



BULLETIN 377 /

FACILITATION OF TRANSPORT  
AND TRADE IN LATIN AMERICA  
AND THE CARIBBEAN

# Rural roads: key routes for production, connectivity and territorial development

## Background

The connectivity provided by transport services is a crucial element of sustainable growth. In this context, rural roads are one of the prerequisites for equal access to health services, education and justice, and to other social and administrative services required for development with equality. The existence and maintenance of these roads also facilitates the provision of other essential infrastructure services such as electricity, water and sanitation. Rural roads facilitate the transport of 88.7% of the region's natural resource export volumes, and thus have a significant impact on international competitiveness. Improvements in the road network reduce



Background	1
I. Connectivity and territorial development	2
II. Rural roads and universal basic access	6
III. The lack of investment in rural roads is an obstacle to sustainable development	8
IV. Recommendations	14
V. Bibliography	15
VI. Publications of interest	17

This *FAL Bulletin* is part of the **reflections on infrastructure** by the Economic Commission for Latin America and the Caribbean (ECLAC). This issue analyses, in particular, the role of rural roads in production, connectivity and territorial development in the region.

It underscores the importance of the rural environment for sustainable development, which is often overshadowed by the excessive urban focus of public policies relating to road infrastructure. Specifically, improving connectivity in rural areas is fundamental to the achievement of various universal access targets enshrined in the 2030 Agenda for Sustainable Development.

This bulletin was prepared by Gabriel Pérez, Economic Affairs Officer of the Infrastructure Services Unit of ECLAC. For more information on this subject, contact [gabriel.perez@cepal.org](mailto:gabriel.perez@cepal.org).

The views expressed in this document, which is a translation of an original that did not undergo formal editorial review, are those of the authors and do not necessarily reflect the views of the Organization.



both transport costs and travel times considerably, thereby increasing productivity and encouraging the creation of more and better jobs (World Bank, 2016). These secondary roads also ensure the connectivity and integrity of the national territory, facilitating the provision of humanitarian aid and alternative routes in emergencies.

Despite this important social, economic and even geostrategic role, there are still territories in Latin America where the only access routes are narrow and steep or uneven pedestrian paths that are impassable to motorized transport, or areas where rivers are the only access routes, both for people and cargo. Worldwide, it is estimated that about 900 million inhabitants of rural areas lack adequate access to the formal transport system (Roberts, Shyam and Rastogi, 2006), and physical isolation is one of the factors behind the level of poverty commonly observed among these rural dwellers.

The lack of connectivity also contributes to the general feeling of abandonment expressed regularly by rural or indigenous inhabitants with respect to the State. This is exacerbated in the rainy season, when roads become impassable for weeks, increasing the local population's feeling of isolation. The 2030 Agenda for Sustainable Development of the United Nations contains specific targets to create an environment of equality in the provision and quality of infrastructure services, with a special focus on rural and indigenous territories, in order to end the stigmas of poverty and isolation that commonly characterize these territories in Latin America and the Caribbean. Improving road conditions to ensure less mud when it rains and less dust in dry periods would not only ameliorate the standards of quality of roadworks, but would also allow decent mobility in conditions similar to those seen in urban areas.

This bulletin analyses the importance of the secondary and tertiary road network, commonly known as rural roads, for production, connectivity and territorial development. It also examines the current state of the network and how it is maintained, and makes recommendations for the financing of these works. The document concludes with a set of recommendations to duly incorporate the dimensions of rural and territorial development into infrastructure policies.

## I. Connectivity and territorial development

At the international level, territories are normally classified according to their urban or rural predominance based on three criteria: population density, population distribution within the area and proximity to large urban centres. Although this classification allows comparisons between territories, it should be noted that the rurality of developed countries is not the same as that of Latin America and the Caribbean. The differences are not limited

to the density of occupation of the territory, but also include the quantity and quality of available services and economic infrastructure providing access to basic amenities, such as schools, hospitals and other cultural and leisure spaces. Moreover, rural roads are often considered gateways to modernity and State action, as they facilitate access for government officials and have a significant impact on the provision of other infrastructure services, such as drinking water, sanitation, electricity and recently, telecommunications. It would be difficult and costly to provide these services without rural roads, which also give rise to new commercial activities, such as those relating to tourism and the sale of craftwork.

