases biodiversity, severely affecting water quality.

further reducing fish populations and the long-term viability of their activity.



Overexploitation is closely linked to illegal, unreported, and unregulated fishing—often carried out by foreign fleets

In response to these challenges, countries in the region have begun taking steps to combat IUU fishing and overexploitation. Many have signed international agreements, such as the FAO Port State Measures Agreement (PSMA), committing to deny port access to vessels suspected of IUU fishing. They have also strengthened national regulations: for instance, Peru adopted the OECD Fisheries Committee's recommendation to implement traceability systems and ensure that subsidies are directed only to legally authorized vessels. Additionally, several countries have established marine protected areas (MPAs) and seasonal fishing bans to allow species to recover.

However, monitoring and enforcement capacity across LAC remains weak, mainly due to limited physical infrastructure—including patrol vessels, drones, and satellite monitoring systems (CLALS American University & InSight Crime, 2022).

Approximately 22% of LAC's marine waters are designated as marine protected areas (MPAs), making it the region with the largest MPA coverage worldwide. LAC also has the highest prevalence of multiple-use MPAs globally, representing 48% of its total protected waters (Brassiolo et al., 2023). These multiple-use areas aim to balance conservation and sustainable use through instruments such as zoning, seasonal closures, and restrictions on fishing practices and catch sizes. A study by Cinti et al. (2025) covering 11 cases in Argentina, Brazil, Chile, Colombia, Ecuador, and Mexico, found that community-managed MPAs often have positive effects on both governance and small-scale fisheries participation. Governments play a key role in supporting capacity building, facilitating community-based management systems, and recognizing the contribution of local communities and producers to conservation and sustainable fisheries—while also strengthening enforcement against potential illicit activities in protected areas.

Opportunities, challenges, and policy recommendations for fisheries and aquaculture

As discussed in Chapter 1, fisheries present significant development opportunities for rural areas, shaped primarily by three lines of action. The first focuses on countries' capacity to develop aquaculture sustainably. The second centers on improving local working conditions through greater efforts to formalize small-scale employment and increase women's participation. The third aims to harness the sector's potential by promoting fish consumption and linking fisheries with tourism and local gastronomy, thereby strengthening regional food security and diversifying rural incomes.

Promoting sustainable aquaculture development. The main challenge facing the sector is ensuring sustainability in capture fisheries, which is threatened by IUU fishing, overexploitation of resources, and vulnerability to climate change. Another cross-cutting issue is the limited availability of official, disaggregated data on fisheries and aquaculture, particularly regarding rural and small-scale activities. This data gap constrains evidence-based policymaking and the identification of clear priorities.

Aquaculture stands out as the activity with the greatest growth potential to meet rising global food demand, given its high nutritional value and low environmental footprint. It also helps relieve pressure on overexploited marine and oceanic fish stocks (FAO, 2024b). Although LAC is already the world's second-largest aquaculture-producing region, production remains concentrated in a few countries. There is considerable room for others to expand freshwater fish, mollusk, crustacean, and algae farming and to better integrate aquaculture into rural economies. FAO (2022c) estimates that the Americas—including Canada and the United States—will experience the highest growth in aquaculture production globally, particularly in Chile, where output could increase by more than 30% between 2020 and 2030.

Policies in this area should focus on technology transfer, financing, and training for small and medium-sized aquaculture producers. Initiatives such as FAO's Blue Transformation and CAF's Sustainable Blue Economy Strategy pursue this approach, promoting the sustainable intensification of aquaculture to benefit vulnerable communities (CAF, 2025b; FAO, 2024b).

Increasing domestic fish consumption offers an opportunity to improve nutrition in Latin America and the Caribbean and to strengthen intraregional markets. Although LAC is a net exporter of seafood, domestic consumption remains low in most countries—except Peru. Policies in this area include nutrition education campaigns that highlight the health benefits of fish and school meal programs that incorporate locally sourced products. These measures can simultaneously raise the incomes of artisanal fishers by expanding domestic markets and enhance food security across the region.



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Key opportunities for fisheries and aquaculture include sustainable aquaculture growth, job formalization, women's participation across the value chain, and promoting fish's nutritional value

Securing the future of capture fisheries requires restoring and conserving fish stocks. This requires science-based management policies that set catch quotas aligned with the maximum sustainable yield, establish biological closures during spawning seasons, and regulate fishing effort (fleet size, permitted techniques, etc.). Chile, for example, has implemented a quota system since the 1990s, while Mexico provides successful local cases—such as the Baja California red lobster fishery, managed by cooperatives and recognized as the world's first artisanal fishery certified by the Marine Stewardship Council (MSC), which continues to operate sustainably decades later (MSC, 2022). Policies promoting cooperative fisheries models also recognize and strengthen local communities' use rights.

For the measures described above to be effective, illegal fishing will need to be eliminated or at least significantly reduced. Policies in this area should focus on strengthening monitoring and deterrence. One key opportunity lies in modernizing surveillance technology, including satellite tracking systems for vessels, drone patrols, and coastal radar (CLALS American University and InSight Crime, 2022), as well as in global initiatives such as Global Fishing Watch, which provide open-access data on fleet positions. Several LAC countries have already begun cooperating through joint patrols and intelligence sharing to intercept illegal vessels. Continuing along this path—by implementing the Port State Measures Agreement, which prevents IUU catches from being landed, and by applying exemplary sanctions—represents an essential step toward deterrence. These efforts will require investment in monitoring

infrastructure and technology, as well as training for enforcement officers in the use of these tools.

Climate change poses an additional threat to the sector, bringing rising ocean temperatures, acidification, shifting current patterns, and increasingly severe storms that endanger fishers and their livelihoods. Fisheries development policies must therefore integrate climate adaptation as a central pillar. This includes early warning systems, hurricane shelters, insurance against extreme events, and the diversification of target species toward those that are more resilient or migrating to new areas. Fishers should also be trained and actively involved in coastal resilience initiatives—such as mangrove and coral reef restoration—two ecosystems that serve as natural protective barriers.

Sector development also depends on closing rural gaps in basic infrastructure, working conditions, and resilience. This is particularly important for small-scale and artisanal fishers, many of whom lack safe docks, refrigerated storage, reliable electricity, local markets, or adequate roads to transport their catch. Expanding local markets, cold storage, and road and digital connectivity would help reduce high post-harvest losses, which, according to FAO (2011), amount to nearly 35% of the sector's total production each year.

It is also essential to extend social protection to fishers through countercyclical insurance schemes, life and health coverage, and inclusion in pension systems. Some countries, such as Brazil, have begun implementing these policies through programs like Seguro Defeso.⁷ Evidence shows that households benefiting from this program have higher school enrollment among children, better housing conditions, and lower rates of youth unemployment and inactivity (FAO, 2022c). Formalizing small-scale fishers is a necessary first step—not only to improve their income and working conditions but also to enable their inclusion in social protection and insurance systems.



Illegal, unreported, and unregulated fishing and the current and potential impacts of climate change are the main threats to fisheries

Many rural communities remain vulnerable because they depend on limited seasonal fishing or farming resources. Some families migrate temporarily, disrupting their daily lives and social organization in their communities. In this context, credit policies are often poorly suited to the realities of the fishing cycle. Conventional loans do not account for closed seasons or income fluctuations, leading to regressive debt patterns that particularly affect those in informal employment (RedLAC & CAF, 2025).

Finally, rural women remain among the most vulnerable groups, due to their invisibility and the prevalence of informal or even unpaid work. In 2013, FAO published a set of good practices to eliminate gender inequalities in fisheries value chains (FAO, 2013a). These include gender equity legislation; support for women's access to land and fishing resources; training; improvements in information and monitoring systems; better occupational health and safety standards; elimination of child labor; and the promotion of women-led collective action.

Beach and fishing tourism also offer expanding opportunities in many coastal areas. Artisanal fishers can offer guided tours, sport fishing, or ecotourism experiences, while coastal regions can strengthen their culinary industries by promoting the sale of fresh fish—activities that generate additional income for rural coastal communities.

At the same time, efforts should also focus on adding value to fisheries products. Currently, much of the artisanal catch is sold fresh at low prices to intermediaries—a practice that also contributes to waste, as it often relies on rudimentary cleaning methods and a lack of modern storage facilities. Training and small-scale investments can help develop fish-processing microenterprises—such as smoking, canning, and vacuum packaging—enabling fishers to achieve greater profitability.

⁷ It is an insurance program that provides benefits to people who depend on artisanal fishing during periods when the activity is prohibited or restricted.

Tourism sector

The relevance of the sector in Latin America and the Caribbean and its link to rurality

Tourism is an important economic activity in Latin America and the Caribbean (LAC), employing around 1% of the population. The sector is particularly significant in the Caribbean and Central America, largely due to the strength of coastal and beach tourism. In The Bahamas, for example, 10.83% of total employment is concentrated in this sector, while in Barbados it reaches 6.19%. Tourist spending also represents an important source of income for both local communities and governments. Across the region, this spending accounts for between 1.6% and nearly 60% of GDP in several Caribbean and Central American countries, while in South America it ranges from 0.3% to 3.8% of GDP.



Approximately 1% of the population in Latin America and the Caribbean works in the tourism sector

Rural tourism has become a policy priority for many governments, according to data from the First Rural Tourism Survey conducted by UN Tourism (2023). This prioritization is reflected in numerous public programs promoting the sector, specifically rural and community-based tourism. The latter is defined as a “form of tourism that takes place in rural areas where local communities, through collective organization, lead and manage their own development” (Gandolfi & Ramírez, 2025). This type of tourism is therefore community-managed, excluding those ventures run by individual families or entrepreneurs.

The importance of rural and community-based tourism has been documented in several countries across the region (see Box 5.6). Based on information from national tourism ministries, its share of total tourism is estimated at 15% in Colombia, 18% in Peru, and 20% in Costa Rica (Gandolfi & Ramírez, 2025).

International organizations such as UN Tourism have also recognized the potential of this subsector, declaring 2020 the “Year of Tourism and Rural Development”, with the goal of fostering development through tourism (UN Tourism, 2024). Building on this momentum, the Best Tourism Villages program was launched to recognize outstanding rural destinations.

International agencies and governments view rural tourism as a tool to bridge infrastructure gaps and expand access to basic services and income opportunities. Moreover, since 54% of tourism jobs are held by women, it also serves as a potential driver of women's economic empowerment (UN Tourism, 2021).

Countries in LAC possess vast natural and cultural wealth, which stands as a competitive advantage in the global rural tourism market. The region hosts nearly 50% of the planet's known biodiversity, despite accounting for only 16% of its land area, and contains 25% of the world's forests and 30% of global renewable freshwater resources (World Bank, 2022).

Box 5.6

The growing importance of rural-based activities in tourism

Between 2010 and 2019, international tourism revenues in LAC grew by 71%, but the COVID-19 pandemic in 2020 caused a sharp 63% drop in earnings (IDB, 2022). By 2023, the number of international visitors to the region had already surpassed pre-pandemic levels, and continued growth was estimated for 2024 (UN Tourism, 2025).

According to UN Tourism, international arrivals in 2024 exceeded the previous year's figures by 7.9% (UN Tourism, 2025). Moreover, about 8 million new jobs are expected to be created in the next decade (WEF, 2025).

There is clear evidence that travelers are increasingly seeking experiences that allow them to connect directly with local culture and nature. Recent reports by Booking.com (2025) show that 77% of travelers look for authentic experiences that reflect the local culture. There is also a growing demand for more sustainable travel, which could further boost ecotourism. This trend is supported by World Bank (2019) studies showing a shift in traveler preferences toward unique cultural experiences at the destination, rather than the traditional focus on accommodation services. According to UNESCO (2021), 40% of all tourism can be classified as cultural tourism.

As Gandolfi and Ramírez (2025) observe:

Since the post-pandemic period, demand for authentic cultural experiences has grown significantly. According to Euromonitor International's Cultural Tourism Report, 65% of travelers included cultural activities in their itineraries in 2022; this figure rose to 72% in 2023 and is projected to reach 78% in 2024. Tourists are also willing to pay up to 20% more for services and products that promote local traditions, reflecting a growing preference for experiential and community-based travel. The report notes that cultural travelers favor accommodations with an authentic local atmosphere—such as country homes, haciendas, or small boutique hotels (25%). A considerable share of their spending goes to regional cuisine, with 40% of budgets allocated to traditional restaurants and local markets to enjoy native dishes. Cultural activities such as craft workshops, cooking classes, and historical tours account for 35% of total spending. According to Euromonitor's survey, average traveler spending on cultural activities and local products rose by 18% between 2022 and 2023 and is expected to grow by another 20% in 2024.

These trends show that a growing percentage of tourists prioritize engaging with the natural and cultural heritage of the communities they visit, fueling demand for destinations in LAC where travelers can immerse themselves in everyday local life, experience ancestral traditions, and enjoy less crowded natural settings.



CAF in Action.

Scan the QR code to explore CAF's strategy to support sustainable tourism industry in LAC



Recent trends—reflecting travelers' growing interest in unique, experience-based tourism—are driving the expansion of cultural and nature-based tourism

In cultural terms, the region stands out for its 147 sites inscribed on UNESCO's World Heritage List, ranging from pre-Hispanic archaeological sites and colonial historic centers to natural landscapes (UNESCO, 2025). Many of these sites are located in rural areas managed by local communities. LAC is home to about 42 million Indigenous people, together with Afro-descendant and mestizo communities that preserve more than 560 languages and unique traditions (World Bank, 2022a). This cultural heritage brings authenticity and added value to the region's tourism offerings.

International programs such as UN Tourism's Best Tourism Villages have recognized several Latin American towns for their achievements in sustainable tourism and community development. In the 2024 edition, award-winning villages were located in Argentina, Chile, Colombia, Ecuador, Guatemala, Mexico, Panama, and Peru.

The main challenges to advancing rural tourism, as identified by national tourism authorities across the region, are presented in Table 5.5. When grouped into seven categories, infrastructure ranks as the top priority, followed by population and economy.

Within the infrastructure category, the main challenges concern the provision of basic services such as drinking water, wastewater treatment, and electricity. These are followed by gaps in access infrastructure for rural areas, including roads, ports, airports, and other facilities.

In the population and economy category, the most significant challenges include income inequality in rural areas and the limited participation of minorities and vulnerable groups.



UNESCO's World Heritage List includes 147 sites in Latin America and the Caribbean

Analyzing rural tourism⁸ as a subsector poses a major challenge due to the lack of statistical information. Not only are harmonized and comparable data across countries unavailable, but in most cases, such data are not collected at all. The First Rural Tourism Survey (UN Tourism, 2023) shows that the availability of basic data on this subsector in the region remains very limited. Of the 18 Latin American countries that responded,⁹ only four¹⁰ (22% of the total) reported collecting information on the total number of visitors engaged in rural tourism. Other variables—such as daily visitors, overnight stays, and spending per visitor—also had low response rates (between three and five countries in the region).

8 UN Tourism defines rural tourism as "a type of tourism activity in which the visitor's experience is related to a wide range of products generally linked to nature-based activities, agriculture, rural lifestyle / culture, angling and sightseeing." It also explains that "rural tourism activities take place in non-urban (rural) areas with the following characteristics: i) low population density, ii) landscape and land-use dominated by agriculture and forestry and iii) traditional social structure and lifestyle."

9 The countries that responded to the survey were the Bahamas, Brazil, Chile, Colombia, Cuba, the Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, and Uruguay.

10 Bahamas, Cuba, Honduras, and Paraguay.



Market in Chinero, Peru.

Table 5.5
Priorities among main challenges (number of countries)

	Infrastructure	Population and economy	Human resources and training	Governance and financial mechanisms	Natural and cultural resources	Destinations, tourism products and business environment	Digitalization and information technologies
Priority ranking (1 = highest priority)	1  (6)	 (3)	 (1)	 (2)	 (2)	 (2)	 (1)
	2  (6)	 (3)	 (2)	 (1)	 (2)	 (0)	 (3)
	3  (1)	 (3)	 (6)	 (2)	 (3)	 (2)	 (0)
	4  (2)	 (3)	 (0)	 (7)	 (2)	 (1)	 (2)
	5  (0)	 (3)	 (3)	 (1)	 (2)	 (6)	 (2)
	6  (0)	 (1)	 (3)	 (4)	 (1)	 (3)	 (5)
	7  (2)	 (1)	 (1)	 (0)	 (5)	 (3)	 (4)
Average ranking	2.53	3.41	3.94	3.94	4.35	4.76	4.88

Note: Rankings ranged from 1 to 7, where 1 indicated the highest priority. No two themes could share the same ranking. Each cell shows the number of countries (numbers in parentheses and diamonds) per priority and challenge.

Source: UN Tourism (2023).

The same survey reveals that the main challenges in collecting such data are budget constraints and the limited availability of technology for obtaining, processing, and analyzing information (66.7% of countries cited both issues). Other challenges include limited knowledge of current technologies used in the field (55.6%), lack of training, education,

and skills among rural tourism providers to collect data (50%), and the limited capacity and expertise of local authorities and destination management organizations (50%). All but one country in the region stated that they require technical, budgetary, or combined assistance to collect and analyze rural tourism data.

Rural and community tourism programs in the region

Gandolfi and Ramírez (2025) analyze the effects of nine rural and community tourism programs in LAC¹¹ (Table 5.6). Except for the Chilean initiative, which dates back to 1995, most of these programs emerged in the region toward the end of the first decade of the century and have generally continued over time. However, several lost priority following the 2020 pandemic.

Table 5.6
Rural and community tourism programs in Latin America and the Caribbean

Country	Program name	Lead government entity	Implementation period
Argentina	Red Argentina de Turismo Rural Comunitario	Ministry of Tourism of the Nation	2009–2017
Bolivia	Programa Nacional de Turismo Comunitario	Vice-Ministry of Tourism	2011–2017
Chile	Programa Nacional de Turismo Rural	National Institute for Agricultural Development (INDAP)	1995–2010
Colombia	Estrategia Nacional de Turismo Comunitario	Ministry of Trade, Industry and Tourism (MINCIT)	2012–Present
Costa Rica	Programa de Apoyo a Mipymes Turísticas (includes rural and community tourism)	Costa Rican Tourism Institute (ICT)	2009–Present
Jamaica	Rural Economic Development Initiative I & II	Ministry of Tourism, Jamaica Social Investment Fund	2017–Present
Paraguay	Plan Nacional de Turismo Rural Comunitario	National Secretariat of Tourism (SENATUR)	2013–2023
Peru	Estrategia Nacional de Turismo Comunitario	Ministry of Foreign Trade and Tourism (MINCETUR)	2007–Present
Dominican Republic	Programa de Turismo Comunitario Sostenible (TCS)	Ministry of Tourism (MITUR)	2016–Present

Source: Gandolfi and Ramírez (2025).

Total spending across these nine programs did not exceed USD 55 million, with individual initiatives ranging from under USD 1 million to the largest—implemented in Bolivia—at USD 16 million. Over time, program budgets showed a clear upward trend. Of the nine analyzed, five received funding from international cooperation agencies, including CAF, IDB, the World Bank, and the Spanish and Japanese cooperation agencies.

11 The study was commissioned for this edition of the RED, and this section highlights its main findings.

Rural and community tourism programs were not created solely to diversify or expand the sector's offerings; in many cases, their primary goal was community development. This was the case for seven of the nine programs reviewed.

Interviewees consulted by Gandolfi and Ramírez (2025) reported a variety of positive outcomes from these programs, spanning economic, sociocultural, environmental, and inclusion-related impacts.

The effects most widely acknowledged included the generation of additional income alongside

traditional activities; spillover benefits extending beyond those directly involved in tourism; job creation for young people and women; and the revitalization of local customs and traditions. Long-term impacts were also noted, such as improvements in education—since higher household income enabled families to finance their children's tertiary studies—and the strengthening of local leadership through capacity development. Tourism also acted as a catalyst for improving basic infrastructure.

Links with agriculture and other rural sectors

There is broad consensus that tourism, when oriented toward celebrating local values, serves as an incentive to protect and showcase the natural and cultural heritage of communities. A notable example is Mexico's Yucatán Peninsula, where tourism around archaeological sites such as Chichén Itzá, along with the participation of Maya communities in the value chain, has strengthened the protection of both cultural and natural heritage (Peraza Cano et al., 2023). Similarly, in Colombia's Coffee Cultural Landscape, tourism centered on local traditions has promoted the conservation of traditional farms and landscapes recognized by UNESCO (Duis, 2007).



Tourism, when aimed at showcasing local values, serves as an incentive for the protection and enhancement of communities' natural and cultural heritage

In general, when forests, landscapes, and traditions become tourism attractions—such as parks, reserves, or cultural events—they generate income and local pride that support their preservation. In Venezuela, NGO Fundación Andes Tropicales implemented the Programa Andes Tropicales (PAT), a community-based tourism initiative designed to strengthen tourism activities linked to livestock and agriculture—mainly coffee—through the creation of tourism routes under the Mucuposadas brand. Later, the program focused its efforts on the Gran Sabana and the Orinoco Delta, developing tourism circuits connected to handicrafts, Indigenous traditions, and environmental conservation. The implementation of this program had positive effects, including income diversification, the development of small productive linkages, the creation of local jobs with strong female participation, community empowerment, the conservation of heritage and natural resources, and enhanced resilience through income generation during periods of low agricultural activity. PAT received support from CAF, and its model was later replicated in Bolivia and Argentina.

Opportunities for rural tourism development and policy directions

Statistical information on rural tourism needs to be strengthened. This issue has been emphasized throughout the report for various areas, but in the case of rural tourism, the data gap is even more severe. In many countries, data are not collected at all. Compounding this is the lack of impact assessments of rural and community tourism programs that provide a full evaluation of their costs and benefits.

Investing in rural tourism means investing in the needs of local populations. According to participants in the First Rural Tourism Survey conducted by UN Tourism, the main challenges are related to connectivity infrastructure and basic services. These constraints affect not only tourists but also residents of rural communities. Public investment in infrastructure and basic services should incorporate potential tourism benefits when assessing priorities and expected returns.

Budgets must align with program objectives. Several programs were long-term and ambitious, yet their allocated budgets were modest. The total spending across the nine programs analyzed by Gandolfi and Ramírez (2025) did not exceed USD 55 million, with individual budgets ranging from under USD 1 million to the largest program at USD 16 million.

Considering that in countries such as Colombia, Costa Rica, and Peru, rural and community tourism accounts for between 15% and 20% of total tourism activity, these programs appear underfunded and should receive greater government support.



Strengthening electrical, digital, and mobile connectivity in rural areas improves the living conditions of their inhabitants and is a key factor in the development of tourism

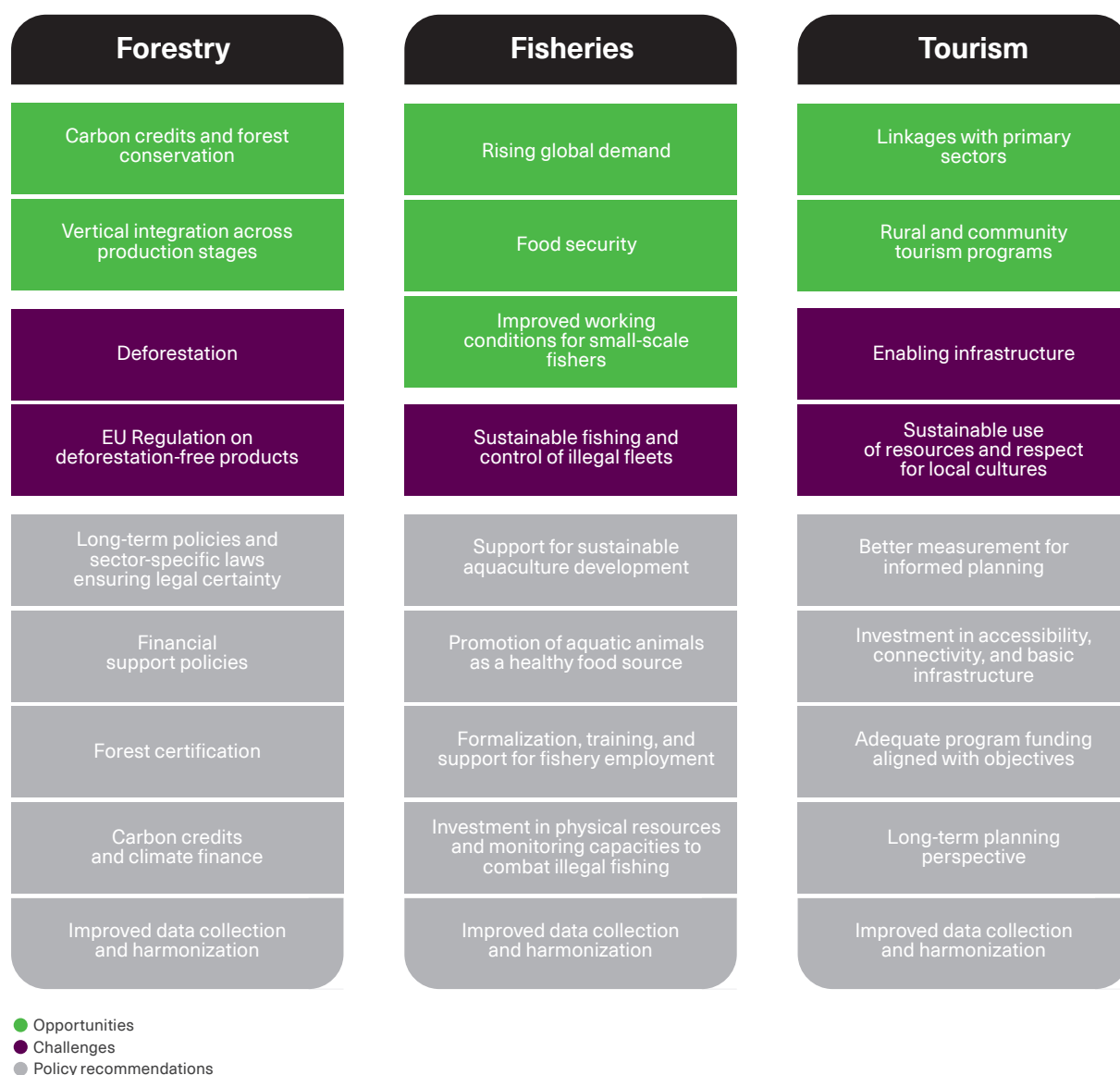
Adopting a long-term perspective is essential. Cross-country comparisons show that countries implementing rural and community tourism programs with medium- and long-term planning tend to achieve deeper and more sustainable impacts. This is evident in Bolivia, Costa Rica, and Paraguay, where programs in place for over 12 years have generated significant sociocultural, environmental, economic, and inclusion-related outcomes (Gandolfi & Ramírez, 2025).

Roadmap for strengthening the forestry, fisheries, and rural tourism sectors

Throughout this chapter, the main challenges and opportunities in three key sectors for rural economies have been outlined. In addition to improving the collection of more accurate and disaggregated data for each sector, a series of

policy measures can help strengthen them and enhance living conditions in rural areas. Figure 5.2 presents a roadmap summarizing the current situation and key actions that can be taken to achieve this across the sectors analyzed.

Figure 5.2
Opportunities, challenges, and policy recommendations





6

**Demographic
transformations
and mobility
in rural areas**



Key messages

The share of the rural population in Latin America and the Caribbean (LAC) has declined steadily since 1950, and projections indicate that this trend will continue over the next three decades.



Fertility rates have historically been higher in rural areas than in urban areas, although the gap has narrowed significantly since the 2000s.



Population aging is occurring with similar intensity in rural and urban areas. At present, people aged 65 and over account for about 10% of the total rural population, a share that will continue to increase.



Indigenous populations are clearly overrepresented in rural areas of LAC, and their presence increases as the degree of rurality of the territory rises.



Rural households in LAC have undergone profound changes over recent decades: they are smaller in size, have fewer children, include a higher share of older adults, and show a higher prevalence of female-headed households.

Rural emigration has slowed, although over the past decade it has still implied the annual departure of 1%–2% of the rural population. Half of those who migrate move to urban municipalities, while the remainder relocate to semiurban or rural municipalities.



Emigration is most intense among young people aged 14 to 29, contributing to the process of demographic aging in rural territories.



Inmigration to rural areas does not offset emigration, but it reaches meaningful levels and plays a growing role in the demographic reconfiguration of these territories.



Health and education indicators point to gains in rural human capital, yet these gains are not sufficient to close the structural gaps that continue to limit well-being and development opportunities.

Demographic transformations and mobility in rural areas¹

Introduction

Economic development and structural change are typically associated with shifts in the territorial distribution of the population.. As economies diversify, employment shifts from primary activities toward services and industry—sectors that are predominantly urban-based. In Latin America and the Caribbean (LAC), this dynamic has unfolded over the past century and is reflected in the sustained decline in the relative weight of the rural population. However, the magnitude and pace of this decline vary across countries, in part because they are at different stages of development and urbanization.

Despite this diversity, the demographic evolution of the rural population follows similar patterns across the region. The share of the rural population has declined gradually in all countries, albeit at different rates. On the one hand, population growth has led some areas that were previously

rural to lose that status. On the other hand, the demographic transition—marked by declining fertility and population aging—has also advanced in rural areas. At the same time, migration flows, traditionally outward, have lost intensity and now show a greater balance between inflows and outflows, reflecting lower migratory pressure and the emergence of new territorial dynamics. Finally, although improvements are observed in human development indicators such as education and health, these gains have been insufficient to close the gaps relative to urban areas.

This chapter documents these processes and provides a panoramic, long-term perspective on the demographic and social transformations of the rural world. Where the information allows, the analysis is complemented by an approach that considers the rural–urban continuum, moving beyond the traditional dichotomy between these two spaces.

¹ This chapter was written by Dolores de la Mata and Tatiana Rosá with research assistance from Juan Barnes, Belén Cañuelo, Leandro Martínez Villa, and Emilse Vargas.

In doing so, the chapter updates and expands the available evidence on rural populations² and lays the groundwork for understanding the structural changes shaping the present and future demographic outlook of rural areas. Anticipating how these dynamics will evolve will be key to understanding the pressures that productive

systems, service provision, social protection, and territories across the region will face in the coming decades. This serves as an essential point of departure for the subsequent discussion of rural household income sources and economic opportunities (Chapter 7), as well as access to basic services (Chapter 8).

The rural population in LAC

The rural population under national definitions

According to data from the Latin American and Caribbean Demographic Centre (CELADE—Population Division of ECLAC & UNDP, 2024), which relies on national definitions of rurality, the rural population in LAC stood at approximately 120 million people in 2025. This figure represents about 18% of

the region's total population. As shown in Chapter 1, the share of the rural population has been declining gradually since 1950, and projections indicate that this trend will continue over the next three decades (UNDESA, 2019).

The rural population under standardized measures of rurality

There is substantial heterogeneity in how countries define rural areas (see Roberts et al., 2017, and Chapter 1). This lack of comparability has generated growing interest in adopting more standardized criteria that allow for international comparisons of populations sharing similar environmental and settlement characteristics. One alternative promoted in recent years is the Degree

of Urbanisation (DEGURBA) classification, which applies homogeneous parameters across countries (see Box 6.1).³ According to this classification, the rural population of the region in 2025 amounted to around 100 million people—equivalent to 15% of the total population—a figure slightly lower than that derived from official national statistics.

2 In particular, traditional sources—such as population projections from CELADE and the United Nations population divisions (CELADE—Population Division of ECLAC & UNDP, 2024)—are complemented with original census processing (1970–2020), the Internal Migration in Latin America and the Caribbean (MIALC) database, and harmonized household survey indicators from CEDLAS (2025) for socioeconomic monitoring (2003–2023), covering 22 countries.

3 There are other methodologies that capture the rural–urban continuum in greater detail. One of them is the Relative Index of Rurality (RIR) (Waldorf, 2006). Albina et al. apply the RIR in Argentina, and their results show that the index is highly correlated with other indicators of rurality, such as nighttime light intensity, satellite data, and DEGURBA measures. This consistency validates its usefulness for territorial analysis and suggests strong potential for comparative studies, although it has not yet been applied in a standardized way across all countries in the region.

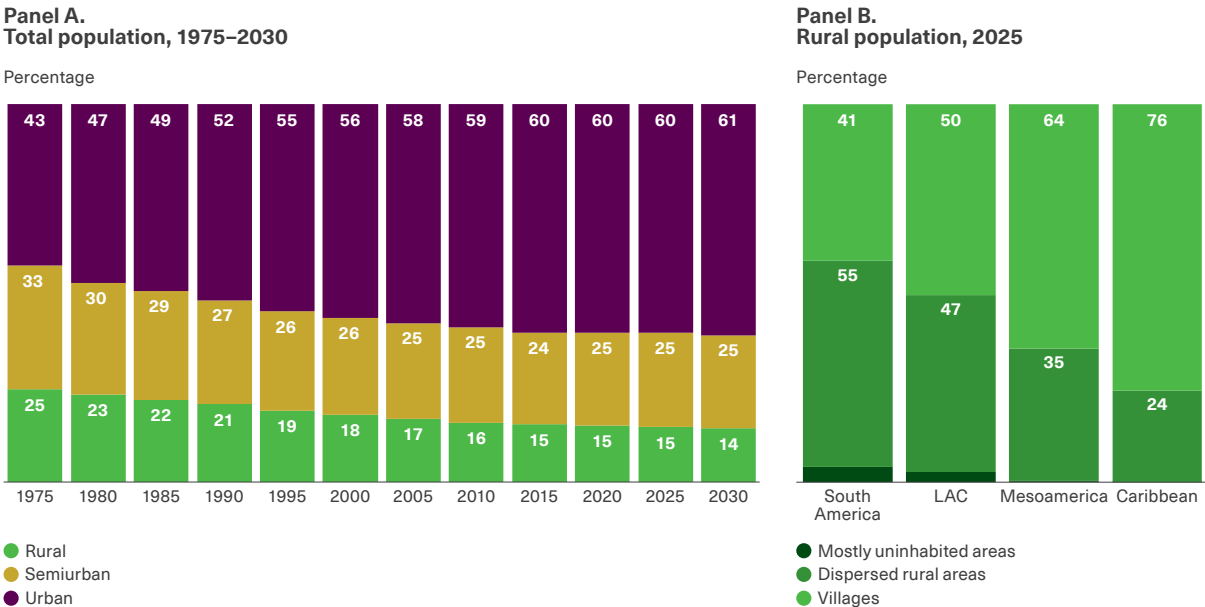
One advantage of DEGURBA is that it allows the population to be characterized along a continuous rural–urban spectrum, identifying areas of intermediate urbanization—referred to as semiurban—where nearly one quarter of the population of LAC currently resides, as well as urban areas, which concentrate close to 60% of the population, as shown in Panel A of Graph 6.1. DEGURBA also distinguishes different categories within the rural population, shown in Panel B of Graph 6.1: approximately half of the rural population lives in rural villages, while the other half resides in dispersed rural areas or largely uninhabited zones.

The composition of the rural population varies across subregions: South America has a higher share of dispersed rural population than Central America and the Caribbean countries.

● ●

Half of the rural population of LAC lives in rural villages, while the other half resides in dispersed or largely uninhabited rural areas

Graph 6.1
Distribution of the population by degree of urbanization in Latin America and the Caribbean



Note: The categories used in Panel A correspond to Level 1 of the DEGURBA classification, while those in Panel B correspond to the rural categories of Level 2 of the same classification (see Box 6.1). Totals may not sum to 100% due to rounding.

Source: Authors based on Schiavina et al. (2023).

Box 6.1

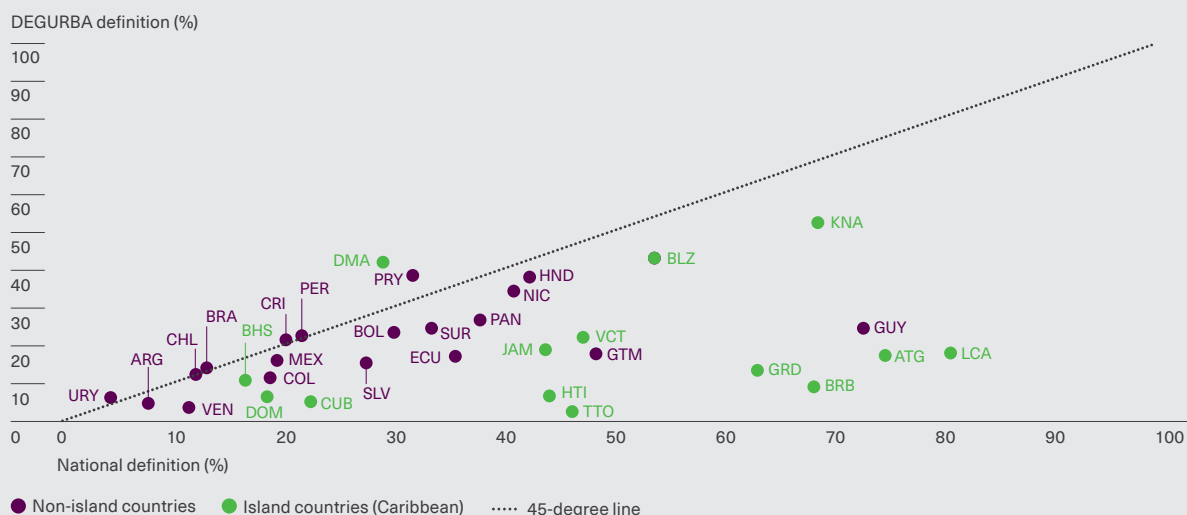
Rural population according to DEGURBA

The DEGURBA approach (from Degree of Urbanisation) is a methodology developed by Eurostat and adopted by international organizations to classify territories according to their degree of urbanization using comparable and objective criteria (European Commission et al., 2024). Unlike traditional definitions based on administrative boundaries, DEGURBA uses a uniform grid of 1km² cells to classify territories by identifying population density patterns and settlement size.

The classification is organized into two hierarchical levels. At Level 1, each grid cell is classified as part of a city or urban area, a semiurban area, or a rural area, based on population density criteria and connectivity to population centers of different sizes. Level 2 of DEGURBA provides a more detailed disaggregation for the semiurban and rural categories, while the city category remains undivided. Within semiurban areas, three subcategories are identified: the small-town center, corresponding to the main core of medium-sized localities; the dense suburb, which groups compact residential areas contiguous to that center; and the suburb or periurban area, which includes lower-density areas located on the periphery. Rural areas, in turn, are divided into villages, corresponding to small population nuclei; dispersed rural areas, characterized by low density and the absence of defined settlements; and largely uninhabited areas, with extremely low or zero population density.

Graph 1 shows the percentage of the population classified as rural under national definitions (horizontal axis) and under the DEGURBA methodology (vertical axis). With a few exceptions (Dominica, Paraguay, and Uruguay), the DEGURBA classification estimates a slightly smaller rural population than national classifications. The differences are particularly pronounced in Caribbean island countries. Several factors may explain this discrepancy. Few LAC countries rely exclusively on population size or population density to define rurality (see Chapter 1). In addition, the DEGURBA method reclassifies some areas as semiurban or urban that national definitions may consider rural (for example, densely populated clusters within otherwise rural municipalities). Finally, the DEGURBA methodology is updated every five years, whereas national definitions are revised less frequently.

Graph 1
Percentage of the rural population in Latin America and the Caribbean according to national definitions and the DEGURBA methodology, 2025



Source: Authors based on UNDESA (2019) and Schiavina et al. (2023).

Degree of rurality of subnational territories

The maps in Figure 6.1 illustrate the magnitude of territorial changes in terms of the degree of rurality that have taken place in LAC over the past 50 years. Of a total of 12,713 municipalities⁴ across 23 countries in the region, approximately 65.68% were classified as rural in 1975 (villages, dispersed rural areas, and largely uninhabited areas), according to the DEGURBA classification (see Box 6.2). By 2025, this share had declined to 51.62%, reflecting a profound transformation in the territorial structure. Box 6.2

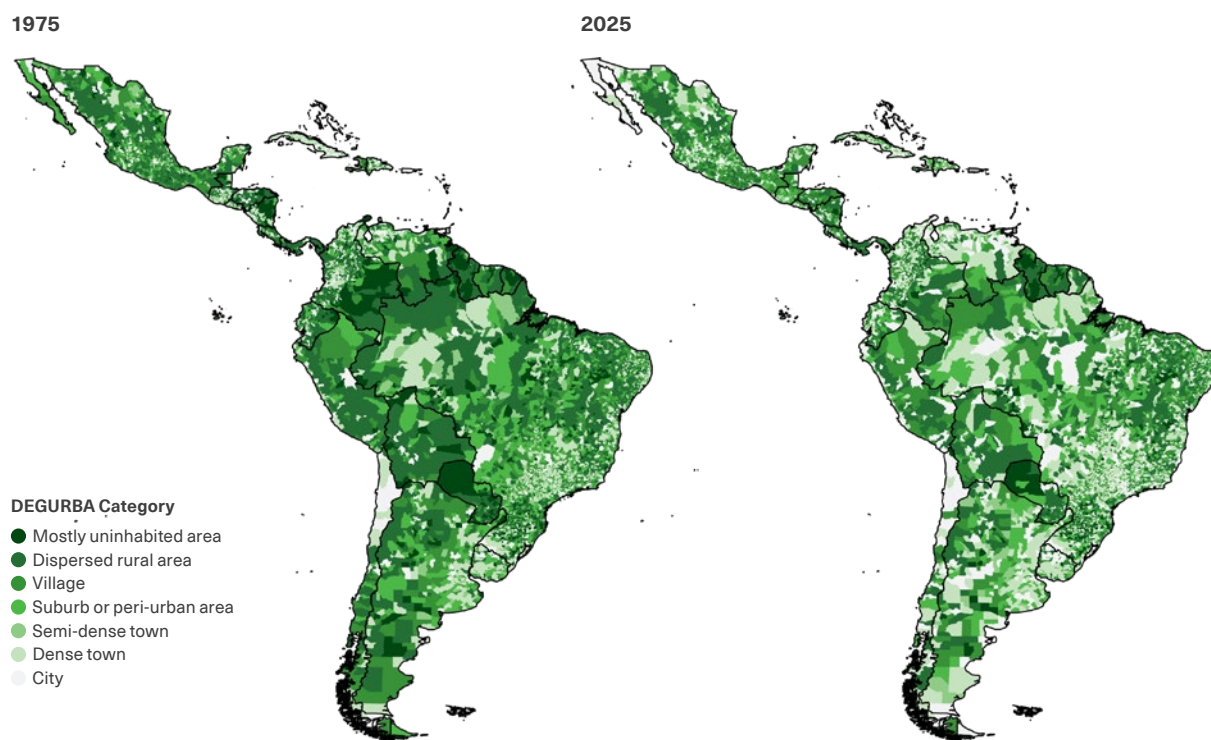
describes in detail the transitions of rural municipalities to other categories over the period 1975–2025.



Approximately two out of every three municipalities in LAC were classified as rural in 1975, while by 2025 the share had fallen to one out of two

Figure 6.1

Degree of urbanization of municipalities in Latin America and the Caribbean, 1975 and 2025



Note: Subnational administrative units are classified according to their degree of urbanization using the DEGURBA criterion (Level 2). Under this classification, units identified as villages, dispersed rural areas, or largely uninhabited areas are considered rural. Those categorized as suburbs or periurban areas, semi-dense settlements, or dense settlements are classified as semiurban municipalities, while units identified as cities correspond to urban municipalities. See Boxes 6.1 and 6.2 for a detailed description of the DEGURBA methodology.

Source: Authors based on Schiavina et al. (2023).

4 Throughout the chapter, these subnational units are referred to interchangeably as municipalities or localities.

Box 6.2

DEGURBA approach applied at the level of subnational administrative units

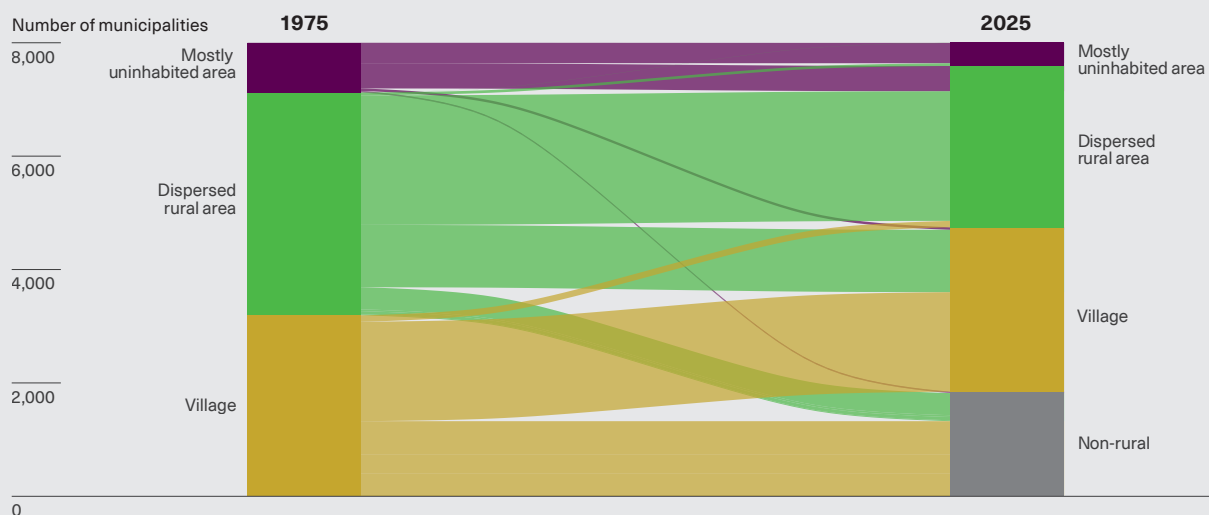
Based on the DEGURBA classification of 1 km² grid cells described in Box 6.1, it is possible to determine the degree of urbanization of larger subnational administrative units (such as municipalities or districts) according to the share of the population residing in each type of grid cell. For example, a subnational unit is classified as rural if more than 50% of its population lives in rural grid cells (that is, low-density cells), according to the Level 1 DEGURBA typology. Similarly, a unit is classified as predominantly urban if more than 50% of its population resides in urban grid cells (dense clusters forming urban centers), and as semiurban in the remaining cases. The Level 2 DEGURBA typology is applied following similar criteria.

Graph 1 shows the distribution of rural municipalities in 1975 according to Level 2 of the DEGURBA classification, as well as the transitions they underwent between 1975 and 2025. Approximately 8,000 municipalities were classified as rural in 1975. Of these, 23% were classified as villages, 32% as dispersed rural areas, and 7% as largely uninhabited rural areas. Some of these areas transitioned to categories with a higher degree of urbanization. Notably, approximately one quarter were no longer classified as rural by 2025.

For this report, the DEGURBA classification applied to subnational administrative units is combined with census data (obtained from Redatam, IPUMS, and MIALC^a) and with CAF's Local and Regional Governments database (2025a), among other sources. This allows for the construction of demographic, migration, access-to-public-services, and subnational public finance profiles by degree of rurality of the territories.

Graph 1

Distribution and transition of rural subnational administrative units in Latin America and the Caribbean, 1975–2025



Note: The countries included are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, French Guiana, Honduras, Haiti, Mexico, Nicaragua, Panama, Peru, Paraguay, Suriname, Uruguay, and Venezuela.

Source: Authors based on Schiavina et al. (2023).

a. Redatam is a software program developed by ECLAC and used by LAC countries to process census data; MIALC is the Internal Migration in Latin America and the Caribbean database; and IPUMS (Integrated Public Use Microdata Series) is a U.S.-based system that integrates census and survey microdata from around the world.

The transformations in the degree of rurality of the subnational units described above underscore the need to reassess the nature of the territories and settlements that remain rural. Over time, these areas are likely to have developed distinctive characteristics that set them apart from those that have urbanized. These characteristics may include greater isolation, lower population density, or more pronounced gaps in infrastructure and economic opportunities. If this

is the case, the population currently living in rural areas is not fully comparable to the rural population of previous decades—especially if the territories that urbanized started from more favorable initial development conditions than those that remain rural today. Accounting for this potential selective persistence of rurality is important when interpreting the well-being indicators analyzed in this chapter of the RED and in the two chapters that follow.

The demographic transition in rural areas

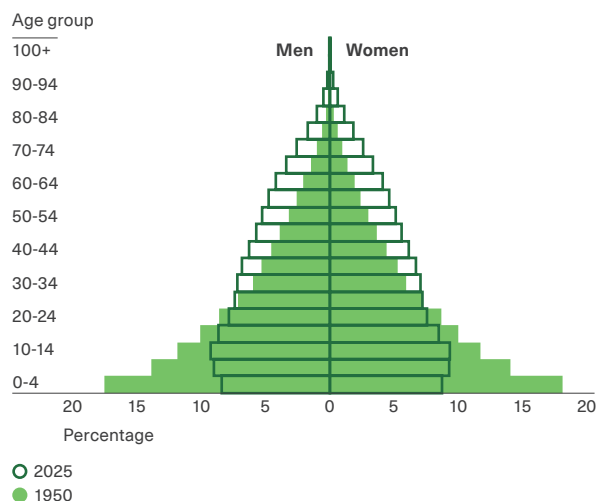
LAC is undergoing a sustained process of demographic change, driven by the combined effects of declining fertility rates and rising life expectancy. This demographic transformation has unfolded much more rapidly in the region

than in many developed countries, generating profound changes in population age structures and intergenerational dependency relationships over the course of just a few decades (Álvarez et al., 2020).

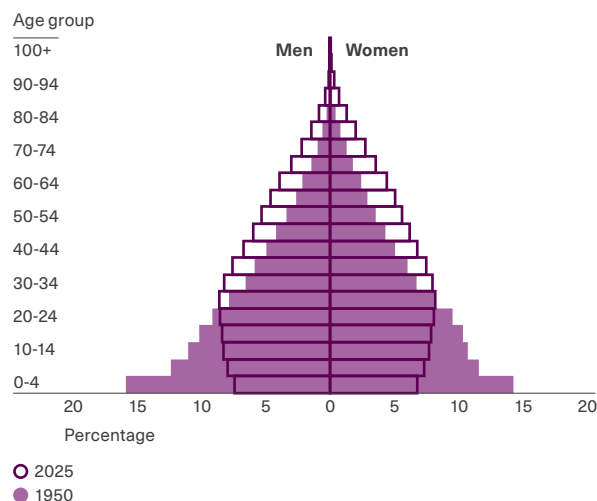
Graph 6.2

Distribution of the population by age and sex. Latin America and the Caribbean average, 1950 and 2025

Panel A. Rural zones



Panel B. Urban zones



Note: Simple average calculated using data from 20 countries (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the Dominican Republic, Uruguay, and Venezuela).

Source: Authors based on CELADE–Population Division of ECLAC and UNDP (2024).

These changes are evident in both urban and rural areas. Graph 6.2 compares the population structure by age and sex in 1950 with projections for 2025 (CELADE–Population Division of ECLAC & UNDP, 2024), based on national definitions of rural and urban areas.⁵ In 1950, both population

pyramids displayed a wide base, reflecting high birth rates, and a progressive narrowing at older ages, associated with lower levels of longevity. By contrast, current population pyramids exhibit a narrower base and a higher share of the population in adult age groups.

Fertility

The decline in births is the main factor behind the slow or zero demographic growth observed in more developed societies and one of the primary drivers of population aging (Cabella & Nathan, 2018). In LAC, total fertility rates have declined steadily over recent decades. On average, the region stands at 1.8 children per woman, below the replacement level, estimated at 2.1 children (ECLAC, 2024).

Historically, fertility rates have been higher in rural areas than in urban areas.⁶ Graph 6.3 shows the evolution in the number of live-born children among women aged 45 to 49 in rural and urban areas, according to national criteria, calculated using census data from the 1970s through the 2020s.

In countries with census data available for the 1970s or 1980s, the average number of children among rural women ranged between 6 and 8, except in Argentina and Uruguay, where it stood at approximately 4 and 3, respectively. In countries with censuses in the 2010s and 2020s, this same indicator ranged between 3 and 5, with the exception of Uruguay (2 children). Overall, the average number of children per woman declined across all countries over the period, both in rural areas (Panel A of Graph 6.3) and in urban areas (Panel B of the same graph). Toward the end of the last century, several countries experienced a more rapid reduction in the number of children

in urban areas, widening the gap with rural areas (for example, in Bolivia, Colombia, Guatemala, Honduras, Mexico, and Paraguay). Since the 2000s, fertility declines in rural areas have been more pronounced, steadily narrowing this gap.⁷



Historically, fertility rates have been higher in rural areas than in urban areas, although this gap has narrowed over recent decades

The economic and demographic literature identifies key factors behind the decline in fertility. These include the expansion of female education, the rising opportunity cost of women's time, changes in gender norms, and increased female labor force participation (Doepke et al., 2023), as well as greater access to contraception and declines in infant mortality. These determinants operate in both urban and rural areas, but with important differences: in rural areas, the transition has been slower due to delayed progress in these changes (Lerch, 2019).

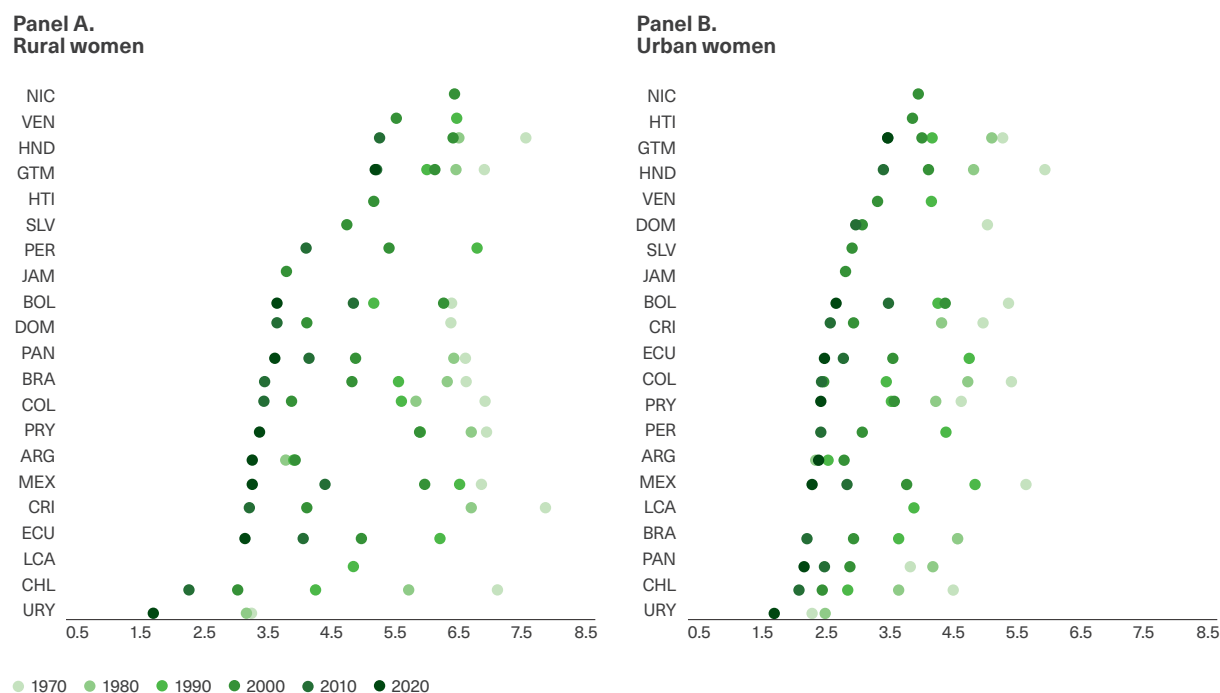
5 Throughout the chapter, the indicators presented for LAC correspond to simple averages across countries. The decision to use simple averages, rather than population-weighted averages, is intended to prevent the results from disproportionately reflecting the situation of the most populous countries.

6 Fertility rates in countries across the region, calculated using Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS), confirm this pattern (CEDLAS, 2025).

7 Graph A.6.1 in the appendix to this chapter, available in the online edition of the RED, shows the evolution of these gaps.

Graph 6.3

Number of live-born children among women aged 45–49 in Latin American and Caribbean countries, 1970s–2020s



Note: The sample covers 21 countries whose censuses provide information on the number of live-born children per woman.

Source: Authors based on Barnes and de la Mata (2025), using census data.

A demographic phenomenon of particular relevance in the region is early motherhood. Adolescent pregnancy remains one of the most persistent challenges in LAC, which records some of the highest rates worldwide. Bancalari et al. (2025) document the pronounced socioeconomic and territorial inequalities associated with this phenomenon, highlighting stark differences between rural and urban areas, with significantly higher rates in the former.

Graph 6.4 shows the evolution of the share of women aged 15 to 19 with children in rural areas

across LAC countries⁸ between 1970 and 2020.

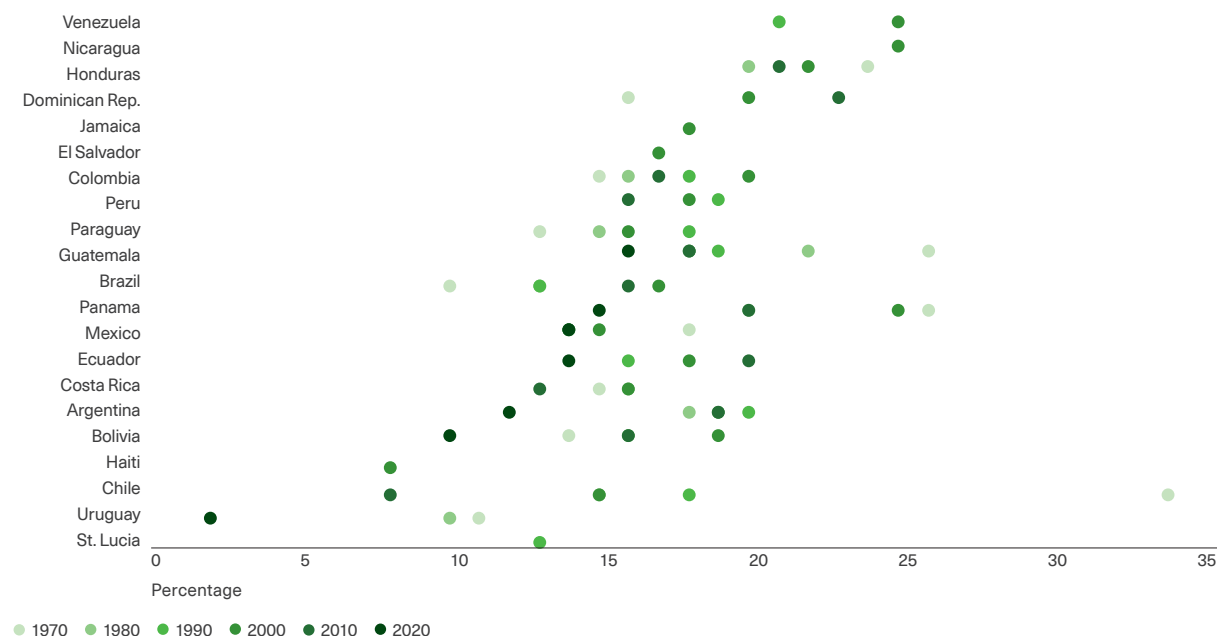
Substantial declines are observed: in the 1970s and 1980s, between 10% and 34% of rural women aged 15 to 19 were already mothers; by the 2010s and 2020s, these figures had fallen to between 8% and 23%, with the exception of Uruguay (2%). Although these advances are encouraging and partly associated with overall fertility declines, adolescent pregnancy remains more prevalent in rural areas than in urban areas, and the reductions observed—particularly over the past decade—have been less pronounced in rural than in urban settings.⁹

⁸ The percentage of women aged 15–19 who are mothers at the time of the census is an alternative and complementary indicator to SDG 3.7.2, which measures the adolescent fertility rate. Although both indicators refer to the same phenomenon (early motherhood), the census-based indicator has the advantage of being structural—that is, it measures the cumulative prevalence within a cohort—and of being comparable over time and across territories, even in contexts where vital registration systems are incomplete or inconsistent.

⁹ Graph A.6.2 in the appendix to this chapter, available in the online edition of the RED, shows these rates for women in urban areas as well as the rural–urban gaps.

Graph 6.4

Percentage of rural women aged 15–19 with children in Latin American and Caribbean countries, 1970s–2020s



Note: The sample includes 21 countries with census data on the number of live-born children per woman.

Source: Authors based on Barnes and de la Mata (2025), using census data.

Aging and dependency in the rural population

The narrowing of the base of the population pyramid and the expansion of older age groups reflect the advance of population aging, a phenomenon that is also strongly evident in rural areas. Panel A of Graph 6.5 shows the evolution of the age composition of the rural population across four broad age groups between 1970 and 2020. Aging, measured by the share of people aged 65 or older, is advancing in rural areas and, as in urban areas, currently accounts for around 10% of the population.¹⁰

The growing relative weight of older adults, together with the decline in the number of children and adolescents, is reshaping dependency ratios and the balance between the working-age and dependent populations. Panel B of Graph 6.5 shows the sustained increase in the old-age dependency ratio, particularly in rural areas: in the 2020s, for every 100 people of working age (15–64), there were 15 people aged 65 or older in rural areas, a share slightly higher than in urban areas. Similar patterns are observed along the rural–urban continuum, as illustrated in Box 6.3: the population

¹⁰ The changes in the distribution of the urban population can be seen in Graph A.6.3 of the appendix to this chapter, available in the online edition of the RED.

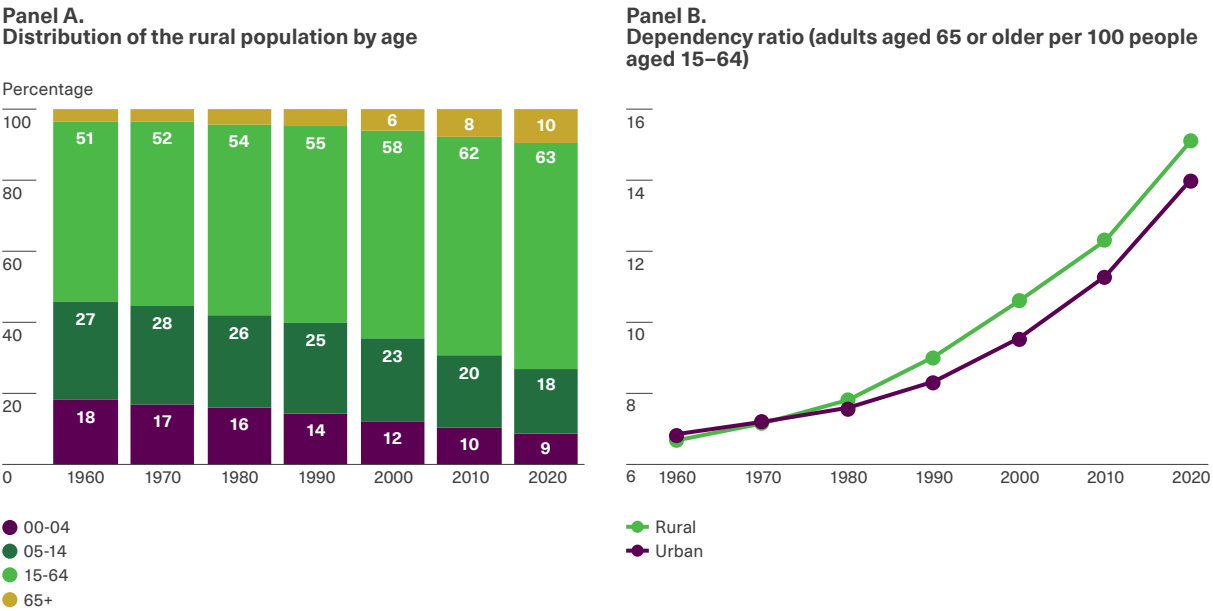
of rural municipalities is not only slightly older, but is also aging at a faster pace and exhibits higher dependency ratios than semiurban and urban municipalities.

Although population aging and rising old-age dependency ratios are widespread across the region, their impact may be more pronounced in rural settings. This is because aging poses specific challenges for the provision of health services, due to increased care needs and related strategies,

as well as for the economic sustainability of households—issues that are examined in greater detail in Chapters 7 and 8.

● ●
Population aging is pronounced in rural areas, just as it is in urban areas

Graph 6.5
Distribution of the rural population by age group and old-age dependency ratios in rural and urban areas. Latin America and the Caribbean average, 1960s–2020s



Note: Simple average calculated using data from 20 countries (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the Dominican Republic, Uruguay, and Venezuela). Projection values correspond to the midpoint of each decade. Totals may not sum to 100% due to rounding.

Source: Authors based on CELADE–Population Division of ECLAC and UNDP (2024).

Box 6.3

Demographic transition along the rural–urban continuum

Barnes and de la Mata (2025) characterize the demographic transition along the rural–urban continuum by integrating census data with the Level 1 DEGURBA classification applied to subnational administrative units.

The analysis covers indicators of aging, fertility, and dependency for municipalities with different degrees of urbanization between 1970 and 2020, based on 67 censuses from 18 countries in Latin America and the Caribbean.

Panel A of Graph 1 shows that population aging, measured by the share of people aged 65 or older, manifests with similar intensity across rural, semiurban, and urban municipalities, and is even higher in rural municipalities. Consistently, Panel B shows a clear hierarchy across geographic settings, with rural areas systematically exhibiting the highest dependency burdens, followed by semiurban areas and, lastly, urban areas.

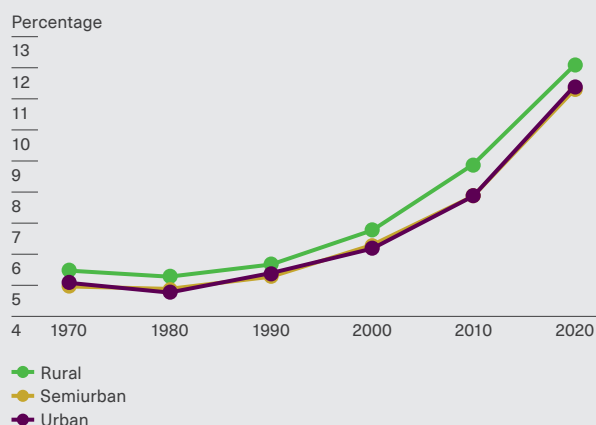
The cross-country comparison reveals several patterns: (1) population aging is a generalized phenomenon across all segments of the rural–urban continuum, with the share of older adults (65 or older) doubling on average between the 1970s–1980s and the 2010s; (2) as early as the 1970s and 1980s, rural and semiurban municipalities already exhibited older population structures than urban municipalities, with the exception of Costa Rica; (3) for the country average, the increase in aging has been greater in rural municipalities, although with notable heterogeneity across countries; and (4) the share of the population aged 85 or older has grown more rapidly in urban municipalities.

The fertility analysis shows that, although rural municipalities continue to exhibit higher fertility levels, the disparity relative to semiurban and urban municipalities has narrowed substantially, pointing to clear convergence across areas.

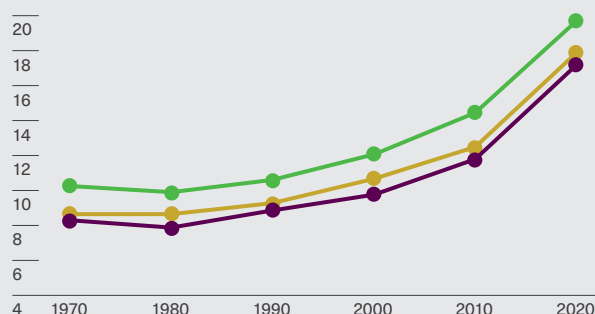
Graph 1

Aging and dependency by degree of municipal urbanization. Latin America and the Caribbean average, 1970–2020

Panel A.
Share of the population aged 65 or older



Panel B.
Old-age dependency ratio (people aged 65 or older per 100 people aged 15–64)



Note: Simple averages calculated using available censuses, by decade, for the 18 countries included (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela). Where possible, values for missing decades were estimated by applying trends specific to each degree of urbanization.

Source: Authors based on Barnes and de la Mata (2025), using census data.

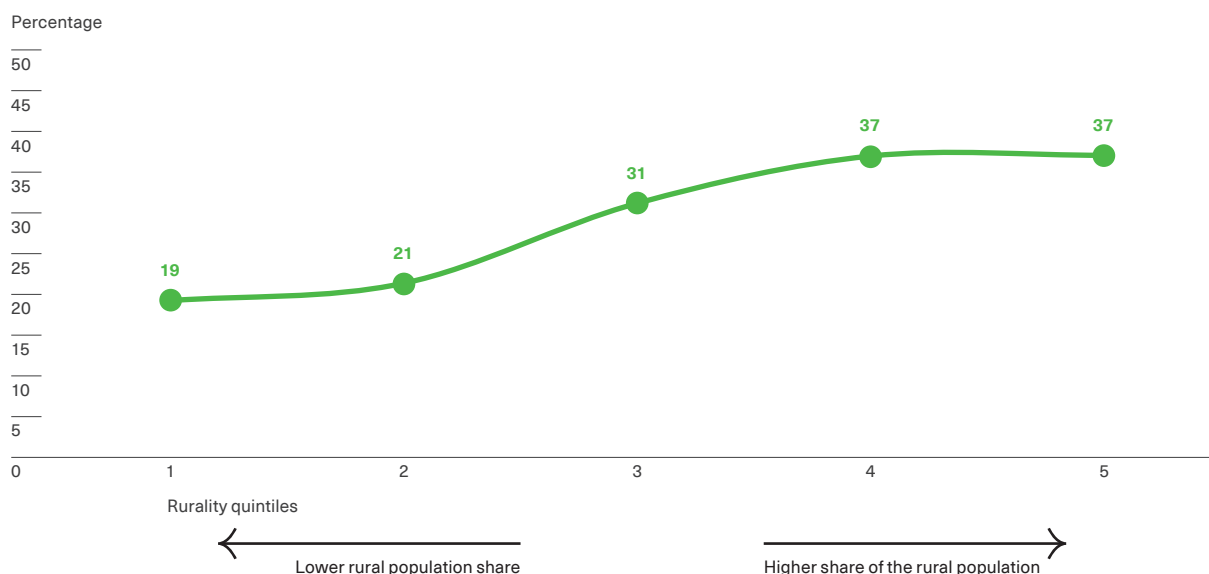
Indigenous population and rurality

Indigenous populations are clearly overrepresented in rural areas of LAC, according to national definitions of rurality—a pattern that is not systematically observed among Afro-descendant populations (Albina et al., 2024). Using census data, Albina et al. (2024) show that the Indigenous share of the rural population more than doubles the national average in several countries: in Colombia, it reaches 10% compared to 3% nationally; in Costa Rica, 5% compared to 2%; in Ecuador, 15% compared to 7%; and in Panama, 27% compared to 12%. In countries with a large Indigenous presence in the total population, this rural overrepresentation also persists. Thus, Indigenous populations account for 80% of the rural population in Bolivia (compared to 47% nationally), 20% in Chile (23% nationally), 52% in Guatemala (41% nationally), and 38% in Mexico (22% nationally).

An analysis at the municipal level shows that as rurality increases, so does the share of the Indigenous population. Graph 6.6 shows the proportion of Indigenous population across municipalities in 14 LAC countries that collect ethnic-racial information in their censuses. Municipalities are ranked into quintiles, from lowest to highest, based on the share of the rural population relative to the total population of the subnational unit. In the first quintile (the 20% of subnational units with the lowest rural population share), Indigenous populations account for 20% of the population. In the final quintile (the 20% of subnational units with the highest rural population share), this proportion rises to 40%.

Graph 6.6

Indigenous population as a share of the total municipal population. Latin America and the Caribbean average by degree of municipal rurality



Note: Quintiles are constructed by ranking municipalities from lowest to highest according to the percentage of rural population. The rural population of each municipality corresponds to that defined under the Level 1 typology of the DEGURBA classification (see Boxes 6.1 and 6.2). The vertical axis shows, for each quintile, the simple average share of the Indigenous population across the municipalities included. In total, 7,580 subnational administrative units from 14 countries are included (Belize, Bolivia, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Uruguay, and Venezuela). Data corresponds to the latest available census for each country.

Source: Authors based on CAF (2025a) and Schiavina et al. (2023).



Family in a rural home in Samaipata, Bolivia.

Household structure

Household composition in LAC has undergone profound changes over recent decades. These changes reflect demographic shifts as well as transformations in economic patterns—associated with changes in productive structures—and in cultural patterns, such as norms governing gender roles (Becca et al., 2025; Esteve et al., 2025; Trias-Prats & Esteve, 2025).

These transformations have affected rural and urban settings differently, with some converging trends and others where marked differences persist. Understanding the structure of rural households—including household size, the presence of children and older adults, female headship, and family structure—is important for analyzing living conditions in rural areas. These characteristics directly shape care arrangements, educational and labor decisions by household members, income sources, and demand for social services, among other factors.

Graph 6.7 summarizes the evolution of these indicators between 2003 and 2023 for rural and urban households in 14 countries in the region included in the CEDLAS (2025).¹¹ First, average household size declined steadily (Panel A), falling from four to three members in both rural and urban areas, reflecting declining fertility.

One of the most notable changes in the region has been the rise in female-headed households (Panel B)—that is, households in which a woman is identified as the main person responsible for the household.¹² This trend reflects transformations in family models and greater female autonomy, but also the persistence of gender inequalities in care responsibilities (Liu et al., 2017). This pattern is observed in both rural and urban areas. In 2023, 16% of rural households were headed by women,

compared to 22% in urban areas, representing a sustained increase over recent decades.

By contrast, economic headship—defined as the main income earner—remains substantially lower among women (Panel C). Although there has been growth relative to the near-zero levels observed in the early 2000s, currently only 6% of rural households and 8% of urban households have a woman as the primary economic provider. This gap highlights the barriers women face in accessing quality employment and the persistent unequal distribution of domestic and care work, which continue to constrain their full economic autonomy, as documented for rural areas in Chapter 7.

Households with children declined significantly (Panel D), in line with falling fertility—from 61% to 43% in rural areas and from 56% to 39% in urban areas. At the same time, the presence of older adults in households increased (Panel E), rising from 21% to 27% in rural areas and from 20% to 27% in urban areas. This demographic shift reflects the population aging discussed earlier, but also the continued role of households as intergenerational support networks, especially in contexts where formal care systems are limited (Becca et al., 2025).

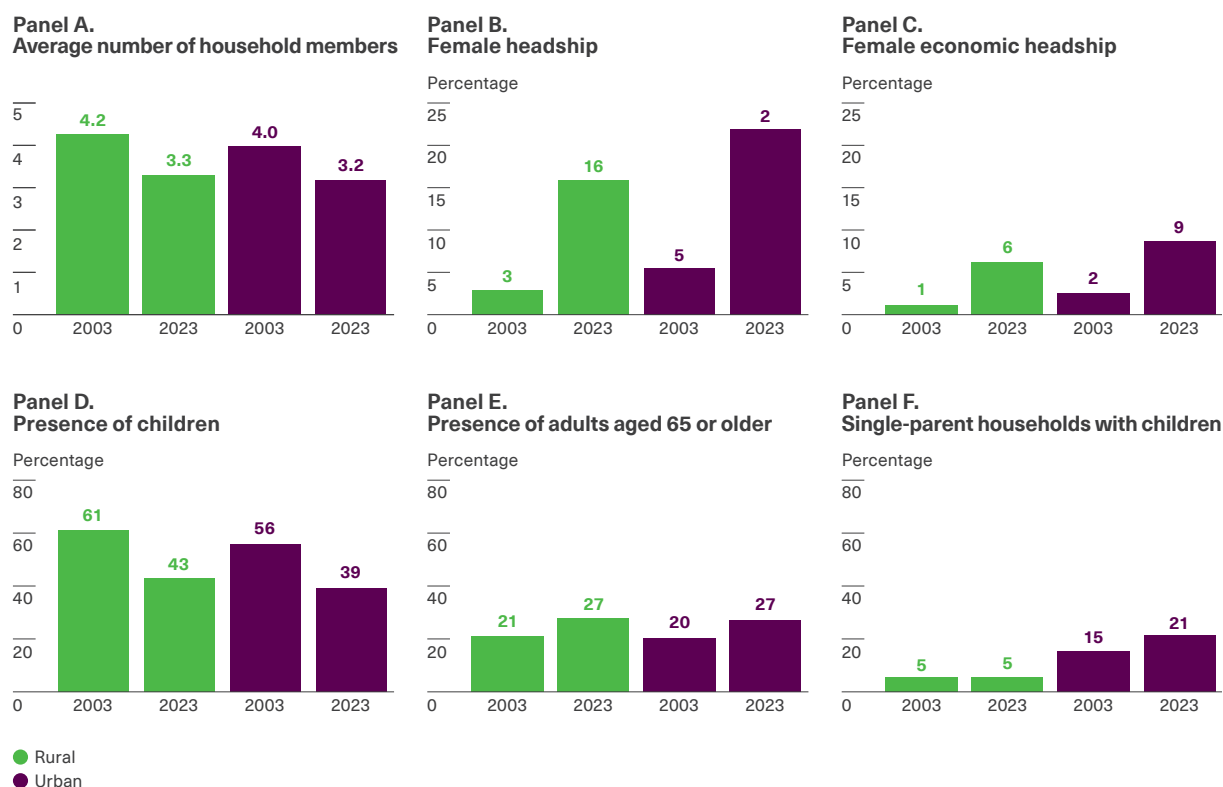
Another relevant change in LAC is the rise in single-parent households, most of them headed by women (Gailán et al., 2023; Ullmann et al., 2014). However, this is a distinctly urban phenomenon, as in rural areas the share of single-parent households has remained stable at around 5% (Panel F). This suggests that, while family arrangements are evolving across the region, traditional household structures remain more prevalent in rural settings.

11 The database includes information for Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, Panama, Paraguay, Peru, and Uruguay.

12 Household headship is self-reported. The increase in female-headed households may reflect a range of factors, including changes in household composition—such as a rise in households headed by women due to the absence of a partner—or changes in reporting practices in households where a couple co-resides.

Graph 6.7

Household characteristics in rural and urban areas. Latin America and the Caribbean average, 2003–2023



Note: Simple average calculated using 14 countries (Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, Panama, Paraguay, Peru, and Uruguay). Panels A, B, C, D, and E are calculated for all households in which the household head is older than 15 years. Panel F excludes single-person households.

Source: Authors based on CEDLAS (2025).



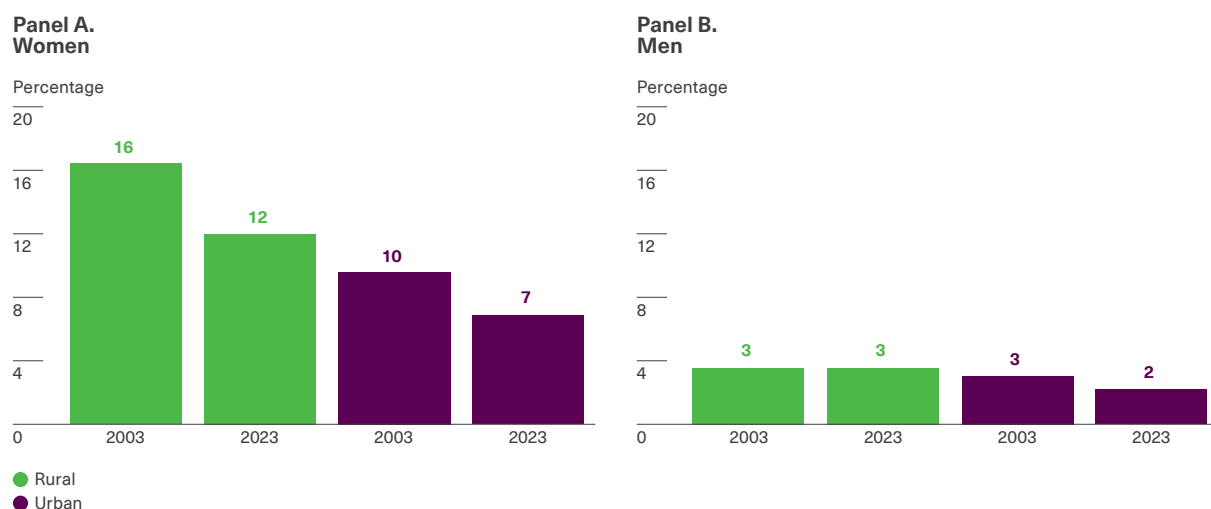
Early marriage remains considerably more common in rural than in urban areas, with significant implications for the educational and labor trajectories of young rural women

remains considerably more common in rural than in urban areas, with significant implications for the educational and labor trajectories of young rural women (Bellés-Obrero & Lombardi, 2023; ECLAC, 2022). Moreover, when it occurs before age 18, early marriage constitutes a violation of human rights (UNICEF, 2019).

A persistent difference between rural and urban areas is the prevalence of early marriage. In both settings, women continue to be more likely than men to marry or enter a union between ages 15 and 19 (Graph 6.8). Despite progress, early marriage

Graph 6.8

Percentage of young people aged 15–19 who are married or in a union in rural and urban areas. Latin America and the Caribbean average, 2003–2023



Note: Simple average calculated using 14 countries (Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, Panama, Paraguay, Peru, and Uruguay).

Source: Authors based on CEDLAS (2025).

Migration

Migration is a key component of demographic change, as it alters the size, structure, and spatial distribution of the rural population. Like the natural components of population growth (births and deaths), migration responds to socioeconomic and territorial determinants, and its analysis is essential for understanding processes of depopulation, productive transformation, and territorial reconfiguration in rural areas.

Out-migration from rural areas reflects the interaction between push and pull factors. Among the former are technological change in agriculture; productivity and wage gaps between rural and urban areas; and high levels of labor informality (Gollin et al., 2014; Harris & Todaro, 1970; Jedwab et al., 2017; Lewis, 1954). These factors are compounded by adverse shocks affecting agriculture, liquidity constraints,

distortions in agricultural markets, and limited access to insurance (Britos et al., 2025; Bryan et al., 2014; Minale, 2018; Munshi & Rosenzweig, 2016), violence and insecurity (Clemens, 2021), natural disasters, and climate change (see Box 6.4). Together with deficits in infrastructure and social protection networks (issues addressed in Chapters 7 and 8 of this report), these conditions constrain opportunities in areas of origin, while access to employment, education, public services, and family networks in destination areas acts as the main pull factor.

Box 6.4

Climate change and migration

Extreme heat waves and other severe climate events are becoming increasingly frequent and intense and are expected to accelerate further in the coming decades (IPCC, 2021). These shocks erode agricultural yields and reduce rural incomes, particularly in rainfed areas with limited risk-management tools (Deschênes & Greenstone, 2007; Jessoe et al., 2018). In contexts of incomplete insurance and credit markets, households adjust inputs, sell assets, reallocate family labor, or migrate (Carter & Lybbert, 2012; Jayachandran, 2006; Rosenzweig & Wolpin, 1993). Climate-induced migration may take the form of “distress migration” (departures to stabilize consumption after losses) or “investment migration” (mobility financed after good harvests as a strategic bet) (Ibáñez et al., n.d.; Kleemans, 2015) and it is often short-distance unless well-established international networks already exist (Findlay, 2011). In LAC, the World Bank projects nearly 17 million internal climate migrants by 2050, equivalent to almost 3% of the population (Rigaud et al., 2018).

A growing body of evidence documents clear causal effects in rural areas and shows that climate shocks increase both international migration and internal migration. Hurricanes have raised migration to the United States from Central America and the Caribbean (Spencer & Urquhart, 2018). In El Salvador, extreme heat reduced maize yields, forced adjustments in labor and inputs, and, without access to irrigation or insurance, pushed international migration as a consumption-smoothing mechanism (Ibáñez et al., n.d.). In Mexico, unusually warm episodes and severe droughts increased migration to the United States (Nawrotzki et al., 2016). On the domestic front, heat waves in Central America and the Caribbean have increased mobility, with relatively larger effects among young women (Baez et al., 2017), while in South America, temperature anomalies have been associated with higher within-country migration (Thiede et al., 2016). In Brazil, intensifying droughts have increased rural-to-urban migration (Busso & Chauvin, 2023). Taken together, evidence based on census or survey data and panel or difference-based designs shows that hurricanes, extreme heat, and droughts act as triggers of rural mobility.

However, the effects are not uniform. In Ecuador, adverse environmental conditions do not always increase departures and may even reduce them depending on context (Gray & Bilsborrow, 2013). Moreover, when networks or liquidity are lacking, severe shocks can inhibit migration (“trapped migration”), reflecting high exit costs and financing constraints (Busso & Chauvin, 2023).

In summary, climate-related migration reveals failures in insurance and credit markets. Public policy must act on two fronts: first, reducing vulnerability at origin (for example, through agricultural and income insurance, countercyclical credit, water and irrigation infrastructure, technical assistance, and early-warning systems) so that households are not forced to migrate; and second, facilitating mobility when agricultural activity at origin becomes unviable (Ibáñez et al., n.d.)—by improving access to credit to finance relocation, reducing remittance costs, ensuring safe transfer channels, and supporting labor-market and housing integration—so that migration can function as an effective and safe adaptation mechanism.

Migration is commonly classified into three categories according to length of stay: short-term (between three and twelve months), medium-term (from one to five years), and long-term (more than five years). The analysis in this chapter focuses on medium-term internal migration, which can

be measured using census questions on place of residence five years prior to the survey. An individual is considered a migrant if they report living in a different locality than five years earlier. The degree of rurality of municipalities of origin and destination is classified using the current

DEGURBA typology or the closest available version (Martinez Villa & Rosá, 2025). This approach makes it possible to identify recent movements from rural municipalities, but it does not capture seasonal or very short-term migration, nor international movements. These limitations are discussed in Boxes 6.4 and 6.5.

It is important to note that migration related to rural areas can be analyzed from two perspectives: outflows from rural localities to other settings (rural emigration) and inflows into rural localities from other areas (rural immigration). This report focuses on rural emigration, as it currently represents the most quantitatively significant migratory phenomenon for understanding demographic change in rural areas.

Box 6.5

Limitations in measuring migration

Measuring migration faces methodological and data constraints that shape the type of analysis that can be conducted and, consequently, the policy recommendations that can be formulated to address this phenomenon in rural areas.

In the region, the main source for identifying recent migration is population censuses, through the question on place of residence five years prior. This approach provides a medium-term snapshot but lacks individual follow-up, making it impossible to reconstruct migration trajectories, returns, length of stay, or to precisely link changes in residence to economic, climatic, or policy shocks. The results reflect discrete cross-sectional observations rather than dynamic processes.

The predominant use of census data also entails limitations in the coverage and quality of key economic variables—such as income and employment—which are often captured only partially or are not fully comparable across countries. In rural areas, high levels of informality and subsistence production further exacerbate these limitations. In addition, this approach cannot capture seasonal, circular, or very short-term mobility, nor can it document multi-residence arrangements that are common in rural settings.

Given these constraints, it is essential to advance the development of longitudinal data collection systems where they do not yet exist and to revive those that have been discontinued. In particular, panel household surveys—which follow the same individuals or families over time—are crucial for analyzing migration trajectories, returns, impacts on well-being, and responses to shocks. Latin America has had valuable experiences in this area, including Nicaragua's National Household Survey on Living Standards Measurement and Mexico's Family Life Survey, whose most recent rounds were conducted more than a decade ago, as well as the Young Lives study in Peru, which remains the only active experience, with a seventh round currently under way (2023–2024). This sustained disinvestment in panel surveys severely limits the ability to understand dynamic phenomena such as migration.

Complementarily, the use of administrative sources and sectoral registries—such as school enrollment records, social programs, or health registries—can help detect changes in residence more promptly. However, these records lack the individual longitudinal component needed to understand migration dynamics and do not substitute for representative longitudinal data.

Box 6.6

Seasonal and temporary rural migration in Latin America and the Caribbean

Seasonal rural migration consists of temporary movements, generally aligned with productive cycles (planting and harvesting, construction projects, extractive activities, or tourism seasons). This form of mobility—prevalent among young rural workers from low-income households—combines subsistence agricultural strategies with temporary paid employment (Soto Baquero & Klein, 2012).

Internal seasonal migration. In agriculture, temporary labor crews are common in coffee-, banana-, and sugarcane-growing areas of the Southern Cone and the Andes, as well as in intraregional flows in Bolivia, Honduras, and Peru (Reardon et al., 2004). Beyond agriculture, large infrastructure projects—such as dams or highways—attract workers for months or years. In Andean mining, rotational arrangements predominate, with workers commuting from rural areas or intermediate cities (Clemenceau, 2023). Sectors such as aquaculture and fish processing—for example, salmon farming in southern Chile—generate sharp peaks in seasonal employment (Tapia Catalán & Marchant Santiago, 2025). In tourist destinations, temporary hiring in hospitality, food services, and related activities intensifies during peak seasons (ILO, 2022). Taken together, these activities show that seasonal rural mobility is not limited to agriculture but extends across multiple sectors with episodic labor demand.

In terms of well-being, these movements allow households to supplement income and improve food security by diversifying labor sources. However, they also entail family separations, increase care burdens in households of origin, and can generate temporary local labor shortages during peak production periods.

Internacional seasonal migration. Short-term movements across borders also occur, structured through social networks, informal arrangements, or temporary mobility programs. Mexico stands out for the participation of agricultural workers in harvesting campaigns in the United States and Canada, while El Salvador, Guatemala, and Honduras register seasonal flows toward southern Mexico. In the Caribbean, movements include migration to the United States during tourism and construction seasons, as well as intraregional flows: the Dominican Republic and the Eastern Caribbean islands receive seasonal workers—mainly from Jamaica and Haiti—to meet peak labor demand (Busso et al., 2023).

For rural households, these forms of mobility generate remittances that smooth consumption and facilitate investment in education, health, or small productive assets. It is estimated that around 40% of remittances in the region are directed to rural areas (Vasconcelos et al., 2017). However, the temporary nature of these arrangements can exacerbate labor precarity in destination areas and increase the vulnerability of households of origin during the absence of adult members.

Overall, seasonal migration—both internal and international—constitutes a key labor strategy for rural households, organized around productive cycles and temporary opportunities, but it is also associated with family costs and labor risks that call for targeted protection policies.

Rural emigration today

Rural–urban migration in LAC is a long-standing process, historically associated with industrialization and the expansion of services, with heterogeneous timing and intensity across

countries. In countries that urbanized early (Argentina, Brazil, Chile, Mexico, and Uruguay), the peak of the rural exodus was observed mainly in the 1980s and moderated during the 1990s. In countries

with later urbanization (Bolivia, Guatemala, Panama, and the Dominican Republic), the peak occurred in the 1990s (Rodríguez Vignoli, 2004).

Graph 6.9 presents recent evidence on migration originating in rural areas along two dimensions.¹³ Panel A shows the rural emigration rate, defined as the annual average number of people who left rural municipalities over the previous five-year period, divided by the rural population at the beginning of that period.¹⁴ By contrast, Panel B presents the rural net migration rate, which captures the net migratory balance of rural municipalities—that is, the annual average difference between the number of people entering and leaving rural municipalities, divided by the rural population five years earlier/ divided by the same rural population base. A negative net migration rate indicates that more people left rural areas than entered them. This distinction is essential for understanding not only the magnitude of migration flows but also their net demographic impact.

Within Panel A, countries such as Brazil, Chile, Colombia, and Peru record the highest levels of rural emigration, with rates that in some cases reach or exceed 2% of the total rural population per year. At the other extreme, countries such as Cuba, El Salvador, and Mexico exhibit more moderate outflows, at around 1% per year, likely reflecting the fact that their migration peaks occurred earlier and the importance of international migration, the magnitude of which cannot be adequately measured using available census data.

● ●
Since the 2010s, rural emigration has implied the annual departure of between 1% and 2% of the rural population

● ●
On average, 50% of people leaving rural municipalities move to urban areas; the rest split in similar shares between semiurban and rural municipalities

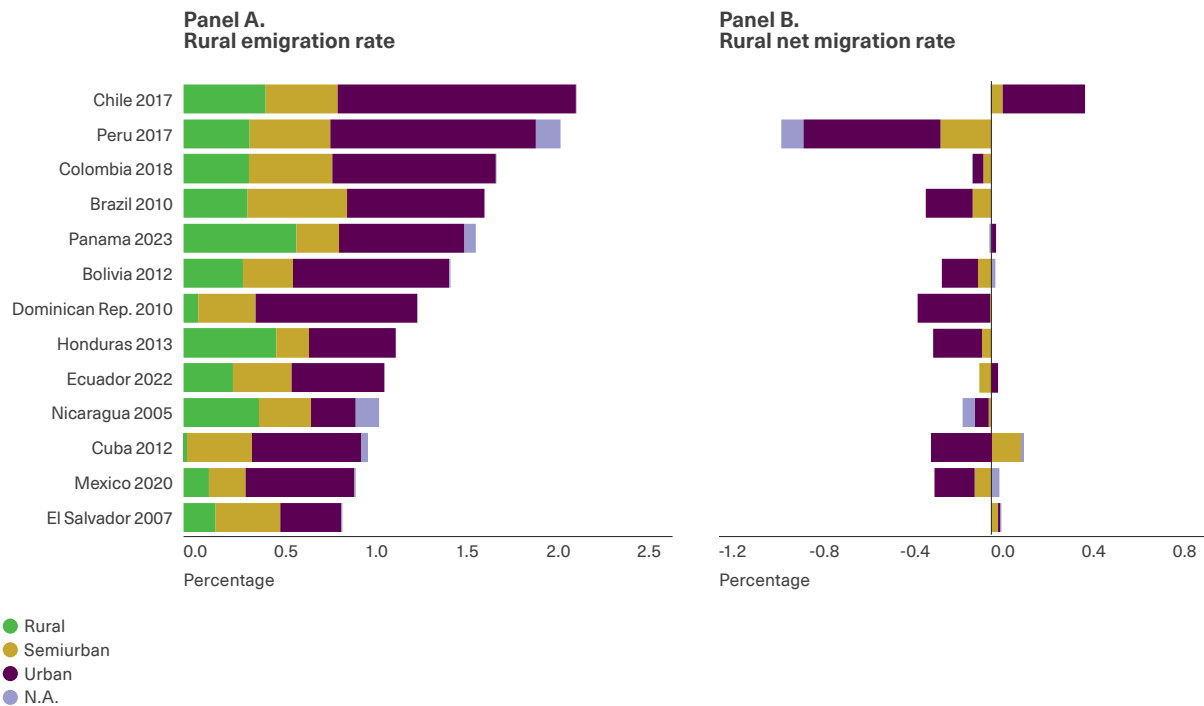
By contrast, net migration patterns differ from those observed for emigration (Panel B). Although countries such as Chile, Colombia, Ecuador, and Panama register relatively high levels of outflows from rural areas, their net migration balances are low or even positive, suggesting that these outflows are partially offset by inflows from other areas. In the case of Chile, for example, high rural emigration is offset by particularly strong urban-to-rural migration, resulting in a positive net balance. By contrast, Peru exhibits both one of the highest rural emigration rates and the most negative net migration balance in the region, with an annual loss close to 1% of its rural population, making it the country with the largest net loss of rural population in LAC.

With respect to destinations, on average, 50% of people migrating from rural municipalities move to urban municipalities, while the remainder is distributed in similar shares between semiurban and rural municipalities (see Graph A.6.4 in the appendix, available in the online edition of the RED). This average structure masks important heterogeneity: for example, in Chile, Cuba, the Dominican Republic, and Mexico, more than 60% of rural emigrants move to urban municipalities, whereas in Ecuador, Honduras, and Panama, movements to other rural municipalities account for between one quarter and nearly half of emigration from rural areas, reflecting short-distance trajectories and labor strategies linked to the rural economy itself.

13 The data reported in this section are based on the authors' calculations using census sources. For Bolivia, Chile, and Mexico, census microdata available through IPUMS International (Ruggles et al., 2025) were processed. For Ecuador, the analysis relies directly on the results of the 2022 National Population and Housing Census (INEC, 2024). For Brazil, Colombia, Cuba, Honduras, Panama, Peru, and the Dominican Republic, the information comes from the MIALC database (CELADE–Population Division of ECLAC, n.d.). The classification of the degree of urbanization of municipalities of origin and destination is based on the DEGURBA typology (see Boxes 6.1 and 6.2): for the place of origin, the classification in effect five years prior to the census is applied, while for the destination, the classification corresponding to the census year is used.

14 The migration rate is expressed as an annual average. It is calculated by dividing by five the total number of people who migrated during the previous five-year period (based on the census question on place of residence five years earlier), assuming that migration is evenly distributed over that period. This annual average is then divided by the total population of the reference group (for example, the rural population five years earlier), so that the resulting figure reflects the relative annual migration flow.

Graph 6.9
 Rural emigration and net migration rates from rural municipalities in Latin America and the Caribbean



Note: The classification of the degree of urbanization of municipalities of origin and destination is based on the DEGURBA typology. For the calculation of rates, the population residing in rural municipalities five years prior to the census is used, except in the case of Bolivia, Chile, Ecuador, and Mexico, where the population residing in rural municipalities at the time of the census is used.

Source: Authors based on IPUMS (Ruggles et al., 2025), INEC (2024), census data processed from MIALC (CELADE–Population Division of ECLAC, n.d.) and Schiavina et al (2023).

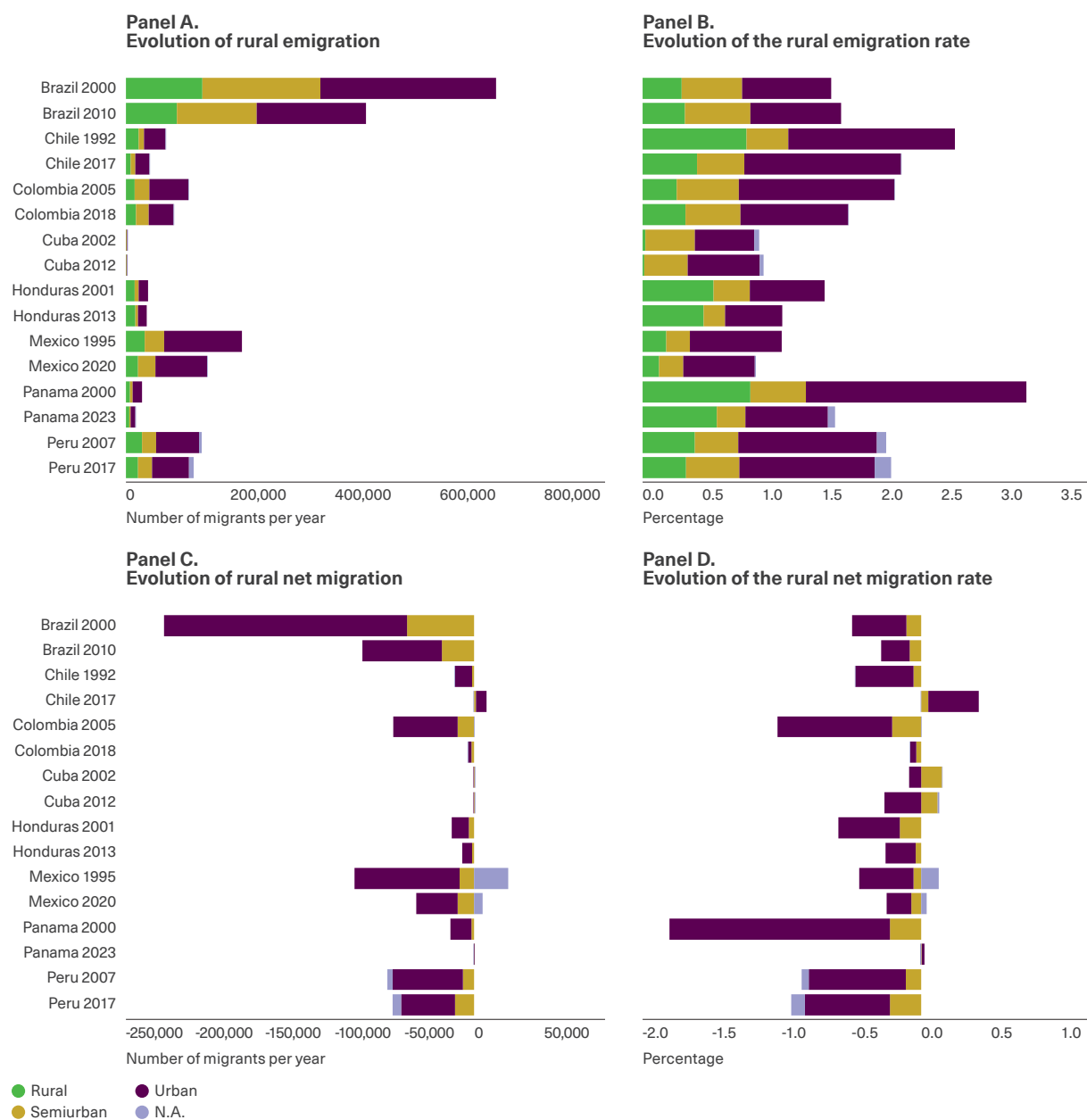
Evolution of rural emigration in recent decades

Panels A and B of Graph 6.10 show the evolution of rural emigration over recent decades across selected LAC countries, allowing for the identification of relevant changes in internal mobility patterns. Overall, migratory flows from rural municipalities have experienced a slight slowdown in recent years, in line with the existing literature (Rodríguez Vignoli, 2017). In absolute terms, the decline in the number of rural emigrants in Brazil between 2000 and 2010 is

notably sharp, potentially reflecting greater territorial stabilization or a reduction in the rural population with migration potential. Similarly, Colombia and Mexico show a decline in the magnitude of rural emigration between the two periods observed, while figures in Honduras, Panama, and Peru remain relatively stable.