As each territory includes different groups and communities, the impact of the lack of connectivity varies from one to the next, based on ethnicity, gender and age. Classification should also be nuanced, so that the distinction can be made between campesinos, people involved in non-agricultural activities and temporary migrants. Bear in mind that populations in rural or remote areas, as well as indigenous populations, tend to suffer from the negative externalities of the large infrastructure projects needed for national development, as their livelihoods and living conditions are affected without their expectations for a better life necessarily being met (Ramos and Pérez, 2018).

From the perspective of rural territorial development, the aim is to create guidelines and concrete actions that drive productive transformation and sustainable territorial development while addressing the specific conditions of the environment. In this scenario, external demand is a catalyst for productive transformation, which in turn fosters an increase in productivity and income, and urban-rural links therefore play a decisive role in the development of agricultural and non-agricultural activities within the territory, and in the creation of social networks based on regional identity. For example, the poor condition of tertiary roads used by small and medium-sized coal-mining companies in Colombia to transport their products not only leads to significant cost overruns in the export of these products that may end up excluding them from the international market, but also to high negative externalities for the health of the population and the environment, even affecting the lives of persons not linked to mining activities (Duque, Medina and Saade Hazin, 2017). In this context, improvements in the provision and quality of available infrastructure, and in services relating to the movement of people and goods, reduce the transaction costs associated with the transport of inputs and final products. This in turn allows products made in remote areas to be sold at competitive prices and facilitates the development of new economic activities, either in the export of primary goods, high value added products, or highly differentiated offerings owing to local specificities, as in the case of special interest tourism. The result is more balanced and sustainable territorial development.

Advancing towards connectivity that focuses on people and is not simply geared towards building roads implies incorporating the human rights-based approach into road design and maintenance. The lack of connectivity could be seen as a barrier to the full exercise and enjoyment of the rural population's human rights,<sup>1</sup> as well as their economic, social and cultural rights, and their civil and political rights. Better rural road accessibility would thus entail not only an improvement in rural dwellers' quality of life —giving them access to better education, health and communications between rural settlements and large urban centres—, but would also facilitate and increase the mobility of people, and stimulate the development of more economic, social, political and cultural activities.

In order to meet these different types of mobility demand, rural infrastructure design must be guided by inter-territorial coordination (LEADER, 2001). This implies recognizing that connectivity is one element contributing to a specific organization of the territory and therefore modes of transport are a tool for the territory and not an end in themselves. It also implies that rural access is not restricted only to rural roads and tracks, but is also

<sup>1</sup> Economic, social and cultural rights include the rights to food, adequate housing, education, health, social security, participation in cultural life, water and sanitation, and work (OHCHR, 2008). Civil and political rights protect individual freedoms and guarantee citizens' ability to participate in the civil and political life of the State in conditions of equality and without discrimination.



linked with other modes of transport, such as waterways (seas, rivers and lakes) or airways, which are essential for medical rescue and the provision of medical supplies, thus giving rise to a set of mobility and logistics services that include motorized modes as well as human and animal traction (Sustainable Mobility for All, 2019).

Therefore, territorial development cannot be seen merely as the connection of territorial hubs through various routes, but must be perceived dynamically, assuming that these routes facilitate different flows through a variety of transport modes, which ultimately determine how well and how much movement is enabled or impeded. The elements of this connectivity depend both on the physical and structural aspects of the territory —meaning the geographical difficulties or advantages it entails for the roll-out of such a network— and on the characteristics, volumes and types of resources to be mobilized. In turn, the movement of goods, services, information and people encompasses attributes of organization, directionality and capacity that are also related to the structures installed in the territory (Figueroa and Rozas, 2006).