Graph 6.10

Temporal evolution of migration originating in rural municipalities, by degree of urbanization of the destination municipality



Note: The classification of the degree of urbanization of municipalities of origin and destination is based on the DEGURBA typology. For the calculation of rates, the population residing in rural municipalities five years prior to the census is used, except in the case of Bolivia, Chile, Ecuador and Mexico, where the population residing in rural municipalities at the time of the census is used.

Source: Authors based on IPUMS (Ruggles et al., 2025), INEC (2024), census data processed from MIALC (CELADE–Population Division of ECLAC, n.d.) and Schiavina et al (2023).



Overall, migratory flows from rural municipalities have experienced a slight slowdown in recent years

When rural emigration rates are considered, the evolution also points to a downward trend in most countries. In Panama, for example, the rate declines markedly between 2000 and 2023, as it does in Peru between 2007 and 2017 and in Honduras between 2001 and 2013. In Colombia, rural emigration as a share of the population falls sharply between 2005 and 2018, potentially reflecting the end of the Colombian armed conflict. The persistence of relatively high percentages in Brazil indicates that, despite the decline in absolute numbers, rural emigration remains a relevant phenomenon relative to the size of its rural population.

Panels C and D of Graph 6.10 show the evolution of rural net migration toward urban and semiurban municipalities, both in absolute terms and as a share of the rural population. Compared with

emigration trends, the decline in outflows from rural areas is even more pronounced when net migration is considered. In countries such as Brazil and Colombia—where emigration declined between the two observation points—net migration balances fall even more sharply, suggesting that outflows have decreased more than proportionally or that return migration has increased. For example, Brazil shifts from a negative net balance in 2000 to a substantially smaller one in 2010, despite continuing to record significant levels of rural emigration.

Similarly, in relative terms, there is a generalized decline in net migration as a percentage of the rural population, more pronounced than that observed for emigration indicators. This suggests that, although mobility persists, return movements (or movements between non-urban areas) have intensified. These patterns may reflect changes in residential strategies, more flexible linkages between rural and urban areas, or increasing constraints on permanent settlement in urban settings.

Rural immigration

Rural immigration has become increasingly relevant in several Latin American countries (Martínez Villa & Rosá, 2025). As shown in Panels B and C of Graph 6.10, although rural emigration to urban municipalities remains the dominant trend, a sustained increase in movements in the opposite direction—from urban or semiurban municipalities to rural municipalities—has been observed in a number of national contexts, with significant implications for the structure and development of these territories. In Chile, census data from 2017 show for the first time that immigration into rural areas exceeds emigration from them, reversing the pattern observed in the 1990s. The evidence suggests that these inflows originate mainly in the Metropolitan Region and are directed toward rural municipalities in the central and southern parts of the country, following a pattern associated with amenity-driven migration, tourism development, and

new real estate opportunities (INE, 2020; Marchant & Rojas, 2015; Martínez Villa & Rosá, 2025).



Rural immigration does not exceed emigration, but it reaches meaningful levels. Although it remains a minor phenomenon in aggregate terms, it plays a growing role in the demographic reconfiguration of rural territories

In other countries in the region, rural immigration does not surpass emigration but nevertheless reaches meaningful levels. According to the most recent censuses, immigrants arriving in rural

municipalities account for around 1% of the rural population per year in Bolivia, Brazil, Colombia, the Dominican Republic, Panama, and Peru (Martínez Villa & Rosá, 2025) and their numbers have grown steadily where comparable census information is available.¹⁵ Although this remains a minor phenomenon in aggregate terms, it plays an increasingly important role in the demographic reconfiguration of rural territories, particularly in contexts of overall population decline. While

a detailed analysis of this process is beyond the scope of this report, existing studies find that these inflows originate primarily in urban or semiurban municipalities and respond to a range of factors, including access to land, the availability of non-agricultural employment, and so-called “amenity migration,” linked to the search for more attractive natural or cultural environments (Marchant & Rojas, 2015; Millán-Otero & Torrejón Cardona, 2023).

Who leaves and who arrives in rural areas?

Age and demographic profile of rural migration in the region

An analysis of the age pattern of internal emigration in LAC shows that this phenomenon is particularly pronounced among young people aged 14 to 29, regardless of the degree of rurality of the municipality of origin, as shown in Table A.6.1 in the appendix (available in the online edition of the RED). Moreover, emigration is especially intense from rural municipalities. This result, combined with the progressive aging of the rural population, reinforces the evidence discussed earlier regarding rising dependency ratios in these areas. A demographic structure characterized by population aging and the departure of working-age individuals directly contributes to an increase in the dependent population in rural areas.

These age patterns are consistent with the push and pull factors described at the beginning of this section. During adolescence and early adulthood, limited educational and labor opportunities in rural areas—together with the concentration of study, employment, and services in urban and semiurban areas—make migration an especially attractive option. As individuals move through the life cycle, the consolidation of family and employment

projects, along with the higher economic and emotional costs of relocation, reduces the propensity to migrate. As a result, internal mobility is concentrated at relatively young ages.



Rural emigration is particularly significant among young people aged 14 to 29, contributing to the aging of the population in these areas

By contrast, the age profile of immigration to rural municipalities tends to be older than that of those leaving rural areas. In the countries analyzed—Brazil (2010), Peru (2017), and Colombia (2018)—most individuals arriving in rural areas are between 30 and 59 years old. The exception is Honduras (2013), where the dominant group is aged 15 to 29 (Martínez Villa & Rosá, 2025). Taken together, the combination of predominantly young rural emigration and older rural immigration means that the negative net migration observed in many rural municipalities contributes to population aging in rural areas.

¹⁵ This increase in immigration is observed in Panama (2023 relative to 2000), Honduras (2013 relative to 2001), Colombia (2018 relative to 2005), and Chile (2017 relative to 1992). The only countries in the sample where rural immigration has declined over time are Brazil (2000 relative to 2010) and Mexico (1995 relative to 2020).

Characterization using census microdata: Mexico and Chile

Using microdata from the most recent censuses available for Mexico (2020) and Chile (2017), a comparative analysis is conducted of individuals who resided in rural municipalities five years prior

to the census. The objective is to characterize those who migrated from these municipalities during that period and to compare them with individuals who remained in rural areas. Because the census migration question refers to place of residence five years earlier, it does not allow the precise timing of migration to be identified, only that it occurred at some point within that interval.

Table 6.1
Demographic characteristics of migrant and non-migrant rural population

Panel A. Chile 2017

Variable	Non-migrant	Rural emigrant	Difference: Emigrant vs. non-migrant	Rural immigrant	Difference: Immigrant vs. non-migrant
Age	41.0	31.8	-9.2***	35.6	-5.4***
Woman	50.1%	49.3%	-0.8***	48.1%	-2.0***
Primary	36.9%	21.2%	-15.7***	27.3%	-9.6***
Secondary	36.5%	61.1%	24.6***	50.1%	13.6***
University	3.6%	9.7%	6.1***	13%	9.4***

Panel B. Mexico 2020

Variable	Non-migrant	Rural emigrant	Difference: Emigrant vs. non-migrant	Rural immigrant	Difference: Immigrant vs. non-migrant
Age	34.8	28.4	-6.4***	30	-4.8***
Woman	51.3%	52.4%	1.1***	51.4%	0.1***
Primary	48.2%	45.4%	-2.8***	49.5%	-1.3***
Secondary	16%	32.9%	16.9***	24.8%	8.8***
University	4.5%	10.1%	5.6***	13.3%	8.8***

Note: The table presents averages for the Chilean population in 2017 and the Mexican population in 2020. Means for educational variables are calculated for the population aged over 18. Rural emigrants are defined as individuals who, five years prior to the census, resided in a locality classified as rural according to the closest available DEGURBA typology and who, at the time of the census, report living in a different, non-rural locality. Rural immigrants are defined as individuals residing in a rural municipality at the time of the census who did not reside in one five years earlier, following the methodology of Martínez Villa and Rosá (2025). ***p-value <0.01; **p-value <0.05; *p-value <0.1%.

Source: Authors based on the 2020 census in Mexico and the 2017 census in Chile (Ruggles et al., 2025) and Schiavina et al. (2023)

Table 6.1 shows that 53% of those emigrating from rural municipalities in Mexico are women, while in Chile the share is slightly lower (49%). With respect to age, census microdata allow for a more precise analysis than broader age brackets used in sources such as MIALC. In Mexico, the average age of those emigrating from rural areas is 28.4 years,

suggesting that many departures occur between ages 23 and 28, toward the upper end of the 14–29 range. In Chile, the average age of rural emigrants is higher, falling between 26 and 31 years, pointing to a later migration pattern, possibly associated with family or labor decisions. In both countries, individuals who leave rural areas are significantly

younger than those who remain, contributing to the relative aging of the places of origin (Martinez Villa & Rosá, 2025).



The data suggest that rural-urban migration largely involves young, working-age individuals with relatively higher levels of education, thereby deepening productivity gaps relative to urban areas

Educational attainment further differentiates migrants from non-migrants. In Mexico, individuals who emigrated from rural municipalities are 17 percentage points more likely to have completed secondary education and nearly 6 percentage points more likely to have completed university education than those who remained in rural areas (see Table 6.1). In Chile, the gap in completed secondary education is even larger—close to 25 percentage points—while the difference in university education is similar, at around 6 percentage points.

Although this analysis does not allow for a definitive determination of whether migrants already had higher education levels prior to migrating or acquired them afterward, the evidence suggests that rural-urban migration is largely composed of young, working-age individuals with relatively higher

levels of education. This dynamic has important implications: it reduces the accumulation of human capital in rural areas and thus deepens productivity and development gaps relative to urban areas.

With respect to the profile of immigrants to rural areas, Table 6.1 shows that in Chile the average age at arrival ranges between 30 and 35 years, while in Mexico those arriving in rural municipalities are between 25 and 30 years old. In both cases, these individuals are younger than the average age of the rural population in the receiving municipalities. In terms of gender composition, slightly fewer women than men arrive in rural municipalities in Chile, while the opposite pattern is observed in Mexico. Regarding human capital, in both countries those who move into rural municipalities are significantly more educated than the resident rural population: around 13% have completed university education, compared with 3.6% and 4.5% of the rural resident population in Chile and Mexico, respectively. In addition, in Chile approximately 22% of these immigrants are returnees to their municipality of origin. In summary, rural immigration tends to rejuvenate receiving municipalities and increase their stock of human capital, but it does not entail major changes in gender composition



Rural immigration tends to rejuvenate receiving municipalities and increase their stock of human capital

Migrating toward opportunity?

While identifying the causal effect of migration on the well-being of the rural population lies beyond the scope of this report, from a public policy perspective, it is essential to understand how the living and working conditions of migrants change in order to design evidence-based instruments and incentives.

Descriptive evidence using microdata: Mexico and Chile

The descriptive analysis of census microdata for Mexico, presented in Table A.6.1 in the appendix (available in the online edition of the RED), shows that rural migrants display, on average, better

indicators of access to basic services (especially piped water and, to a lesser extent, electricity) as well as greater access to information and communication technologies, but a lower likelihood of owning their home. These patterns are consistent with the literature documenting that access to housing—and particularly to adequate-quality housing—may deteriorate as a consequence of migration and can even become a barrier to migration (Lagakos et al., 2023).

In labor market terms, Martínez Villa and Rosá (2025) show that in both Mexico and Chile migration from rural areas is associated with stronger labor market attachment and changes in occupational structure. In Mexico, migrants exhibit clearly higher employment rates and lower unemployment than those who remain in rural areas. In Chile, while employment gaps are more limited, migration is associated with lower participation in primary activities (agriculture, fishing, and forestry) and a higher likelihood of working in non-manual occupations (commerce, public administration, business and real estate services), and to a lesser extent in manual activities such as manufacturing, construction, and paid domestic work—the latter being particularly relevant for female migration (Rodríguez Vignoli, 2019).

Regional evidence: Comparing sending and receiving municipalities

To extend the analysis beyond Mexico and Chile and characterize the origin–destination patterns of migration from rural municipalities in LAC, territorial indicators from CAF’s local and regional government database (CAF, 2025a) are combined with census information to identify the ten rural municipalities with the highest population outflows and the ten non-rural municipalities with the highest attraction of internal migrants in the region (Graph 6.11). Overall, rural migrants tend to originate from municipalities with higher unemployment rates, lower human capital accumulation, and poorer access to basic services, and move toward localities that, on average, offer better infrastructure and broader service coverage.

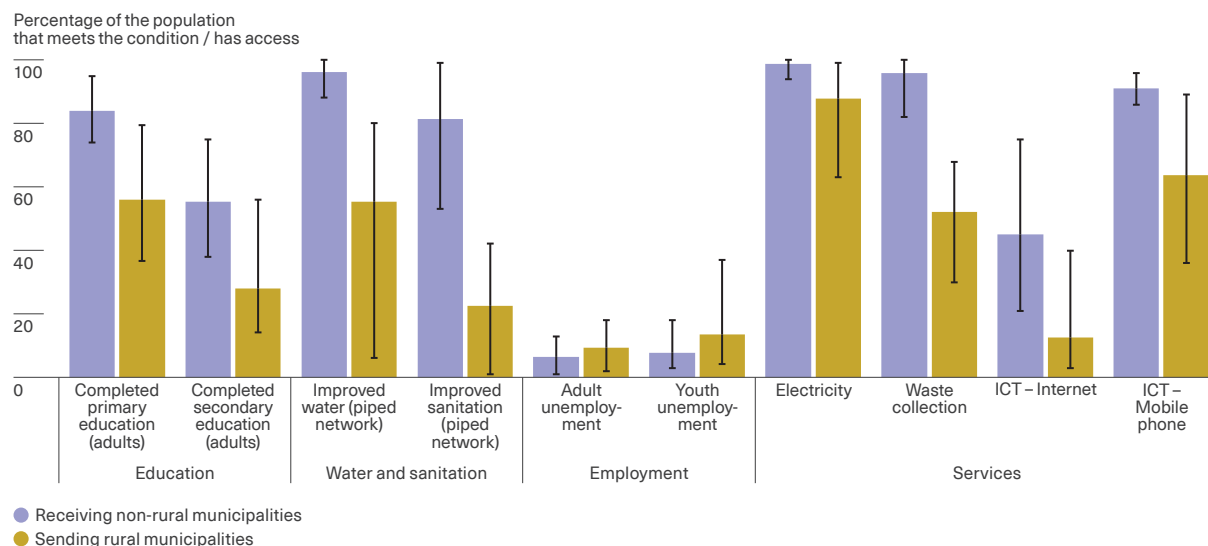


Overall, rural migrants tend to originate from municipalities with higher unemployment, lower human capital accumulation, and poorer access to basic services, and move toward localities that, on average, offer better infrastructure and service coverage

When accounting for cross-country heterogeneity, Martínez Villa and Rosá (2025) show that in Bolivia, Colombia, Honduras, and Panama unemployment rates—particularly youth unemployment—can be higher in the urban municipalities receiving migrants than in the rural municipalities sending them. This suggests that migration to cities does not guarantee a generalized improvement in labor market opportunities. This pattern is consistent with two non-mutually exclusive interpretations: (1) that rural migrants, who are positively selected in terms of age and education, are not necessarily moving toward labor markets that are less attractive from their individual perspective, and (2) that a share of migrants does settle in cities with lower dynamism and poorer aggregate employment conditions. The latter interpretation aligns with the literature on urban congestion or saturation and high informality (Busso et al., 2023; Fields, 1975; Inquilla-Mamani et al., 2023; Lara et al., 2020; Maloney, 2004), which documents how large inflows of population into low-dynamism urban labor markets can raise unemployment and informality and limit the city’s potential as a pathway for upward mobility for some rural migrants. The scarcity of studies with causal identification on rural emigration in LAC, however, constrains the ability to precisely identify which mechanisms dominate this process.

Graph 6.11

Profile of the rural municipalities with the highest outflows and the non-rural municipalities with highest inflows of rural population



Note: The graph shows the mean values of selected development indicators for the ten cities receiving the largest number of rural migrants among those analyzed (Santa Cruz de la Sierra in Bolivia; Brasília, Fortaleza, Rio de Janeiro, Salvador de Bahia, and São Paulo in Brazil; Bogotá in Colombia; Distrito Central in Honduras; Tijuana in Mexico; and Lima in Peru), compared with the ten rural areas with the highest outflows. Error bars show minimum and maximum values within each group. Sending municipalities (Campo Formoso, Cometá, Novo Repartimento, Santana do Acaraú, and Santa Luzia in Brazil; Coqueta in Colombia; Chone and Guaranda in Ecuador; Juticalpa in Honduras; and Hato Mayor in the Dominican Republic) were identified by ranking all rural subnational areas included in the MIALC censuses and matrices by total number of emigrants and assigning development indicators using information from CAF (2025a). See Martínez Villa and Rosá (2025) for a country-level disaggregated analysis.

Source: Authors based on IPUMS (Ruggles et al., 2025), INEC (2024), census data processed from MIALC (CELADE–Population Division of ECLAC, n.d.), Schiavina et al. (2023), and CAF (2025a).

Balance of the evidence and public policy challenges

In sum, migration from rural municipalities in LAC—although it has slowed, due both to reduced emigration and the incipient rise in rural immigration in several countries—continues to contribute to rural population decline and is linked to limited service provision, low productivity, and scarce economic opportunities at origin. Migrants tend to be younger and relatively better educated, suggesting positive selection and the potential for widening of rural–urban gaps. Population outflows reduce density and may discourage investment in infrastructure and services, reinforcing a vicious cycle of lagging development. For those who

are able to migrate, descriptive evidence points to improvements in labor outcomes, access to services, and human capital accumulation, but also to significant housing-related costs and heterogeneous outcomes depending on the country and city of destination.

Beyond this descriptive evidence, what is known using (quasi-)causal identification in LAC remains limited and is concentrated almost exclusively on Brazil, with a focus on receiving cities. These studies document impacts on labor markets, housing, urban services, and crime (Busso et al., 2025; Egger, 2022; Feler & Henderson, 2011; Ferré, 2011; Ferreira et al., 2025; Imbert & Ulyssea, 2022), but provide less evidence on the welfare of rural households at origin. In parallel, descriptive work

for the region indicates that rural migrants often gain access to better jobs, but to more precarious housing and services (Busso et al., 2023; Rodríguez Vignoli, 2017), reinforcing the need for causal studies that allow for a comprehensive evaluation of the costs and benefits of migration.

The international literature complements this picture. Experimental and structural studies—primarily in Asia—show that migration, often seasonal, can operate as an insurance mechanism against income shocks and generate substantial welfare gains for poorer households (Bryan et al., 2014; Lagakos et al., 2023; Meghir et al., 2022; Morten, 2019), although extrapolating these findings to a highly urbanized region such as LAC

is not straightforward. Evidence on long-term effects is even more limited: outside the region, Ward (2022) documents sizable intergenerational income gains associated with internal migration in the United States, but no comparable studies exist for LAC.

In this context, the public policy debate remains open. Migration subsidies may provide relief to vulnerable households but risk deepening territorial inequalities, while strengthening basic services, infrastructure, connectivity, and risk-management mechanisms in rural areas seeks to ensure that migration is an option—rather than the only available strategy—for accessing opportunities.

Human development indicators: Health and education

Alongside profound demographic changes and declining poverty, the region has experienced significant social transformations. Among them, the expansion of human capital—encompassing skills, educational attainment, and health—stands out as a key dimension of well-being. Human capital formation is essential for improving life trajectories (Berniell et al., 2016), and inequalities in this process constitute a central mechanism through which intergenerational gaps are reproduced

in the region (Berniell et al., 2025). A healthier population also reduces pressure on health and care systems, while a more skilled population boosts productivity and adaptability in a context of technological and environmental change (Álvarez et al., 2018; Fernández et al., 2025). Although these improvements have also reached rural areas, gaps relative to urban areas persist and continue to constrain the development opportunities of the rural population.

Educational coverage

LAC has achieved sustained increases in basic education coverage, at both the primary and secondary levels. This progress has helped narrow gaps with urban areas (De la Mata et al., 2022). The improvements are reflected in higher years of schooling among younger generations. On average, according to CEDLAS (2025), while people aged over 55 living in rural areas accumulated five years of education in 2023 (compared with eight in urban areas), those aged 15 to 24 accumulated ten years (11 in urban areas), as shown in Panel A

of Graph 6.12. With the universalization of primary education in the region, primary school enrollment rates in 2023 reached 98% in rural areas, matching those observed in urban areas (Panel B of the same graph). At the secondary level, rural enrollment in 2023 stood at 75%, compared with 85% in urban areas. These gaps tend to be larger in countries with a relatively higher share of rural population (Fernández et al., 2025).

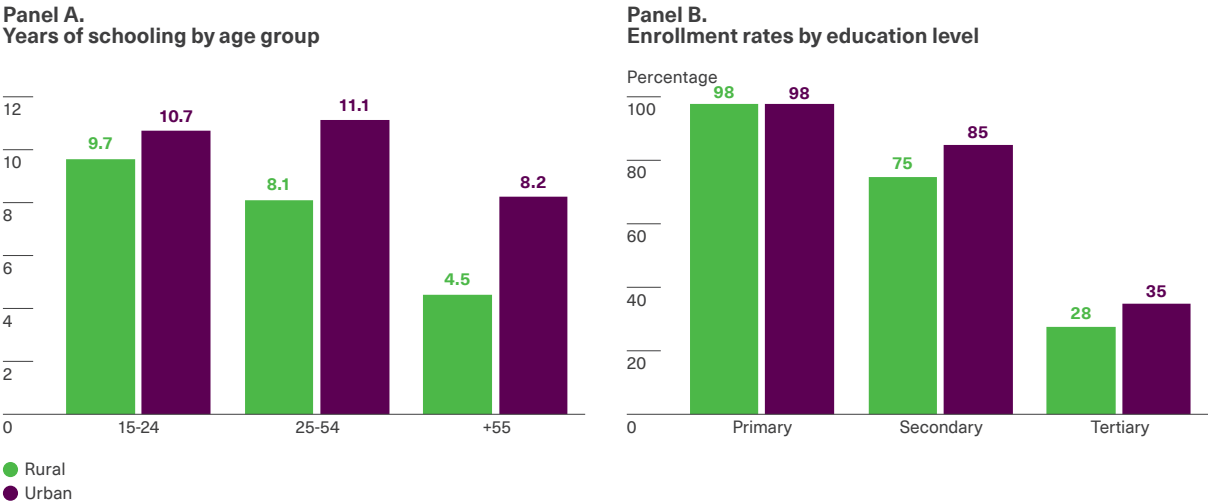


Rural ethno-education project for modular school construction supported by CAF in Timbiquí, Colombia.

Tertiary enrollment rates remain significantly lower in rural areas, reflecting limited opportunities for advanced training and specialization (see Panel B of Graph 6.12). To some extent, these gaps are expected, as the supply of education at this level tends to be concentrated—due to scale and cost considerations

(see Chapter 8)—in urban areas and, within them, in large cities. In addition, technical education and short-cycle programs, which have proven to be a viable option for expanding postsecondary education in geographically underserved areas, remain scarce in the region (Ferreya, 2017; Ferreyra et al., 2022).

Graph 6.12
Educational indicators in rural and urban areas. Average for Latin America and the Caribbean, 2023



Note: Simple average calculated using data from 14 countries (Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, Panama, Paraguay, Peru, and Uruguay).
Source: Authors based on CEDLAS (2025).

Learning outcomes in primary and secondary education

The substantial improvements in education coverage have not succeeded in closing learning gaps for students attending rural schools. These lags reflect, in part, the structural socioeconomic

disadvantages faced by the rural population, but they are also linked to differences in the quality of education provided, as discussed in greater detail in Chapter 8.



CAF Action.
Scan the QR code to learn more about the construction of educational centers in Timbiquí.



Despite major gains in education coverage, learning gaps among students in rural schools persist

Graph 6.13 presents the ratio between scores obtained by rural and urban students on standardized tests at the primary level (third and sixth grade) and at the secondary level (15-year-olds) in 2018.¹⁶ A value above one indicates a rural advantage, while a value below one reflects a disadvantage relative to urban areas. At the regional average (indicated by the dashed lines in the graph), the ratios remain below one at all education levels, pointing to a systematic learning gap in rural areas.

This lag is even more concerning given that urban performance levels in the region are already low compared with those of higher-income countries.

Notably, the rural–urban gap widens as students progress through the education system: ratios are lower at the secondary level than at the primary level, suggesting a cumulative process of disadvantage in skill acquisition (Berniell et al., 2016). In addition, at the secondary level, higher dropout rates in rural contexts may bias results upward, since students who remain in the system tend to perform better than the average of their cohort; as a result, actual learning gaps may be even larger than those observed under conditions of higher school retention.

Graph 6.13

Rural–urban ratio of average scores on standardized mathematics tests for third grade, sixth grade, and 15-year-old students in Latin America and the Caribbean, 2018



Note: The rural–urban ratio is calculated as the average score obtained by rural students on standardized mathematics tests divided by the average score of urban students. A value <1 indicates a rural disadvantage in test performance. For indicators derived from ERCE, the definition of rural and urban corresponds to that used by each country in those assessments. For PISA-based indicators, the rural variable is constructed using locality size.

Source: Authors based on CEDLAS (2025), using microdata from ERCE and PISA assessments.

¹⁶ The calculations use data from the Regional Comparative and Explanatory Study (ERCE), a standardized assessment coordinated by UNESCO in Latin America and the Caribbean to measure student learning and its determinants, and from the Programme for International Student Assessment (PISA), coordinated by the OECD.

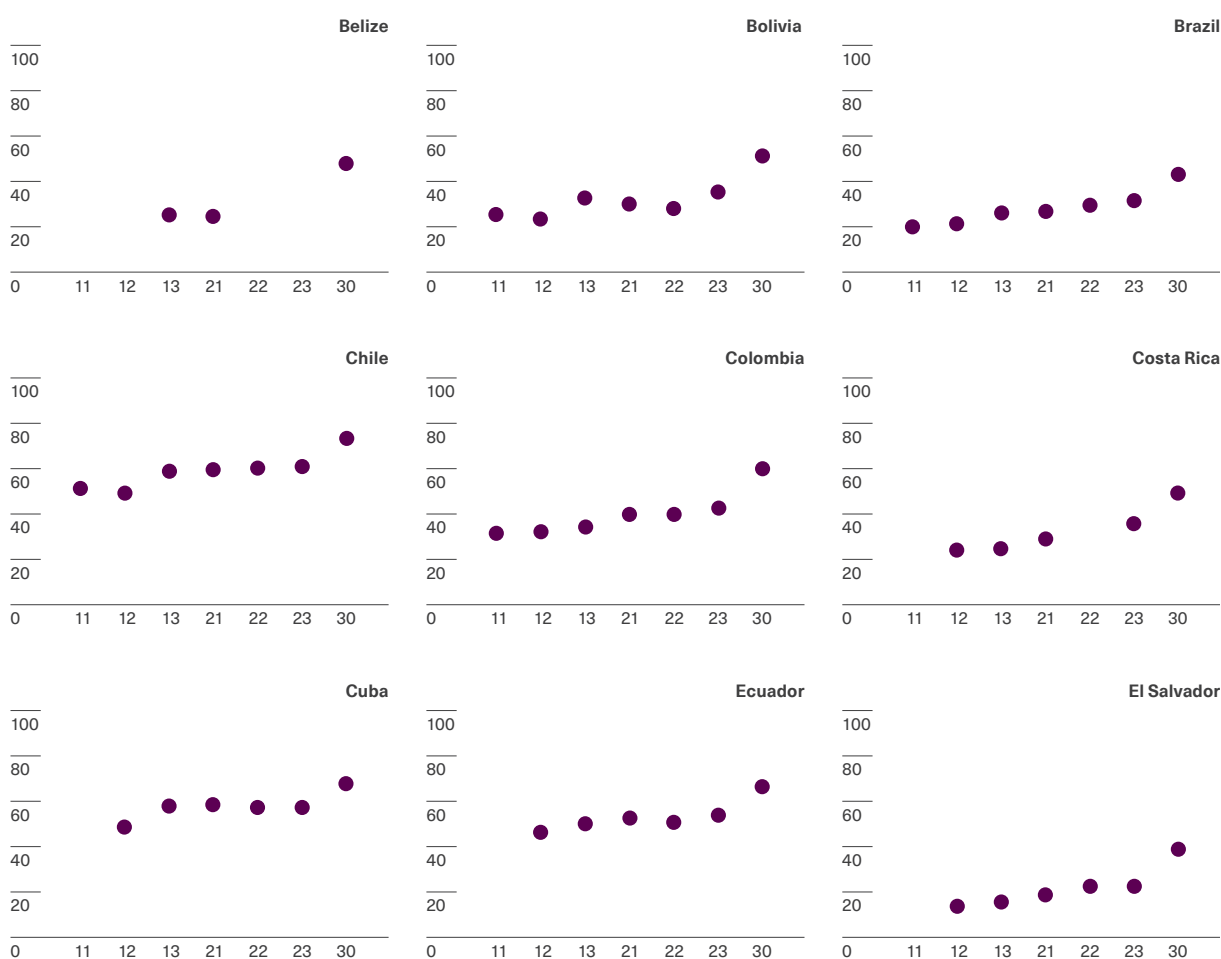
Education along the rural–urban continuum

The degree of rurality of the municipality of residence has a significant influence on educational opportunities. Graph 6.14 shows the percentage of the population with completed secondary education in municipalities classified by their level of urbanization according to the DEGURBA criterion. In most countries in the region, a clear gradient is observed: the higher the degree of urbanization of the municipality, the higher the share of people who

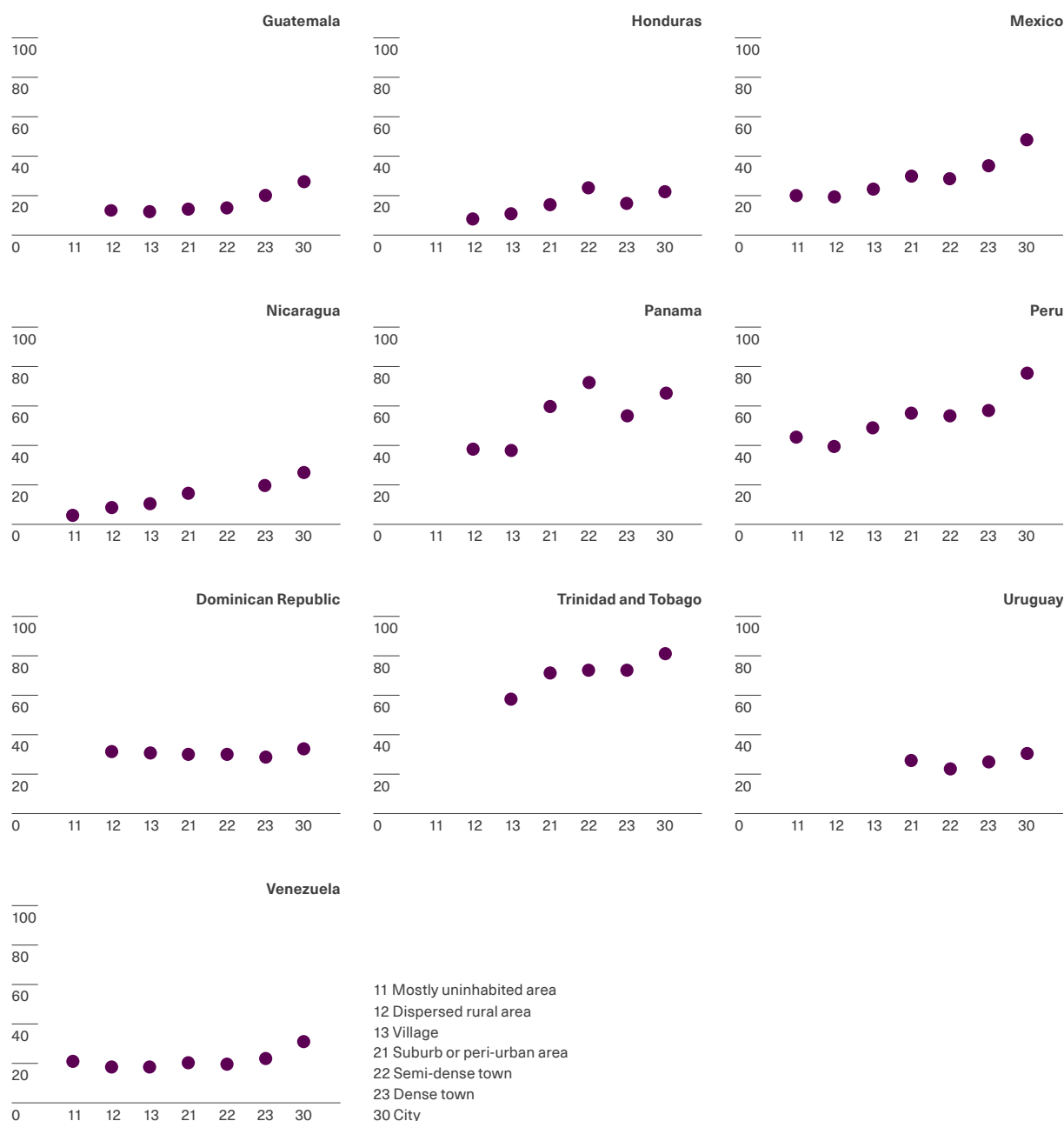
complete secondary education. Rural municipalities (villages, dispersed rural areas, and mostly uninhabited rural areas) consistently display the lowest completion levels for this education level, while semiurban municipalities (suburbs and dense or semi-dense towns) exhibit intermediate levels. This pattern highlights their potential role as spaces for territorial articulation in education policy.

Graph 6.14

Percentage of the population with completed secondary education by degree of municipal urbanization



Continued on the next page →



Note: Subnational administrative units are classified by degree of urbanization using the DEGURBA criterion (level 2). Under this classification, mostly uninhabited areas (11), dispersed rural areas (12), and units identified as villages (13) are considered rural. Units categorized as suburbs or peri-urban areas (21), semi-dense towns (22), or dense towns (23) are classified as semiurban, while units identified as cities correspond to urban areas (30). See Boxes 6.1 and 6.2 for a detailed description of the DEGURBA methodology. Census years by country are as follows: Belize, 2010; Bolivia, 2012; Chile, 2017; Colombia, 2018; Costa Rica, 2011; Ecuador, 2022; Guatemala, 2018; Honduras, 2013; Mexico, 2020; Nicaragua, 2005; Panama, 2023; Peru, 2017; Uruguay, 2011; and Venezuela, 2011.

Source: Authors based on CAF (2025a) and Schiavina et al. (2023).



The degree of rurality of the municipality of residence has a significant influence on educational opportunities

However, in some countries, this gradient is weak or even nearly flat. In other cases, it takes a U-shaped form. For example, Chile, Cuba, and Trinidad and Tobago show high and relatively homogeneous completion levels across all types of territories,

suggesting greater territorial equity. In countries such as the Dominican Republic, Uruguay, and Venezuela, some intermediate categories (suburbs or dense towns) display completion levels similar to—or even lower than—those observed in rural areas, indicating that the rural–urban pattern does not always follow a linear progression. These results underscore that closing education gaps requires improvements in both coverage and quality, with a territorial approach that addresses structural inequalities associated with the degree of rurality.

Health

Health is another key dimension of human development. Graph 6.15 presents the rural–urban ratio for several health indicators for children and adolescents and for adults. Because these are negative indicators of health outcomes and access, values above one indicate a rural disadvantage, while values below one reflect an advantage relative to urban areas.

Among children and adolescents (Panel A), indicators such as stunting, adolescent motherhood, and inadequate prenatal care show higher incidence in rural areas in all countries, with the exception of Barbados, Costa Rica, and Suriname for stunting. These patterns reveal structural shortcomings in access to essential services during critical stages of the life cycle (Bancalari et al., 2025).

Among adults (Panel B), some conditions, such as excess weight or hypertension, are equally prevalent or even less common than in urban areas. However, rural areas exhibit greater difficulties in the treatment and follow-up of chronic conditions, such as untreated hypertension, as well as in access to reproductive health services.



Health and education indicators show improvements in rural human capital, but progress remains insufficient to close the structural gaps that limit well-being and development opportunities

Taken together, health and education indicators show that human capital in rural areas has improved, but progress remains insufficient to close the structural gaps that continue to constrain well-being, productivity, and development opportunities for these populations. While part of these gaps in human development indicators is associated with poorer economic conditions and higher food insecurity among the rural population—that is, demand-side factors, as documented in Chapter 1—significant supply-side barriers also persist. These are analyzed in detail in Chapter 8 and include limitations in both access to and quality of education and health services.

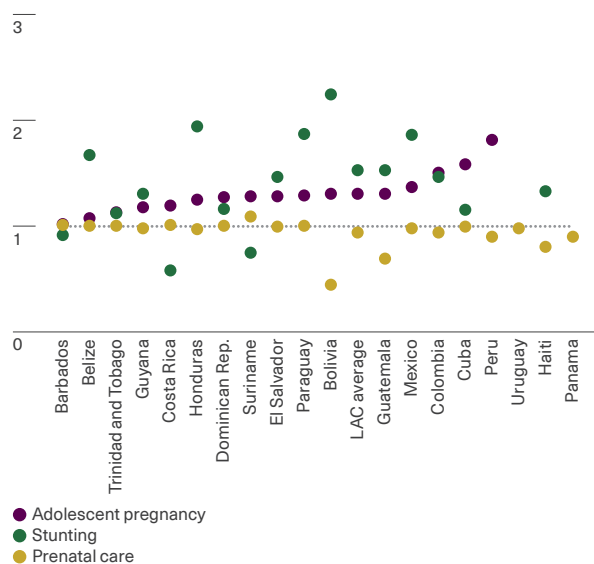


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Scan the QR code to explore CAF's educational infrastructure projects.

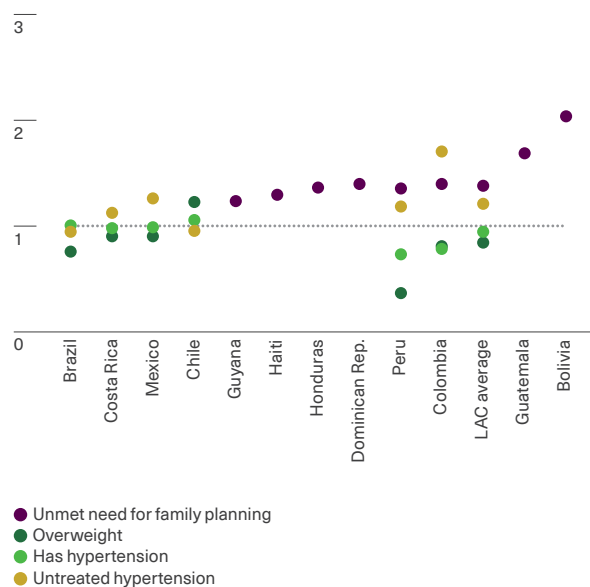
Graph 6.15

Rural–urban ratios for health indicators and access to health services

Panel A.
Children and adolescents



Panel B.
Adults



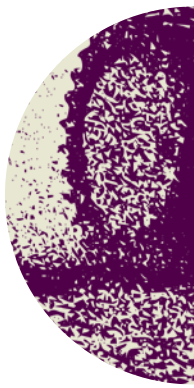
Note: The rural–urban ratio is calculated by dividing the value of each indicator in rural areas by the corresponding value in urban areas. Because these are indicators of poor health performance, values greater than one indicate a rural disadvantage in health, except in prenatal care, where values less than 1 indicate rural disadvantage. The most recent available data are used for each country. See Bancalari et al. (2025) for a detailed description of the indicators.

Source: Authors based on Bancalari et al. (2025), using Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), and national health surveys.



7

**Employment,
income, and
vulnerability
in rural areas**



Key messages

Although rural poverty has declined over the past two decades, households—particularly agricultural ones—remain highly vulnerable due to informality and limited diversification of income sources.

Over the last two decades, the rural poverty rate in Latin America and the Caribbean has been cut in half, yet it remains twice as high as the urban rate and still affects one in every three people living in rural areas.

Rural households are diverse: not all depend on agriculture, but those engaged independently in the agricultural sector face the highest levels of poverty and vulnerability.

Many vulnerable rural households—and within them, particularly women—devote a significant share of their time to subsistence production. While this activity provides a basic means of sustenance, it also increases these households' vulnerability to productive and climate-related shocks, reinforcing their disadvantages.

Rural employment is undergoing a transition. For the first time, fewer than half of workers are employed in agriculture, while non-agricultural jobs are gaining ground. Yet, two-thirds of rural workers are informally employed, and rural wages continue to lag.

Rural poverty is mitigated by private transfers such as remittances and by public transfers, although the latter still face constraints in coverage, sufficiency, and accessibility in rural areas and among specific groups.



Strengthening social protection is essential—by expanding income transfers and non-contributory pensions that are more adequate, better targeted, and effectively reach Indigenous populations and geographically isolated households. At the same time, linking social protection with productive inclusion is key to promoting upward mobility.



Diversifying rural employment requires investment in high-potential sectors—both agricultural and non-agricultural—supported by training and labor policies aligned with local demand and the ongoing transition toward more sustainable activities.



Reducing inequality calls for closing gender and ethnic gaps through the expansion of childcare services, investment in time-saving infrastructure, financial inclusion, and employment policies that promote the participation of women and Indigenous peoples in quality jobs.

Employment, income, and vulnerability in rural areas¹

Introduction

Rural areas in Latin America and the Caribbean (LAC) are marked by deep inequalities. Although rural poverty has fallen by half over the past two decades, it still affects one in three residents, twice that of urban poverty. Life in rural areas continues to be defined by greater risk and vulnerability resulting from limited access to basic services, poor infrastructure, and fewer job opportunities. Understanding how rural families make a living and the challenges they face is essential for designing policies that reduce inequalities and expand development opportunities.

The agricultural sector² has historically been the backbone of the rural economy and remains a vital source of income and employment (Gáfaro et al., 2025). Millions of households depend on agricultural activities, most of them through self-employment in small production units. However,

this sector combines low productivity with high levels of informality, leaving those who rely on it vulnerable to poverty and to economic or climate-related shocks. At the same time, fewer than half of rural workers are now employed in agriculture, reflecting a shift toward other occupations that, while expanding, do not always provide quality employment conditions.

This chapter updates and expands the available evidence on rural livelihoods. Unlike other reports that have examined employment and rural–urban gaps (Byerlee et al., 2008; Weller et al., 2016; Cicowiez et al., 2006), it offers a detailed picture of rural households' livelihood strategies and how they have evolved amid the region's ongoing structural transformation. The analysis draws on harmonized household survey indicators from CEDLAS (2025), the most comprehensive and consistent database

1 This chapter was written by Dolores de la Mata and Mariana Marchionni. Iván Albina and Juan Barnes provided research assistance.

2 Throughout the chapter, the term “agricultural sector”—or simply “agriculture”—is used to refer to the productive activities encompassing agriculture, livestock, hunting, and forestry.

for long-term socioeconomic monitoring—with representative data for rural and urban areas in 14 countries across the region from 2003 to 2023.

The findings reveal the diversity of rural realities. Not all households depend on agriculture, and among those that do, conditions vary widely. The greatest vulnerabilities are concentrated among households with limited income diversification—particularly those that rely almost entirely on self-employment in low-productivity agricultural work. Informality extends beyond agriculture, affecting a wide range of activities and limiting access to social protection, thereby perpetuating labor precariousness in rural areas.

In this context, progress in reducing poverty coexists with persistent challenges that disproportionately affect the most vulnerable groups in rural areas—particularly women and Indigenous peoples. This calls for policies that not only strengthen social protection but also promote productive inclusion.

The chapter concludes by underscoring the need to promote employment diversification toward higher-potential activities, foster labor formalization, and ensure that the most disadvantaged segments of the rural population can effectively access these opportunities. These are key steps to reducing rural households' vulnerability and expanding their development opportunities.

Rural households and their link to the agricultural sector

The process of structural transformation in LAC's economies has significantly reshaped the economic strategies and opportunities available to rural households. Far from the traditional stereotype of being purely agricultural,³ today's rural households display remarkable diversity—not only across countries, but also within them.

In this context, it is useful to distinguish between agricultural households, defined here as those in which the head of household or spouse has their main occupation in the agricultural sector—and other rural households.⁴ On average, one in four households in LAC lives in rural areas, and 44% of these are agricultural.⁵ Figure 7.1 illustrates how rural households are distributed according to this classification.

3 For simplicity, the term “agricultural” is used to refer both to households, as described in the text, and to income derived from that sector.

4 This definition is similar to that proposed by Gáfaró et al. (2025), with one key difference: those authors classify a household as agricultural if it has at least one member employed in the sector, while here a more restrictive criterion is applied—based on the occupation of the head or spouse. This approach avoids classifying as agricultural those households whose connection to the sector is marginal (for example, when the only member engaged in agriculture is a child, possibly as an unpaid worker) and assumes that the occupation of the head or spouse more accurately reflects the household's main axis of economic participation. Beyond this conceptual distinction, the share of households classified as agricultural does not differ substantially when applying either definition.

5 The countries included in the analysis are those covered in the CEDLAS (2025) database with representative data for rural areas over the 2003–2023 period: Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Honduras, Mexico, Panama, Paraguay, Peru, the Dominican Republic, and Uruguay. Graph A.7.1 in the appendix to this chapter, available in the online edition of the RED, shows the share of the rural population and rural households in the national totals derived from these data. Together, these 14 countries account for roughly 80% of LAC's rural population, according to estimates by the Latin American and Caribbean Demographic Centre (CELADE–ECLAC Population Division & DPNU, 2024). Throughout the chapter, the indicators presented correspond to the simple average of these 14 countries. The use of simple rather than population-weighted averages helps prevent results from being disproportionately influenced by the largest countries in demographic terms. Brazil and Mexico together represent 55% of the total rural population and 65% of the urban population in this sample. Rural areas are defined according to the criteria established by each country's national statistics institute.



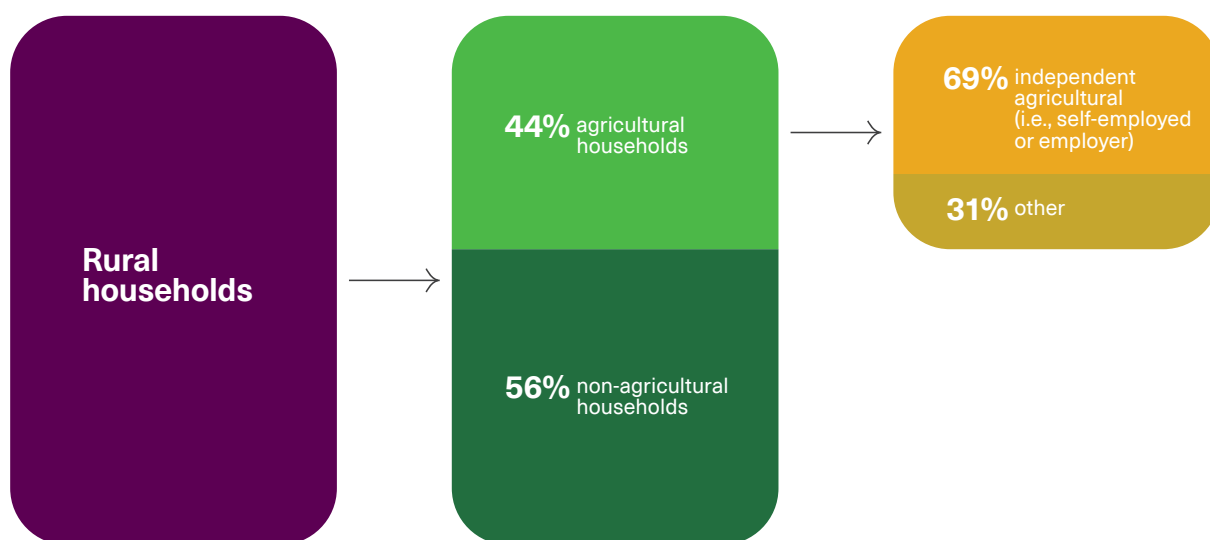
Far from the traditional stereotype of the purely agricultural household, today's rural households show remarkable diversity—not only across countries, but also within them

Among agricultural households, a particularly relevant subgroup stands out: independent agricultural households. This category includes those in which the head of household or spouse

is self-employed (61% of agricultural households) or an employer (8%). Unlike other agricultural households, their productive activity depends on their own capacity to generate income from land, family labor, and, in some cases, the hiring of additional workers. These households largely correspond to the small-scale production units that predominate in LAC (see Chapter 2) and are generally characterized by low productivity and high vulnerability. On average, they account for 69% of rural agricultural households and nearly one-third of all rural households in the region.

Figure 7.1.

Classification of rural households according to their employment link with the agricultural sector. Average for Latin America and the Caribbean, 2023



Note: Agricultural households are defined as rural households in which the head or spouse has their main occupation in the agricultural sector. Within this group, independent agricultural households are those in which the head or spouse is self-employed or an employer.

Source: Authors, based on CEDLAS data (2025).

Box 7.1

Agricultural households, land tenure, and agricultural production

Household surveys in El Salvador (ONEC, 2023), Mexico (INEGI, 2022), and Peru (INEI, 2024) include, in addition to the standard labor modules, agricultural modules that make it possible to compare the definition of agricultural household used in this chapter with indicators of agricultural production and land tenure.

According to the labor modules, rural agricultural households represent 26.8% of all rural households in El Salvador, 56% in Mexico, and 89% in Peru. Among them, independent agricultural households account for 58%, 74%, and 90%, respectively.

Data from the agricultural modules in El Salvador and Peru make it possible to examine the relationship between agricultural households and land ownership. In Peru, 61% of agricultural households own farmland, while in El Salvador the proportion is 22%.

The link with producer status is clear for independent agricultural households. For instance, all independent agricultural households in both El Salvador and Peru report engaging in agricultural production, whether for self-consumption, commercialization, or both. In terms of land tenure, ownership predominates among agricultural households in Peru (70%), although other arrangements are also observed, such as rental agreements (less than 4%) and sharecropping or lending (28%). In El Salvador, ownership is less common (34%), while rental and sharecropping are more prevalent (36% and 30%, respectively). In Mexico, the National Survey of Household Income and Expenditure (ENIGH) for 2022 does not collect data on land tenure but confirms that all independent agricultural households are also producer households.

This classification makes it possible to capture different degrees of exposure to long-term phenomena—such as the process of structural transformation—and to short-term shocks, whether climatic or macroeconomic, by focusing on the core of each household's productive strategy. Although the classification does not assume that agricultural households depend exclusively on agriculture, it is neither based on land ownership nor does it necessarily imply that they are producers. In practice, however, these dimensions often overlap, as illustrated in Box 7.1 with examples from El Salvador, Mexico, and Peru.



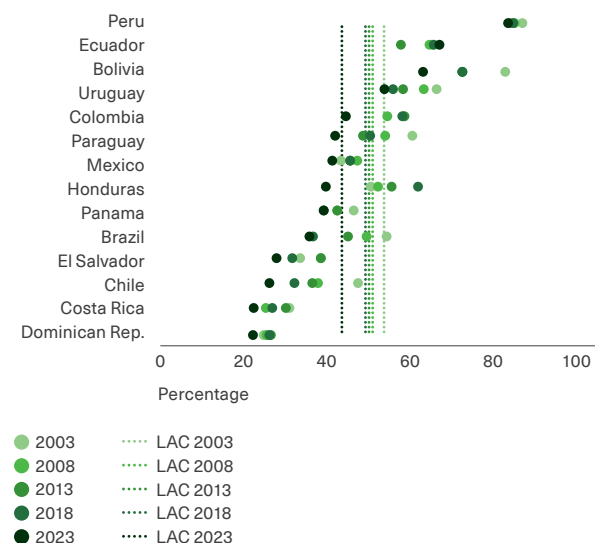
A clear downward trend is observed in the share of agricultural and independent agricultural households across most of the region

The share of agricultural households varies widely across countries, as shown in Panel A of Graph 7.1. In Peru, 84% of rural households are agricultural, compared with just 22% in Costa Rica and the Dominican Republic. These figures highlight the heterogeneity of the rural economy, with diverse forms of economic participation that, as discussed later, are associated with different levels of vulnerability. Cross-country differences are also evident in the relative share of independent agricultural households. Panel B of Graph 7.1 shows that this share ranges from 75% in Peru to only 7% in Costa Rica. This diversity translates into varying degrees of vulnerability, as explored in the following section. Beyond these cross-country differences, the graph also reveals a clear downward trend in both agricultural and independent agricultural households across most of the region over the past two decades, with particularly steep declines in Brazil, Bolivia, Chile, and Paraguay.

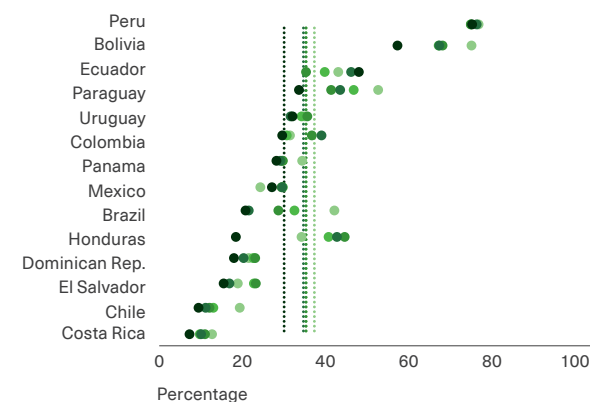
Graph 7.1

Evolution of the share of agricultural and independent agricultural households in total rural households in Latin American and Caribbean countries, 2003–2023

Panel A.
Agricultural households (percentage of rural households)



Panel B.
Independent agricultural households
(percentage of agricultural rural households)



Note: Agricultural households are defined as those in which the head or spouse has their main occupation in the agricultural sector. Within this group, independent agricultural households are those in which the head or spouse is self-employed or an employer.

Source: Authors, based on CEDLAS data (2025).

Rural household income

The income sources of rural households directly affect their level of economic vulnerability. This section examines the levels and trends of household income, poverty incidence, and the composition of total income for all rural

households, as well as for agricultural and independent agricultural households. Key aspects of income measurement in rural areas—essential for interpreting the statistics—are discussed in Box 7.2.

Rural income and the rural–urban poverty gap

Over the past two decades, LAC has experienced sustained growth in household income, accompanied by a sharp reduction in poverty (World Bank, 2022b; ECLAC, 2021; Gasparini et al., 2023). On average, per capita household

income—measured in constant 2017 dollars and adjusted for purchasing power parity (PPP)—grew by 58% between 2003 and 2023. Growth was stronger in rural households (87%) than in urban

Box 7.2

Measuring income in rural areas

Measuring income in rural areas poses specific challenges that must be considered to ensure an accurate interpretation of the statistics. These challenges relate to differences in the cost of living between rural and urban areas, the relative importance of non-monetary income, and the limitations of capturing such income in household surveys. The main methodological aspects are outlined below.

A first key aspect relates to differences in price levels and cost of living. CEDLAS (2015) estimates that, on average, prices in rural areas of LAC are about 15% lower than in urban areas. While national household surveys generally do not incorporate this adjustment, the CEDLAS database (2025) applies it uniformly across all countries, thereby improving regional comparability.

Another important factor is the greater prevalence of non-monetary income among rural households, such as the consumption of goods from their own agricultural or non-agricultural production, or payments in kind. The CEDLAS database (2025) includes a harmonized measure of total household income that incorporates both monetary labor income (such as wages and self-employment earnings) and non-monetary income (including the value of goods produced for self-consumption and remuneration in kind—for example, food, housing, or services provided by the employer). As discussed later, excluding self-consumption would underestimate available resources and distort poverty measurements, particularly among lower-income households.

A third aspect relates to income from agricultural activities, which accounts for a significant share of rural earnings. These incomes tend to show strong seasonal fluctuations, requiring reference periods long enough to reduce bias. In Colombia, for example, surveys use different reference periods depending on the area—monthly in urban zones and annual in rural ones. In most countries, however, this distinction is not applied.

Finally, it is also important to consider the limitations associated with income underreporting. Carletto et al. (2022) show that this bias is more pronounced for agricultural income and tends to increase with the level of well-being. Nevertheless, the evidence suggests that using self-reported income from household surveys remains the best available option for measuring poverty in LAC, given the lack of comparable and harmonized consumption data.

As discussed in detail in Chapter 6, sustained income growth has driven a significant reduction in poverty across the region, particularly in rural areas.⁶ On average, the share of the rural population living below the international poverty line of USD 6.85 per day declined from 66% to 34%, although it remains twice as high as in urban areas. This pattern is observed in most countries, albeit with varying degrees of progress.



Despite overall improvements in rural income, households engaged in agriculture—particularly those operating independently—remain among the most economically vulnerable

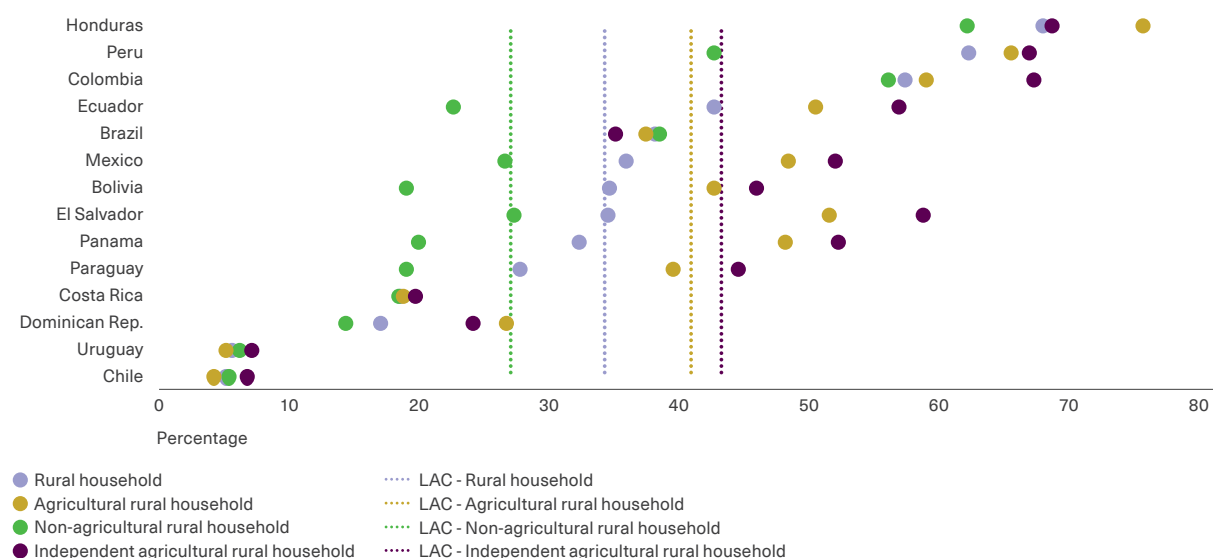
6 Haiti and Venezuela are likely the only exceptions to the general trend of poverty reduction in the region over recent decades, although no official statistics are available for these countries.

The reduction in rural poverty extends to all types of households—both agricultural and non-agricultural, and within the former, both wage-earning and independent. However, marked differences in vulnerability persist. In 2023, the rural poverty rate stood at 34%, but rose to 41% among agricultural households and 43% among independent agricultural households. In contrast, poverty incidence among non-agricultural rural households was considerably lower, at 27%.

This pattern is observed in nearly all countries (Graph 7.2), suggesting that engagement in agricultural activity—particularly when undertaken independently—remains associated with higher levels of economic vulnerability, even amid overall improvements in rural incomes.⁷ The exception is countries with high-productivity agriculture, such as Brazil, Chile, and Uruguay, where poverty levels show little variation according to households' degree of involvement in the agricultural sector.

Graph 7.2

Rural poverty in Latin American and Caribbean countries by household type, 2023



Note: Poverty is defined as the share of individuals living in households with income below USD 6.85 per person per day at purchasing power parity (PPP). Agricultural households are defined as rural households in which the head or spouse has their main occupation in the agricultural sector. Independent agricultural households are those in which the head or spouse is self-employed or an employer.

Source: Authors, based on CEDLAS data (2025).

7 When separating households of self-employed workers and employers (the two groups that make up the set of independent agricultural households), it becomes clear that the former are much poorer than the latter (45% versus 23%). However, since employers represent, on average, only about 8% of all agricultural households, they were kept within the broader group of agricultural households for the analysis presented in Graph 7.2. An additional finding is that agricultural non-independent households show, on average, lower poverty rates than independent ones. This result is particularly striking, as it contrasts with the historical view of day laborers as the most vulnerable group in Latin American rural societies—a view long associated in the literature with semi-feudal labor relations, landlessness, and peasant movements (Bobonis & Morrow, 2014; Knight, 1986; McCreery, 1983). The evidence suggests that, in the current context, that relative disadvantage has been reversed.



Chichicastenango Market, Guatemala.

How rural households generate income

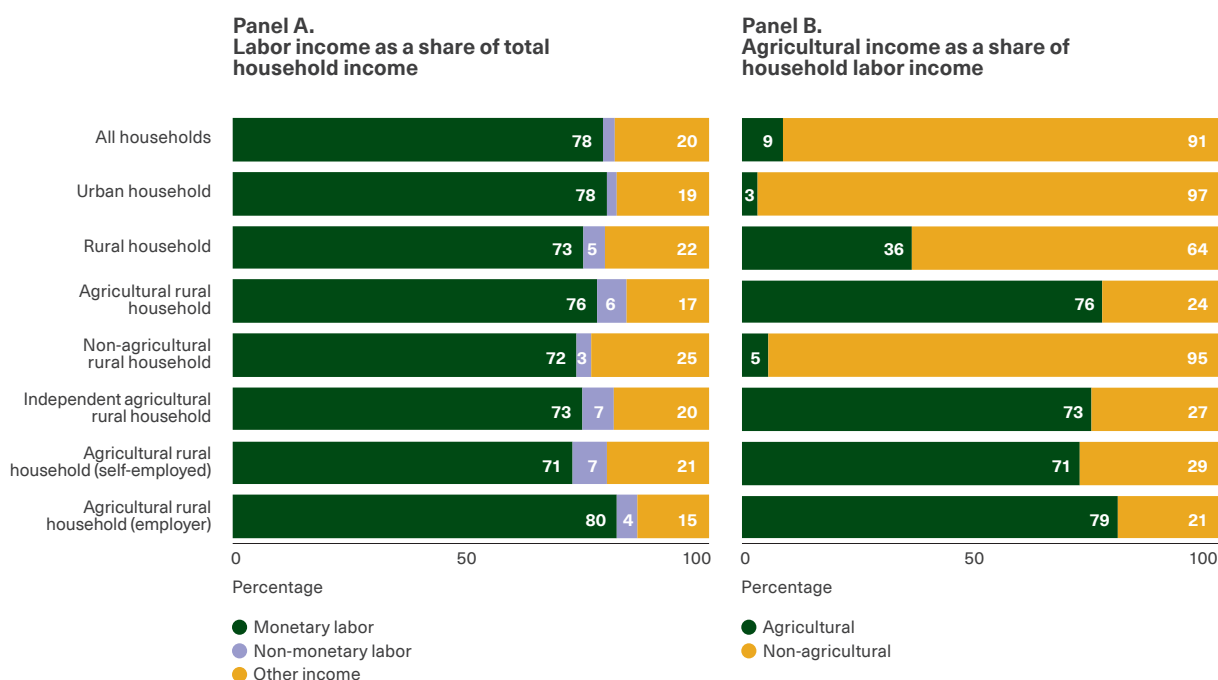
Most household income comes from work. According to household survey data, labor income—including both monetary and non-monetary components—accounts for an average of 78% of total income among rural households in the region, only slightly below the share observed among urban households (80%).

Panel A of Graph 7.3 shows that, within the rural population, agricultural households depend even more on labor income than other rural households. Labor income accounts for 82% of total income

among agricultural households and 75% among non-agricultural rural households. Within agricultural households, the share is slightly lower among independent ones, at 79%. This reflects the fact that this subgroup is concentrated in the lower deciles of the income distribution, where low self-employment productivity limits the relative contribution of labor income, while public and private transfers—such as remittances, family support, or community networks—make up a significant share of total household income.

Graph 7.3

Decomposition of household income by household type. Average for Latin America and the Caribbean, 2023



Note: Labor income includes both monetary income (such as wages or self-employment earnings) and non-monetary income (such as self-consumption and in-kind remuneration). Agricultural household income is estimated as the sum of all labor income (from both primary and secondary occupations) earned by members whose main occupation is in the agricultural sector. Agricultural households are those in which the head or spouse has their main occupation in agriculture, while independent agricultural households are those in which the head or spouse is self-employed or an employer. Totals may differ slightly from 100% due to rounding.

Source: Authors, based on CEDLAS data (2025).



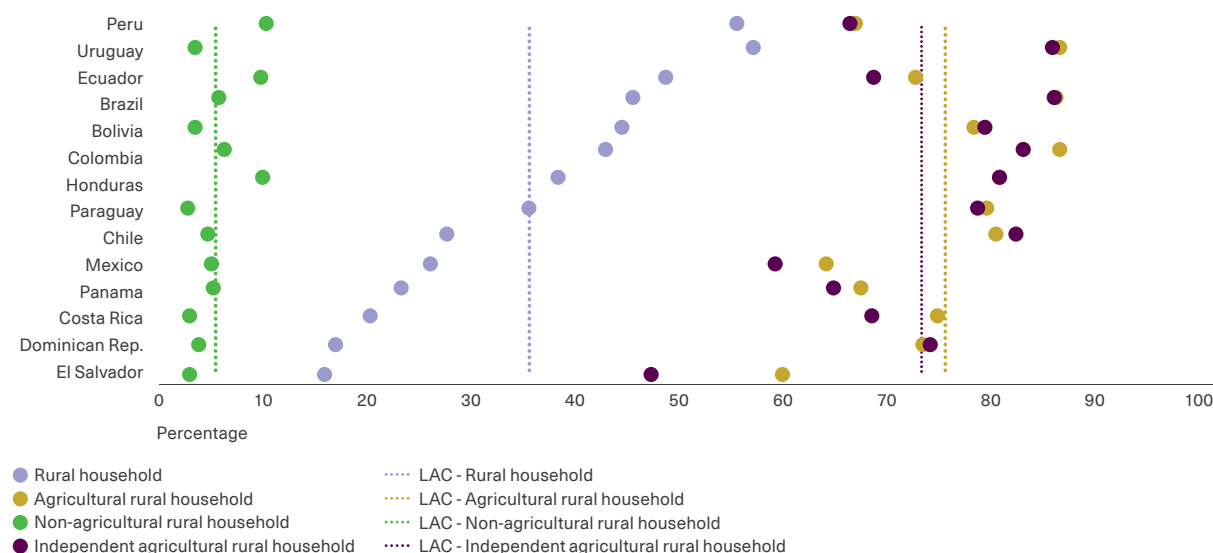
A high dependence on agricultural income exposes households to greater risk and deepens their vulnerability beyond what poverty rates reveal

The differences become even more pronounced when comparing the composition of labor income across household types, as shown in Panel B of Graph 7.3. On average, 36% of rural household labor income comes from activities in the agricultural

sector.⁸ Naturally, this share is much higher among agricultural households (77%) and independent agricultural households (75%). This concentration is even greater in some countries—such as Brazil and Uruguay—where around 87% of labor income among both agricultural and independent agricultural households is linked to the agricultural sector, as shown in Graph 7.4. By contrast, among non-agricultural rural households, the contribution of agricultural income is marginal, averaging only 5% across the region and peaking at around 10% in countries such as Ecuador, Honduras, and Peru.

Graph 7.4

Agricultural income as a share of labor income by household type in Latin American and Caribbean countries, 2023



Note: Agricultural household income is estimated as the sum of all labor income (from both primary and secondary occupations) of members whose main occupation is in the agricultural sector. Agricultural households are those in which the head or spouse has their main occupation in agriculture, while independent agricultural households are those in which the head or spouse is self-employed or an employer.

Source: Authors, based on CEDLAS data (2025).

⁸ Household agricultural income is estimated as the sum of all monetary and non-monetary labor income (from both primary and secondary occupations) earned by members whose main occupation is in the agricultural sector. A significant share of agricultural income may come from self-production. In household surveys such as ENAHO (Peru) and ENIGH (Mexico), this component can be estimated directly, using specific modules for producers, or indirectly, based on the labor income reported by self-employed workers. The direct method yields values for self-production that are between 25% and 30% higher than those estimated indirectly—a difference consistent with the findings of Gáfaró et al. (2025).

This specialization in agricultural activities can heighten household exposure to sector-specific risks, particularly among those in the lowest income deciles, contributing to deeper vulnerability than that reflected in poverty rates. Moreover, heavy dependence on agriculture may limit opportunities for diversification and participation in other sectors. The literature shows that this situation stems from multiple frictions—financial, institutional, and related to labor mobility—that hinder the reallocation of workers toward more productive

activities and create poverty traps in which households remain in low-productivity occupations with limited opportunities for accumulation or transformation (Banerjee & Duflo, 2011; Carter & Barrett, 2006; La Porta & Shleifer, 2014). Conversely, the expansion of employment in non-agricultural sectors within rural areas is consistently associated with lower levels of poverty, food insecurity, and inequality (Imai et al., 2015; Lanjouw & Murgai, 2009; Rahman & Mishra, 2020).

Diversification of labor income and vulnerability in rural areas

The analysis of income sources reveals the economic strategies of rural households and highlights their levels of vulnerability. Panel A of Graph 7.5 shows that, as household income increases—measured by deciles of total household income within each country—the share of labor income in total income also rises significantly. On average, labor income accounts for only 39% of total income among rural households in the first decile, compared with 86% among those in the top decile. The lower share of labor income in the bottom deciles is partly offset by a greater incidence of public and private transfers.

Panel B of Graph 7.5 shows, for all rural households, a clear positive relationship between the level of labor income and the degree of labor market diversification. In the lowest deciles, agricultural income represents more than 63% of total labor income and is largely derived from self-employment in agriculture. As income rises along the distribution, wage employment in other productive sectors becomes increasingly important. By contrast, self-employment in non-agricultural activities remains relatively stable across income levels. In sum, higher-income rural households have a more diversified employment structure, which can help reduce their economic vulnerability.

Panel C of Graph 7.5 repeats this analysis but focuses exclusively on agricultural rural households. Among those in the lower deciles, labor income comes almost entirely from independent work in the agricultural sector (either as self-employed or employers), accounting for 75% of the total. The share of income from agricultural wage employment increases across the first few deciles, reaching its peak around the fourth decile before declining. In higher-income households, non-agricultural sources of income account for a larger share.

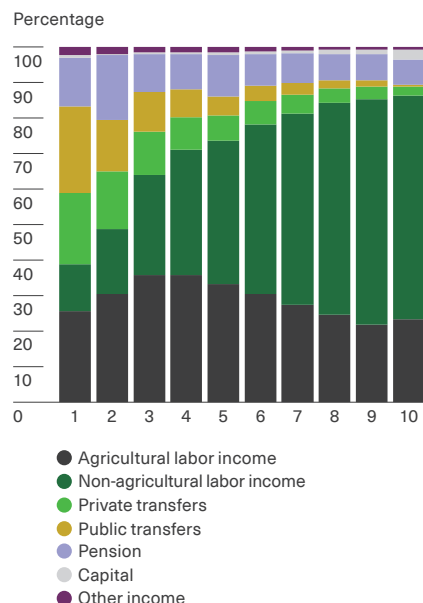
Although some diversification of labor income sources is observed among higher-income agricultural households, agricultural income remains predominant—accounting for 68% even in the top decile.⁹ This dependence on the agricultural sector can limit households' capacity to respond to economic or climate shocks, as well as to broader changes associated with structural transformation.

9 Gáfaró et al. (2025) documented similar patterns, showing that the combination of labor activities is very limited among lower-income households—especially among those engaged exclusively in agriculture—while diversification increases at higher income levels, although it is not widespread. The findings presented in this chapter are consistent with that evidence.

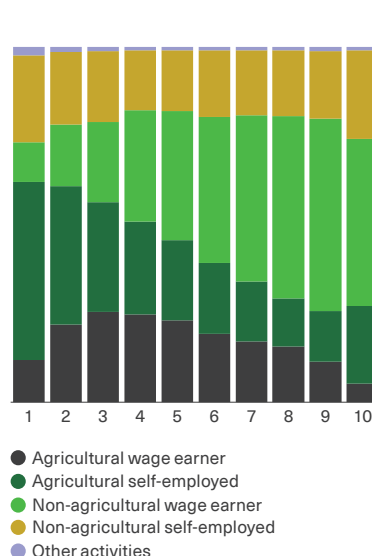
Graph 7.5

Decomposition of household income by decile. Average for Latin America and the Caribbean, 2023

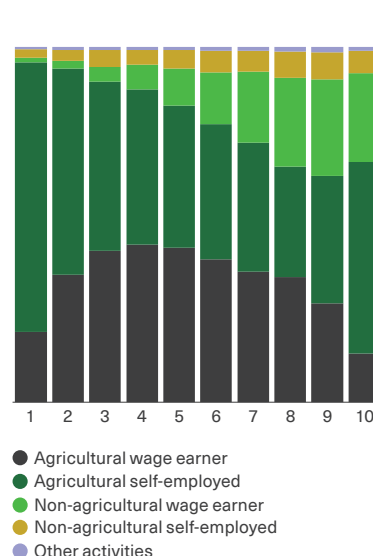
Panel A.
Decomposition of total income
among rural households



Panel B.
Decomposition of labor income
among rural households



Panel C.
Decomposition of labor income
among agricultural rural households



Note: The disaggregation corresponds to deciles of total household income calculated at the national level. On average across the 14 countries, the first four deciles include 53% of rural households, while the top four deciles account for only 26%. Labor income includes both monetary income (such as wages or self-employment earnings) and non-monetary income (such as self-consumption and in-kind remuneration). Agricultural household income is estimated as the sum of all labor income—both from primary and secondary occupations—of members whose main occupation is in the agricultural sector. Agricultural households are defined as those in which the head or spouse has their main occupation in the agricultural sector. Graph A.7.2 in the appendix to this chapter, available in the online edition of the RED, shows the breakdown for urban households.

Source: Authors, based on CEDLAS data (2025).

Overall, this analysis reveals distinct patterns by income level and by degree of connection to agricultural activity. Poorer rural households rely more heavily on public and private transfers, and most of their labor income is generated through self-employment. In contrast, as income rises, labor income sources become more diversified, and wage employment in non-agricultural sectors gains weight. These findings reflect different income-generation strategies and reveal varying levels of vulnerability to shocks.



As household income rises, income sources become more diversified, and wage employment in non-agricultural sectors gains importance

The transformation of employment in rural areas

Sectoral structure of employment

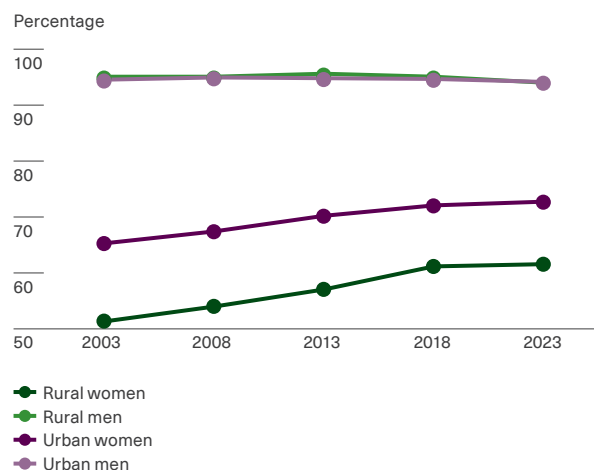
Before examining changes in employment structure, it is worth briefly considering trends in labor supply. Over the past two decades, labor force participation has increased in rural areas of LAC, but largely in step with urban areas, leaving the gap between them relatively unchanged. Between 2003 and 2023, the rural participation rate rose from 73% to 77%, consistently remaining about five percentage points below the urban rate. This increase was driven mainly by higher participation among rural women, which rose from 51% to 62%, as shown in Panel A

of Graph 7.6, although there are no clear signs of convergence with urban women. Gaps also persist along the intensive margin: in 2023, employed individuals in rural areas worked an average of two fewer hours per week than their urban counterparts, amid a slight but widespread reduction in working time, as shown in Panel B of Graph 7.6.¹⁰ In short, despite progress in women's participation in the labor market, there have been no major shifts in labor supply that would have narrowed the structural divide between rural and urban areas.

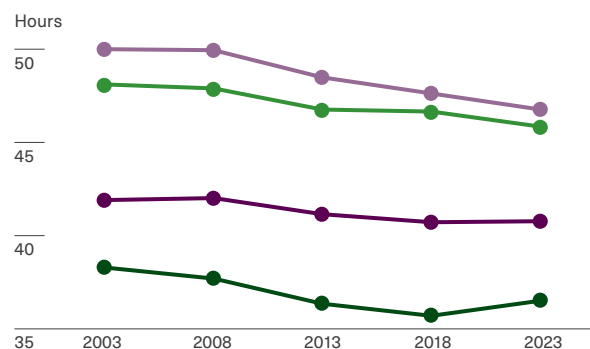
Graph 7.6

Evolution of labor supply in rural and urban areas by gender. Average for Latin America and the Caribbean, 2003–2023

Panel A.
Labor force participation



Panel B.
Hours worked per week

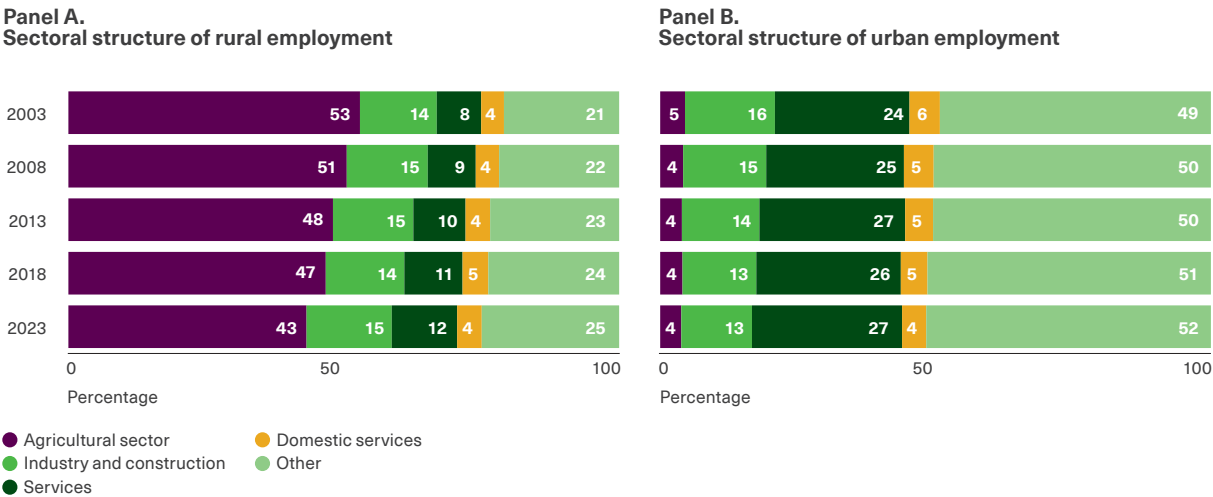


Note: Indicators are computed for the population aged 25–54.

Source: Authors, based on CEDLAS data (2025).

¹⁰ Differences in hours worked should be interpreted with caution, since agricultural work is on average more physical and seasonal, which may reflect both supply-side constraints and variations in the demand for labor. On the other hand, these comparisons do not control for worker characteristics or sectors of employment. When the comparison is restricted to workers with the same level of education, the gap in weekly working time between rural and urban areas falls to just under one hour among people with medium and high education levels, but remains at two hours for those with low education levels.

Graph 7.7
 Evolution of the sectoral structure of employment. Average for Latin America and the Caribbean, 2003–2023



Note: Indicators are calculated for the population aged 25–54. The *agricultural sector* includes agriculture, livestock, hunting, and forestry; *services* include professional, health, and education services; and *other* comprises fishing, mining and quarrying, trade, transport, and public administration. The primary sectors—fishing and mining and quarrying—represent a very small share of rural employment (1.6%) and are therefore included under *other*. Totals may differ slightly from 100% due to rounding.

Source: Authors, based on CEDLAS data (2025).

The most profound changes are observed in the structure of employment and in the forms of labor participation. In less developed economies, small rural producers account for the largest share of the rural population, devoting nearly all their working time to agricultural activities on their own land, with little or no access to external labor markets. With economic development, these households begin hiring labor or selling their work to other enterprises, gradually integrating into the broader labor market (Charlton et al., 2021; Taylor & Charlton, 2018). This phenomenon has long been recognized as a central feature of the development process: as early as 1954, Arthur Lewis (1954) identified the shift of workers from agriculture to more dynamic sectors as the core of economic growth, and Timmer (1988) later coined the term agricultural transformation to describe this structural evolution. Much of the change in rural labor markets in LAC reflects this transition,

though at a slower pace than in developed countries (see Chapter 1).

●●

For the first time in the region, fewer than half of rural workers are employed in the agricultural sector—a decline of 10 percentage points since 2003

Panel A of Graph 7.7 analyzes the economically active population aged 25–54 and shows that LAC has experienced a steady decline in agricultural employment over the past two decades, while the services sector has absorbed an increasing share of workers. For the first time in the region, fewer than half of rural workers are employed in agriculture—a



Tequila production in Mexico.

drop of 10 percentage points since 2003.¹¹ This shift has profoundly transformed the employment structure in rural areas, where agricultural activities have historically concentrated most jobs. By

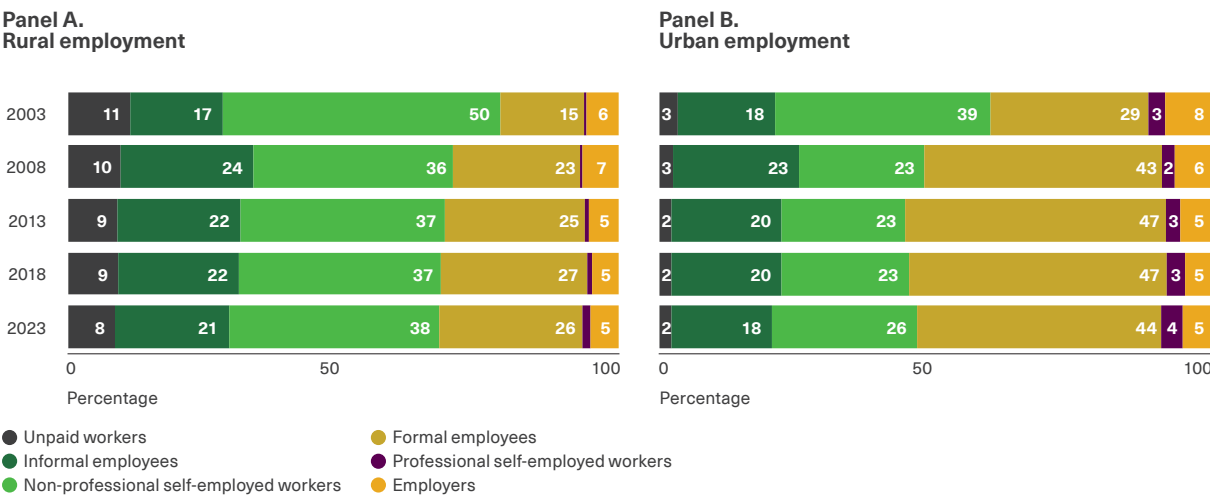
contrast, urban areas show no comparable change, as the transition toward a service-based economy occurred much earlier, and their labor markets are already more diversified.

Labor relations and the decline in informal employment

Alongside changes in the sectoral structure of employment, the organization of work in rural areas has also undergone a transformation. Over the past two decades, there has been a decline in predominantly informal forms of employment—such

as low-skilled self-employment, unregistered wage work, and unpaid labor—and an expansion of more stable and regulated forms, such as registered wage employment (Jensen, 2022; La Porta & Shleifer, 2008, 2014; Schoar, 2010).

Graph 7.8
Evolution of labor relations. Average for Latin America and the Caribbean, 2003–2023



Note: Indicators are calculated for the population aged 25–54. Totals may differ slightly from 100% due to rounding.
Source: Authors, based on CEDLAS data (2025).

11 There are significant cross-country differences that reflect both levels of development and country-specific factors, when focusing exclusively on rural employment, a negative correlation is observed with GDP per capita (see Graph A.7.3 in the chapter appendix available in the online edition of the RED).

In rural areas of LAC, the share of wage employment has grown steadily, rising from 32% in 2003 to 47% in 2023 (Panel A of Graph 7.8), driven mainly by the expansion of registered, or formal, wage jobs. Conversely, the share of low-skilled self-employment fell from 50% to 38%, and unpaid work declined from 11% to 8%—the latter mostly corresponding to family workers, who, as discussed in the next section, are primarily women. Taken together, these shifts reflect an 11-percentage-point reduction in rural labor informality, from 78% in 2003 to 67% in 2023. Most of this decline took place during the first decade (2003–2013), followed by a period of deceleration and, in some cases, stagnation. Panel B of Graph 7.8 shows a similar pattern in urban areas, where labor informality dropped from 60% in 2003 to 47% in 2023.

As shown in Panel A of Graph 7.9, rural informality declined over the period in most countries, although to varying degrees and without a uniform pattern. In some cases, a partial reversal of this trend can be observed, likely linked to the effects of the COVID-19 pandemic. This is the case in Panama and Uruguay, where the steady decline in informality up to 2018 reversed over the following five years. Panel B of the same graph further shows that informality remains substantially higher in the agricultural sector than in other rural activities—a pattern observed consistently across nearly all countries. Thus, the decline in rural informality appears to be at least partly associated with structural change, as the shift of workers from agriculture to non-agricultural sectors seems to have contributed to formalization.

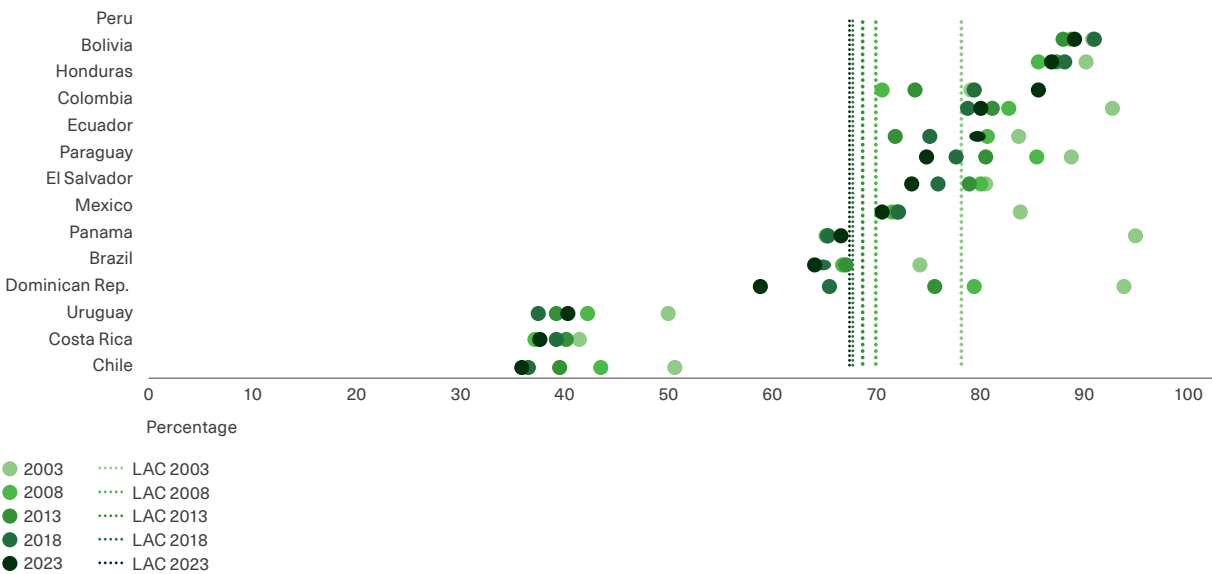


Informal employment remains significantly higher in rural areas, reaching 67% versus 47% in urban areas

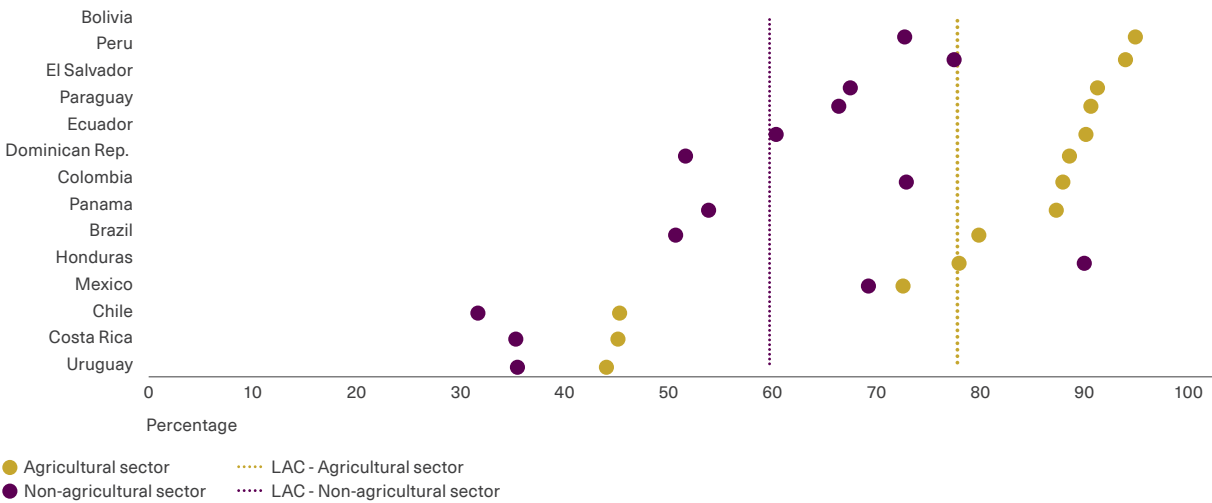
Despite these gains, labor informality remains significantly higher in rural areas: in 2023, it averaged 67%, 20 percentage points above the urban rate (47%). This persistence reflects structural barriers that limit access to formal employment for a substantial share of the rural population (Ulyssea, 2020). High levels of informality restrict access to social protection linked to registered employment (also known as contributory social protection) and to mechanisms that ensure job stability (Fields, 2004; Gasparini & Tornarolli, 2009; Maloney, 2004; Tornarolli et al., 2014), perpetuating vulnerability. The situation is even more critical among youth (ages 15–24) and older adults (over 55) in rural areas, whose informality rates reach 77%—about 10 percentage points higher than for the 25–54 age group.

Graph 7.9
Rural labor informality in Latin American and Caribbean countries

Panel A.
Evolution of informality, 2003–2023



Panel B.
Informality in the agricultural sector versus other sectors, 2023



Note: Indicators are calculated for the population aged 25–54. The informality rate includes unregistered wage workers, non-professional self-employed workers, and unpaid workers.

Source: Authors, based on CEDLAS data (2025).

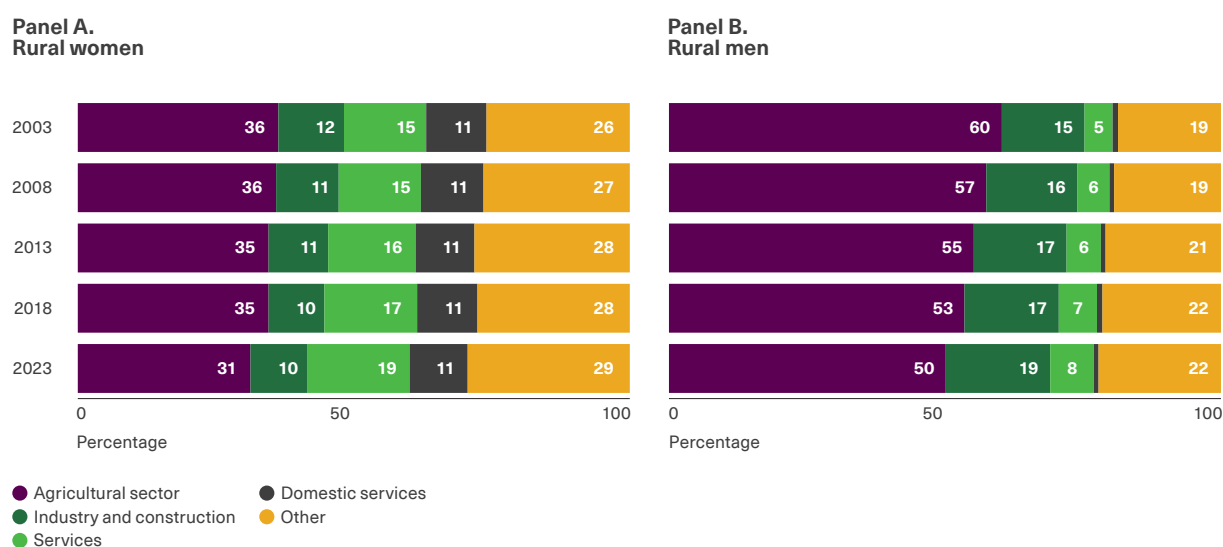
Gender gaps in rural labor markets

The process of structural change in LAC countries is reshaping the employment situation of rural women relative to men (Marchionni et al., 2025). Graph 7.10 shows that participation in agricultural employment has declined among both men and women in the region. Women have mainly shifted toward the services sector (Panel A)—a

transition that may reflect the greater compatibility between service-sector activities and domestic responsibilities, as well as the expansion of traditionally female-dominated occupations such as education, health, and commerce. Rural men have also moved toward services, though primarily into industry and construction (Panel B).

Graph 7.10

Evolution of the sectoral structure of rural employment by gender. Average for Latin America and the Caribbean, 2003–2023



Note: Indicators are calculated for the population aged 25–54. The *agricultural sector* includes agriculture, livestock, hunting, and forestry; *services* include professional, health, and education services; and *other* comprises fishing, mining and quarrying, trade, transport, and public administration. The primary sectors—fishing and mining and quarrying—represent a very small share of rural employment (1.6%) and are therefore included under *other*. Totals may differ slightly from 100% due to rounding.

Source: Authors, based on CEDLAS data (2025).

These changes have also been accompanied by shifts in the forms of labor participation, as Graph 7.11 illustrates. Between 2003 and 2023, registered wage employment increased, while unpaid family work among women and self-employment among men declined. Although these changes indicate a modest reduction in informal employment arrangements—which

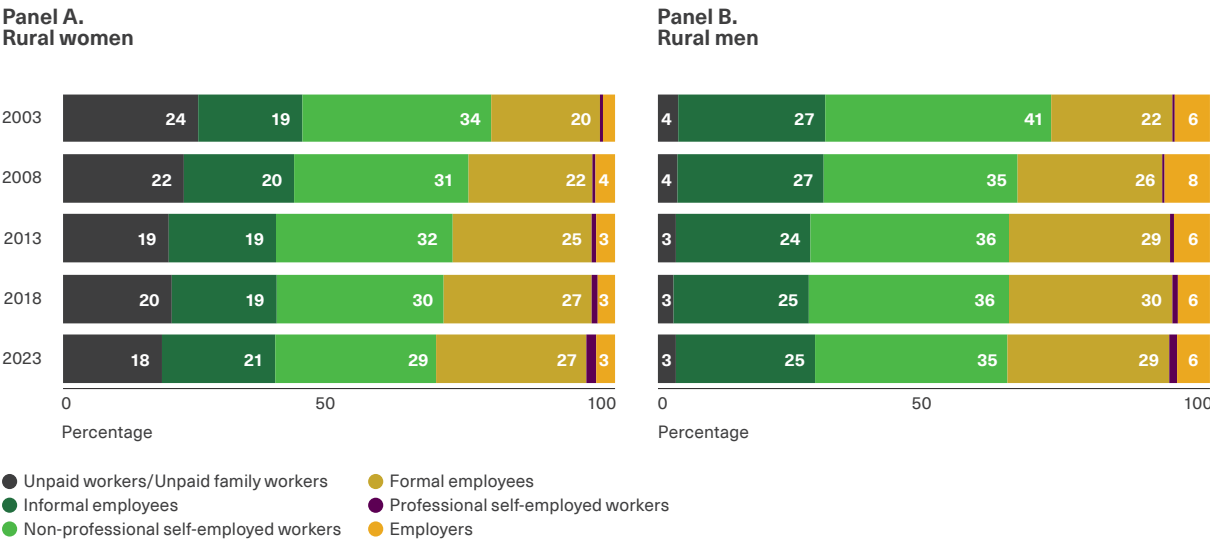
include unregistered wage work, low-skilled self-employment, and unpaid labor—informality in rural areas remains very high: in 2023, 68% of women and 63% of men in those areas were still engaged in informal employment. As Marchionni et al. (2025) note, this apparent parity conceals a deep inequality in the nature of employment between men and women: unpaid work accounts for 18% of

rural female employment, compared with only 3% among men.

Evidence shows that motherhood is one of the main determinants of gender gaps in LAC labor markets (Berniell et al., 2021, 2023; Marchionni & Pedrazzi, 2025). In rural settings, this pattern takes on distinctive characteristics. Marchionni et al. (2025) find that the birth of a first child significantly reduces women’s labor supply—both in participation and hours worked. Motherhood also leads to a shift toward more precarious forms of employment, particularly in the primary sector

and informal jobs, as shown in Graph 7.12. In the latter case, all three forms of informality increase—unregistered wage work, self-employment, and unpaid labor—with the latter rising more sharply in rural than in urban areas (Panel B). Before motherhood, 23% of employed rural women already worked without pay, compared with only 3% in urban areas, and this share rises further after the birth of the first child. This dynamic limits rural women’s ability to fully benefit from the opportunities generated by structural transformation, deepening preexisting inequalities.

Graph 7.11
Evolution of labor relations by gender. Average for Latin America and the Caribbean, 2003–2023

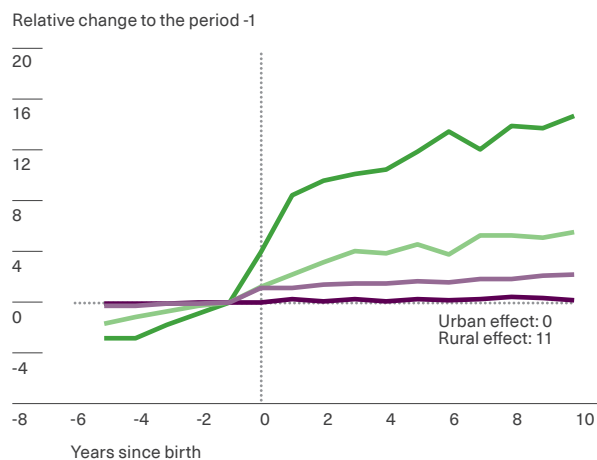


Note: Indicators are calculated for the population aged 25–54. Totals may differ slightly from 100% due to rounding.
Source: Authors, based on CEDLAS data (2025).