Not only is the accessibility of a territory important, but also the ease with which the inhabitants and the products made there can leave the territory and be connected with the rest of the population (Sieber, 1997). This semantic distinction seeks to make clear that the improvement of road accessibility is not the same for all inhabitants, as the main beneficiaries of investments in road projects are usually residents with access to private modes of transport and not necessarily the poorest segments of the population as would be expected. Improvements are also perceived differently among users. For example, for users of motorized transport, the condition of the road is more important than the difficulty of the route. Meanwhile, pedestrians and cyclists are more concerned about the distance or duration of the journey than the state of the road (Smith and González, 2000).

Adequate territorial accessibility, therefore, requires measures that take into account the disparity in modes of transport (light, medium and heavy vehicles) and favour actions both for people who have their own transport and for inhabitants or indigenous communities that require non-motorized means of transportation for their mobility or to transport their agricultural production. Improvements in road connectivity also lead to the emergence of new formal transport services with predictable routes and affordable prices for rural people without their own transport, providing them with better connections to other larger towns and the services concentrated there (Smith and González, 2000).

Improving rural connectivity can have different impacts on the population, depending on gender, age group, caste or ethnic group and individual household income. This is why transport interventions should be coupled with other complementary policies (Roberts, Shyam and Rastogi, 2006). For example, improved connectivity services could make it more feasible for men to migrate temporarily to other towns in search of better paying jobs, resulting in an increased workload for women who remain in the original household. Similarly, improved accessibility makes consumer goods more affordable to households, but affects rural artisans and residents whose livelihoods depend on transport. Thus, new conflicts may arise with the arrival of connectivity and they require mitigation and control measures. For example, in the face of an agricultural export boom, the flow of vehicles on rural roads increases, which generates complaints from the inhabitants of those areas about congestion, more airborne dust and poor road safety owing to a road infrastructure that does not meet the new requirements.





An interesting regional example is Corrientes province in Argentina, for which the Fundación Agropecuaria para el Desarrollo de Argentina and the Ministry of Production of Corrientes created a prioritized map of the road network based on different variables and indicators (*Diario Impacto Corrientes*, 2019), e.g.:

- In the social sphere: roads that could be used to shorten distances and improve the connection between towns and cities.
- In the productive sphere: roads used for agricultural and livestock production and tourism.
- In the education sphere: geolocalization of 1,026 rural schools with a total of almost 60,000 students.
- In terms of resilience and adaptation: roads and routes that could be used as alternatives in case of closures owing to flooding of the main paved routes.

The aim of this exercise was to generate more objective parameters in the prioritization of investment needs, establishing an order of importance and thus achieving greater social efficiency of the annual investments made by the Ministry of Production to improve rural roads (*Revista Vial*, 2019a). Preliminary results revealed that one third of network kilometres were categorized as high priority, which will allow the optimization of the management of improvement plans for rural roads in the province and at the same time the evaluation of the relative importance of paved provincial and national roads, and also the creation of policies and works to that effect.

The ministries of public works will continue to play a central role in strengthening connectivity and territorial development. This requires investments and actions that favour comprehensive and balanced territorial development. Completing and improving the quality of a country's road network is necessary to achieve the universal accessibility enshrined in the Sustainable Development Goals by 2030. This would involve strengthening actions in areas such as the integration of isolated territories, transport subsidies and the implementation of enabling works, with respect to routes (bridges, tunnels and canalized watercourses) as well as docks and small airstrips in remote areas and other civil works that can improve network capacity, coverage and resilience. Sectoral ministries must also foster concrete citizen participation and strengthen the decentralization of decision-making on investments, as a means of empowering rural dwellers and authorities to ensure that they can participate in the design and improvement of connectivity based on their real needs.

## II. Rural roads and universal basic access

The quantity and quality of available infrastructure determine, to a large extent, the production and consumption patterns of an economy. The type of infrastructure chosen and the way it is designed, regulated and operated also affect the price, timing and quality of the products (Pérez and Sánchez, 2019). Infrastructure also plays an important role in the development of urban-rural links, and in the insertion on the international market of agricultural and other production from rural territories, as these investments are fundamental for inclusive and sustainable productive, institutional and social transformation (UNDP, 2014).