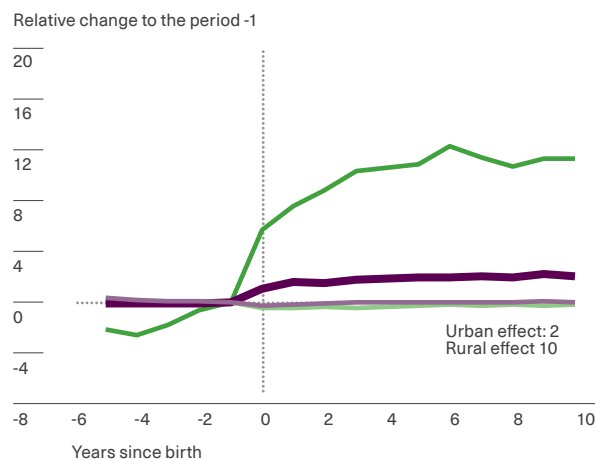
Graph 7.12

Effect of the first child on the likelihood of different types of employment in rural and urban areas of Latin America and the Caribbean

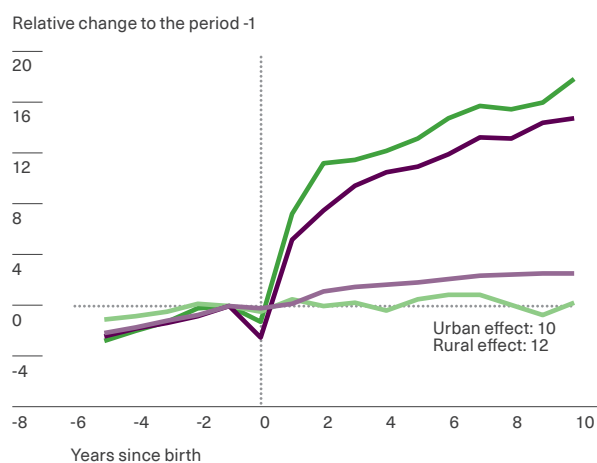
Panel A.
Employment in the primary sector



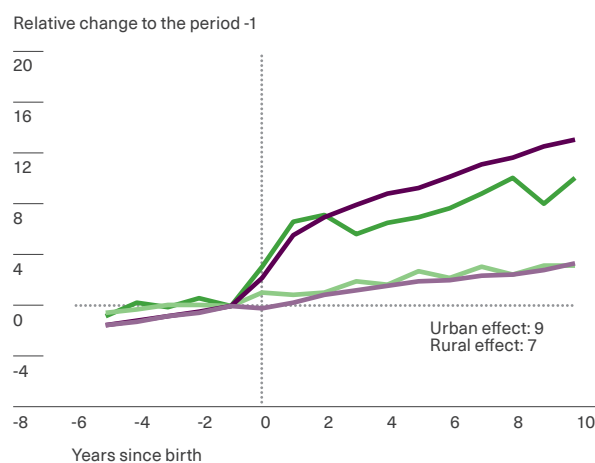
Panel B.
Unpaid employment



Panel C.
Unregistered wage employment



Panel D.
Non-professional self-employment



— Rural women
— Rural men
— Urban women
— Urban men

Note: The lines show the change (measured in percentage points) in each of the indicators over time relative to the base period (corresponding to the year prior to the birth of the first child). The primary sector includes agriculture, livestock, hunting, forestry, fishing, and mining.

Source: Marchionni et al. (2025, Figure 8).



A marked gender inequality persists in the type of labor participation: 18% of rural women work without pay, compared with 3% of men. Motherhood widens this gap

Using time-use data from Mexico, Marchionni et al. (2025) provide complementary evidence showing how domestic workloads constrain the economic autonomy of rural women. Although childcare demands are high, the rural–urban

gap in this area is small. However, rural mothers devote considerably more time than their urban counterparts to household chores, subsistence production, and tasks such as collecting water. These responsibilities—together with limited access to labor-saving technologies and external household services—reduce the time available for paid work. This suggests that the persistence of rural–urban gaps in women's employment reflects not only labor market segmentation but also unequal time burdens within the household, which continue to fall disproportionately on rural women.

Wages in rural areas

Hourly labor income has trended upward across the region. In rural areas, the average wage increased by 44% over the past two decades. Despite this progress, the rural–urban gap remains: in 2023, rural wages were on average 34% lower than urban wages. This gap can be attributed to both supply-side factors (workers' characteristics) and demand-side factors (firms' characteristics). Graph 7.13 illustrates the contribution of these different factors.

On the firm side, wage gaps may arise from a greater concentration of low-productivity sectors in rural areas, particularly small-scale agricultural units (Loayza & Rigolini, 2016). Indeed, hourly wages—which include both monetary and non-monetary remuneration and cover both wage employment and self-employment—show clear differences across worker types. Urban non-agricultural workers earn the highest incomes, with an average hourly wage of USD 6, followed by rural non-agricultural workers (USD 4.8), urban agricultural workers (USD 3.6), and rural agricultural workers (USD 3.3). This ranking reveals a double wage penalty associated with both working in agriculture and residing in rural areas. The gap between the two extremes is substantial: rural agricultural workers earn, on average, 46%

less per hour than their urban non-agricultural counterparts (bar 2 in Graph 7.13).

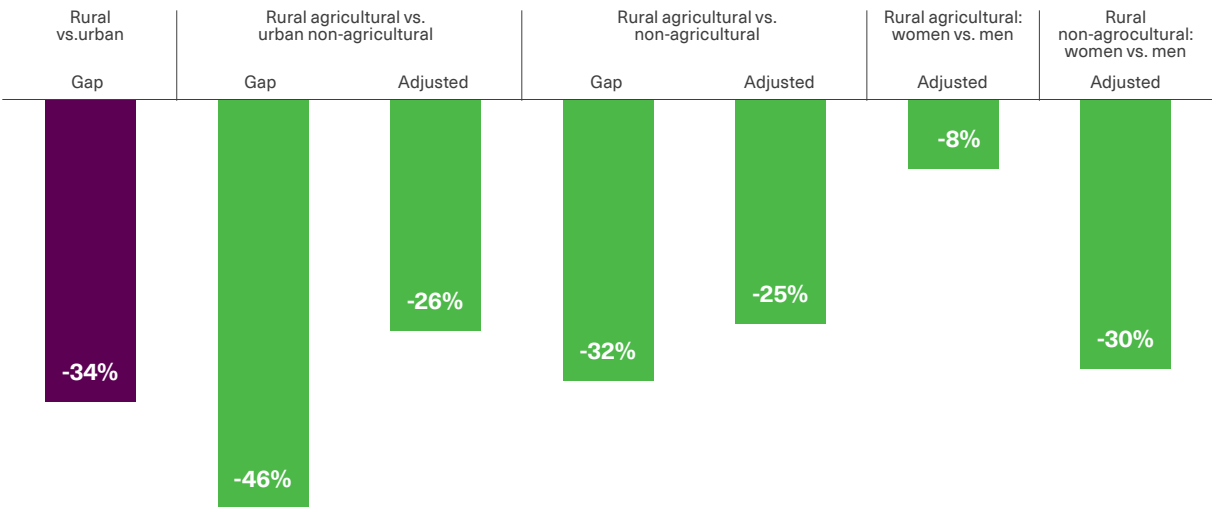
These wage gaps also reflect supply-side factors in the labor market. As documented in Chapter 6, rural areas lag behind urban ones in human capital. Accordingly, wage gaps narrow when worker characteristics such as age, gender, and education are held constant. In fact, the wage gap between rural agricultural and urban non-agricultural workers shrinks from 46% to 26% (bars 2 and 3 in Graph 7.13), confirming that much of this disadvantage is explained by observable worker characteristics. In contrast, the gap between agricultural and non-agricultural workers within rural areas changes little after controlling for these characteristics, falling only from 32% to 25% (bars 4 and 5). Similarly, rural women working in agriculture earn 8% less per hour than their male counterparts, while the gender wage gap widens to 30% among rural workers outside agriculture (bars 6 and 7).¹²

¹² Individuals without wages are excluded from the sample used to estimate the Mincer equations. Therefore, the wage gap between rural women and men—particularly in the agricultural sector (bar six in Graph 7.13)—masks another, deeper inequality discussed earlier: the high incidence of unpaid employment among female agricultural workers.



Training-of-trainers program for women miners supported by CAF in Bolivia.

Graph 7.13
 Wage gaps. Average for Latin America and the Caribbean, 2023



Note: Wage gaps are estimated using Mincer equations for individuals aged 25–54, with the logarithm of hourly wages as the dependent variable. The baseline model includes only a rural dummy and yields the unadjusted rural–urban gap (bar 1). Additional variables are then introduced for the productive sector (agriculture vs. non-agriculture) and its interaction with rurality, allowing estimation of wage gaps between rural agricultural and urban non-agricultural workers (bar 2), and between rural agricultural and rural non-agricultural workers (bar 4). Conditional gaps (bars 3 and 5) are obtained by adding controls for education, age, and gender. A third model, estimated only for rural workers, includes a binary variable for agricultural employment, a gender indicator, and their interaction, along with education and age controls, to estimate gender wage gaps (bars 6 and 7).

Source: Authors, based on CEDLAS data (2025).

The averages shown in Graph 7.13 mask significant cross-country heterogeneity. Graph 7.14 depicts the relationship between GDP per capita—used as a proxy for the level of development and progress in structural transformation—and average wages in urban (Panel A) and rural (Panel B) areas of each country. It also shows the relationship between GDP per capita and average rural agricultural wages (Panel C) and rural non-agricultural wages (Panel D). Multiple years are included for each country, allowing for temporal analysis.

Hourly wages display a clear positive relationship with GDP per capita, which becomes more pronounced at higher levels of development. This positive and convex relationship—less evident in rural areas (Panel B) and particularly in the agricultural sector (Panel C)—may reflect lower returns to human capital (see Box 7.3), although other mechanisms may also be at play. For instance, recent studies highlight that firms’ wage-setting

power tends to increase with market concentration (Card, 2022; Manning, 2021). This mechanism could be especially relevant as agriculture evolves through the development process: as self-employment declines, mechanization and large-scale production drive greater concentration among fewer companies, strengthening their ability to set wages. In this context, the shift from agricultural to wage-based employment may be accompanied by labor market dynamics that limit the transmission of productivity gains to wages.

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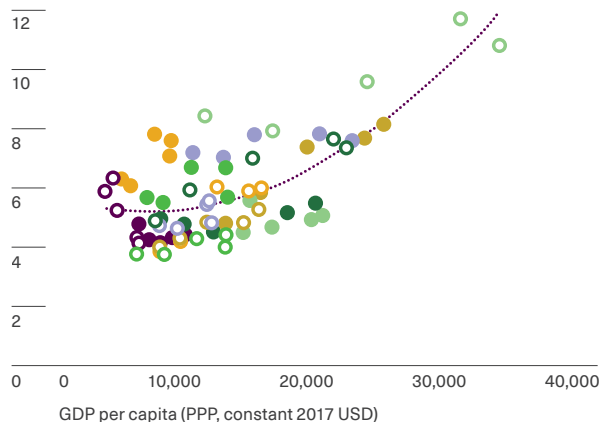
The shift from agricultural employment toward more wage-based forms may be accompanied by labor market dynamics that limit the transmission of productivity gains to wages

Graph 7.14

Relationship between wages and GDP per capita in Latin American and Caribbean countries, 2003–2023

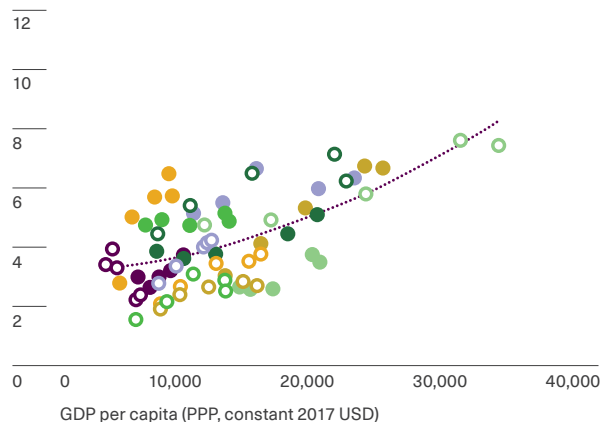
**Panel A.
Urban wage**

Urban wage (PPP, constant 2017 USD)



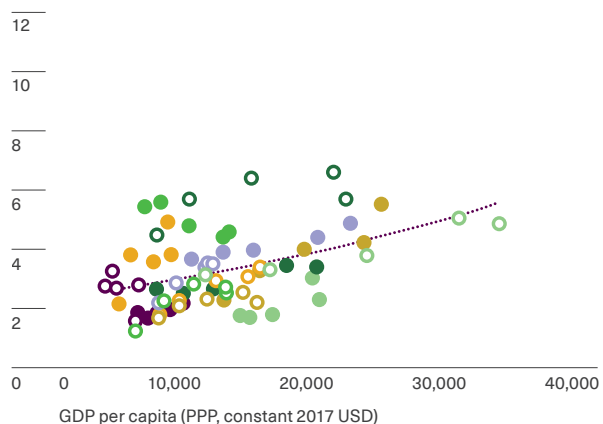
**Panel B.
Rural wage**

Rural wage (PPP, constant 2017 USD)



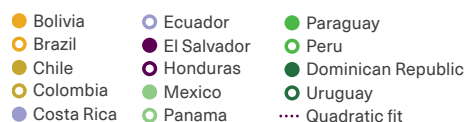
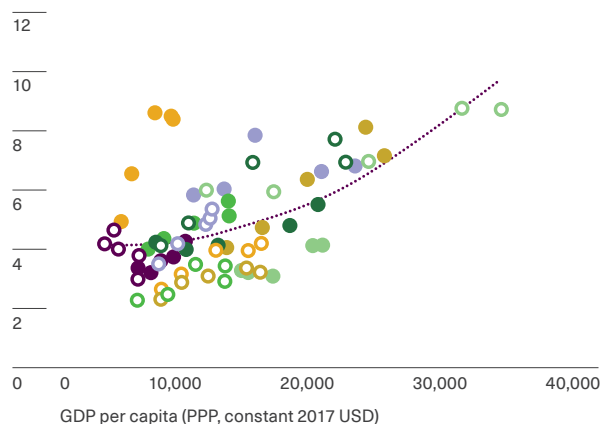
**Panel C.
Rural agricultural wage**

Rural agricultural wage (PPP, constant 2017 USD)



**Panel D.
Rural non-agricultural wage**

Rural non-agricultural wage (PPP, constant 2017 USD)



Note: Indicators are calculated for the population aged 25–54.

Source: Authors, based on CEDLAS (2025) and World Bank (2025h) data.

Box 7.3

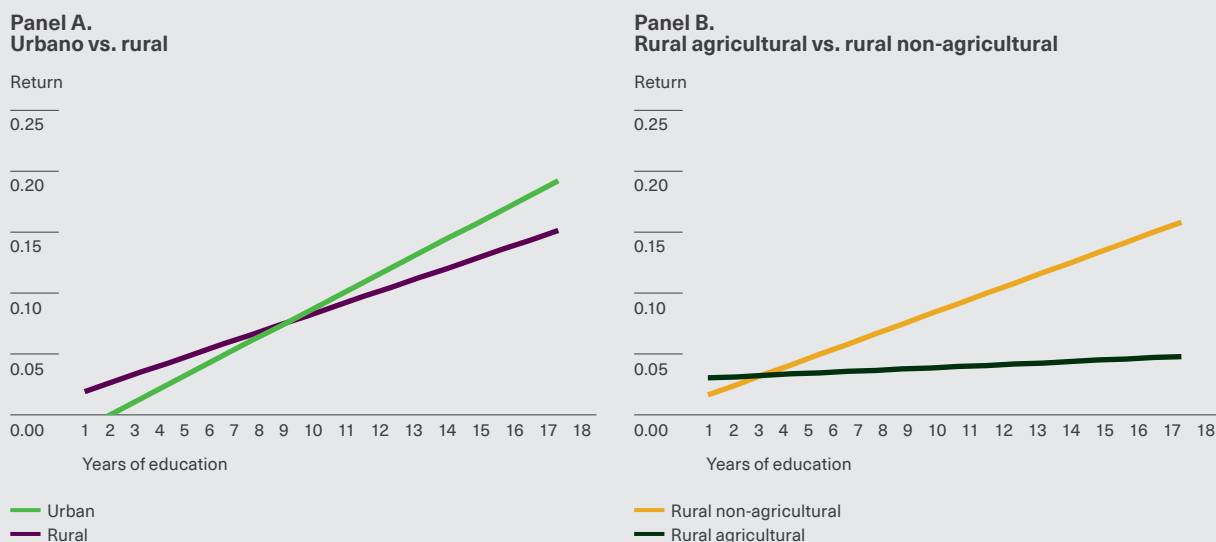
The role of returns to education

Human capital moderates some of the contrasts between rural and urban labor markets. For instance, in 2023, labor force participation in rural areas exceeded that of urban areas by nearly six percentage points among people with low education, but the difference narrowed to just under two points among those with completed higher education. A similar pattern is observed for informality: in rural areas, it declines from 77% to 13% when moving from the least to the most educated, while the rural–urban gap narrows from nine to two percentage points.

However, when it comes to earnings, human capital—rather than narrowing differences—tends to amplify them. Graph 1 shows that returns to education increase more rapidly in urban than in rural areas, meaning that income disparities between the two widen as education levels rise. Within rural areas, this divergence originates in the agricultural sector: there, returns are nearly flat and remain low even among those with higher education, while they rise much more sharply in the non-agricultural sector.

This suggests that urban labor markets and rural non-agricultural sectors concentrate higher-productivity activities with greater capacity to absorb and reward human capital. By contrast, in the agricultural sector, structural constraints limit the ability to translate formal education into higher productivity, while other factors—such as employers’ market power—may also help explain the low returns observed.

Graph 1
Returns to years of education. Average for Latin America and the Caribbean, 2023



Note: Results are based on regressions estimated for individuals aged 25–54, where the logarithm of wages is explained by years of education and its squared term, controlling for age and gender. In Panel A, the model includes a rural area indicator and its interactions with both education and squared education. In Panel B, the sample is restricted to rural workers, and the model includes an indicator for employment in the agricultural sector, together with the corresponding interaction terms.

Source: Authors, based on CEDLAS data (2025).

Non-monetary labor income

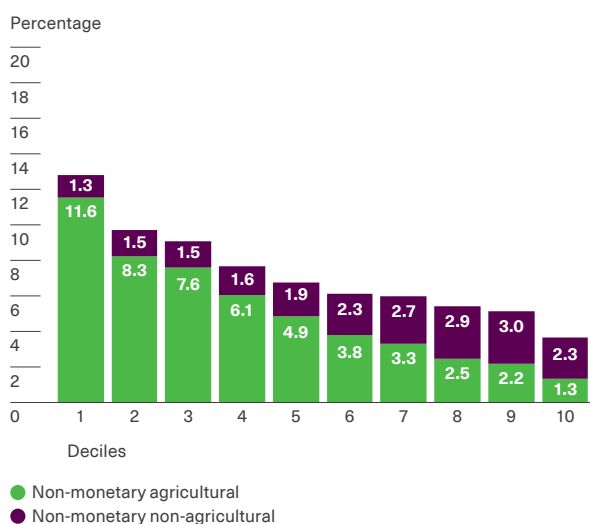
In rural households across LAC, non-monetary income—such as self-consumption and in-kind remuneration—constitutes a relevant source of resources, particularly among households linked to agriculture.¹³ As shown in Panel A of Graph 7.3, non-monetary income accounts for an average of

4% of total income in rural households—twice the share observed in urban ones—and rises to 6% among agricultural and independent agricultural households. Its relative weight is greater among households in the lowest income deciles, especially when measured in relation to labor income.¹⁴

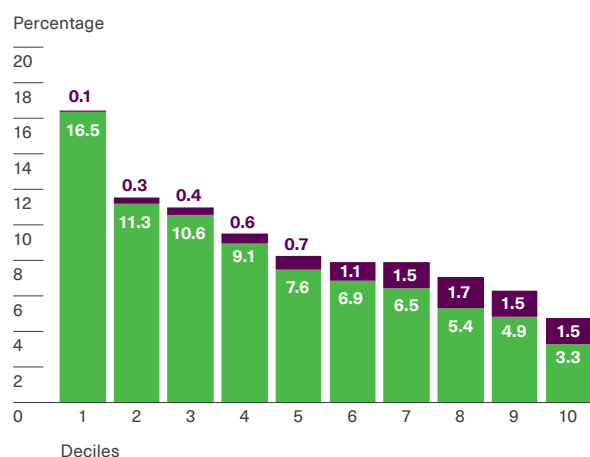
Graph 7.15

Share of non-monetary labor income within labor income by decile. Average for Latin America and the Caribbean, 2023

Panel A.
Rural households



Panel B.
Rural agricultural households



Note: Data are disaggregated by deciles of total household income calculated at the national level. On average across the 14 countries, the first four deciles include 53% of rural households, while the top four deciles account for only 26%. Agricultural households are defined as those in which the head or spouse reports their main occupation in the agricultural sector. Non-monetary income includes the value of self-consumption and in-kind payments.

Source: Authors, based on CEDLAS data (2025).

¹³ Household surveys and the CEDLAS database (2025) make a systematic effort to impute non-monetary income. The measurement of such income—derives from different types of employment relationships (employers, wage earners, self-employed workers, or other forms of work). However, current estimates may still be slightly underestimated, as in some countries this income is not fully captured.

¹⁴ Graph 7.A.4 in the appendix to this chapter, available in the online edition of the RED, shows significant variation across LAC in the relative weight of non-monetary income among the most vulnerable households. Peru and Ecuador stand out as the countries where this type of income is a key source of earnings for the poorest rural households—well above levels observed in the rest of the region.

Graph 7.15 shows the share of non-monetary income within total labor income by household income decile. Among rural households, this share reaches 13% and 9% in deciles 1 and 2, respectively (Panel A), while in rural agricultural households it rises to 17% and 11% in the same deciles (Panel B). Agricultural non-monetary components outweigh non-agricultural ones, except in the upper income deciles (Panel A). In rural agricultural households (Panel B), agricultural components continue to account for a large share across all deciles.

The CEDLAS database (2025) does not distinguish between self-consumption and in-kind payments within non-monetary income. However, analysis of Peru's National Household Survey (ENAH) and Mexico's National Survey of Household Income and

Expenditure (ENIGH) shows that self-consumption is the main component, representing about 85% of this type of income in both countries. These findings indicate that many vulnerable rural households—and particularly women within them (Marchionni et al., 2025)—dedicate a substantial portion of their time to subsistence production.



Among the most vulnerable rural households, subsistence production occupies a significant share of time and accounts for about 15% of labor income among the poorest agricultural households

Employment and income among rural Indigenous people

Indigenous peoples are a particularly relevant group within rural areas, as shown in Chapter 6, where it was noted that they are overrepresented in these territories. They are also among the most vulnerable groups, facing higher rates of poverty and deprivation than the rest of the rural population—partly due to their more limited and precarious integration into labor markets.

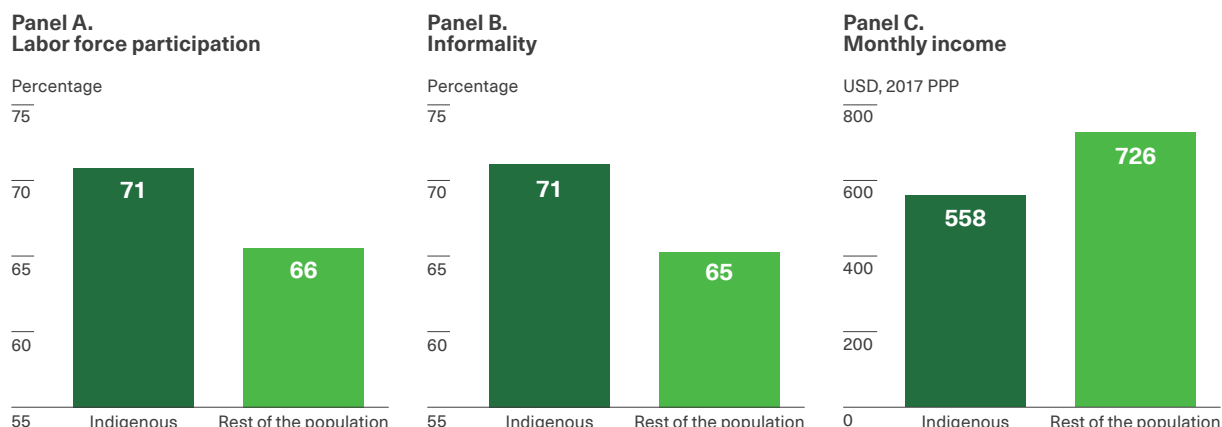
In 2023, labor force participation among Indigenous peoples exceeded that of the rest of the rural population (Panel A of Graph 7.16). However, this apparent advantage in participation does not translate into better opportunities: 71% of rural Indigenous workers aged 25–54 are employed under informal conditions—six percentage points above the incidence of informality among the rest of the rural population (65%) (Panel B). This overrepresentation in informal employment reflects both human capital gaps and structural barriers, as well as persistent forms of discrimination in labor markets (De la Mata et al., 2022). The disadvantage is also evident in income levels: as shown in Panel C of Graph 7.16, rural Indigenous workers earn, on average, substantially lower monthly incomes than their non-Indigenous rural counterparts.

The clear disadvantage of rural Indigenous peoples in terms of job quality and income is closely tied to their greater dependence on agriculture and subsistence production. The case of Peru illustrates this point well. According to the 2024 ENAH survey, 55% of rural households identify as Indigenous (whether the head or spouse). Among them, 91% are agricultural households, and 86% of these are independent agricultural households. By contrast, among non-Indigenous rural households, 87% are agricultural and 75% are independent agricultural.

Indigenous households engaged independently in agriculture operate, on average, larger plots of land than their non-Indigenous counterparts (8.13 hectares versus 2.75), although they are less frequently owners or tenants. They also show greater reliance on self-consumption, which represents 18% of their total income compared with 16% among non-Indigenous households. While this production ensures a basic subsistence level, it also increases these households' exposure to productive and climate-related shocks, reinforcing the income disadvantages described above.

Graph 7.16

Labor indicators for Indigenous peoples in rural areas. Average for Latin America and the Caribbean, 2023



Note: Simple average based on six countries: Brazil, Chile, Ecuador, Mexico, Peru, and Uruguay. The comparison group includes White and mestizo populations, among others, but excludes Afro-descendants. Indicators are computed for individuals aged 25–54. Income is estimated in purchasing power parity (PPP) dollars.

Source: Authors, based on CEDLAS data (2025).

Public policies for employment and social protection in rural areas

Although rural poverty has declined over the past two decades, household vulnerability—especially among agricultural and independent households—remains high. Labor informality persists, income sources remain poorly diversified, and gender

and ethnic gaps continue to be significant. In this context, public policies should focus on reducing vulnerability and fostering comprehensive social and productive inclusion.

Social protection policies

Income transfers

Strengthening income protection policies is a key priority for improving the living conditions of rural households. Over the past three decades,

income-support programs have expanded and consolidated across LAC, becoming a core component of social protection systems (Álvarez et al., 2025; Cecchini & Atuesta, 2017; Stampini et al., 2025).



Artisanal fishing in Monteverde, Ecuador.

One of the main tools has been conditional cash transfer programs, currently in place in 19 countries in the region (ECLAC, 2025a). Conditionalities are typically linked to school attendance and health checkups and, by promoting the accumulation of human capital among children and youth, aim to break the intergenerational transmission of poverty (De la Mata et al., 2022).



Although income transfers could in theory discourage labor participation, evidence indicates that this effect is limited and, in some rural contexts, even reversed

Between 2003 and 2023, public transfers—including conditional cash transfers—rose from an average of 1.3% to 4.3% of total rural household income in the region.¹⁵ The fastest growth occurred between 2003 and 2013. As expected, the relative importance of these transfers is higher among the lowest income deciles, reaching 24% for households in the first decile and 14% for those in the second, as shown in Panel A of Graph 7.5. A counterfactual exercise comparing the observed poverty rate with a hypothetical rate that excludes public transfers from household income shows that, without these transfers, rural poverty would have been 3.3 percentage points higher.¹⁶

Extensive evidence from impact evaluations across the region underscores the importance of conditional transfers in reducing structural rural vulnerability by improving education and child health outcomes (Barham et al., 2024;

Cecchini et al., 2021; Laguinde et al., 2025; Millán et al., 2019; Parker & Vogl, 2023; Stampini et al., 2025). An unintended effect of such programs is the disincentive they may generate for labor participation or formal employment. Nonetheless, evidence from developing countries largely indicates that their impacts on labor supply are limited (Banerjee et al., 2017). Research in rural areas of Latin America and the Caribbean supports this conclusion, and in some cases, even points in the opposite direction. In Bolivia, for instance, Vera-Cossio (2022) finds that receiving the Bono Juancito Pinto—the country's flagship conditional cash transfer program—increased labor participation among household heads and their spouses. In Mexico, additional positive effects have been observed, such as greater incentives for productive investment among rural households (Gertler et al., 2012) and higher levels of financial inclusion (Masino & Niño-Zarazúa, 2020).

Non-contributory pensions

Another key pillar of income-support policies is non-contributory pensions. A significant share of the population reaches old age without meeting the requirements for contributory pensions, leaving them in a situation of economic vulnerability (Álvarez et al., 2020). This problem particularly affects women and Indigenous peoples, given their lower participation in formal employment, as discussed earlier. A counterfactual exercise comparing the observed poverty rate with the hypothetical rate that would result from excluding non-contributory pensions from household income shows that these programs also play a significant role in reducing rural poverty: without them, the

15 Government transfers include conditional transfers, in-kind transfers, and other current non-contributory social transfers (such as family allowances and non-contributory unemployment benefits) and exclude pensions.

16 This exercise is purely descriptive: it assumes that household behavior remains unchanged after the removal of transfers and therefore should not be interpreted as the causal effect of transfer programs. Graph A.7.5 and Table A.7.1 in the chapter appendix, available in the online edition of the RED, present these results for the LAC average and for each country, distinguishing between rural and urban areas. The contribution of transfers to reducing rural poverty in Brazil is high, both in absolute terms (percentage points) and in relative terms (percentage variation). In Chile and Uruguay, although the absolute changes are small, the relative variation is significant. In the remaining countries, the contribution ranges from moderate (Colombia, Costa Rica, Ecuador, Mexico, Panama, and the Dominican Republic) to low (Bolivia, El Salvador, Honduras, Paraguay, and Peru). In some countries, the contribution is smaller in rural than in urban areas.

poverty rate in rural areas would be 2.5 percentage points higher on average.¹⁷

Impact evaluations indicate that non-contributory pensions have improved the well-being of rural populations, particularly by reducing extreme poverty. In Mexico, the 70 y Más (Spanish for 70 and Over) Program has shown particularly strong effects in rural areas and among Indigenous peoples (Ávila Parra et al., 2024). Likewise, studies in Paraguay (Bando et al., 2020) and in Mexico (Galiani et al., 2016) report improvements in the health of older adults living in rural areas. Bottan et al. (2021) analyzed the role of a near-universal non-contributory pension program in Bolivia during the COVID-19 pandemic. Their findings highlight the insurance function of these transfers and their effectiveness in strengthening financial resilience and reducing food insecurity among poor and vulnerable households alike.

Non-contributory pensions also allow older adults to withdraw—at least partially—from productive activities. In Mexico, Juárez and Pfutze (2015) find that pensions for individuals aged 70 and older reduced labor supply among men but not among women. Notably, the same study shows that these transfers do not discourage labor participation among working-age household members living with beneficiaries and, moreover, help young people aged 15–17 reduce their labor participation, thereby extending their time in education. In Bolivia, Canelas & Niño-Zarazúa (2022) find that the Renta Dignidad program had no negative effects on adult labor participation in beneficiary households. Finally, in Brazil, the expansion of non-contributory pensions for women during the 1990s had positive effects on female labor participation (Khanna et al., 2025).

Challenges in strengthening income-support policies

Significant challenges remain regarding coverage, sufficiency, and targeting of income-support policies. There are multiple reasons why these programs still fail to reach all poor households (Banerjee et al., 2024). Many programs still lack sufficient scale. Moreover, targeting and beneficiary selection mechanisms often have limitations that lead both to the exclusion of poor households and the inclusion of non-poor ones. Some poor households are particularly difficult to reach due to structural barriers such as geographical isolation, limited access to basic services (required to comply with conditionalities in the case of conditional cash transfers), lack of information, or distrust in public institutions (Robles et al., 2019). These structural barriers tend to be higher among Indigenous peoples, as documented by Bauchet et. al (2018) in the case of Bolivia.

An additional challenge relates to the adequacy of benefits, which are not always sufficient to lift households above the poverty line—thereby limiting the overall impact of these policies. In the absence of sufficient and effective income protection, rural families continue to rely heavily on private transfers (remittances, family support, or community networks), which remain a cornerstone of their livelihood strategies, as discussed in Box 7.4.

¹⁷ Table A.7.1 in the chapter appendix, available in the online edition of the RED, presents the results of this exercise for each country.

Box 7.4

Private transfers

Private transfers—especially remittances—play an important role in the economies of LAC, particularly for the most vulnerable households (Vacaflares, 2018). According to CEDLAS (2025), these transfers account for an average of 16% of household income in the bottom three deciles, slightly below the share observed in urban areas (20%).

Private transfers act as self-insurance mechanisms against shocks, compensating for the lack of public protection and limited access to credit. In the case of Mexico, Amuedo-Dorantes and Juárez (2015) show that the receipt of non-contributory pensions substitutes private transfers.

These transfers also help reduce vulnerability, improve education and access to healthcare (Askarov & Doucouliagos, 2020; Edwards & Ureta, 2003), and influence households' labor participation and productive decisions (Adams & Cuecuecha, 2010; Amuedo-Dorantes & Pozo, 2006).

There is also a strong link between financial inclusion and the receipt of private transfers. The barriers to financial inclusion faced by rural households—discussed in Chapter 8—can limit their ability to receive resources from family members who migrate to other regions or countries (IFAD & World Bank, 2015).

In-kind transfers

Within the broader set of income-support policies, in-kind transfers—such as the direct distribution of food—offer certain advantages over cash transfers. On the one hand, they help improve nutrition, as households tend to consume the goods received, thereby increasing their intake of calories and micronutrients (Cunha, 2014; Leroy et al., 2010). On the other, they can have positive spillover effects on local markets: in remote areas, they lower the prices of basic goods for the entire population, not just for beneficiaries (Cunha et al., 2019). This is because, in contexts with limited market access and low competition among suppliers, direct public provision introduces competition, as shown by Michelson et al. (2012) and Jiménez Hernández and Seira (2022).

Productive social protection policies

A broader approach to social protection recognizes that, in order for people living in poverty to overcome this condition, protection measures must be integrated with strategies for economic inclusion. Experiences across the region are diverse, and their results have been mixed.

On the one hand, there is encouraging evidence on the effectiveness of programs that transfer productive assets—particularly when combined with enabling components such as training and technical assistance. These programs have shown positive impacts, especially among women (Bandiera et al., 2017; Banerjee et al., 2015, 2024). The literature highlights that overcoming one of the main constraints—limited access to assets—is a decisive step toward breaking poverty traps.

On the other hand, numerous initiatives have sought to promote entrepreneurship among poor rural households. However, the evidence calls for caution: business development programs have shown mixed and hard-to-generalize results. For example, Carter et al. (2019) find positive effects from Nicaragua's Rural Development Program, though these are significantly smaller among the poorest households.¹⁸ This suggests that not everyone is equally equipped to succeed as an entrepreneur, since doing so requires specific skills that must be developed or previously attained. (Sanguinetti et al., 2013). In the agricultural sector, inadequate program design can even reinforce structural issues such

as low productivity and small-scale operations—particularly among subsistence family farms (as discussed in Chapters 2 and 3)—and discourage the transition toward more productive sectors.



Rural entrepreneurship is not always a pathway to inclusion: its outcomes are uneven and, without sound design, it can reinforce existing inequalities

Labor regulations

Union organization and collective bargaining can improve labor conditions in rural areas, but their impact has been limited in practice. Geographic dispersion, subcontracting, and informality weaken the direct relationship between employers and workers, making both unionization and effective collective bargaining more difficult (Weller et. al, 2016).

A notable case is Uruguay, where significant progress has been made in institutionalizing rural collective bargaining. Unlike in other countries, Uruguay's agricultural sector experienced an early expansion of wage employment (Riella & Mascheroni, 2019). In 2023, wage earners accounted for 51% of agricultural employment, and 90% of them were formally registered, the highest proportion in the region.

Since 2005, rural collective bargaining mechanisms have been implemented with the participation of workers, employers, and the state. These have made it possible to establish the eight-hour workday and limit outsourcing, thereby improving working

conditions in the sector. Although no rigorous impact evaluations are available, the evidence suggests improvements in minimum wages and a reduction in working hours.

At the same time, labor regulation in rural areas also faces the challenge of child labor, which remains more prevalent in agriculture than in other economic sectors. The ILO (2021) estimates that nearly 50% of all child labor in LAC occurs in the agricultural sector, often under hazardous conditions or in ways that interfere with school attendance. While several countries have strengthened legal frameworks and labor inspection systems to prevent and penalize child labor, geographic dispersion and high levels of informality continue to limit their effectiveness.

¹⁸ Small producers were required to present a business plan and received technical and financial training, as well as inputs consistent with their individual plan. They also had access to co-financing benefits, such as partial subsidies for improved agricultural inputs and cost-sharing arrangements for individually or cooperatively owned equipment or facilities.

Active labor market policies

Strengthening active labor market policies can help reduce the frictions that limit access to quality jobs in rural areas, where geographic dispersion and high informality make both finding work and recruiting qualified candidates more difficult.

Several instruments can help ease these frictions, including job boards, employment assistance, internship programs, training initiatives, and skills certification. Evidence highlights the strong potential of such interventions in developing countries—particularly when they focus on young people and vulnerable populations (Berniell & de la Mata, 2017; Carranza & McKenzie, 2024; Escudero et al., 2019; Ibararán et al., 2019; Le Barbanchon et al., 2023; Novella & Valencia, 2022). However, Maïga et al. (2020) emphasize the need for further evidence on the impact of agricultural skills-development programs for youth.

In LAC, these policies can be strengthened by linking them with sectors that have high potential for rural employment diversification, such as agri-food value chains (Berdegúe et al., 2025), both in the primary sector and its downstream linkages, rural services, and other strategic sectors (tourism, fishing, mining, and forestry), as discussed in previous chapters. Promoting “green jobs,” many of

which are located in rural areas, is also particularly relevant in the context of the energy transition and ongoing efforts to reduce greenhouse gas (GHG) emissions (Allub et al., 2024).¹⁹ One example is the initiatives of several local governments that use transfer programs to promote ecosystem restoration as a form of productive social protection for small-scale farmers during the periods between harvests.



Active labor market policies can be strengthened by linking them with sectors that have high potential for rural employment diversification

Within this framework, training and reskilling programs are essential to align the workforce with new market demands. These sectors offer valuable opportunities to raise incomes and diversify rural employment, but taking advantage of them often requires retooling workers' skills. Evidence from the region shows that classroom-based, on-the-job, and blended training schemes have had positive effects (Escudero et al., 2019).

Postsecondary education

Within the strategies to promote rural employment diversification, expanding access to postsecondary education is particularly important, as such access remains very limited in rural settings. The strategic expansion of public institutions and short-cycle training programs—such as technical degrees, technological programs, or professional

certifications—has shown strong potential to increase enrollment in geographically underserved areas (Bassi et al., 2021; Ferreyra, 2017). However, this type of educational offering remains scarce in most countries of the region, with Colombia standing out as a notable exception (Ferreyra et al., 2022).

¹⁹ The International Labour Organization (ILO) defines green jobs as “decent jobs that contribute to preserve or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency.” Green jobs help improve energy and resource efficiency, reduce GHG emissions, minimize waste and pollution, protect and restore ecosystems, and support climate adaptation.

Ensuring the relevance of postsecondary education is essential and calls for forward-looking labor demand analyses tailored to local contexts. For instance, strengthening educational offerings to prepare the workforce for the emerging demands of green jobs represents a major opportunity—one that should be assessed in each region according to its productive and environmental characteristics. Technical training in fields such as renewable energy, natural resource management,

energy efficiency, and information technologies applied to agricultural production offers a strategic pathway for aligning the education agenda with the energy transition and sustainable development in rural areas.

At the same time, education systems must also adapt to local opportunities across both agricultural and non-agricultural sectors.

Policies to reduce gender gaps

Reducing gender gaps in employment and income in rural areas requires addressing the structural barriers linked to motherhood and caregiving, traditional gender norms, and the limited availability of quality employment opportunities for women, as documented by Marchionni et al. (2025).

Although, as discussed in Chapter 6, fertility rates among rural women have been declining, they remain higher than in urban areas. Expanding access to childcare and early childhood education services is therefore a key priority. Evidence shows that these services can improve women's labor outcomes by facilitating their entry into the workforce, enabling transitions to more desirable occupations, and increasing the productivity of their businesses. However, when additional barriers persist—such as restrictive social norms or a lack of quality jobs—childcare services alone are not sufficient to close gender gaps (J-PAL, 2023).

Marchionni et al. (2025) also emphasize that one of the main constraints faced by rural women is the amount of time devoted to unpaid domestic tasks other than caregiving, such as subsistence production or water collection. Investment in basic infrastructure (water, energy, transport) and in time-saving technologies is therefore essential to ease this burden and expand women's employment opportunities.



Reducing gender gaps in rural employment and income requires addressing structural barriers linked to motherhood and caregiving, traditional gender norms, and the limited availability of quality jobs for women

Another key pillar is technical training programs with a gender focus, complemented by affirmative actions to promote women's participation in strategic sectors traditionally dominated by men, such as agribusiness, fishing, and construction. Financial inclusion policies, while relevant for the entire rural population, are particularly important for women, who continue to face greater barriers to access.

Finally, policies should be accompanied by initiatives to transform social norms. Awareness campaigns and gender-responsive education programs that challenge stereotypes about the economic and family roles of rural women are key to consolidating progress and closing existing gaps.

Enabling policies to support better labor conditions

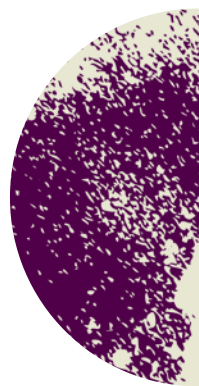
In many cases, employment opportunities exist in nearby towns or localities, but high transport costs, poor connectivity infrastructure, and the lack of mobility services create significant barriers that prevent rural workers from accessing them. In practice, these barriers limit the ability to take advantage of available job opportunities.

Infrastructure policies—covering both transportation networks and digital connectivity—are key enablers of labor market inclusion in rural areas and of efforts to close connectivity gaps. As documented in Chapter 8, empirical evidence consistently shows that investments in physical and digital infrastructure have positive effects on rural employment by lowering job search costs, improving access to broader markets, and expanding the range of opportunities available to workers and entrepreneurs.



8

**Access to quality
services for
comprehensive
rural development**



Key messages

Rural areas are characterized by low population density and high geographic dispersion, which limits economies of scale and raises service provision costs.

Access to water and sanitation in rural Latin America and the Caribbean (LAC) has increased over recent decades, but service remains far from safe and adequate—as required by SDG goal No.6—particularly in sanitation.

In most countries, nearly the entire rural population now has access to electricity. The main challenge is ensuring service quality by reducing the frequency and duration of power outages.

Sixty-six percent of the rural population in LAC lives within 2 km of a road, but this share drops to 40% when considering only paved roads.

Only half of rural households have internet access, and their connection speeds lag far behind those in urban households. Even where networks or new technologies are available, affordability—both of the service and the devices— remains the main barrier.

Rural areas have fewer health and education facilities, especially those offering higher-complexity services. As a result, residents must travel long distances to access them. Existing facilities also tend to have fewer resources, leading to significant gaps in both physical infrastructure and qualified personnel.



Thirty-three percent of the rural population still lacks access to formal financial services. The main barriers are distance to service points and the costs of becoming banked. Some semiformal instruments—such as savings and credit associations—have high female participation and reduce vulnerabilities, while mobile money helps overcome distance and cost barriers.



Closing rural service gaps requires action on two fronts. On the supply side, it is necessary to promote demand aggregation to ensure financial viability and encourage private participation, alongside decentralized and community-based solutions and the use of digital technologies to expand coverage. On the demand side, affordability must be ensured through subsidies and sustainable tariffs, and digital skills strengthened to enable effective service use.

Access to quality services for comprehensive rural development¹

Introduction

Access to quality infrastructure and basic services in rural localities of Latin America and the Caribbean (LAC) is a fundamental pillar for both household well-being and the productive development of these territories. Unlike urban areas, rural regions have low population density and high geographic dispersion, which limit economies of scale and raise service provision costs. This challenge is further compounded by structural transformation and demographic transition.

It is also essential to understand that service provision operates as an interconnected system in which deficits in one area constrain access to—and the effectiveness of—others. Many services require complementary infrastructure (for example, internet access is not possible without electricity), and limitations affect not only coverage but also service quality. When infrastructure and services lack sufficient quality, effective use becomes restricted and the social benefits diminish.

These conditions reduce profitability and limit the attractiveness of private investment, even when the social benefits of access to these services are substantial. The gap between private returns and social benefits makes the state a critical actor in guaranteeing the provision of and access to basic services and infrastructure. Its role extends beyond construction or direct provision to include generating incentives to expand coverage, regulate quality, and coordinate the multiple actors (different levels of government, the private sector, and civil society) involved in planning, financing, and operating services. The state also plays a central role in policies that increase service demand, such as pricing regulations or subsidies, information initiatives, and training in financial literacy.

¹ This chapter was written by Florencia Buccari and Tatiana Rosá with research assistance from Leandro Martínez Villa.

This chapter analyzes access to and the quality of rural infrastructure and services that directly affect household well-being and the productivity of economic activities. The discussion is organized into three interrelated blocks. The first examines household access to drinking water, sanitation, and electricity. The second block examines physical and digital connectivity. Finally, the chapter focuses on education, health, and financial services. Although coverage gaps have narrowed significantly in many areas—with the exception of sanitation—quality gaps persist and remain a major challenge for rural development in the region.

This chapter must be interpreted with the understanding that accurately measuring these gaps in rural areas is difficult. Many statistics do

not distinguish sufficiently between urban and rural settings, and when municipalities grow and add services, they are often reclassified as urban (see Chapter 6), which may underestimate progress in rural localities. In addition, available data show who has access and at what quality, but rarely identify whether gaps stem primarily from supply constraints (for example, difficulties and costs of deploying and operating networks) or demand-side constraints (for example, cultural or linguistic barriers or unaffordable prices). To mitigate these limitations, the chapter integrates diverse sources with household surveys and, where evidence allows, distinguishes between supply- and demand-side issues, as each assessment entails different policy instruments.

Water, sanitation, and electricity

Household access to drinking water and adequate sanitation services is essential for health, productivity, and equity.² These services reduce the spread of disease, improve quality of life, and have positive effects on gender equity and social inclusion (Devoto et al., 2012; Galiani et al., 2005; Hammer & Spears, 2016; Spears, 2020). Recognizing their importance, the United Nations declared them human rights in 2010, and they are at the core of SDG 6.

Electricity is also a fundamental enabling input for the functioning of other services—such as health, education, and telecommunications—and is part of SDG 7. A meta-analysis of 50 studies by Jiménez Mori (2017) estimates that access to electricity in

rural households has increased school enrollment, employment, and income. Moreover, the expansion of electricity access since the 1970s has been associated with a decline in the use of polluting household fuels (such as firewood, coal, and kerosene) across LAC over the last half century, although in 2021 these fuels continued to be used more in rural households (31% of residential energy consumption) than in urban ones (10%) (Allub et al., 2024). Reduced reliance on these fuels for cooking or heating has positive health implications, especially for women and children.

2 Access to irrigation water is discussed in Chapter 3 of this report.

Access to water and service quality

Over the past two decades, the region has made significant progress in expanding rural households' access to drinking water. Graph 8.1, based on harmonized household survey indicators processed by CEDLAS (2025), shows the evolution of access in rural and urban areas across 10 countries in the region.³ It highlights that, while overall access has increased, the urban–rural gap narrowed from 34 percentage points in 2003 to about 16 percentage points in 2023—an improvement, though territorial inequalities remain. Although many countries have achieved notable progress (such as Ecuador, Paraguay, and Peru), gaps persist in countries such as Brazil.

Beyond coverage, service quality exhibits worrying gaps. Under SDG definitions, the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) uses a “service ladder” grouped into three levels. Safely managed water—the SDG 6.1 target—refers to water from an improved source that is available on the premises, free of priority contamination, and accessible when needed. Basic access refers to water from an improved source that requires up to 30 minutes round-trip to collect. Limited access (or unimproved) refers to water requiring more than 30 minutes round-trip, water from an unimproved source, or water obtained directly from surface bodies such as rivers or lakes.⁴

According to 2024 JMP data for nine LAC countries (Brazil, Colombia, Ecuador, Guatemala, Guyana, Peru, the Dominican Republic, Suriname, and Trinidad and Tobago), only 55% of the rural population has safely managed water. Although this represents an increase of nearly 10 percentage points since 2003, it remains far below the urban rate (83%). Another 39% of rural households have basic access, and 6% continue to rely on limited or unimproved sources. In light of these indicators, reaching the SDG target by 2030 remains a significant challenge.



LAC has made substantial progress in expanding rural households' access to drinking water, but only 55% of the rural population has safely managed water

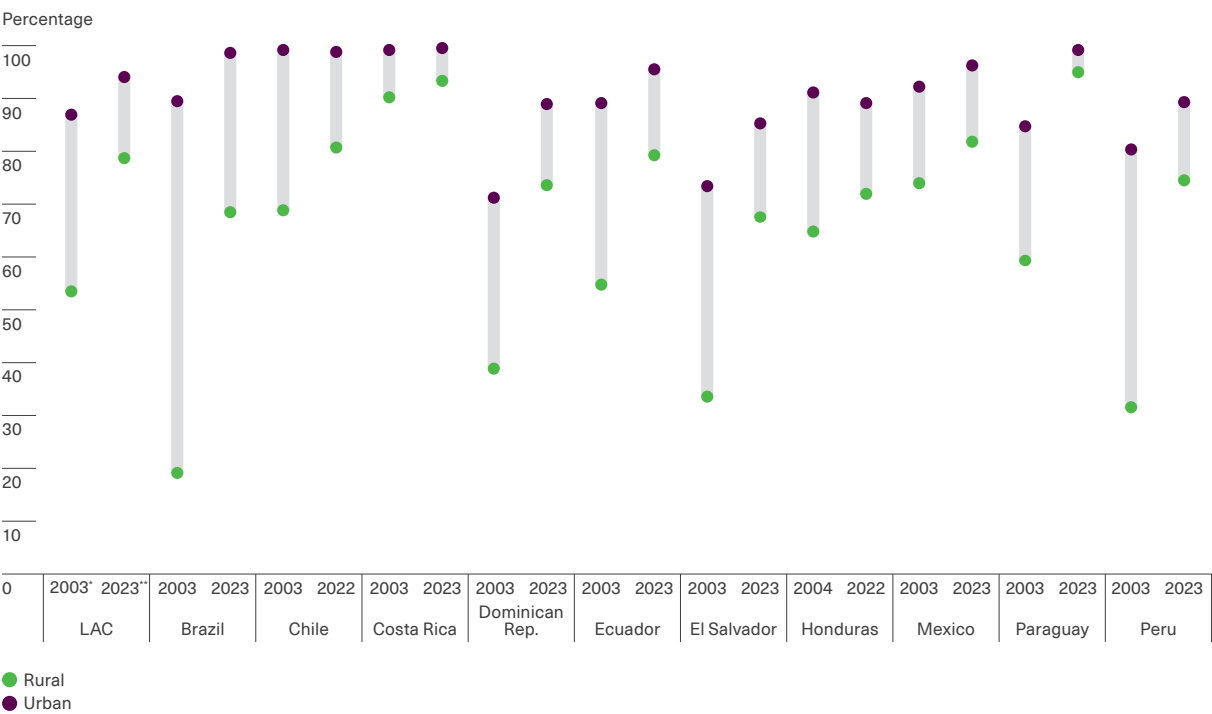


CAF Action.
Scan the QR code to see CAF's water and sanitation projects.

³ Unlike in Chapter 7, this section uses 10 countries, since Bolivia, Colombia, Panama, and Uruguay do not have data on access to water, sanitation, and electricity for the periods considered.

⁴ The unsafely managed-access category includes the levels of limited, unimproved access and direct access to surface water sources as defined by the JMP classification.

Graph 8.1
 Share of rural and urban households with access to water on the premises
 in Latin American and Caribbean countries, 2003–2023



Note: Figures refer to households with access to water within the household premises or property. Asterisks in LAC average years indicate that, for some countries, no information was available for the selected year; in those cases, the closest available year was used.
Source: Authors based on CEDLAS (2025).

Access to unsafely managed water sources—and even basic access, though to a lesser extent—continues to pose health risks and deepen inequalities, particularly due to the time required to collect water. Women and girls are usually

responsible for this task, which negatively affects their labor outcomes and economic autonomy (Marchionni et al., 2025), their well-being (Devoto et al., 2012), and their school attendance (Koolwal & Walle, 2013).

Sanitation service access and quality

Access to sanitation services remains a structural challenge in LAC. These services encompass the management of excreta—from collection in household facilities to emptying, transport, treatment, and disposal. For measurement purposes, household surveys consider a home to

have sanitation when it has a hygienic bathroom with water-based flushing connected to a public sewer or wastewater system.



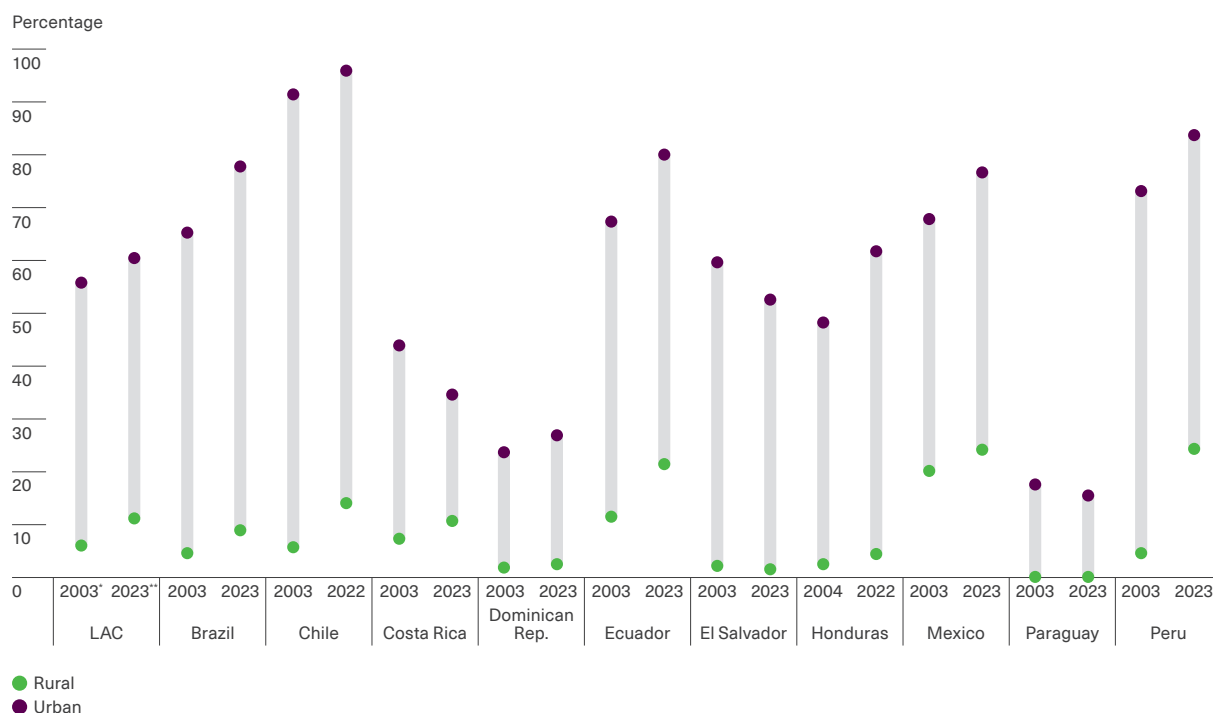
Eleven percent of rural households have sewerage connections, while half have safely managed sanitation

Graph 8.2 shows that urban–rural gaps in sanitation are much larger than those observed in access to water. In 2023, 61% of urban households in LAC had adequate sanitation, compared with just 11% of rural households. These inequalities are not only substantial but have shown little reduction: at the

regional level, the average gap remained virtually unchanged between 2003 and 2023. Even in countries where urban areas have made progress, expansion into rural zones has been limited and, in many cases, uneven. The low figures also reflect the classification threshold: in household surveys, “adequate sanitation” typically requires a sewer connection—a condition less viable in rural areas—and therefore underrepresents local, on-site solutions that can also be safe (Rozenberg & Fay, 2019).

Graph 8.2

Share of rural and urban households with access to sanitation in Latin America and the Caribbean, 2003–2023



Note: Figures refer to households with adequate, non-shared sanitation facilities. Asterisks in LAC average years indicate that, for some countries, data for the selected year were unavailable and the closest available year was used.

Source: Authors based on CEDLAS (2025).

JMP's "service ladder" measures progress in safely managed sanitation beyond sewer connections, addressing the limitations of household surveys. The three levels of the ladder are: (1) safely managed sanitation, the SDG target (an improved, non-shared facility in which excreta are contained and safely emptied, transported, and treated, or treated in situ); (2) basic sanitation (an improved, non-shared facility without verification of safe excreta treatment); and (3) limited or unimproved sanitation (shared or unimproved facilities, or open defecation). Although data on safely managed sanitation are not available for all countries, in seven LAC countries (Cuba, Ecuador, Guyana, Jamaica, the Dominican Republic, Suriname, and Trinidad and Tobago), the average stands at around 50%, highlighting how far these countries remain

from achieving universal access to this standard (JMP, 2025). Regarding comparable metrics for at least basic sanitation in rural areas, JMP records show an increase from 50% to 74% between 2003 and 2024, indicating significant progress.

Another particularly relevant indicator in rural contexts is open defecation, a practice with severe public health and child development consequences. On average, the region has achieved notable progress: in 2024, fewer than 3% of rural residents practiced open defecation. However, serious challenges persist in countries such as Bolivia and Haiti, where close to 30% of the rural population continues to rely on this form of excreta disposal.

Policies to improve water and sanitation access and quality

Designing public policies to expand access to water and sanitation requires addressing supply- and demand-side challenges simultaneously. On the supply side, gaps persist in distribution networks and nearby infrastructure, as well as in sanitation facilities that ensure safe disposal. On the demand side, barriers arise from connection costs, service tariffs, and affordability, and the investments required within households, along with the need to shift social norms and practices. In this context, many countries design water and sanitation policies jointly at the government level, but implementation—often distributed across multiple agencies—requires interinstitutional coordination to align investments, tariff structures, and subsidy schemes.

Regarding the infrastructure needed to achieve the SDG standard for safely managed water, Rozenberg and Fay (2019) note that the technologically viable option with the lowest unit cost is networked service with household connections. However, reaching this level of coverage demands substantial spending on initial investment as well as operation and maintenance, amounting to between 1% and 1.5% of GDP in low- and middle-income countries, with wide heterogeneity across contexts (Rozenberg & Fay, 2019). Some successful

cases in the region—such as Bolivia's MiAgua public investment program, financed with support from CAF—have enabled 400,000 rural families to gain access to safe water (Maris, 2023).



Expanding safe water access depends on extending networks and household connections, whereas safely managed sanitation can be delivered through decentralized solutions

For safely managed sanitation, Rozenberg and Fay (2019) identify decentralized systems as the most cost-effective option in rural settings, particularly dry pit latrines with proper waste management. Although sewerage networks can also meet the standard, costs are typically higher in low-density, geographically dispersed communities.

When implementing these policies, governments face a trade-off between direct public provision (with high fiscal costs) and concessions to private

actors (with lower pressure on public budgets but a risk of limited coverage in low-income or remote areas). Evidence from Brazil shows that companies expand where operations are profitable: network extensions tend to be continuous from existing pipelines and oriented toward higher-income localities (Santos & Guidetti, 2025). This dynamic hampers expansion into rural areas, which typically face limited service availability and lower incomes. Thus, if concessions are used, governments must establish coverage obligations or incentives, accompanied by appropriate subsidies or urban–rural cross-subsidization schemes.

Beyond expanding supply, effective household uptake depends on affordability (connection fees, tariffs, and operating or maintenance costs), liquidity constraints, access to information, and usage norms. Evidence from Brazil shows that even where infrastructure exists, households do not always connect, and connection costs are a central barrier, with uptake increasing alongside household income (Santos & Guidetti, 2025).

On the demand side, the most effective instruments combine targeted connection subsidies (or installment payment schemes or microcredit) with progressive tariff designs that limit fixed charges and protect a basic level of consumption. In the case of Brazil, connection subsidies increase adoption where networks exist; when coupled with tariff adjustments that restore financial viability, they also incentivize network expansion and improve overall well-being (Santos & Guidetti, 2025). In certain rural contexts, community-based arrangements can improve well-being compared with purely private management by avoiding prices above marginal cost, although they require mechanisms to sustain investment (Kremer et al., 2011)

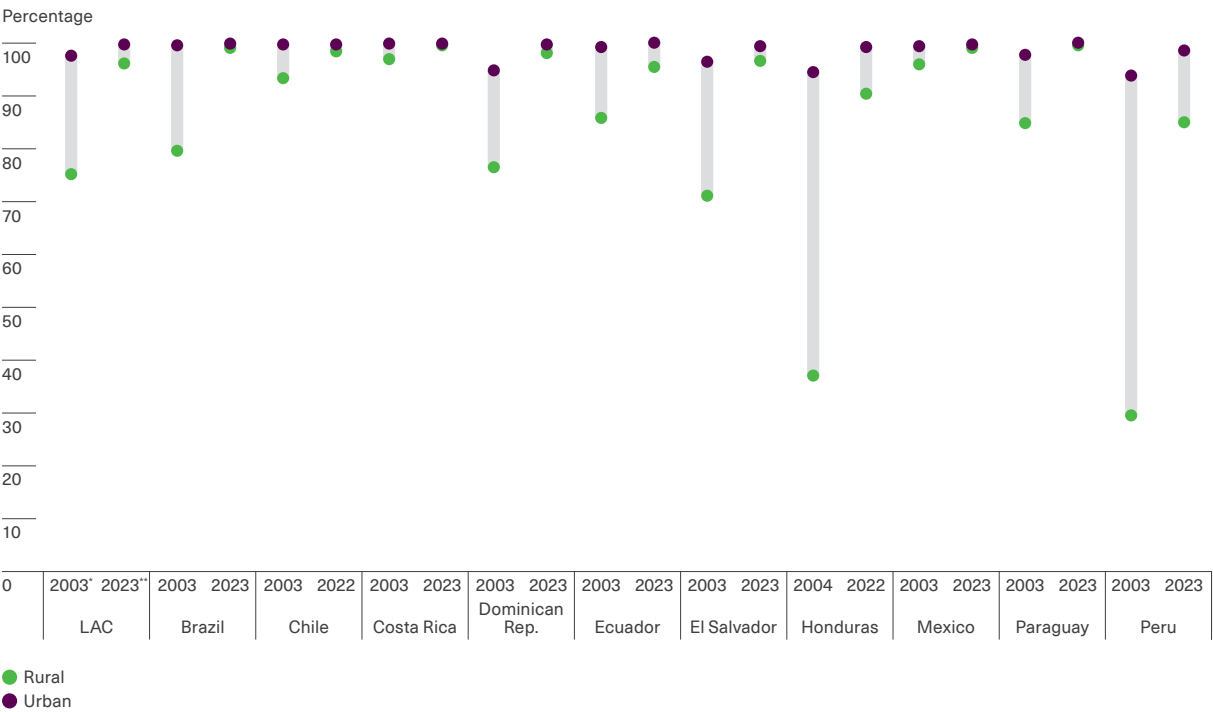
For safely managed sanitation in rural areas where network expansion is not viable, international evidence supports prioritizing decentralized solutions backed by demand-side incentives. A review of 27 evaluations in 14 Asian and African countries finds that subsidies for latrine construction outperform soft loans and stand-alone information campaigns; results are stronger and more persistent when paired with behavior-change strategies and active facilitator follow-up (J-PAL, 2025).

Electricity access and quality

Rural households' access to electricity increased in most LAC countries with available data between 2003 and 2023, a period during which urban–rural gaps narrowed, as shown in Graph 8.3. In several cases—such as Chile and Mexico—the gap has nearly closed. Even so, in others, such as Honduras and Peru, significant lags persist.

●●
Rural households' electricity access increased between 2003 and 2023 in most LAC countries, and urban–rural gaps narrowed

Graph 8.3
 Share of rural and urban households with access to electricity in Latin America and the Caribbean, 2003–2023



Note: Asterisks in LAC average years indicate that, for some countries, no information was available for the selected year; in those cases, the closest available year was used.
Source: Authors' elaboration based on CEDLAS (2025).

The main gap in electricity provision between urban and rural areas in LAC relates to service quality rather than access. Although limited residence-disaggregated data hinder precise assessments, the few countries that report such information—such as Panama and Uruguay—show stark differences. In the second half of 2024, the frequency of power outages in rural areas was double that of urban areas in Panama and four times higher in Uruguay (ASEP, 2024; URSEA, 2025). Outages in rural zones lasted an average of 10 hours in Uruguay (four times longer than in the country's urban areas) and between two and three hours in Panama (double the average duration in urban areas of the country). In both countries, regulatory limits for these indicators are less stringent for rural areas, reflecting lower

quality expectations; in Panama's case, these differentiated limits are exceeded more frequently in rural connections.

● ●
The quality of electricity service in rural areas—measured by the frequency and duration of power outages—differs significantly from that in urban areas

Policies to improve electricity access and quality

Many of the region's advances in rural electricity access were made possible by government programs specifically targeting this population segment. Table 8.1 summarizes the main initiatives that contributed to the most significant reductions in access gaps over the past two decades. These

programs were first implemented in the late twentieth and early twenty-first centuries, involving multiple levels of government and, in many cases, incorporating renewable energy generation solutions whose expansion has accelerated in recent years.

Table 8.1

Policies for rural electrification in Latin American and Caribbean countries

Country	Name	Start year	Investment in distribution networks	Includes renewable energies
Argentina	Proyecto de Energías Renovables en Mercados Rurales	1999	No	Yes
Brazil	Luz para Todos	2003	Yes	Yes, for remote areas
Bolivia	Programa de Electrificación Rural y Proyecto Mejora del Acceso Sostenible a la Electricidad en Bolivia	2010	Yes	Yes
Chile	Programa de Electrificación Rural y Programa de Energización Rural y Social (PERyS)	1994	Yes	Yes
Colombia	Fondo de Apoyo Financiero para la Energización de las Zonas Rurales Interconectadas y Fondo de Apoyo Financiero para la Energización de las Zonas No Interconectadas	2000/2002	Yes	Yes
Ecuador	Fondo de Electrificación Rural y Urbano-Marginal	1996	Yes	Yes
Honduras	Programa de Electrificación Rural en Lugares Aislados	2018	No	Yes, for remote areas
Mexico	Fondo de Servicio Universal Eléctrico	2017	Yes	Yes
Panama	Programa de Electrificación Rural y Proyecto de Electrificación Rural en Sistemas Aislados	2006	Yes	Yes
Peru	Programa Masivo Fotovoltaico y Proyecto de Mejoramiento de la Electrificación Rural	2007	Yes	Yes

Source: Authors based on Laguzzi and Mercure (2025), Willcox and Cooper (2025), MHE (2025), Subdere (2025), MME (2025), MAE (2025), Olade (2024), Secretaría de Energía (2017), Gómez et al. (2014), and DGER (2014).

Small-scale generation networks, in particular, have proven effective in low-density and geographically complex areas, as they can aggregate demand where populations are dispersed. Studies such as Eras-Almeida et al. (2019) highlight that decentralized systems make it possible to scale rural electrification cost-effectively in areas where traditional grid extension is not viable. In some cases, these programs have been complemented

by subsidies for the purchase of solar panels and batteries to improve affordability. Another strategy that can enhance the sustainability of these projects—and their effective adoption by rural communities—is to integrate local actors into the initiatives and provide the technical assistance needed for installation and maintenance.

Regarding improvements in service quality, regulation imposed on distribution companies plays a central role. As noted earlier, and in line with Delavechia et al. (2023), some countries in the region have established differentiated quality standards for urban and rural areas, with indicators tied to penalties or compensations. According to Corton et al. (2016), financial penalties have

the potential to improve service quality without increasing firms' costs. Another recommended regulatory measure is the publication of service quality reports by distributor with regional disaggregation. In Brazil, this also includes publishing a ranking of distributors based on service quality, increasing peer pressure among providers.

Rural connectivity

Physical connectivity

The construction of rural roads has positive effects on rural development (González-Navarro et al., 2023; Ludwig et al., 2016; Redding & Turner, 2015). Several studies find positive impacts of building and upgrading transport infrastructure on firms' exports (Volpe Martincus et al., 2017), agricultural production (Sotelo, 2020),⁵ and the adoption of technological innovations in agriculture (Aggarwal, 2018), consistent with the discussion in Chapter 3 of this report. Transport infrastructure can also support structural transformation processes—that is, the shift away from agricultural activities toward services and manufacturing (Asher & Novosad, 2020; Berg et al., 2017; Fiorini & Sanfilippo, 2022; Khandker & Koolwal, 2011; Quintero & Sinisterra, 2022).

Road infrastructure also has positive effects on rural household well-being. Aggarwal (2018) finds that road paving in India reduces the prices of household consumption goods as a result of greater market integration. Meanwhile, Alder et al. (2023) and Sotelo (2020) find positive—but heterogeneous—effects on economic activity, concentrated in localities that were more developed to begin with.

Measuring physical connectivity for the rural population

One of the first indicators used to assess the availability of transport infrastructure is the length of roads relative to a country's land area. LAC has a low density of roads in relation to its territory (Cont et al., 2025; González-Navarro et al., 2023; Sanguinetti et al., 2021). According to the International Road Federation (IRF), LAC countries had an average of 17 km of roads per 100 square kilometers (km²) of land area—similar to Africa's indicator of 13 km per 100 km². The region remains far from the levels observed in the United States and Canada (67 km per 100 km²) or in Europe (32 km per 100 km²). Finally, only 22% of the region's road network is paved, a figure again close to African countries (24%) and far below Europe (82%) and Asia (72%) (IRF, 2025).⁶

At the same time, the rural population in LAC is geographically dispersed (see Box 8.1). Therefore, to approximate how effectively transport infrastructure provides accessibility, it is essential to consider how roads are distributed across the territory in relation to their proximity to inhabitants.

5 Donaldson (2018) shows that the arrival of the railroad in India increased trade and income per unit of land. In LAC, however, freight transport relies primarily on roads, so this chapter concentrates on that mode.

6 These calculations use the most recent year with available data for the countries in each region.

Box 8.1

The geographic dispersion of the rural population: A challenge for ensuring services and infrastructure

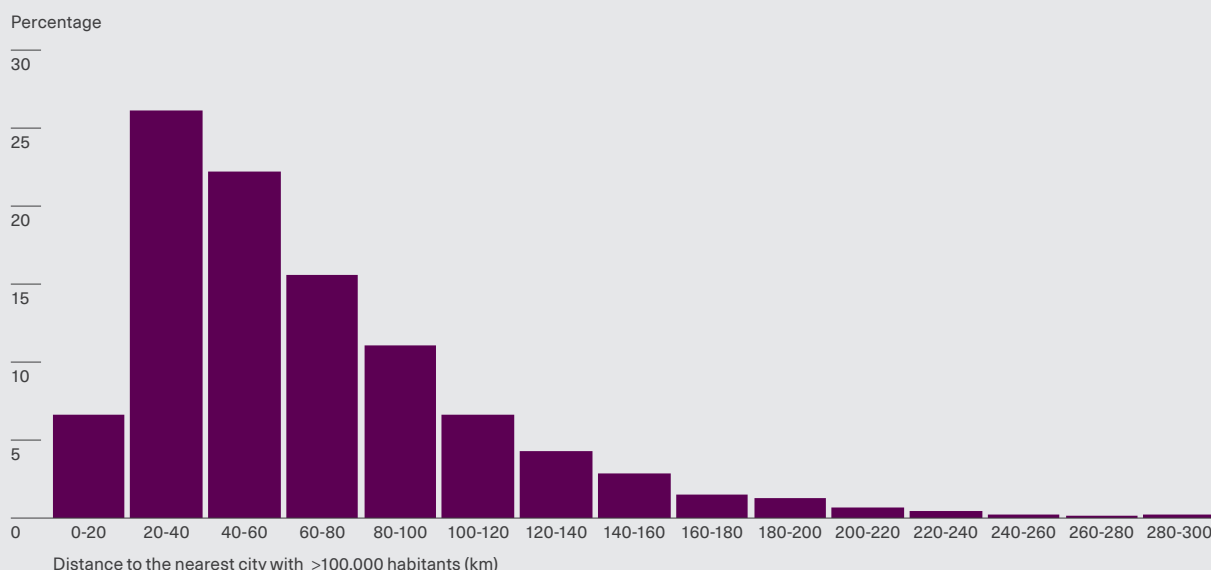
The rural population of LAC has a high spatial dispersion and, on average, is more isolated than in developed countries. One way to quantify this dispersion is to calculate, for each locality, the average distance to all other localities in the country, weighted by population. This indicator was defined by Xia et al. (2020). Calculations for LAC carried out for this report show that the rural population lives, on average, 25% farther away from other localities than the urban population—a gap larger than that observed in OECD countries, where the difference is 18%.^a

Another way to assess dispersion is to examine the distance from rural populations to intermediate or large cities (with at least 100,000 inhabitants). The results show that about half of the population in these municipalities lives less than 60 km from a city of this size, while around 10% live more than 160 km away (Graph 1).

This territorial configuration poses a central challenge for public policy: it raises service provision costs and limits the possibility of extending networks, deepening existing territorial inequalities.

Graph 1

Distribution of the rural population by distance to a city of at least 100,000 inhabitants



Note: The graph shows the percentage of the rural population by distance categories/bands/ranges from their place of residence to a city with at least 100,000 inhabitants within the same country. The countries included are Antigua and Barbuda, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Peru, El Salvador, Trinidad and Tobago, and Venezuela. Distance to a city of at least 100,000 inhabitants is considered up to a maximum of 300 km.

Source: Authors based on CAF (2025a) and Schiavina et al. (2023).

a. The dispersion indicator corresponds to the population-weighted average of the squared distances between all localities in a country. For the rural population, only localities located in rural municipalities—as defined by Schiavina et al. (2023)—are considered, with distances measured relative to all localities in the country.



Sixty-six percent of the rural population in LAC lives within 2 km of a road, and 40% lives within 2 km of a paved road

A useful measure for evaluating physical accessibility is the Rural Access Index, which measures the percentage of the rural population living less than 2 km from an all-season road (Roberts et al., 2006). This indicator is currently included under the SDG on resilient infrastructure. According to our own calculations—following the methodology presented in Box 8.2—66% of the rural population in LAC lives less than 2 km from a road (Graph 8.4). This figure is below the average for lower-middle-income countries

and significantly lower than in OECD countries (94%) and North America (87%). However, the measure falls even more when only paved roads are considered: the share of the region's rural population living within 2 km drops to 40%, with substantial heterogeneity across countries and subregions (see Table A.8.1 in the appendix to this chapter, available in the online edition of RED).

A complementary exercise with several OECD countries whose land area is comparable to that of South American countries (Spain, Australia, and Canada) shows differences in accessibility when considering all roads regardless of condition (86% of the rural population lives within 2 km of any road) versus paved roads only (73%). Yet the gap is considerably wider in LAC.

Box 8.2

Methodology for measuring rural accessibility in this chapter

This box presents the authors' calculations of the percentage of the rural population living less than 2 km from a road in LAC countries (equation 1)

$$\% \text{ rural population living within 2 km of a road} = \frac{\text{Rural population living within 2 km of a road}}{\text{Total rural population}} \quad (1)$$

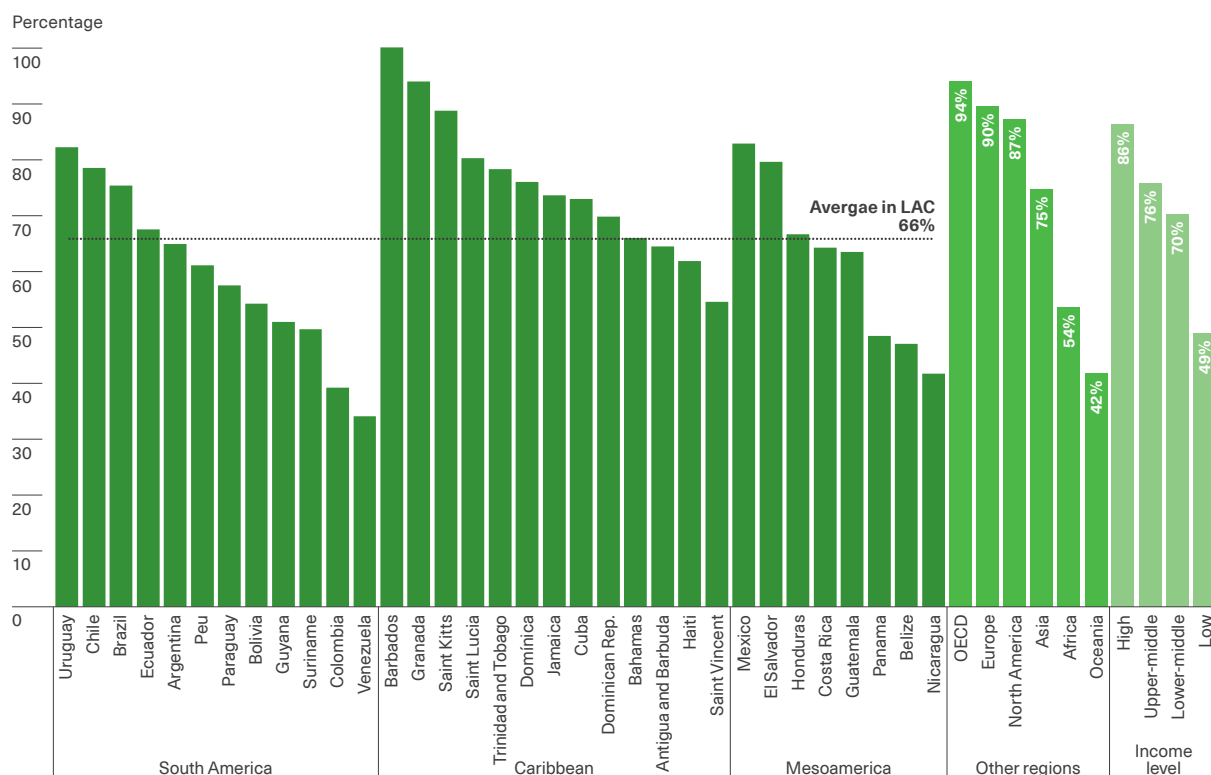
The methodology follows the approach used by the World Bank (2016). Total rural population is calculated by counting population grid cells from WorldPop (2020) that fall outside the urban-locality mapping from the Global Rural-Urban Mapping Project (GRUMP) (CIESIN-Columbia University et al., 2011). For the numerator, georeferenced rural population data are overlaid with road datasets from the Heidelberg Institute for Geoinformation Technology (HeiGIT, 2024). The only exception among LAC countries is Mexico, for which OpenStreetMap data are used (HOT, 2025). Both datasets enable cross-country comparisons and alignment with existing global measurements, although they may differ from national data sources.

To approximate accessibility based on road quality, the indicator is calculated using both all roads and paved roads only. Accordingly, it includes roads in the primary (main), secondary, and tertiary networks, the latter two of which are generally under the responsibility of subnational governments—state and local, respectively (Fernández Ordoñez, 2023).

Where possible, measurements are disaggregated at the local government level, using the geographic boundaries in CAF's dataset (2025a). Table A.8.1, included in the appendix to this chapter (available in the online edition of RED), provides the geographic disaggregation levels used in each country. For more details on the methodology and results, see Buccari et al. (2025).

Graph 8.4

Percentage of the rural population living less than 2 km from a road in Latin American and Caribbean countries and other regions



Note: The percentages shown in the graph include both paved and unpaved roads. The methodology used for LAC countries is described in Box 8.2. Data for the remaining countries were obtained from Azavea et al. (2019) and aggregated according to the World Bank's income-level classification (2025f). The OECD average excludes LAC countries.

Source: Buccari et al. (2025).

Heterogeneity is also evident within countries. Measurements conducted at the level of local territorial entities (municipalities or localities)⁷ allow for an analysis of within-country variation and its relationship to geographic, demographic, and fiscal characteristics. Buccari et al. (2025) present the correlations between the accessibility indicator and various attributes of each local entity, considering both all roads and paved roads only. The results

show that larger territorial size and greater variation in altitude are associated with a smaller share of the rural population living within 2 km of a road. In contrast, there is a positive relationship between accessibility and the share of rural population (relative to the total population of the local entity), which may reflect a prioritization of road construction in places where rural residents make up a larger proportion of the population.

⁷ Throughout the chapter, these subnational units are referred to interchangeably as "municipalities" or "localities." Strictly speaking, under the Degree of Urbanisation (DEGURBA) classification, this level corresponds to the country's second administrative tier (e.g., municipalities, districts, cantons, or communes, depending on each country's political-administrative structure).

Incorporating public finance data also shows that the road-access indicator is positively associated with local governments' per capita tax revenues. This association becomes even stronger when considering accessibility to paved roads only. However, it is important to note that this relationship may reflect bidirectional causality: on the one hand, local governments with greater fiscal resources may be better positioned to invest in secondary or tertiary road infrastructure; on the other hand, greater accessibility may stimulate local economic activity and thereby increase tax collection.

Policies for improving physical connectivity in rural areas

Investment in road infrastructure

Public financing of roads is one of the main components of infrastructure investment in the region (Infralatam, 2025), although it starts from lower levels than those observed in OECD countries (Sanguinetti et al., 2021). To improve the physical accessibility of rural populations, in addition to building new roads, spending on upgrading and maintaining existing infrastructure is essential.

The contrast between rural populations' proximity to roads in general and to paved roads (see Table A.8.1 in the appendix to this chapter, available in the online edition of RED) shows that accessibility gains can be achieved through investments in road upgrading. Sanguinetti et al. (2021) simulate the impact that improving road quality would have on access to domestic markets in 17 LAC countries. The results show that simply upgrading existing roads could generate significant improvements in market access. In countries such as Bolivia and Colombia, potential access to people could double, suggesting high potential returns from

investments in road rehabilitation. Effects are clearly heterogeneous: in Uruguay and Panama, for example, the increase is below 10%.

Maintenance investments represent a substantial share of total lifecycle spending on infrastructure, shape the quality of services it can provide over time (Sanguinetti et al., 2021), and can yield substantial savings compared with later rehabilitation. Serebrisky et al. (2017) highlight the example of Peru, where between 1992 and 2005 the country spent seven times more repairing roads than it would have cost to maintain them regularly. Constraints on this type of spending include political-economy challenges, fiscal limitations, institutional issues, and state-capacity shortcomings. The latter also involves having adequate diagnostics of the condition of existing infrastructure. Encouragingly, the cost of assessing road conditions has fallen in recent years through the use of satellite-imagery analysis (PPIAF, 2023).



Road maintenance represents a substantial share of total spending, determines service quality over time, and can generate significant savings compared with later rehabilitation

Improving subnational state capacity and coordination across levels of government

The involvement of different subnational government levels varies widely across countries and governance systems: federal countries such as Argentina and Brazil tend to decentralize public investment more than unitary systems (Alves et al., 2025).



CAF Action.
Scan the QR code to see
CAF's rural road projects.



Rural road in a sugarcane plantation in Panama.

However, projects executed by subnational governments tend to be of lower quality than those carried out by national counterparts (Alves et al., 2025). The main causes behind this deficiency relate to state capacity—particularly in planning and preparing feasibility studies. To address these barriers, which can affect project costs (both construction and subsequent operation and maintenance), continuous staff training, technical assistance, and advisory services are recommended, together with efforts to professionalize investment management.

To remedy these institutional-capacity limitations at the local-government level, some countries have adopted hybrid approaches. In Mexico, for example, under the Road Paving Program for Municipal Seats, the central government finances, prioritizes, and selects the projects, while municipalities are responsible for their execution (SCT, 2025).

Digital connectivity

Internet access has positive impacts on development in emerging economies (Hjort & Tian, 2025), particularly in rural areas. On the one hand, it expands the markets available to firms, workers, and consumers and reduces information frictions. For example, Goyal (2010) finds that, in India, a policy that installed internet kiosks in rural areas to disseminate soybean price information increased the prices received by producers and expanded the land area allocated to the crop.

On the other hand, digital connectivity raises worker productivity. Several studies document increases in both skilled and unskilled employment rates (Bahia et al., 2024; Hjort & Poulsen, 2019). Some of the mechanisms behind productivity gains from internet access include human capital accumulation and improved matching between firms and workers. Internet connectivity also facilitates the adoption of technological innovations (Hjort & Tian, 2025).

Coordination with the private sector

Public–private partnerships (PPPs) make it possible to leverage private-sector resources and capabilities to close access gaps in historically underserved territories. Their use, however, has been limited for secondary or tertiary roads—those connecting dispersed rural areas—due to lower traffic volumes and low direct profitability.

To encourage these arrangements, some countries have implemented demand aggregation mechanisms, bundling road segments with different traffic levels. In Uruguay, for example, projects have been tendered that combine rehabilitation and maintenance of both national and secondary roads (Corporación Nacional para el Desarrollo, 2017). In the same case, availability payment mechanisms have been used, whereby the State compensates the private sector only if it guarantees a minimum road quality standard.



Internet access expands markets and reduces information frictions, boosts productivity, supports structural transformation, increases consumption, and reduces poverty

An important effect relates to changes in employment type and sector. First, Hounghonon et al. (2022) find that high-speed internet in Africa is associated with a higher likelihood that rural households start non-agricultural businesses, mainly in services. Bahia et al. (2023), using data from Tanzania, show that access to third-generation (3G) networks encourages women with at least primary education to move from agricultural self-employment into non-agricultural jobs. However, they find no overall effect on women's total labor force participation, highlighting ongoing challenges in capturing the benefits of digital technologies.

These employment effects translate into improvements in other dimensions of household well-being. Bahia et al. (2024) find that broadband connectivity increases consumption levels and reduces poverty rates, with effects concentrated in rural areas. This is consistent with earlier results from Beuermann et al. (2012), who documented reductions in both poverty and extreme poverty in rural Peruvian localities following the introduction of 2G mobile coverage.

Taken together, this literature consistently shows that internet access not only improves productivity and employment but also helps reduce poverty and strengthen household well-being, particularly in rural areas. As discussed in the following subsections, connectivity also enables access to other services, such as financial services, telemedicine, and virtual education.

Internet access and quality in rural areas

Despite extensive evidence on the positive effects of digital connectivity in rural settings, 47% of rural households in LAC still lacked internet access in 2023 (Graph 8.5). Although coverage has increased over the past decade, a substantial challenge remains: the gap with urban areas reaches 24 percentage points and widens among household heads aged 55 or older (see Graph A.8.1 in the appendix to this chapter, available in the online edition of RED). Moreover, these metrics refer to household access and do not always capture individual connectivity outside the home—for example, through personal mobile data or community Wi-Fi access points. Looking instead at effective internet use—whether via mobile data or fixed connections—74% of adults in 10 LAC countries reported using the internet in the previous three months (UIT, 2025).⁸



In 2023, 47% of rural households in LAC still lacked internet access at home. Barriers to access stem from both demand-side factors (affordability or digital skills) and supply constraints

Household surveys in some countries, such as Colombia, indicate that price is the main reason why households do not subscribe to internet service (DANE, 2024). Access is also conditioned by the availability of complementary services, such as electricity, and by device ownership. However, figures and gaps remain largely unchanged when requiring joint access to both electricity and internet (CEDLAS, 2025), suggesting that the main bottleneck comes from internet connectivity itself (availability and price) rather than from a lack of electricity. These patterns, combined with limited digital skills among the population, point to demand-side obstacles that compound supply-side limitations.

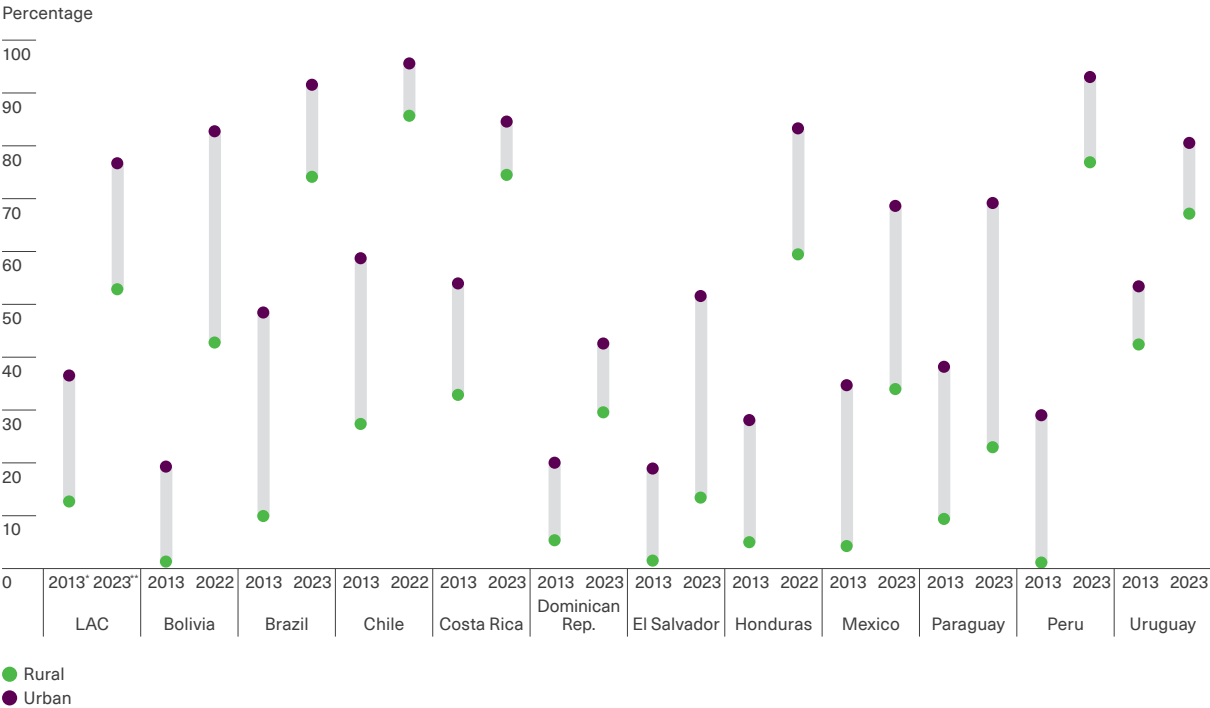
Regarding service quality, fixed broadband download speeds increased between 2019 and 2024 across countries in the region. These improvements were observed in both urban and rural municipalities and helped narrow some service-quality gaps, though substantial rural–urban differences persisted in 2024: on average, speeds in urban localities were 64% higher than in rural ones (Panel A of Graph 8.6). This gap exceeds that observed in OECD countries, where metropolitan municipalities had fixed-internet speeds 44% higher than those in more remote areas (OECD, 2025). Panel A of Graph 8.6 also shows that mobile internet speeds improved over the same period due to the rollout of 5G technology. However, the uneven deployment of this network across urban and rural areas contributed to widening mobile-internet speed gaps—a trend that may ease as governments complete full network coverage.

⁸ Data for Chile, Colombia, Costa Rica, Jamaica, and Mexico are from 2023, and data for Brazil, Ecuador, Paraguay, Peru, and the Dominican Republic are from 2024.

Network response time (latency) is also a key quality indicator, particularly for services such as telemedicine or virtual education (OECD, 2025). Panel B of Graph 8.6 shows that, overall, latency decreased in LAC between 2019 and 2024. The progress was more significant in urban municipalities than in rural ones, widening rural–urban gaps: in 2024, fixed-internet latency was 57% higher in rural localities than in urban ones, and 90%

higher for mobile internet. According to the OECD (2025), differences in fixed-internet latency between metropolitan and remote areas in member countries reach 22%. This means rural–urban latency gaps for fixed internet are larger in LAC than in the OECD. Moreover, the trend over this period diverged sharply: while these gaps narrowed in the OECD, they widened in LAC (OECD, 2025).

Graph 8.5
Share of rural and urban households with internet access in Latin America and the Caribbean, 2013–2023

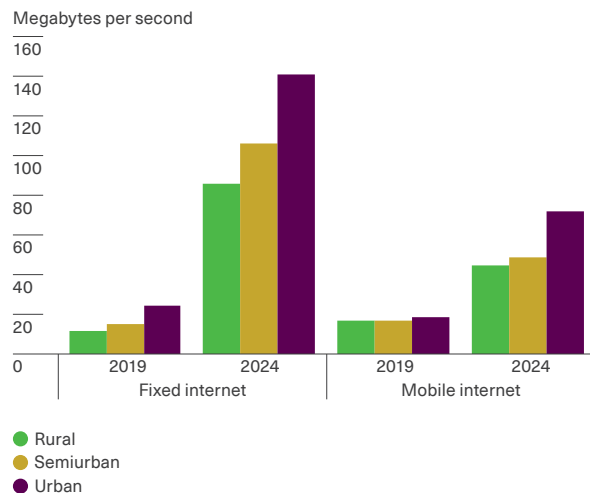


Note: Asterisks in LAC average years indicate that, for some countries, no information was available for the selected year; in those cases, the closest available year was used.
Source: Authors based on CEDLAS (2025).

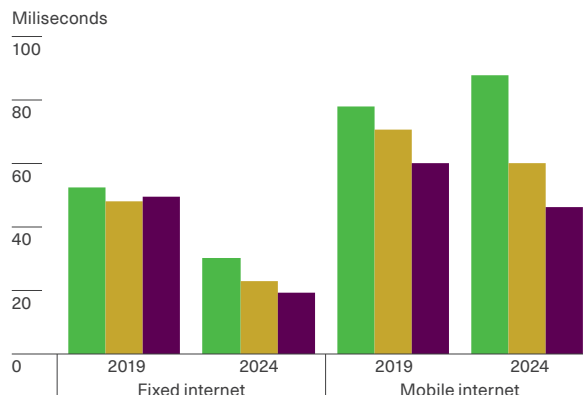
Graph 8.6

Quality Indicators for fixed and mobile internet in Latin America and the Caribbean by municipal degree of urbanization

Panel A.
Evolution of fixed and mobile internet download speeds



Panel B.
Evolution of fixed and mobile internet latency



Note: The speed and latency values shown in panels A and B represent averages across municipalities classified according to the DEGURBA framework.

Source: Authors based on OOKLA (n.d.), CAF (2025a), and Schiavina et al. (2023).

Policies to expand internet access and improve service quality

Several LAC governments have made closing digital connectivity gaps in rural areas a policy priority. Colombia aims to achieve 85% territorial coverage with the option to subscribe to fixed or mobile broadband; Costa Rica targets an average mobile download speed of 32 megabytes per second (Mb/s) on fourth-generation networks; and Mexico seeks to cover 92.2% of the population with fourth-generation technology through its Red Compartida initiative (OECD, 2025).

However, moving toward these goals is highly costly. In Peru, for instance, the infrastructure investment required to eliminate digital connectivity gaps in rural localities was estimated at around 5% of GDP in 2021—even after accounting for economies of scale from community-managed solutions (World Bank, 2025a; Pronatel, 2021).⁹

Affordability is the main challenge for expanding satellite internet access—one of the most promising alternatives for increasing connectivity in rural areas

⁹ These estimates from Peru's National Telecommunications Program are based on expanding service through the provision of wireless internet to public institutions (schools, health centers, municipal offices). This approach increases economies of scale and reduces costs; therefore, the estimates should be interpreted as a lower bound of the cost.

Box 8.3

Satellite internet

In rural localities where fiber-optic or mobile networks are unavailable—or only available intermittently—satellite internet has become the fastest-to-deploy alternative. Two technology families coexist, each with distinct performance characteristics: low-earth-orbit (LEO) constellations, which offer lower latency and self-installation kits, and geostationary (GEO) satellites, which have higher latency and typically apply traffic management policies. In addition to global operators (Starlink, HughesNet, Viasat), local integrators and providers also participate in delivering the service: they acquire wholesale LEO or GEO capacity and handle the “last mile” through fixed wireless links or short fiber extensions. Their proximity to consumers—in sales, installation, and support—facilitates adoption; however, their smaller scale and the quality of the intermediate link to the internet may translate into data caps or traffic prioritization.

Effective adoption depends on two mutually reinforcing enabling conditions. First, as with all internet-access technologies, they require a reliable power source: the antenna or terminal, router, and devices all need continuous electricity. Second, equipment availability and affordability for end users are essential: connectivity delivers benefits only if households and institutions have access to computers or phones and can sustain the monthly service cost.

Regarding the latter, residential LEO plans typically range from USD 30 to USD 70 per month, with typical upfront investments between USD 300 and USD 500 (depending on equipment and country). Compared with fixed alternatives (fiber or cable), monthly satellite prices can be double or more (as shown by our estimates for Chile, Mexico, Colombia, and Brazil), limiting individual adoption. These amounts represent a high share of average monthly income—exceeding 10% in countries like Colombia and Mexico and between 5% and 8% in Chile and Brazil. In some markets, installation fees may vary with local demand, which is often higher in rural areas, raising the cost of entry.^a

Given these high costs, community models—Wi-Fi access points managed in schools, health posts, or community centers—offer a cost-effective way to expand reach. These arrangements allow a satellite connection to be shared among numerous users, reducing per-household expenses.

From a public-policy perspective, satellite internet is a viable option for closing gaps in remote areas, prioritizing community access points with verifiable service standards and cofinancing equipment investments to lower implementation costs. In sum, while the technology is available, these advances must be accompanied by policies that ensure affordability to guarantee effective digital connectivity in rural areas.

a. Satellite internet prices were obtained from Starlink’s official website (n.d.). Fiber-optic prices were obtained from TELMEX (n.d.) for Mexico, ETB (n.d.) for Colombia, Movistar (n.d.) for Chile, and Melhorplano (n.d.) para Brazil.

Three main technology families currently coexist for providing internet access in rural areas. The first includes wired solutions such as fiber optic and coaxial cable. The second consists of terrestrial wireless solutions, including mobile networks and

fixed wireless access. The third comprises satellite solutions, which have expanded rapidly. Each poses distinct policy challenges: wired solutions require planning and maintaining physical infrastructure (ducts, poles, and backbone networks); wireless

solutions require radio coverage and spectrum management;¹⁰ and satellite services, which do not depend on local networks, shift the focus to service and equipment costs. While affordability is a cross-cutting challenge across all technologies, it tends to be the main barrier for rural households and productive establishments in the case of satellite access (see Box 8.3).

Incorporating requirements into licensing and bidding processes

One of the main barriers preventing private actors from deploying connectivity infrastructure in rural areas is low profitability. To address this, governments can design contracts that link service provision in high-profit areas to obligations in less profitable ones, ensuring coverage where the market alone would not deliver.

In mobile broadband (3G, 4G, 5G), service is delivered over radio and requires access to radio spectrum—ranges of frequencies that constitute a scarce public resource allocated by the state through licenses, often via auctions. These auctions can include coverage obligations and other requirements aimed at promoting deployment in rural and remote areas; when combined with competitive markets, such mechanisms have proven effective in OECD countries, provided that obligations do not discourage bidder participation (OECD, 2022).

In addition, several countries complement these auctions with spectrum licenses specifically tailored to rural areas. These licenses may be low-cost or socially oriented and are granted to small or local operators to serve smaller communities (OECD, 2025). This approach—used in Australia, the United States, Finland, Japan, Mexico, New Zealand, the United Kingdom, and Sweden—enables services such as mobile broadband and fixed wireless links in areas where large operators do not invest. In Mexico, for instance, the regulatory framework

includes social-purpose spectrum licenses for nonprofit service provision and licenses for small operators targeting rural areas (article 83 of the 2024 Federal Telecommunications and Broadcasting Law).

Public–private partnerships

This mechanism allows the public sector's coverage goals to be combined with the operational capacity of the private sector. In internet access, a common model involves the government—directly or through public enterprises—cofinancing network deployment with a private company, while the latter manages and maintains the infrastructure under a time-bound concession. At the end of the concession period, the network may revert to the state or remain open to multiple operators, fostering retail competition and preventing infrastructure monopolies (OECD, 2025).

These models have been applied in Peru's National Fiber-Optic Backbone Network (Red Dorsal Nacional de Fibra Óptica) and Mexico's Red Compartida (Pronatel, 2021), among other examples. In Chile, the Telecommunications Development Fund (FDT) allocates competitive subsidies through public tenders to expand coverage—primarily in rural or low-income areas—while imposing execution and operational obligations on awardees.

Among the key lessons learned is the importance of demand studies and careful assessment of potential new entrants; without these, projects can become financially unviable (Berrone et al., 2018). Additionally, contractual flexibility (for example, in tariff structures) is essential for managing traffic and optimizing the use of underutilized networks, thereby supporting the long-term sustainability of the project.

¹⁰ This refers to the use of radio frequencies—a public resource administered by the state—which are allocated to service providers, often through auctions.

Shared infrastructure

Sharing infrastructure—such as poles, ducts, and towers—reduces costs and accelerates internet deployment. The logic is simple: if power poles already exist along a road, different companies can use them to support their cables, paying a regulated fee. Similarly, if municipal underground ducts are available, fiber can be run through them instead of reopening the roadway. In Peru, for instance, part of the National Fiber-Optic Backbone Network was deployed over medium-voltage electricity towers, avoiding construction in difficult terrain and lowering costs (Pronatel, 2021).

For public policy, the challenge lies in establishing frameworks that require or incentivize third-party access to this infrastructure and enable the use of public assets to avoid duplicative works and reduce deployment costs (OECD, 2024, 2025). Several countries have moved in this direction, including Canada, Colombia, Spain, the United States, and Portugal (OECD, 2025). Clear rules, pricing, and responsibilities are crucial: in Peru, shared-infrastructure use became one of the most contentious elements of the contract, underscoring the need for well-defined frameworks and effective dispute-resolution mechanisms (Berrone et al., 2018).

Education and health

As discussed in earlier chapters, significant gaps persist between urban and rural areas in educational and health outcomes. These disparities stem from multiple factors, including family conditions and the broader socioeconomic context (De la Mata et al., 2022), but also from the effective access to—and quality of—the education and

health services available (Álvarez et al., 2025). There are also strong complementarities between the provision of quality education and health services. For example, access to health services—and their positive effects on vaccination and disease prevention—can support higher school enrollment (Rocha & Soares, 2010).

Gaps in education access and quality for rural populations

Although some gaps in access to primary schooling between rural populations and their urban counterparts have narrowed in recent decades, marked differences in educational outcomes persist (as shown in Chapter 6 of this report). Divergences also remain in access to postsecondary education.

The limited economies of scale typical of rural areas are associated with smaller, less competitive school systems with fewer resources, resulting in significant gaps in inputs—both in terms of physical infrastructure and the hiring of qualified personnel (Bonilla-Mejía et al., 2024; Echazarra & Radinger, 2019). The scale of these systems also implies

higher per-student costs (Echazarra & Radinger, 2019; OECD, 2021).

The availability of schools in rural municipalities declines progressively from early childhood to primary and secondary levels, based on calculations using georeferenced data from Peru's Ministry of Education (Minedu, n.d.) and a municipality's degree of urbanization (Schiavina et al., 2023). This is compounded by the lower variety and availability of schools from which families may choose. According to the latest round of the OECD's Programme for International Student Assessment (PISA), on average, 50% of secondary schools in rural areas report being the only school accessible to their

students, compared with just 10% in urban areas (OECD, 2023). This limited availability is reflected in the longer distances rural students must travel to reach a school. Rodríguez-Segura and Kim (2021) find that 5% of Guatemala's population lives more than 3 km from a public primary school, while in Peru this figure reached 11.5% in 2020, and 3% in Costa Rica. Albina et al. (2025) show that in Argentina the distance to schools increases with the level of rurality

One factor shaping educational quality is the condition of school infrastructure, which is significantly worse in rural settings than in urban ones. Table 8.2 shows large gaps in several LAC countries in the percentage of primary-school students attending institutions with access to basic

services (particularly water) or learning spaces (libraries and science labs). Allub et al. (2025) estimate that, on average, the student-to-computer ratio in secondary schools in 2022 did not differ substantially between rural and urban areas, but the share of those computers connected to the internet did differ, with rural areas lagging behind.



The availability of schools in rural areas decreases progressively from early childhood through primary and secondary levels, resulting in greater distances for students to reach them

Table 8.2

Percentage of primary-school students attending schools with access to basic services and learning spaces

Country	Access to water		Access to electricity		Access to a library		Access to a science laboratory	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Argentina	92	95	100	100	41	79	29	41
Brazil	88	99	97	100	30	73	0	15
Colombia	29	94	92	100	50	57	17	37
Costa Rica	89	100	98	100	20	79	1	8
Dominican Rep.	79	87	95	100	39	75	1	21
Ecuador	80	93	98	100	29	33	16	26
El Salvador	78	99	99	100	32	60	8	37
Guatemala	74	95	85	100	27	30	5	10
Honduras	96	86	100	88	59	24	24	7
Mexico	75	98	100	100	56	57	0	2
Nicaragua	62	96	67	98	19	58	1	4
Panama	46	98	66	98	26	51	15	59
Peru	50	94	91	100	30	56	1	28
Paraguay	94	99	99	100	37	80	2	9
Uruguay	81	100	100	100	60	59	0	16

Note: Data refer to the percentage of third-grade primary students in urban and rural areas with access to basic services and learning spaces. Processed by CIMA based on UNESCO data (2019).

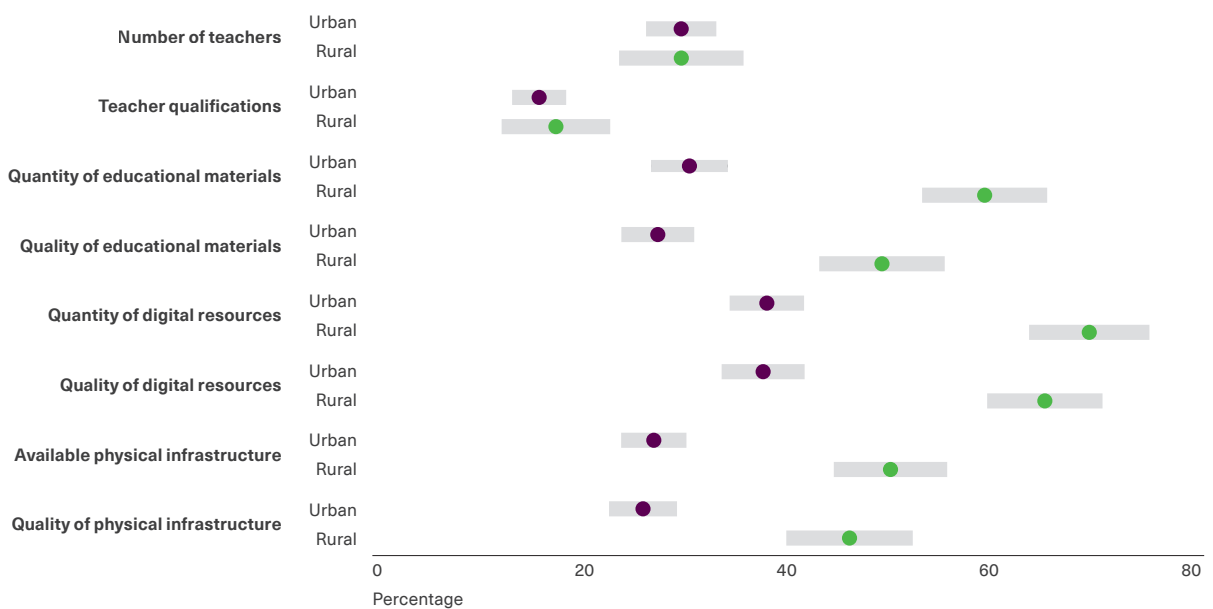
Source: Authors based on CIMA (2025).

The remoteness of schools, infrastructure deficits, and the prevalence of multigrade instruction compound another challenge: attracting qualified teachers (Evans & Méndez Acosta, 2023). Ajzenman et al. (2024) examine Peru, where teachers with high entrance-exam scores can list the schools where they would prefer to work. Their findings show a clear preference for/bias toward more urban schools, closer to the capital, and with better access to public services. Some schools—mostly rural—are never selected. In parallel, Bobba et al. (2021) and Elacqua et al. (2022) find that rural teachers in Peru

and Chile, respectively, tend to be less qualified than their urban counterparts. Recruitment challenges are further compounded by the specific features of rural instruction, including the need for multilingual education and the predominance of multigrade classrooms.

Finally, shortages of both human and material resources increase substantially with the degree of rurality. The availability of these resources affects instructional quality across the region, particularly in rural schools (Graph 8.7).

Graph 8.7
Proportion of school principals who report that different factors affect instruction quality in rural and urban areas



Note: The graph shows the percentage of secondary-school principals who consider each listed factor to be an impediment to quality instruction, combining the categories “to some extent” and “a lot.” The rural-urban classification is based on the population of the school’s area: areas with fewer than 3,000 inhabitants are classified as rural, while areas with more than 100,000 inhabitants are classified as urban. Dots represent averages for LAC countries; bars represent standard deviations.

Source: Authors based on OECD (2023).

Policies to bring education closer to rural areas and improve its quality

As noted in the previous subsection, rural education faces challenges both on the demand and the supply side. To encourage school attendance, governments have used income-transfer programs¹¹ and bilingual education initiatives that incorporate ancestral languages spoken in rural communities (Hynsjö & Damon, 2016; Patrinos & Vélez, 2009).

On the supply side, many rural localities in LAC still lack nearby primary or secondary schools. The literature examining the effects of building new schools finds positive impacts on enrollment, attendance, and learning outcomes (Angrist et al., 2025; Evans & Méndez Acosta, 2021), although most evidence comes from Africa and Asia. Duflo (2001), for example, shows that school construction in Indonesia increased years of schooling more sharply in provinces with lower population density. Burde and Linden (2013) identify gender-differentiated effects in enrollment and learning outcomes following the construction of rural schools in Afghanistan.¹²

However, as rural populations decline, other policies can help expand the educational services available to these communities. Improving road access—although not an education-specific intervention—has considerable potential to enhance access to schools. Adukia et al. (2020) examine the effects of building secondary and tertiary roads in India and find a 7% increase in lower-secondary enrollment during the three years following the paving of a road. While no effect on primary enrollment is found, learning outcomes at that level do improve. Aggarwal (2018), Khandker et al. (2009), Khandker and Koolwal (2011), and Mukherjee (2012) report similar results for rural road construction on school enrollment. In addition, several countries have created school clusters to pool demand, offering different

education levels in nearby communities (Echazarra & Radinger, 2019).



Options for attracting qualified personnel to rural areas are varied: financial and professional incentives, information campaigns, and behavior-change interventions

As discussed earlier, one of the main factors affecting the quality of education in rural areas is the difficulty of attracting qualified teachers. Policy options are diverse: financial incentives, professional incentives (additional training, accelerated career paths), information campaigns, behavior-change initiatives, and even mandatory rotations, among others (Evans & Méndez Acosta, 2021). Based on a review of the literature, Evans and Méndez Acosta (2021) highlight that most financial-incentive interventions have had positive effects on attracting and retaining teachers in hard-to-staff rural areas in Africa. Key policy lessons include the need to consider spillover effects on non-beneficiary schools and the fact that teachers often face information barriers about these programs—barriers that could be reduced through targeted outreach campaigns.

Finally, other policies have used information and communication technologies (ICTs) to bring educational services to remote areas and, in some cases, help ease constraints related to teacher shortages and skill levels. A regional example is Mexico's *telesecundarias*, designed to serve early secondary students in rural or marginalized communities through televised lessons delivered in classrooms, supported by an on-site teacher

11 More details can be found in Chapter 7 of this report.

12 Although early childhood centers are not addressed separately in this subsection, the region has made significant progress in adding more (Berniell et al., 2016), with positive effects on primary-school performance and on the probability of attending secondary school at age 15 (Berlinski et al., 2008, 2009). Similar effects are found in expansions to rural areas: Berkes et al. (2024) report positive impacts from a preschool-construction program in Cambodia that targeted children who previously had no access to any center.

with generalist training (Unesco, 2024). Fabregas and Navarro-Sola (2025) show that this intervention increased graduation rates from lower secondary school compared with similar areas lacking access to the program. While Borghesan and Vasey (2024) also find positive learning results for students attending these schools, the largest improvements occur among average-performing students rather than those at the lower end of the performance distribution.

Implementing ICT-based strategies to expand educational services must take into account shortages of digital equipment and the limited digital skills of teachers and students. According to the most recent PISA survey, where students are asked whether they can perform 14 ICT-related tasks, the average 15-year-old in urban schools reports being able to complete eight tasks, compared with only six among students in rural schools (OECD, 2023). In OECD countries, by contrast, no significant rural–urban differences are observed.

Gaps in access to health services and their quality

In recent decades, some gaps in access to health services and health outcomes between urban and rural populations in LAC have narrowed (as shown in Chapter 6 of this report), although in some countries they remain a significant barrier to human-capital accumulation. Bancalari et al. (2025), using standardized indicators of health care, find gaps of up to 56% in the quality of prenatal care across nine countries in the region.¹³

Demand for health services in low-income settings faces both monetary and non-monetary barriers, including social norms, limited information on the returns to health investments, and concerns about service quality (Dupas & Miguel, 2017; León-Ciliotta et al., 2025). These barriers disproportionately affect women and can have long-term consequences.

On the supply side, as in the education sector, limited economies of scale and the dispersion of the rural population can affect the availability of health centers and hinder access to more complex facilities. Although comparative evidence for the region is limited due to the lack of harmonized georeferenced data, the case of Chile illustrates these differences clearly. According to the Ministry of Health (DEIS, 2025), all rural municipalities have at least one low-complexity health facility, but only 8% have a medium-complexity center (compared

with 95% in urban municipalities), and fewer than 1% have a high-complexity facility (versus 65% in urban areas).



Limited economies of scale and the geographic dispersion of rural populations reduce the availability of health centers and hinder access to higher-complexity services

As a result, rural residents must travel to obtain care, and distances can be substantial. Weiss et al. (2020) calculate travel times based on georeferenced information on population distribution, health facilities, and roads. Globally, 8.9% of the population must travel more than 60 minutes by private transport to reach a health facility, compared with 13.7%, on average, in LAC. When taking an average for the entire population, this figure represents only a lower bound for residents of rural municipalities, who—as shown in Box 8.1—are widely dispersed across the territory. These distances already pose a challenge for the use of health services and, consequently, for health outcomes. According to the review by

¹³ Only in Suriname does the quality in rural areas surpass that of urban areas.

Mseke et al. (2024), distances as short as 16 km between residents and health centers can reduce access.

Another challenge in rural health provision is the shortage of specialized personnel. Table 8.3 shows that as municipal urbanization increases

in Brazil, the number of health professionals and physicians per 100,000 inhabitants rises accordingly. The gradient is most pronounced for physicians: urban municipalities have nearly two more doctors per 100,000 residents than rural ones, even after accounting for differences in income levels.

Table 8.3
 Relationship between the number of health professionals and physicians per 100,000 inhabitants and the degree of urbanization

	Variation in the number of professionals	Variation in the number of physicians
Differences		
Semiurban vs. rural	0.32***	0.37***
Urban vs. rural	0.76***	1.76***

Note: The table reports coefficients from ordinary least squares regressions in which the dependent variable is the number of health professionals (column 1) and physicians (column 2) per 100,000 inhabitants. The omitted category is rural municipalities. Variables are measured at the municipal level. Both regressions include state fixed effects and controls for municipal income levels. Asterisks indicate statistical significance: *** 1%, ** 5%, * 10%.

Source: Authors based on Datasus (2025), Schiavina et al. (2023), and Alves et al. (2025).

Policies to improve health services in rural areas

Some policies that help ease demand-side barriers to health-service use include monetary interventions (such as subsidies and pricing strategies), along with efforts to disseminate information, cover transportation and logistical costs, and reduce the minor administrative procedures required to access care (Dupas & Miguel, 2017).

On the supply side, a first step toward increasing access to health services is the construction of new facilities. Croke et al. (2020) find that the number of institutional births and prenatal visits in Ethiopia increased following the construction of health centers, while Ramos Pastrana et al. (2024) show that building the first hospital in Mexican municipalities reduced maternal and neonatal mortality.

Strengthening the presence of health professionals—particularly those responsible for primary care—is also essential. In Brazil, the Programa Saúde da Família sought to expand primary-care coverage through teams composed of at least three professionals (a doctor, a nurse, and an assistant), together with community health workers. Rocha and Soares (2010) estimate that expanding these services led to reductions in mortality, especially in the poorest municipalities with the least health-care infrastructure.



Community rural health project supported
by CAF in Ecuador.



Improvements in physical and digital accessibility, the presence of itinerant services and new facilities, and professional-incentive schemes can increase the availability of health services and qualified personnel in rural areas

Several countries have also used non-financial incentives to encourage medical professionals to work in remote or rural areas. One example is Peru's Servicio Rural y Urbano Marginal de Salud, a program under which licensed health professionals serve in rural localities; participation is mandatory for holding public-sector positions, entering professional specializations, and receiving government scholarships or financial support for further studies (MINSA, 2025).

Another approach to increasing the number of health-care workers in rural areas is to expand the types of profiles eligible for these posts. In some cases, individuals with lower levels of formal specialization—community health workers (WHO, 2018)—provide primary care. Evidence from several interventions with community health workers in rural Central America and the Caribbean suggests they have been effective in detecting and managing noncommunicable diseases (Duan et al., 2018).

In many cases, expanding access can also be achieved through mobile or itinerant health-care teams. Cristia et al. (2015) evaluate Guatemala's Programa de Extensión de Cobertura, in which teams composed of health professionals (a doctor or nurse and an assistant) conducted monthly visits to rural, Indigenous, or otherwise underserved communities. Services focused on maternal and child health. Results show significant increases in child vaccination coverage and prenatal visits by qualified personnel (substituting informal providers).



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Scan the QR code to see CAF's projects in telemedicine.

Improvements in physical and digital accessibility can also increase the timely use of health services by rural communities. Aggarwal (2021) shows that rural road construction in India was associated with increases in prenatal checkups and in the number of births occurring in health facilities. The study also reports improvements in medical care, including greater access to prenatal supplements and higher child vaccination rates, with larger gains for girls.

Finally, telemedicine and the use of ICTs in health care can help overcome some barriers to access, especially for primary care. Although countries in the region have made efforts to incorporate these tools, implementation still faces challenges related to the preparedness of health professionals and to infrastructure in health centers (Allub et al., 2025). While most countries have plans to improve the necessary physical infrastructure, progress and implementation remain limited. These constraints are compounded by the digital-connectivity gaps between urban and rural areas discussed in the "Digital connectivity" subsection, which affect individuals' ability to access these services. This underscores the importance of maintaining in-person and multi-channel care, ensuring that residents who face connectivity barriers or limited digital skills can still visit nearby health centers and receive the support they need.



Telemedicine and the use of ICTs in health care can help overcome barriers to access, but their effective adoption requires improving professional preparedness and strengthening infrastructure in health centers

Access to financial services

Access to financial services in rural areas of LAC remains limited. Expanding this access is a key tool for strengthening both household productivity and well-being. From a productive perspective, access to credit is positively associated with technology adoption, productive diversification, and higher agricultural yields, as demonstrated by studies in Mexico, Brazil, and Peru (Carrer et al., 2020; Frisancho & Valdivia, 2024; Santana et al., 2023). Financial services also support the development of rural enterprises, which are essential for diversifying household income sources.

From a well-being perspective, financial inclusion helps reduce economic vulnerability. Savings make it possible to smooth consumption in the face of unstable income, while access to insurance—particularly health and climate-related coverage—improves households' ability to cope with adverse

events. Access to credit and insurance markets can even prevent both seasonal and permanent migration from rural areas to cities (Meghir et al., 2022; Morten, 2019). In addition, households with greater access to financial services tend to invest more in education and health, reinforcing their paths toward upward mobility (Briano-Turrent, 2025; Rubio & León, 2025).

However, formal financial institutions are often absent from rural and remote areas due to high transaction costs, low population density, the seasonality and informality of income sources, and limited physical and digital infrastructure (Burgess & Pande, 2005; Hernandez, K. et al., 2024; Lopez & Winkler, 2018). Additional barriers include limited credit histories, low levels of financial literacy, and distrust of the banking system (FIDA, 2021).

Access and barriers to financial inclusion

According to the Global Findex 2024, 30% of adults in LAC do not have an account at a financial institution nor use mobile money, compared with just 5% in high-income countries.¹⁴ The share is even higher in rural areas: 33% lack access to formal services (a bank account or mobile money). Use of digital wallets in the region has increased in recent years—the same survey shows that 33% of rural adults report having such an account, up from less than 25% in 2021. However, their role appears more complementary than substitutive: the share of adults without access to banking services only rises slightly (to 36%) when mobile money users are excluded.

Heterogeneity exists across countries and in rural–urban gaps in account ownership. As shown in Graph 8.8, while in Chile and Brazil almost nine

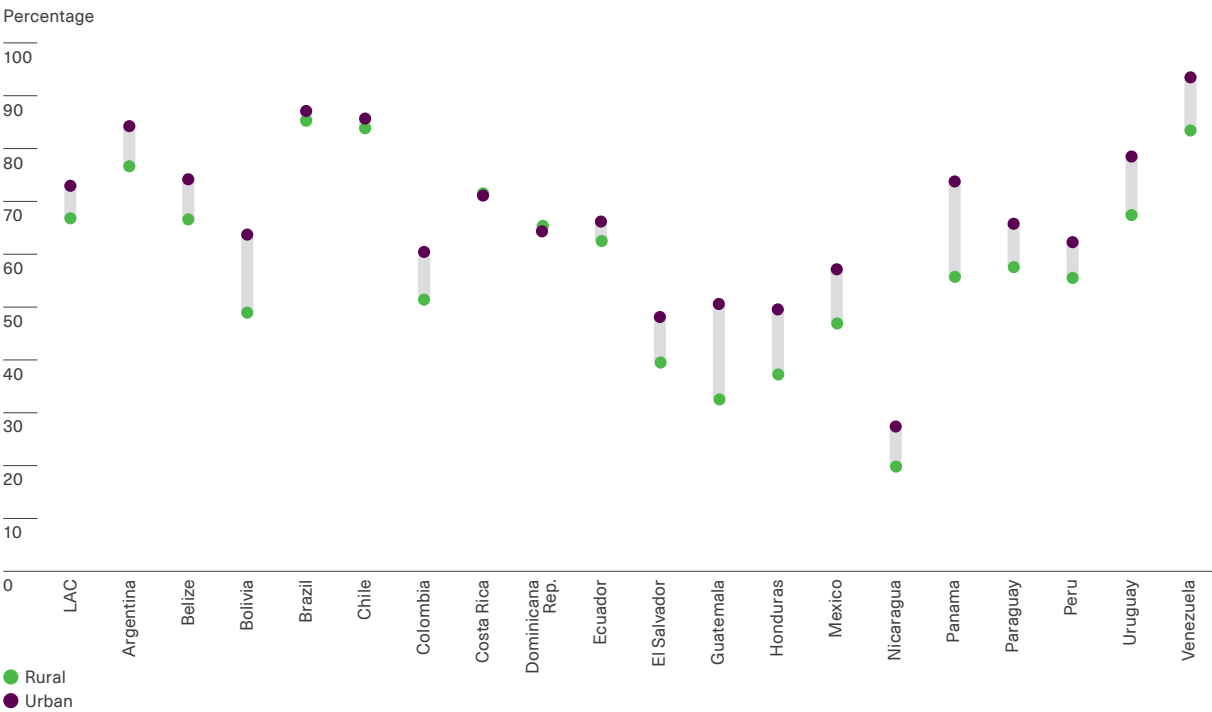
out of 10 adults—whether urban or rural—have a bank account, in Bolivia, Colombia, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Paraguay, and Peru, more than half of the rural population does not. Adding mobile money accounts does little to alter this picture: inclusion increases only marginally, without changing the overall outlook.



In rural areas of LAC, 33% of adults lack access to formal financial services. The main barriers are physical distance and service costs

¹⁴ Regional groupings exclude high-income countries under the World Bank classification; in LAC, these are Chile, Panama, and Trinidad and Tobago.

Graph 8.8
 Share of adults in Latin American and Caribbean countries with an account, by place of residence, 2024



Note: LAC figures are weighted averages using each country's total population.
Source: Authors based on the World Bank (2025j).

When examining the reasons why adults in LAC do not have a bank account, physical distance remains an important barrier. Table 8.4 shows that almost 20% of the rural population cites distance to a financial institution as their main reason for not having an account, compared with only 11% in urban areas. Nevertheless, the cost of financial services is the primary reason for the lack of access in both rural and urban settings. Finally, distrust in the financial system is notably higher among rural adults than among their urban counterparts.

●●
In rural and remote areas, the limited presence of formal financial institutions reflects high transaction costs, low population density, seasonal and informal incomes, and limited physical and digital infrastructure

Table 8.4

Main reasons why individuals in urban and rural areas do not have an account at a bank or similar institution

Reason for not having an account	Rural	Urban	Gap
... financial institutions are too far away	19.4%	11.5%	-7.9%
... financial service fees are too expensive	21.9%	17.6%	-4.3%
... does not have enough money to open one	12.2%	10.1%	-2.1%
... someone else in the family already has one	13.1%	15.3%	2.2%
... does not trust financial institutions	12.5%	9.5%	-3.0%
No response	20.9%	36.1%	

Note: The table reports the percentage of individuals by the main reason for not having an account, out of the total number of people who indicated not having one.

Source: Authors based on the World Bank (2025j).

These gaps are compounded by significant differences between rural and urban populations in financial knowledge and resilience to income loss (see Graph A.8.2 in the appendix to this chapter, available in the online edition of RED). However, attitudes toward financial technology (digital attitude) are similar across both settings, suggesting that rural populations are willing to adopt digital financial products.

Finally, among those who do have an account, an important indicator is the actual use of financial services. According to the Global Findex 2024, roughly 50% of adults in LAC reported having borrowed money, with similar levels in rural and urban areas—a pattern also observed in high-income countries.

Financial instruments and policies to support adoption in rural areas

Evidence suggests that expanding financial services to rural populations in LAC requires a diverse and complementary set of tools.

To start, several instruments tailored to rural contexts have improved the provision of services in remote areas. These include (semi)formal community-based solutions such as Rotating Savings and Credit Associations (ROSCAs), which pool members' regular contributions to finance individual needs on a rotating basis—relying on local trust and group discipline (Besley et al., 1994). Another model is the Village Savings and Loan Association (VSLA), where self-managed groups accumulate joint savings and extend small loans to

members; repayments and interest are distributed at the end of each cycle. Unlike ROSCAs, where funds are rotated and do not generate collective returns, VSLAs combine savings, flexible credit, and shared earnings. In rural Peru, VSLAs show high female participation, reduced vulnerability, and mixed effects on financial inclusion, and they serve as a platform for additional services such as microinsurance or digital payments (Frisancho & Valdivia, 2024).

A second set of tools involves proximity-based delivery models, such as branchless banking. Through banking agents and simplified accounts, these models have expanded social payments and basic services in areas without bank branches. Brazil was a pioneer in using the banking channel to deliver conditional cash transfers, bringing low-income households closer to the formal system (Jayo et al., 2012; Lindert et al., 2007).



In rural Peru, savings and loan groups show high female participation and reduced vulnerability, and serve as a platform for additional services such as microinsurance and digital payments

A third approach involves microcredit, which, although not designed specifically for rural environments, has achieved substantial penetration. Evidence shows that even with broad coverage, its effects on economic well-being in rural and semirural settings are limited. In Sonora (Mexico), the expansion of group lending by Compartamos increased women's access to finance and the scale of their microenterprises, but did not raise average household income or spur the creation of new businesses; positive impacts were concentrated in well-being outcomes (lower depression, higher confidence) and in reductions in harmful coping strategies (Angelucci et al., 2015). Consistent results across countries—including Mexico—show modest increases in investment and self-employment, without robust effects on income, consumption, or human development, and with weaker signals of women's empowerment compared with community-based instruments such as VSLAs (Banerjee et al., 2015).

Overall, adapting financial products is crucial for success in agricultural and dispersed settings. Less rigid repayment schedules aligned with production cycles, grace periods, and appropriate collateral enable higher-return investments and improve credit effectiveness (Field et al., 2013). Products can also incorporate programmed savings for seasonal expenses (inputs, education, health) and working-capital lines that account for climate shocks. Mobile banking offers a practical channel to operationalize this flexibility: it enables instant and person-to-person payments, encourages small and frequent savings, facilitates collections at fairs and local shops, and extends the reach of correspondents and agents in remote areas.

On the demand side, public transfers have proven effective as an accessway for these services. For example, shifting Progresas's cash payments in Mexico to account deposits reduced transaction costs and reshaped households' savings portfolios. Likewise, in Brazil's Bolsa Família program, the use of banking agents and Caixa bank accounts broadened financial engagement among rural households—particularly women, who were often the account holders (Lindert et al., 2007; Masino & Niño-Zarazúa, 2020).

Another constraint on demand is the lack of credit history. In recent years, alternative scoring systems have expanded the frontier of access. In addition, financial data interoperability—such as Brazil's Open Finance framework—allows customers to share their data across regulated institutions, supporting alternative credit scoring and personalized products (Banco Central do Brasil, 2025).



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At the same time, distrust and limited financial knowledge mean that the adoption of digital money accounts must be accompanied by digital and financial literacy policies and anti-fraud measures. In LAC and Sub-Saharan Africa, about 30% of users report receiving fraudulent messages requesting money, with higher exposure among adults with less schooling (Klapper et al., 2025). Evidence also shows that simple interventions—such as interactive phone-based training—reduce fraud incidence among mobile-money users (Klapper et al., 2025). Reducing vulnerability requires simple content (budgeting, responsible credit use, understanding total costs), digital-security habits (PINs, biometrics, identity verification), effective complaint channels, transaction limits and alerts, and transparency rules that prevent hidden fees.

Another emerging risk as financial services expand in low-literacy rural areas is exposure to high prices and over-indebtedness. Some studies report that rural microentrepreneurs in Haiti allocate around 40% of their net profits to debt service—almost twice the share observed in urban areas—and that interest rates in rural localities are typically higher: around 30% annually in microfinance, roughly double the rate charged by traditional banks (Bonomo et al., 2025; Roa, 2013). Although these findings vary across countries and institutions, they highlight the downside of financial

inclusion: without proper credit assessment, cost transparency, and financial education, expanding microcredit can deepen vulnerabilities.



Expanding financial services must include adapting products to rural contexts—with flexible repayment aligned to income cycles, grace periods, and appropriate collateral

Taken together, the evidence suggests that an effective package for rural areas includes flexible repayment schedules aligned with production cycles, grace periods, and appropriate collateral; low-cost physical access points (agents); interoperable payments and digital accounts; community organizations with strong female participation (e.g., VSLAs); and better data for risk assessment—all supported by robust consumer-protection frameworks and an explicit pro-women focus in account ownership, usability, and security (Banco Central do Brasil, 2025; Frisanco & Valdivia, 2024; R. Goyal, 2023; Jayo et al., 2012; Masino & Niño-Zarazúa, 2020).

Roadmap to improve access to and quality of rural services

The comprehensive assessment of gaps in essential rural services in LAC presented in this chapter confirms that, although coverage has expanded significantly in most areas, marked inequalities in quality persist. Limitations linked to dispersed populations, higher service-provision costs, and low private profitability explain much of these gaps, underscoring the need for tailored policies and close coordination across sectors and levels of government.

Table 8.5 summarizes the main policies to strengthen both the supply of—and demand for—quality services in rural LAC.

Table 8.5

Tools and policies to improve access to and quality of services in rural areas

Service	Assessment of access and service quality in rural areas	Policies and tools	
		Supply	Demand
Water	79% of households in LAC have access to water on their premises. - Only 55% of the rural population has access to safely managed water.	- Network extensions for household connections. - Regulation and coverage obligations (private provision). - Community-based solutions.	Targeted connection subsidies or installment-payment models with progressive tariff designs.
Sanitation	11% of households have sewerage access. 50% of rural residents have access to safely managed sanitation.	Decentralized safe-sanitation solutions (e.g., pit latrines with waste management).	- Subsidies. - Information and social-norm interventions.
Electricity	- Coverage exceeds 95% of rural households in most LAC countries. - Significant quality gaps (frequency and duration of outages), with limited reporting by countries.	- Decentralized renewable-energy solutions for isolated areas. - Integration of local actors and community solutions. - Quality-enhancing regulation, with financial penalties and distributor-level reporting, disaggregated regionally.	Subsidies for purchasing solar panels and batteries.
Physical connectivity	66% of the rural population in LAC lives within 2 km of a road. 40% lives within 2 km of a paved road.	- Investment in construction, upgrading, and maintenance. - Strengthening subnational state capacity and coordination across government levels. - Demand-aggregation mechanisms (bundling road segments with different traffic levels) to encourage private participation.	
Digital connectivity	47% of rural households in LAC lack home internet access. - Internet speeds in urban localities are 64% higher than in rural areas.	- Coverage obligations and other requirements in private-sector tenders; demand aggregation. - Public–private partnerships. - Satellite internet expansion offers new connectivity options.	- Subsidies or progressive tariff designs to promote affordability. - Improved digital skills.
Education	- Greater availability of early-childhood and primary education, but sharp declines at the secondary level. - Much poorer infrastructure conditions in rural settings. - Teacher-recruitment challenges.	- Construction of education centers. - Improved physical connectivity. - Human-capital attraction: financial and professional incentives, mandatory rotations, information and behavior-change campaigns. - School clusters. - Use of ICTs (telesecundarias, virtual classes).	- Income transfers. - Education programs that include native languages. - Improved digital skills.
Health	- Expansion of primary care in rural areas, but persistent gaps in access to higher-complexity services. - Prenatal-care quality gaps of up to 56%. - Shortages of specialized personnel.	- Construction of health centers. - Improved physical connectivity. - Human-capital attraction: financial and professional incentives, mandatory rotations, expanded job-profile criteria. - Itinerant services. - Use of ICTs (multichannel telemedicine).	- Subsidies and pricing strategies for health services. - Transportation-cost subsidies to help patients reach faraway health facilities. - Information dissemination.
Financial services	33% of the rural population still lacks access to financial services. - Main barriers: physical distance and transaction costs.	- Flexible repayment schedules suited to seasonal income. - Semi-formal community solutions such as ROSCAs and VSLAs. - Branchless banking and mobile money.	- Bank-deposited public transfers as an entry ramp. - Digitized public transfers as an entry point. - Financial education to build trust and prevent fraud (especially for online services). - Cost and interest-rate regulation. - Improved digital skills.

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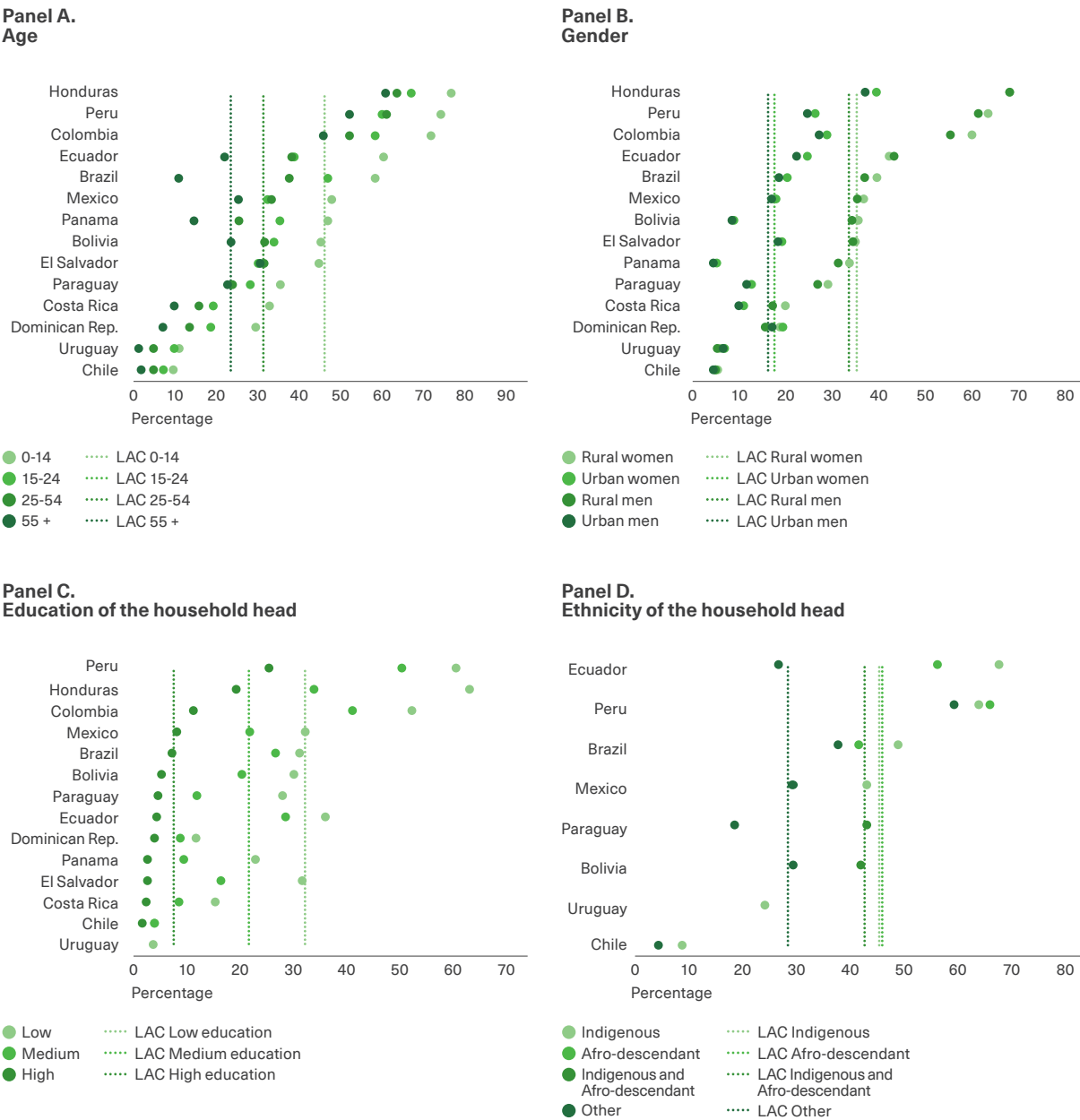
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Appendixes



Chapter 1 Appendix

Graph A.1.1
Rural poverty by age, gender, education, and ethnicity in Latin American and Caribbean countries, 2023

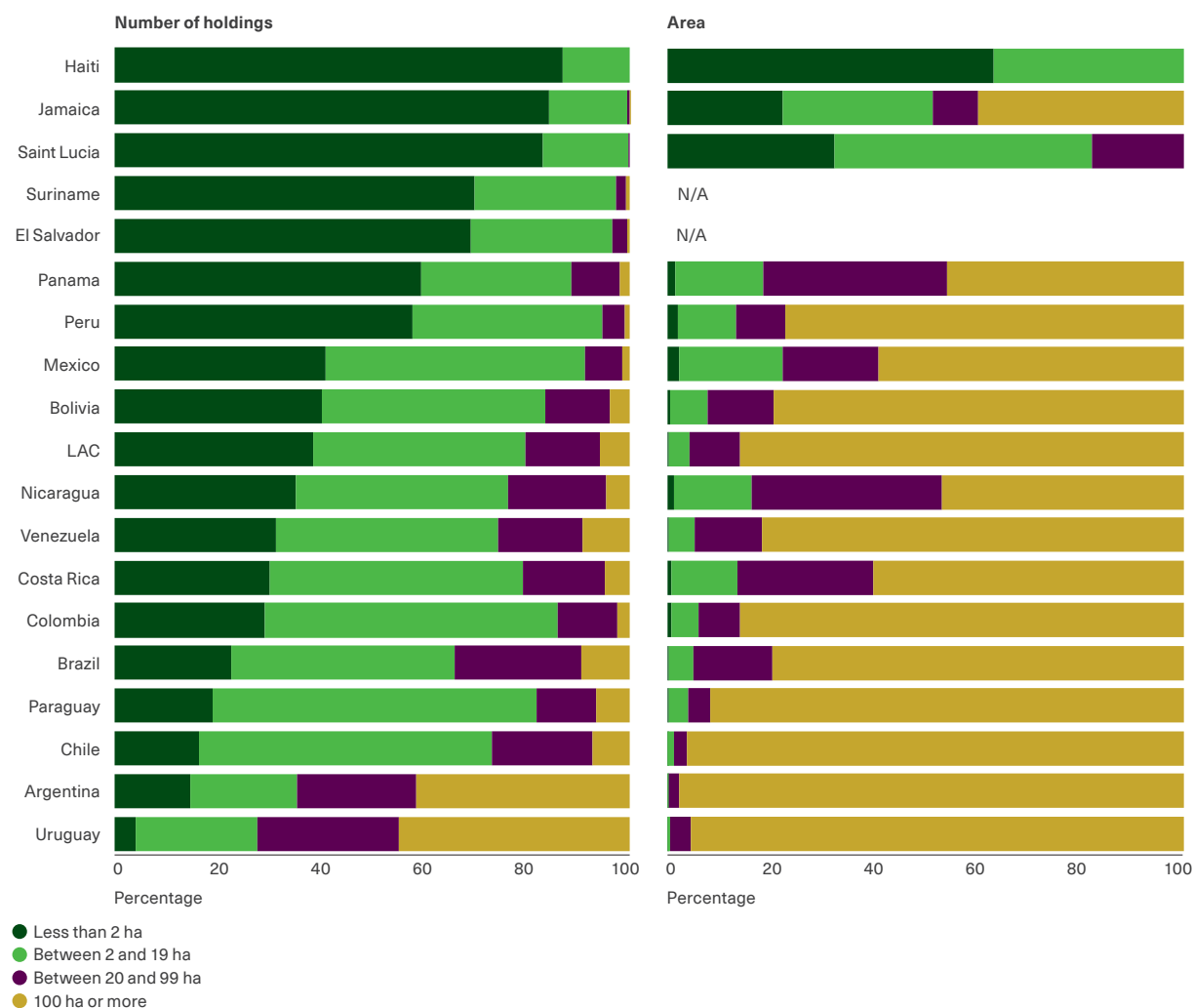


Note: Poverty is defined as the share of the population living in households with income below a threshold of USD 6.85 per person per day (PPP).
Source: Authors based on data from CEDLAS (2025).

Chapter 2 Appendix

Graph A.2.1

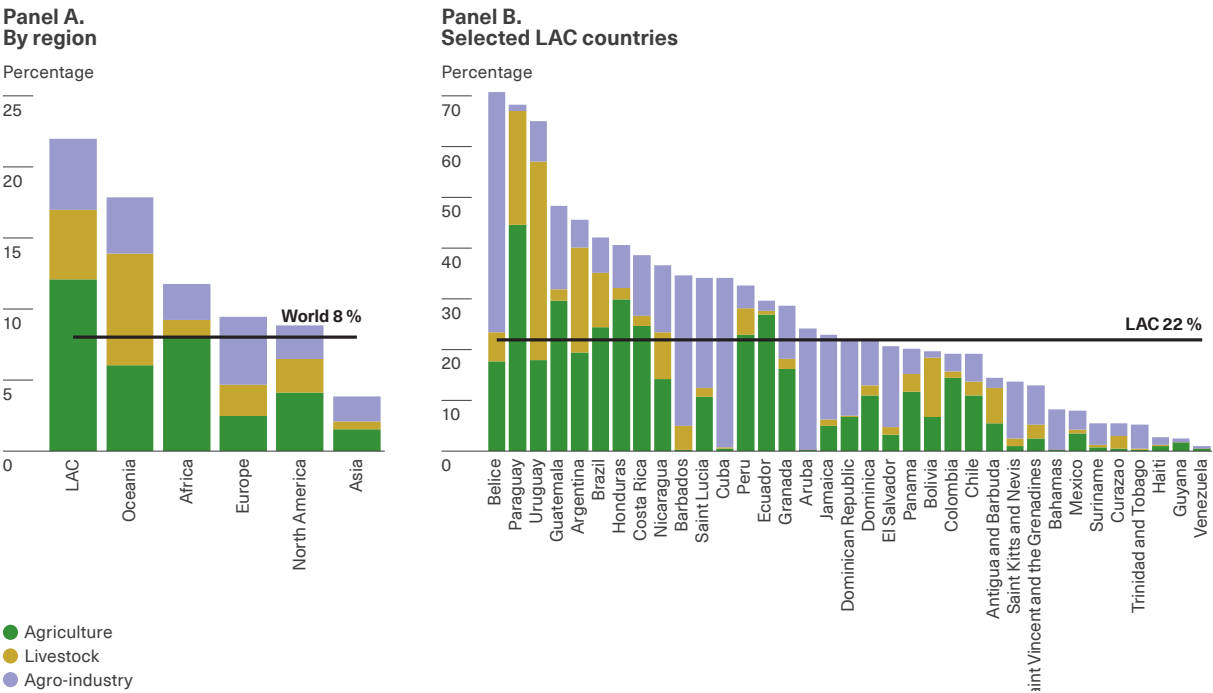
Distribution of farms and land area in a selection of countries in Latin America and the Caribbean, by firm size



Note: Values correspond to the latest year with available data for each country from the two most recent rounds of the World Census of Agriculture (2010 and 2020).

Source: Authors based on FAO (2025c).

Graph A.2.2
Exports of the agricultural and agro-industrial sectors, 2023



Note: Countries are sorted in descending order according to the combined share of agriculture, livestock, and agro-industry in total exports.
Source: Authors based on UNCTAD (2025b).

Table A.2.1
Average size of farms

Region/Country	Average size (hectares)
Africa	60.5
South Africa	265.8
North America	257.5
Asia and Pacific	215.6
Australia	4,430.8
Europe	59.9
Middle East and Central Asia	5.6
Latin America and the Caribbean	66.0
Latin America	102.8
Argentina	620.1
Bolivia	39.8
Brazil	69.2
Chile	330.0
Colombia	46.0
Costa Rica	25.9
Ecuador	14.7
El Salvador	2.3
Guatemala	4.5
Mexico	14.7
Nicaragua	23.1
Panama	10.9
Paraguay	104.3
Peru	17.1
Suriname	6.3
Uruguay	365.3
Venezuela	53.9
Caribbean	3.5
Dominica	2.3
Dominican Republic	9.0
Grenada	1.0
Haiti	1.0
Jamaica	1.4
Saint Kitts and Nevis	2.1
Saint Vincent and the Grenadines	1.0
Saint Lucia	1.2
The Bahamas	11.6
Trinidad and Tobago	4.5

Source: Authors based on FAO (2025c).

Table A.2.2

National definitions of family farming

Country	Concept	Legal framework	Criteria
Argentina	Family farming	Law No. 27,118/2014, Historical Reparation of Family, Peasant, and Indigenous Farming	• Direct family management of the productive enterprise. • Full or partial ownership of the means of production. • Predominantly family labor (some wage labor may be used). • The family resides in a rural area. • Agricultural activity must be the main source of income.
Bolivia	Family farming	Law No. 338/2013 on Peasant Organizations and Integration of Sustainable Family Farming	• Active participation of all family members in production, storage, processing, marketing, and consumption. • Predominantly family labor. • Household income mainly based on family production.
Brazil	Family farming	Law No. 11,326	• Area equal to or smaller than four fiscal modules (ranging from 5 to 110 hectares, depending on the municipality and factors such as soil conditions, topography, and access). • Labor provided mainly by the family unit. • Household income derived predominantly from the establishment or enterprise.
Chile	Subsistence unit	National Agricultural and Forestry Census	• Area smaller than 2 hectares. • No recorded sales in the agricultural year.
	Peasant family farming	Law No. 18,910, Organic Law of the National Institute for Agricultural Development (INDAP)	• Assets not exceeding 3,500 unidades de fomento. • Operating a plot of up to 12 basic irrigation hectares, or living and working in rural areas. • Income mainly derived from agricultural or silvo-agricultural activities.
Colombia	Peasant, family, and community farming	Law No. 2,046/2020 on Mechanisms to Promote the Participation of Local Small Agricultural Producers and Peasant, Family, and Community Farming	• Family-, association-, or community-based management and organization of production. • Diversified activities: agriculture, livestock, fishing, aquaculture, forestry, agro-industry, and others. • Predominantly family labor (with the possibility of hired workers). • Deep ties to the territory—cultural, social, and ecological. • Recognition as a complementary socioeconomic system with peasant, ancestral, and multicultural identity.
Panama	Family farming	Law No. 127/2020 on Measures for the Development of Family Farming in Panama	• Agroecological, agro-industrial, aquaculture, artisanal, fishing, and beekeeping activities, among others. • Productive management carried out by the family. • Participation of all family members and use of family labor. • Production oriented toward food self-sufficiency and income generation. • Typology of family farmers: producers for self-consumption who occasionally work elsewhere; producers for self-consumption who sell small surpluses locally; producers for self-consumption with market linkages who need institutional support. • Land-size limits by geographic area: from 5 to 50 hectares, depending on the district or Indigenous territory.
Paraguay	Peasant family farming	Law No. 6,286 on the Defense, Restoration, and Promotion of Peasant Family Farming	• Labor predominantly provided by the family. • Production oriented toward household needs (focus on self-consumption, with some income from family-run activities). • Limited use of hired labor, capped at 20 temporary day laborers per year. • Land-size limits: up to 50 hectares in the Eastern Region and up to 500 hectares in the Western Region. • The holding is operated and managed by the family as a peasant unit.

Table A.2.3

Average tariffs applied between regions in the agriculture and livestock sectors (percent), 2021–2023

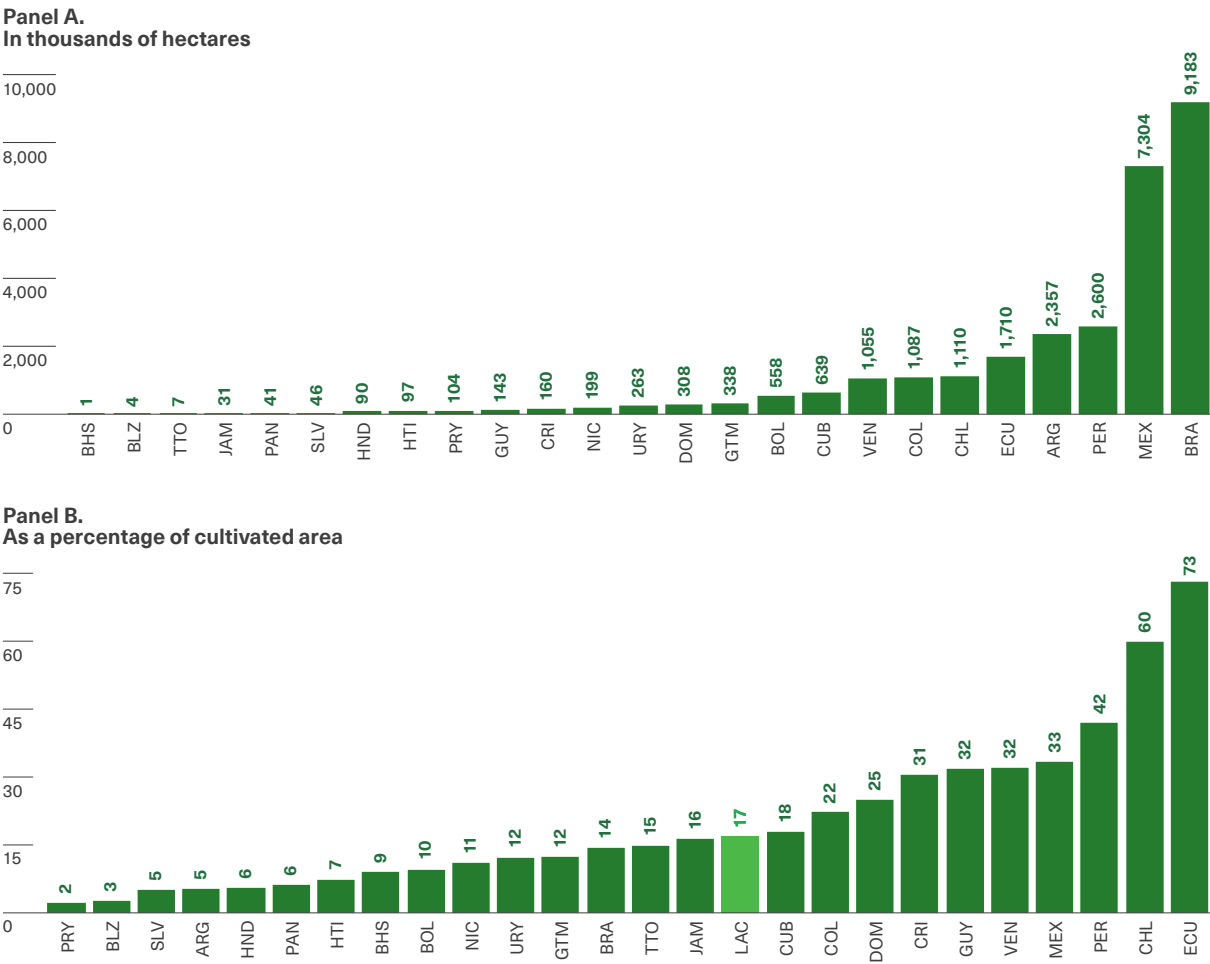
Sector	Import Region	Export Region							
		Mercosur	Pacific Alliance	CAN	SICA	Caricom	EU	USMCA	Asean+3
Agriculture	Mercosur	0.0	1.7	0.1	8.8	19.8	4.8	3.6	15.1
	Pacific Alliance	1.2	0.3	1.6	4.2	19.8	0.2	0.3	10.9
	CAN	0.1	0.8	0.0	6.9	19.8	0.1	1.5	12.6
	SICA	8.0	2.2	8.3	1.6	19.2	0.0	0.7	14.6
	Caricom	8.2	7.3	9.4	8.5	2.9	0.0	4.5	15.1
	EU	8.2	8.4	10.6	8.9	19.8		6.4	15.1
	USMCA	7.1	1.5	6.1	3.9	19.8	1.7	2.0	12.7
	Asean+3	8.2	6.1	10.1	8.4	19.8	1.6	4.5	4.8
Livestock	Mercosur	0.0	3.4	3.1	16.1	24.6	3.3	5.6	10.6
	Pacific Alliance	1.5	0.7	3.4	11.4	24.6	0.2	0.7	8.0
	CAN	0.3	1.5	0.0	14.2	24.6	0.3	2.7	9.6
	SICA	8.5	6.5	14.1	3.8	24.0	0.0	2.6	10.2
	Caricom	8.8	9.7	13.9	15.4	3.9	0.0	5.5	10.6
	EU	8.8	11.3	15.5	16.1	24.6		7.9	10.7
	USMCA	7.8	3.5	10.2	9.3	24.6	1.2	2.9	9.5
	Asean+3	8.8	9.1	15.1	15.4	24.6	1.1	5.8	2.1

Source: Authors based on data from UNCTAD's Trade Analysis and Information System (TRAINS) obtained through WITS (2025).

Chapter 3 Appendix

Graph A.3.1

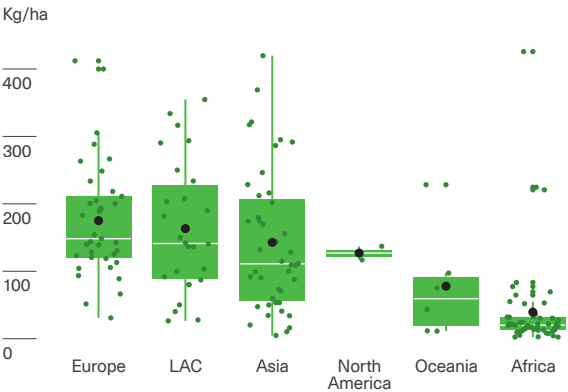
Area equipped for irrigation in Latin American and Caribbean countries, 2022



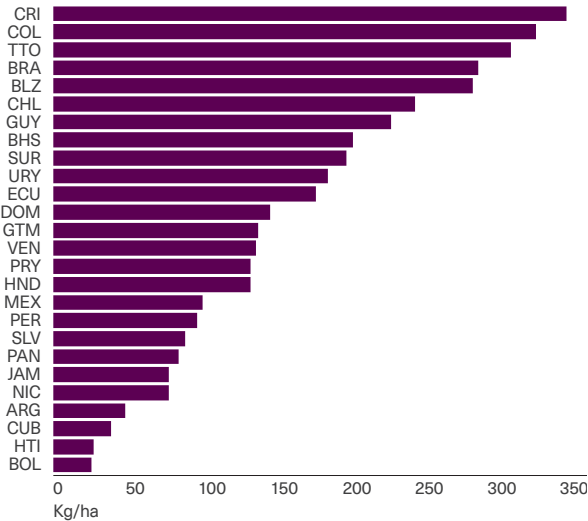
Source: Authors based on data from the USDA (2025).

Graph A.3.2
Fertilizer use intensity, average 2014–2022

Panel A.
Latin America and the Caribbean compared
with other world regions



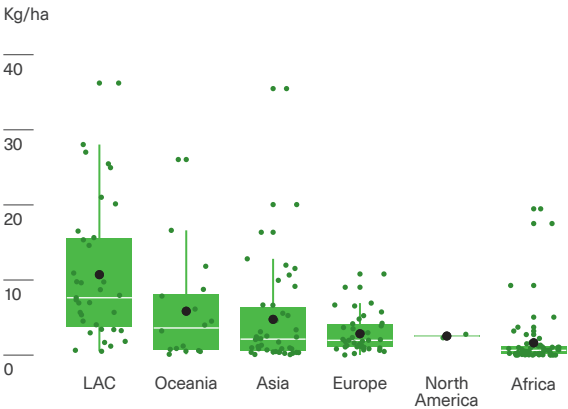
Panel B.
Countries in Latin America and the Caribbean



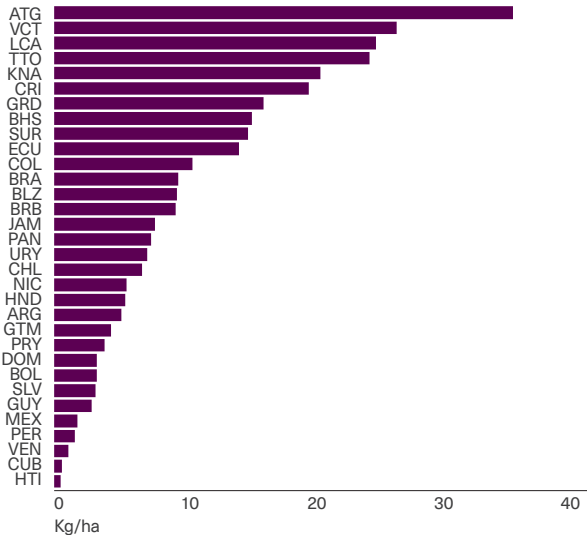
Note: The boxplot shows, for each region, the median (white line), the interquartile range (IQR), the whiskers defined by $Q1 - 1.5 \times IQR$ and $Q3 + 1.5 \times IQR$, and outliers. The black dot indicates the mean for each region.
Source: Authors based on data from the USDA (2025).

Graph A.3.3
Pesticide use intensity, average 2014–2023

Panel A.
Latin America and the Caribbean compared
with other world regions



Panel B.
Countries in Latin America and the Caribbean



Note: The boxplot shows, for each region, the median (white line), the interquartile range (IQR), the whiskers defined by $Q1 - 1.5 \times IQR$ and $Q3 + 1.5 \times IQR$, and outliers. The black dot indicates the mean for each region.
Source: Authors based on data from the FAO (2025h).

Table A.3.1
Biotechnological crops in Latin America

Country	GM crop area (million hectares)	Main GM crops and share of each crop's total cultivated area
Argentina	25	Soybeans (100%); maize (99%); cotton (100%)
Bolivia	1.8	Soybeans (97%)
Brazil	68.5	Soybeans (99%); cotton (99%); maize (95%)
Chile	0.011	N/A
Colombia	0.15	Maize (36%); cotton (90%)
Honduras	0.07	Maize (20%)
Mexico	0.009	N/A
Paraguay	4.0–4.4	Soybeans (90%)
Uruguay	1.3–1.5	Soybeans (98%)

Note: Data on cultivated area correspond to 2024; for Argentina and Brazil, figures are estimates for the 2024/2025 growing season. In Chile, genetically modified crops are not grown commercially, although the country allows the propagation of GM seeds for export. In general, base seeds are imported from the United States, reproduced and multiplied in Chile, and then re-exported to the United States and Canada (AgbioInvestor, 2025). In Mexico, the only GM crop under commercial production is cotton, using obsolete seed varieties and restricted to certain areas; no recent advances in plant or animal biotechnology have been recorded due to regulatory and policy constraints (USDA, 2024b).

Source: Authors based on AgbioInvestor (2025) and USDA (2024a, 2024b 2024c).

Table A.3.2
Effects of climate change by country

Region / Country	Potential yield						
	Current (1)	Under climate change (2)	Ratio (2)/(1)	With spatial reallocation of crops (3)	Ratio (3)/(2)	With spatial reallocation and changes in crop composition (4)	Ratio (4)/(3)
Central America							
Belize	1,276	1,065	0.8	1,192	1.1	2,156	1.8
Costa Rica	1,611	1,473	0.9	1,826	1.2	2,682	1.5
El Salvador	1,129	1,167	1.0	1,251	1.1	3,250	2.6
Guatemala	1,243	1,087	0.9	1,372	1.3	2,815	2.1
Honduras	1,180	1,207	1.0	1,395	1.2	3,142	2.3
Nicaragua	985	1,034	1.1	1,443	1.4	2,995	2.1
Panama	1,295	1,377	1.1	1,691	1.2	2,987	1.8
North America							
Canada	648	829	1.3	948	1.1	1,618	1.7
Mexico	1,003	736	0.7	1,032	1.4	1,604	1.6
United States	1,457	1,183	0.8	1,410	1.2	1,728	1.2
South America							
Argentina	1,210	1,138	0.9	1,341	1.2	3,136	2.3
Bolivia	1,420	1,241	0.9	1,581	1.3	2,850	1.8
Brazil	1,108	953	0.9	1,232	1.3	2,358	1.9
Chile	2,136	1,171	0.6	1,672	1.4	3,819	2.3
Colombia	1,693	1,390	0.8	1,776	1.3	2,277	1.3
Ecuador	1,296	1,116	0.9	1,497	1.3	2,322	1.6
French Guiana	1,562	1,421	0.9	2,009	1.4	1,580	0.8
Guyana	1,482	1,384	0.9	1,543	1.1	1,937	1.3
Paraguay	1,386	1,171	0.8	1,478	1.3	2,500	1.7
Peru	1,903	731	0.4	1,755	2.4	1,262	0.7
Uruguay	1,545	1,173	0.8	1,341	1.1	3,755	2.8
Venezuela	1,424	1,035	0.7	1,369	1.3	2,359	1.7
Caribbean							
Antigua and Barbuda	2,879	1,285	0.5	1,310	1.0	3,454	2.6
Cuba	1,924	1,372	0.7	1,588	1.2	2,346	1.5
Dominican Republic	1,918	1,170	0.6	1,578	1.3	2,150	1.4
Jamaica	1,242	1,763	1.4	1,924	1.1	2,364	1.2
The Bahamas	836	804	1.0	957	1.2	1,279	1.3
Europe							
Portugal	1,821	625	0.3	1,255	2.0	1,832	1.5
Spain	1,360	702	0.5	1,248	1.8	2,103	1.7
Countries in LAC	1,477	1,140	0.8	1,469	1.3	2,493	1.7

Note: Yield is measured as the value of production at international prices per hectare.

Source: Authors based on Adamopoulos (2025)..

Chapter 5 Appendix

Table A.5.1

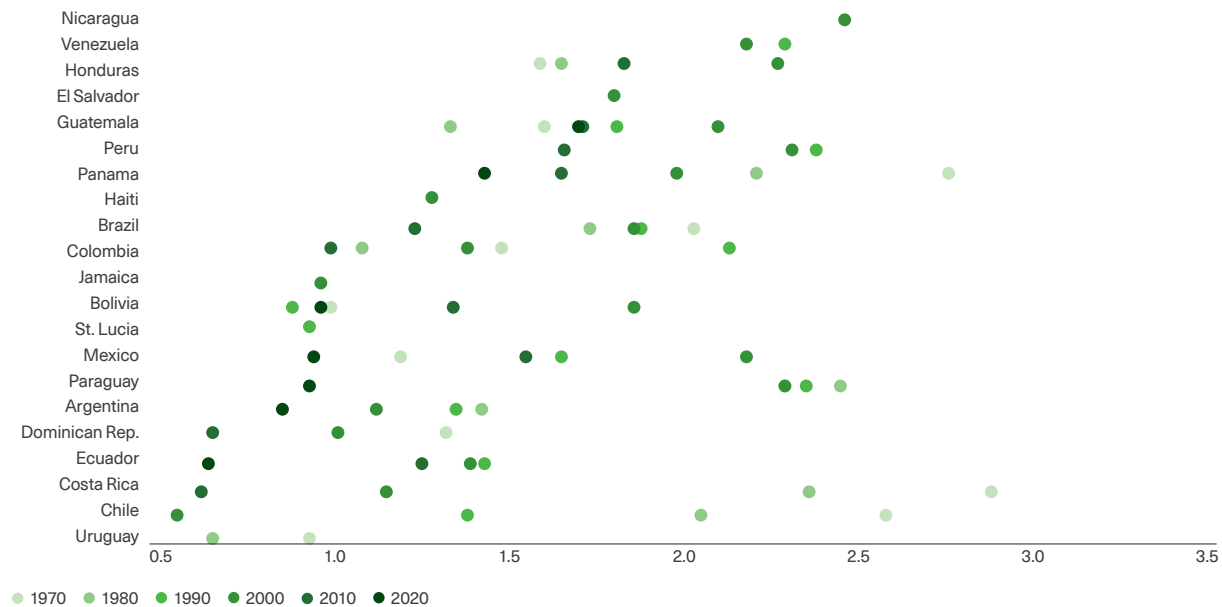
Sources of national accounts used to draft
Table 5.3 and Graph 5.3

Country	Table 5.3	Graph 5.3
Argentina	INDEC (n.d.)	INDEC (n.d.)
Chile	BCC (n.d.)	BCC (n.d.)
Colombia		DANE (n.d.)
Costa Rica		BCCR (2023)
Ecuador		BCE (n.d.)
Mexico		INEGI (n.d.)
Paraguay		BCP (n.d.)
Peru		INEI (n.d.)
Uruguay	BCU (n.d.)	BCU (n.d.)

Chapter 6 Appendix

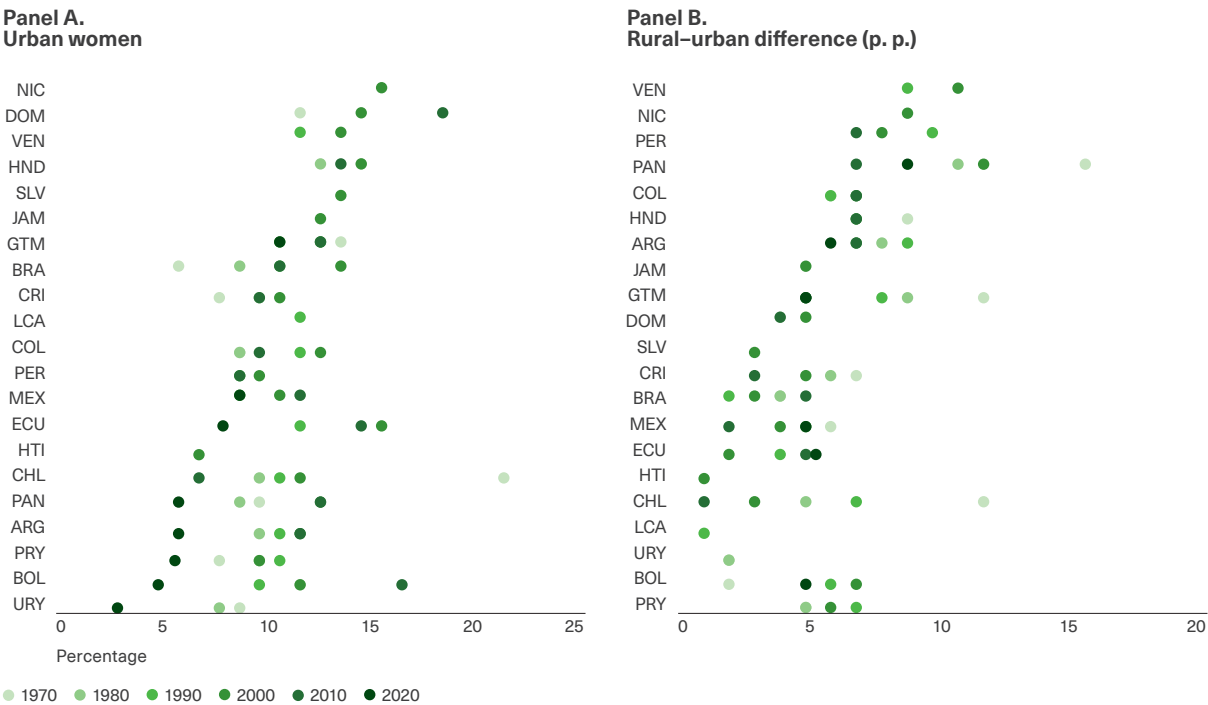
Graph A.6.1

Difference between rural and urban areas in the number of live births per woman aged 45–49 in Latin American and Caribbean countries, 1970s–2020s



Source: Authors based on Barnes and de la Mata (2025), using census data.

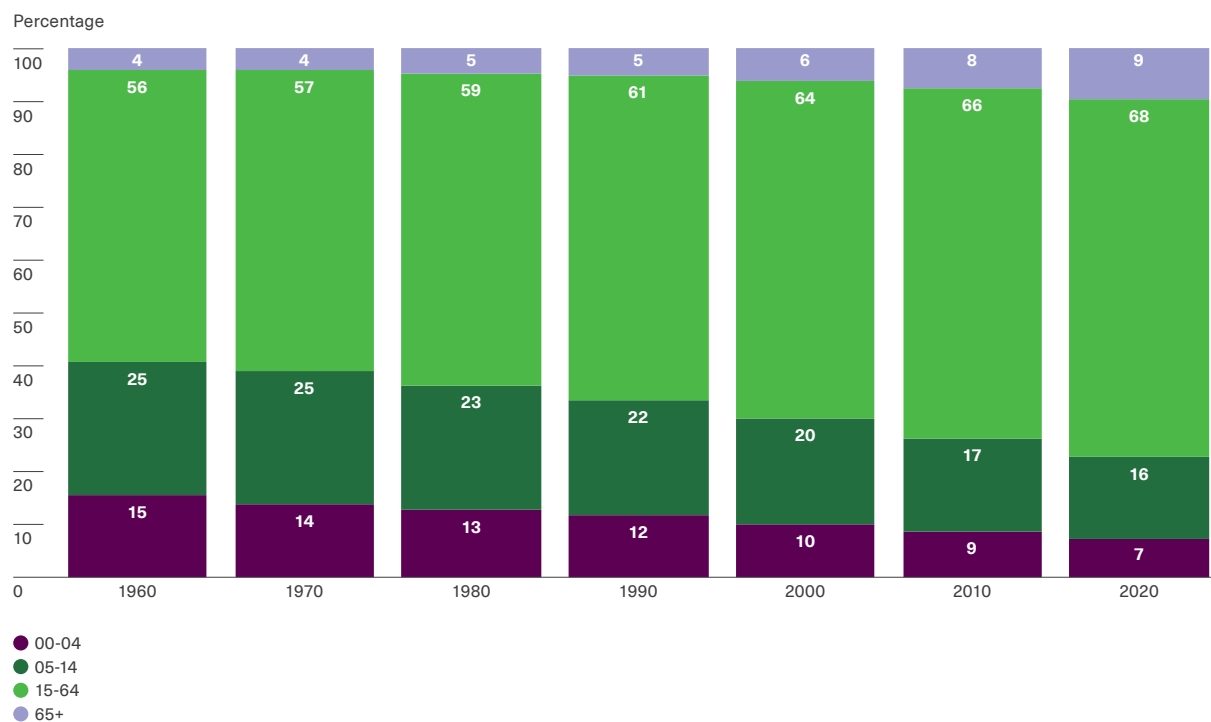
Graph A.6.2
Percentage of urban women aged 15–19 with children and the rural–urban difference in Latin American and Caribbean countries, 1970s–2020s



Note: The sample covers 21 countries whose censuses provide information on the number of live births per woman. The gap is expressed in percentage points (p.p.).
Source: Authors based on Barnes and de la Mata (2025), using census data.

Graph A.6.3

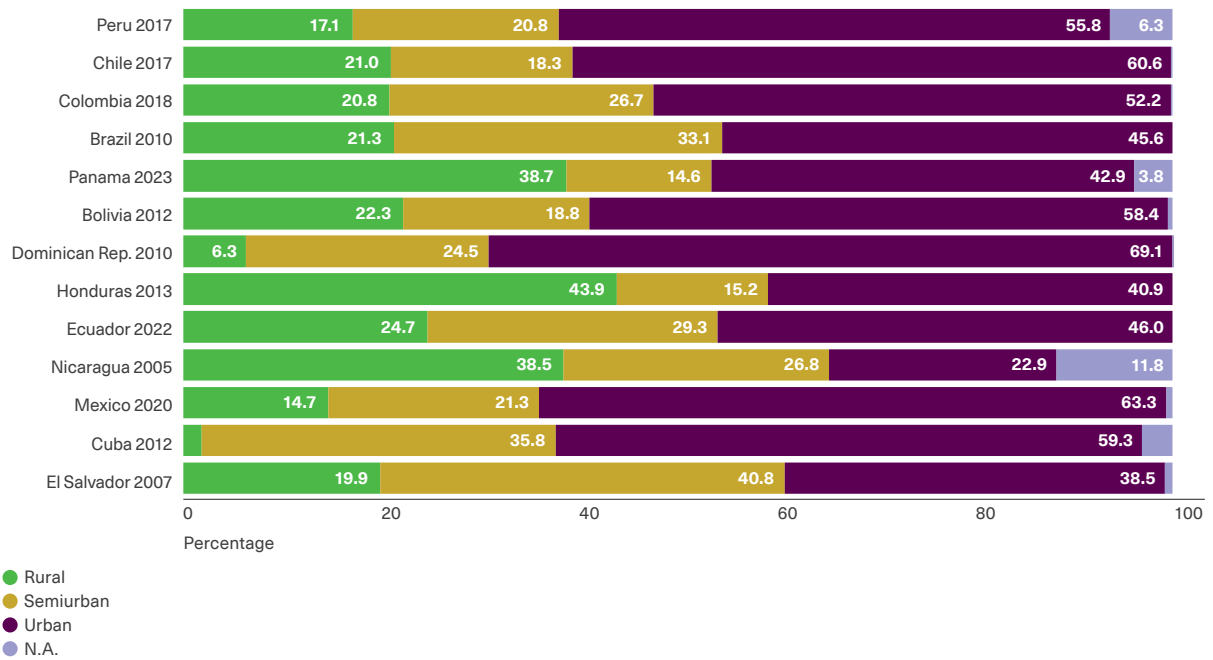
Distribution of the urban population by age group. Latin America and the Caribbean average, 1960s and 2020s



Note: Simple averages calculated using data from 20 countries (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the Dominican Republic, Uruguay, and Venezuela). Projection values correspond to the midpoint of each decade.

Source: Authors based on CELADE–Population Division of ECLAC and UNDP (2024).

Graph A.6.4
 Rural emigration by degree of urbanization of the destination in Latin American and Caribbean countries



Note: Data for Bolivia, Chile, and Mexico were processed using census microdata available from IPUMS International. For Ecuador, results from the national census were used directly. For Brazil, Colombia, Cuba, Honduras, Panama, Peru, and the Dominican Republic, the data source is MIALC, developed by CELADE–Population Division of ECLAC. The classification of the degree of urbanization of origin and destination localities is based on the DEGURBA typology: for the place of origin, the classification in effect five years prior to the census is applied, while for the destination, the classification corresponding to the census year is used. The most recent census available for each country is used.

Source: Authors based on IPUMS (Ruggles et al., 2025), INEC (2024), census data processed from MIALC (CELADE–Population Division of ECLAC, n.d.), and Schiavina et al (2023).

Table A.6.1

Housing characteristics of the rural migrant and non-migrant population in Mexico, 2020

Variable	Rural emigrant	Non-migrant	Difference: Emigrant vs. non-migrant
Piped water connection	78.4%	43.4%	35.0***
Flush toilet	73.3%	38.1%	35.2***
Number of bedrooms	3.7	3.6	0.1***
Household members	2.6	2.6	0.0
Electricity	98.7%	97.4%	1.3***
Homeownership	33.7%	84.5%	-50.8***
Cement floor	51.6%	74.2%	-22.6***
Concrete roof	81.7%	46.2%	35.5***
Cement walls	93.3%	73.4%	19.9***
Adobe walls	1.5%	15.1%	-13.6***
Cardboard/waste walls	0.3%	0.3%	0.0
Wooden walls	3.2%	9.1%	-5.9***
Mobile phone	94.1%	72.9%	21.2***
Internet access	50.5%	77.7%	-27.2***

Note: The table reports averages for the Mexican population in 2020. A rural emigrant is defined as any individual who, five years prior to the census, resided in a locality classified as rural according to the closest-in-time DEGURBA typology and who, at the time of the census, reports living in a different, non-rural locality. The difference shown in the third column corresponds to the difference in means between the migrant and non-migrant populations. ***p-value <0.01; **p-value <0.05; *p-value <0.1.

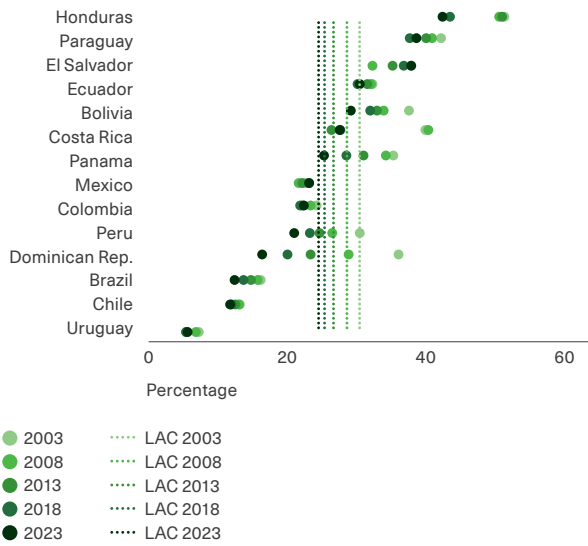
Source: Authors based on IPUMS (Ruggles et al., 2025) and Schiavina et al. (2023).

Chapter 7 Appendix

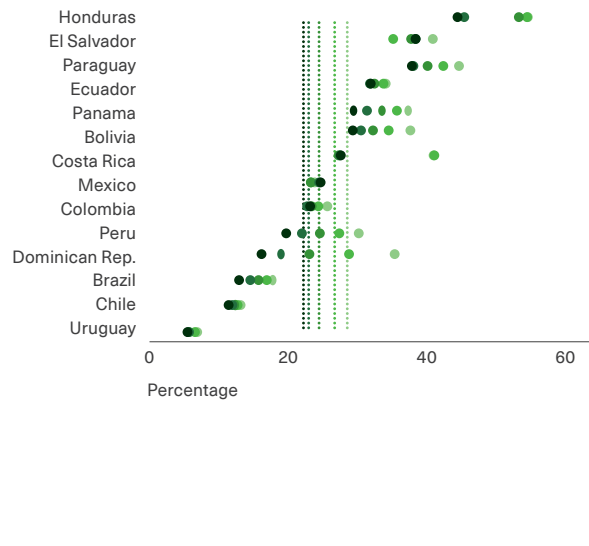
Graph A.7.1

Evolution of the share of the rural population and rural households in national totals in Latin American and Caribbean countries, 2003–2023

Panel A.
Percentage of rural households
in total households



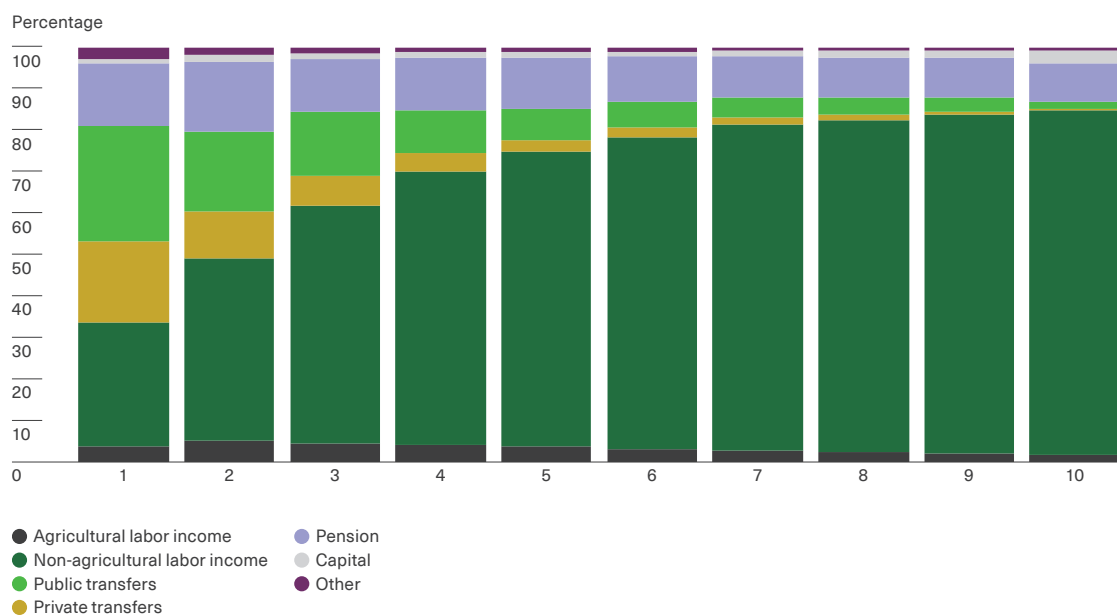
Panel B.
Percentage of people living in rural areas
in total population



Source: Authors, based on CEDLAS data (2025).

Graph A.7.2

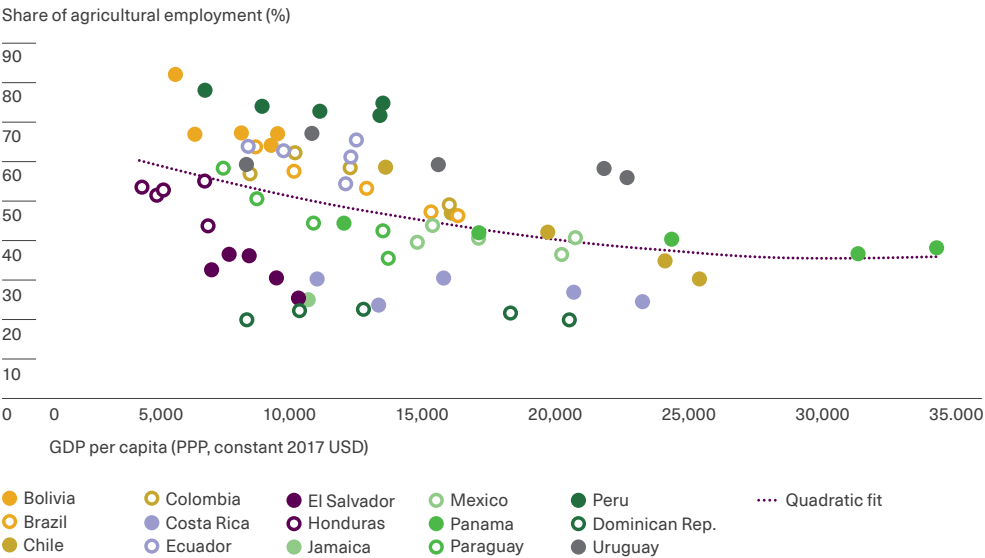
Decomposition of total household income by decile for urban households.
Average for Latin America and the Caribbean, 2023



Note: Data are disaggregated by deciles of total household income calculated at the national level. Labor income includes both monetary income (wages or earnings from self-employment) and non-monetary income (self-consumption and in-kind remuneration). Household agricultural income is estimated as the sum of all labor income—from both main and secondary occupations—of members whose main occupation is in the agricultural sector. Agricultural households are defined as those in which the head or spouse has their main occupation in agriculture.

Source: Authors, based on CEDLAS data (2025).

Graph A.7.3
 Correlation between employment in the agricultural sector as a share of total rural employment and GDP per capita in Latin American and Caribbean countries, 2003–2023

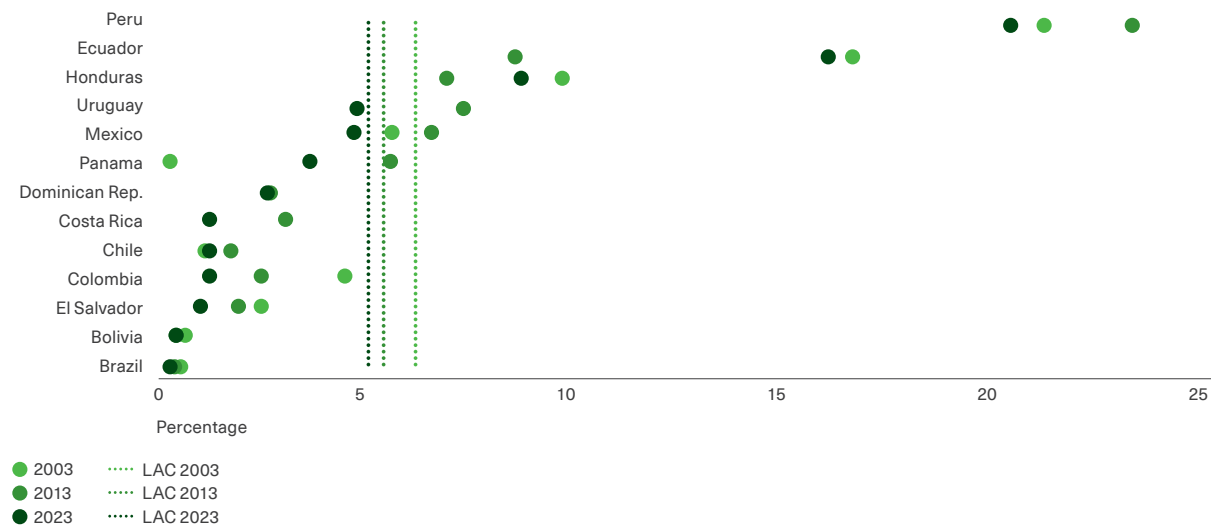


Note: Indicators are calculated for the population aged 25–54. Each point represents a country and a year. The years considered are 2003, 2008, 2013, 2018, and 2023.

Source: Authors, based on CEDLAS (2025) and World Bank (2025) data.

Graph A.7.4

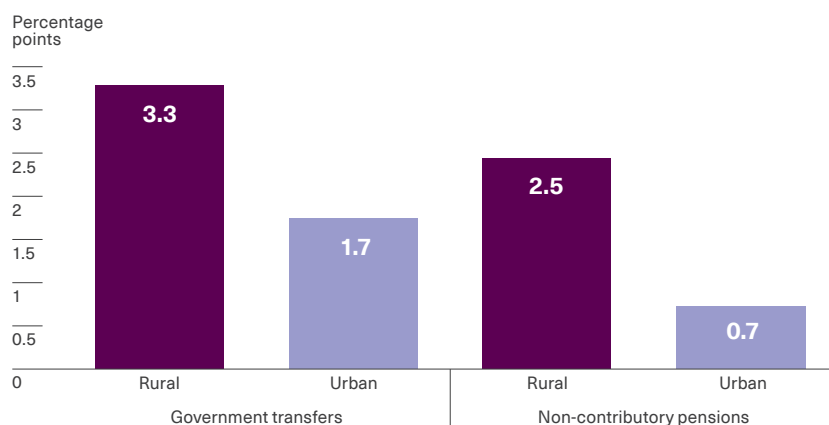
Share of non-monetary labor income in total income among rural households in the three lowest income deciles in Latin American and Caribbean countries, 2003–2023



Source: Authors, based on CEDLAS data (2025).

Graph A.7.5

Average increase in poverty rates in Latin America and the Caribbean after excluding government transfers and non-contributory pensions, 2023



Note: Poverty is defined as the percentage of individuals living in households with income below USD 6.85 (PPP-adjusted) per person per day. The household surveys for Colombia, Ecuador, Mexico, the Dominican Republic, and Uruguay do not distinguish income from contributory and non-contributory pensions; therefore, these countries are excluded from the estimates.

Source: Authors, based on CEDLAS data (2025).

Table A.7.1

Variation in poverty rates after excluding government transfers and non-contributory pensions, 2023

Country	Poverty rate (PR)		Poverty rate excluding government transfers		Change in p.p. of PR after excluding government transfers (change %)		Poverty rate excluding non-contributory pensions		Change in p.p. of PR after excluding non-contributory pensions (change %)	
	(1) Rural	(2) Urban	(3) Rural	(4) Urban	(5) Rural	(6) Urban	(7) Rural	(8) Urban	(9) Rural	(10) Urban
Bolivia	34.7	8.6	37.0	9.4	2.3 (6.6)	0.8 (9.1)	38.7	9.2	4.0 (11.6)	0.6 (7.1)
Brazil	38.1	19.4	48.1	24.7	10.0 (26.1)	5.3 (27.3)				
Chile	5.1	4.7	7.5	6.2	2.4 (47.5)	1.5 (32.7)	8.4	5.9	3.3 (65.3)	1.3 (26.8)
Colombia	57.5	27.9	63.5	31.2	6.1 (10.5)	3.3 (11.8)				
Costa Rica	18.5	10.4	21.4	11.7	2.9 (15.5)	1.3 (12.1)	21.6	11.5	3.1 (16.6)	1.1 (10.4)
Ecuador	42.7	23.4	46.8	25.1	4.1 (9.7)	1.7 (7.1)				
El Salvador	34.6	18.7	34.6	18.7	0.1 (0.3)	0.0 (0.0)	35.3	19.4	0.8 (2.2)	0.6 (3.4)
Honduras	68.0	38.2	68.4	38.5	0.5 (0.7)	0.3 (0.7)	68.0	38.3	0.0 (0.0)	0.0 (0.1)
Mexico	35.9	17.4	41.1	19.6	5.2 (14.6)	2.3 (13)				
Panama	32.3	4.8	38.0	6.8	5.7 (17.5)	2.0 (40.7)	35.7	5.5	3.3 (10.3)	0.6 (12.9)
Paraguay	27.8	12.2	29.1	12.7	1.3 (4.5)	0.5 (4.3)	31.5	13.4	3.7 (13.3)	1.2 (10.2)
Peru	62.3	25.5	64.0	25.9	1.7 (2.8)	0.4 (1.7)	63.7	25.9	1.4 (2.3)	0.4 (1.6)
Dominican Rep.	17.1	18.1	19.8	20.4	2.7 (15.7)	2.3 (12.7)				
Uruguay	5.6	6.7	6.9	9.6	1.3 (23.5)	2.9 (43.1)				
Simple average	34.3	16.9	37.6	18.6	3.3 (9.6)	1.7 (10.1)	37.9	16.1	2.5 (7.1)	0.7 (4.5)

Note: Poverty is defined as the share of individuals living in households with income below USD 6.85 (PPP-adjusted) per person per day. In the household surveys for Colombia, Ecuador, Mexico, the Dominican Republic, and Uruguay, it is not possible to distinguish between income from contributory and non-contributory pensions; therefore, these countries are excluded from the calculations. The values in columns 6, 7, 9, and 10 show changes in percentage points (p.p.), with figures in parentheses indicating percentage changes relative to the observed poverty rate (% change).

Source: Authors, based on CEDLAS data (2025).

Chapter 8 Appendix

Table A.8.1

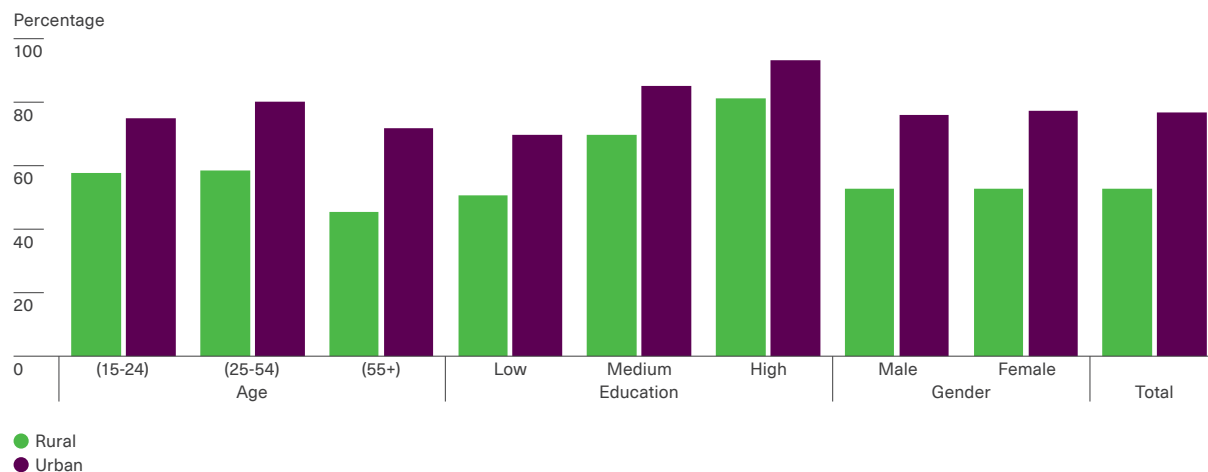
Rural population living within 2 km of a road, by country in Latin America and the Caribbean

LAC subregion	Country	Level of disaggregation	Rural population living within <2 km of a road	Rural population living within <2 km of a paved road	Difference
South America	Uruguay	Subnational – local	82%	73%	-9%
	Chile	Subnational – local	78%	71%	-8%
	Brazil	Subnational – local	75%	56%	-19%
	Ecuador	Subnational – local	67%	43%	-25%
	Argentina	Subnational – intermediate	65%	51%	-14%
	Peru	Subnational – secondary local	61%	26%	-35%
	Paraguay	Subnational – local	57%	47%	-11%
	Bolivia	Subnational – local	54%	29%	-25%
	Guyana	Subnational – intermediate	51%	30%	-21%
	Suriname	Subnational – local	50%	41%	-9%
	Colombia	Subnational – local	39%	23%	-16%
	Venezuela	Subnational – local	34%	19%	-15%
Caribbean	Barbados	National	100%	100%	0%
	Granada	National	94%	92%	-2%
	Saint Kitts and Nevis	Subnational – local	89%	89%	0%
	Saint Lucia	Subnational – local	80%	80%	-1%
	Trinidad and Tobago	Subnational – local	78%	50%	-28%
	Dominica	National	76%	66%	-10%
	Jamaica	Subnational – local	73%	58%	-15%
	Cuba	Subnational – local	73%	43%	-29%
	Dominican Republic	Subnational – secondary local	70%	33%	-36%
	Bahamas	Subnational – local	66%	50%	-16%
	Antigua and Barbuda	Subnational – local	64%	58%	-7%
	Haiti	Subnational – secondary local	62%	31%	-31%
	Saint Vincent and the Grenadines	National	54%	47%	-7%
Mesoamerica	Mexico	Subnational – local	83%	31%	-52%
	El Salvador	Subnational – secondary local	80%	62%	-17%
	Honduras	Subnational – local	67%	31%	-36%
	Costa Rica	Subnational – local	64%	52%	-13%
	Guatemala	Subnational – local	63%	34%	-29%
	Panama	Subnational – local	48%	37%	-11%
	Belize	Subnational – intermediate	47%	35%	-12%
	Nicaragua	Subnational – local	42%	29%	-12%
Subregions	South America		63%	43%	-20%
	Caribbean		67%	37%	-30%
	Mesoamerica		71%	34%	-38%
	LAC		66%	40%	-26%

Source: Buccari et al. (2025).

Graph A.8.1

Share of rural and urban households with internet access by characteristics of the household head

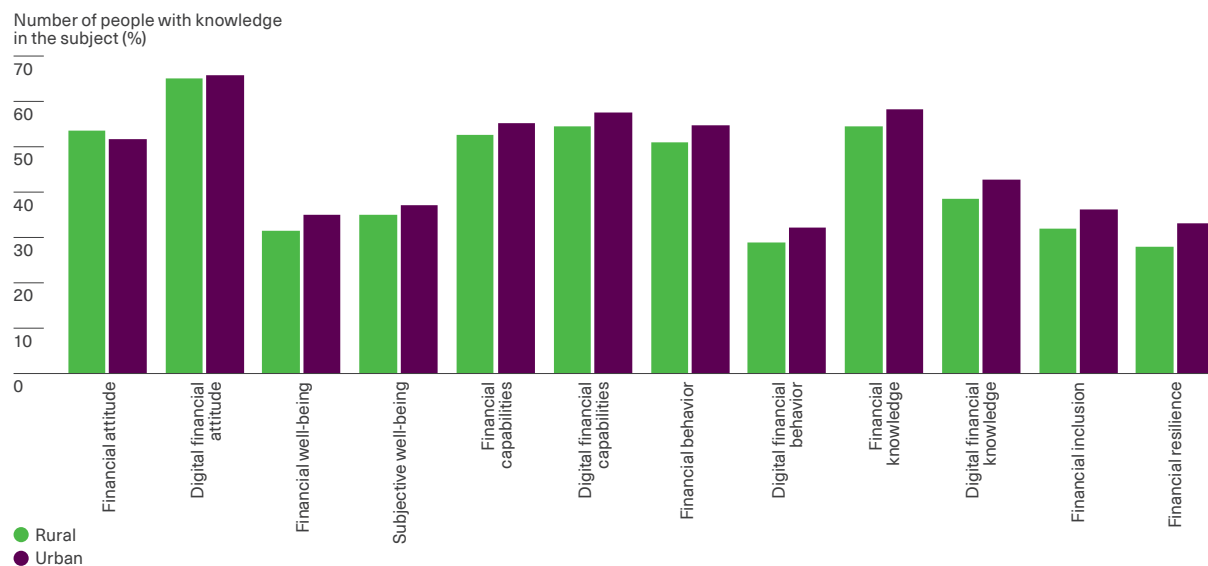


Note: Simple averages across the countries shown in Graph 8.5.

Source: Authors based on CEDLAS (2025).

Graph A.8.2

Financial indicators in rural and urban municipalities in Latin America and the Caribbean



Note: Indicators show the simple LAC average and include the following countries (with their corresponding data years): Argentina (2017), Bolivia (2013), Brazil (2020), Chile (2023), Colombia (2019), Costa Rica (2023), Ecuador (2020), Panama (2022), Paraguay (2022), Peru (2019), and Uruguay (2022).

Source: Authors based on CAF (n.d.).

In Latin America and the Caribbean, rural areas are undergoing a profound transformation. Beyond their traditional association with primary production, they now concentrate significant strategic potential for economic development, the provision of essential goods, environmental sustainability, and cultural preservation. This potential is emerging in a context shaped by the energy transition, climate change, and the reconfiguration of global value chains. At the same time, rural areas continue to face persistent challenges related to household incomes, access to services, infrastructure, and productive capacities, which limit their ability to contribute to growth and reduce inequality across the region.

This new Report on Economic Development examines the role of rural areas as a driver of regional development through an integrated approach that brings together population dynamics, labor markets, productive systems, and services and infrastructure. Within this framework, the report characterizes the productive and labor structure of rural territories, as well as the living conditions of rural households. It also identifies persistent gaps in access to services and infrastructure that constrain their development. Building on this analysis, the report explores opportunities to raise productivity and promote diversification in key sectors such as agriculture and agribusiness, mining and energy, tourism, forestry, fisheries, and aquaculture, as well as the challenges associated with the energy transition and the growing global demand for sustainably produced primary goods.

The report identifies the main bottlenecks that prevent rural territories from fully realizing their potential, including productivity gaps, labor informality, limited physical and digital connectivity, unequal access to essential and financial services, and challenges related to environmental sustainability and climate change. Based on this assessment, it proposes a set of policy actions aimed at strengthening productive and human capacities, improving territorial integration, and promoting more inclusive, dynamic, and sustainable rural development—capable of expanding opportunities and improving the well-being of people and communities across the region. In this regard, the report underscores that rural development represents a strategic opportunity that calls for integrated public policies to harness ongoing transformations and close long-standing gaps.