The existence and level of functioning of rural roads—which include both secondary roads (estimated traffic volume of at least 150 vehicles per day and less than 700 vehicles per day) and tertiary roads (less than 150 vehicles per day)—are crucial to connectivity between territories and to the provision of transport services for both the people living there and for the operation of agribusiness logistics chains and the production of other goods there.

Within this conceptual framework, connectivity is one of the fundamental design elements of a rural road network that contributes to sustainable development with equality. Simply put, connectivity is the existence of a link between two points, either between people and places, or between these people and places and specific points of the territory where travel is concentrated, such as subnational capitals or product departure points (e.g. markets and ports). From a functional point of view, connectivity can also be defined as the capacity to place goods, services, information and people at different points of a territory according to the demands of the different areas of national interest (Figuerola and Rozas, 2006).

However, the mere existence of a link between two points is not enough to achieve sustainable development with equality. There is also a need for physical and operating measures which enable mobility that adheres to minimum standards of periodicity, quality and safety. In this respect it is important to bear in mind that the movement of both people and goods in rural areas is heavily influenced by the existence of routes (by land, water and air) and by their accessibility throughout the year. Access to infrastructure is also essential to agricultural production and other primary economic activities in rural or peripheral areas, to ensure efficient and competitive connections to international destination markets, and the lack of this access would represent a real obstacle to rural development (Leguizamón, 2019). Although rural roads may serve as a connection to a territory, they are not the only type. Many territories in peripheral areas such as Amazonia, islands or distant territories with no overland connection, require various forms of waterborne transport (via seas, rivers, lakes) or air transport to gain access to other more populated areas in the territory. Thus, connectivity not only entails building roads but also providing enabling infrastructure to improve territorial connectivity.

The second important element of this conceptual framework is universal access which, generally speaking, is the ability of any member of society to connect to a series of services, opportunities and markets among a wide range of origins and destinations. Universal access is included in the targets of the 2030 Agenda for Sustainable Development, specifically of Goal 9, to build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation, and indicator 9.1.1 on the proportion of the rural population who live within 2 km of an all-season road (United Nations, 2017). This distance is considered a reasonable threshold to meet a person's minimum economic and social requirements.

The connectivity of rural areas and peripheral territories can be assessed through the Rural Access Index (RAI) developed by the World Bank, which measures the percentage of rural people who live within 2 km of an all-season road (Roberts, Shyam and Rastogi, 2006), using information from both the existing road network (quantity and quality) and from household surveys. The advantage of its use in the evaluation of rural projects is that the decision is not based on achieving social or private returns, but simply ensuring the cost-effectiveness of the project (Leguizamón, 2019).



The World Bank's use of this indicator for 62 countries in six regions around the world in 2006 showed that improved rural accessibility not only increases the competitiveness of agriculture and other rural economic activities, but it also reduces multidimensional poverty, favouring lower rates of morbidity and mortality, as well as better health outcomes and increases in school enrolment rates for children and disadvantaged groups. The Rural Access Index reading for Latin America and the Caribbean was 54, indicating that in 2006, almost 46% of the region's population did not live within 2 km of an all-season road. The global average was 68.3, with the region reflecting a higher percentage than only South Asia (58) and Sub-Saharan Africa (a very low 30) (Roberts, Shyam and Rastogi, 2006).

The use of the Rural Access Index is still in the early stages and most countries in Latin America and the Caribbean do not gather these data. It is hoped that, as countries are required to report on progress in achieving target 9.1 of the 2030 Agenda for Sustainable Development, the use of satellite imagery will help to encourage the widespread use of the Rural Access Index as a base indicator, allowing the distinction of performances within national territories (World Bank, 2016). For now, the existing data are limited and derive mainly from the original surveys carried out by the World Bank in 2006 and from subsequent road projects implemented by the same institution, as shown in table 1.

**Table 1**

Latin America (selected countries): Rural Access Index, various years

Country	Rural Access Index (RAI) (percentages)	Year data were updated
Bolivia (Plurinational State of)	48	2003
Brazil	53	2001
Chile	76	2003
Costa Rica	82	2003
Ecuador	73	2003
Nicaragua	28	2000
Paraguay	42	2019
Peru	37	2016

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of information from the World Bank.

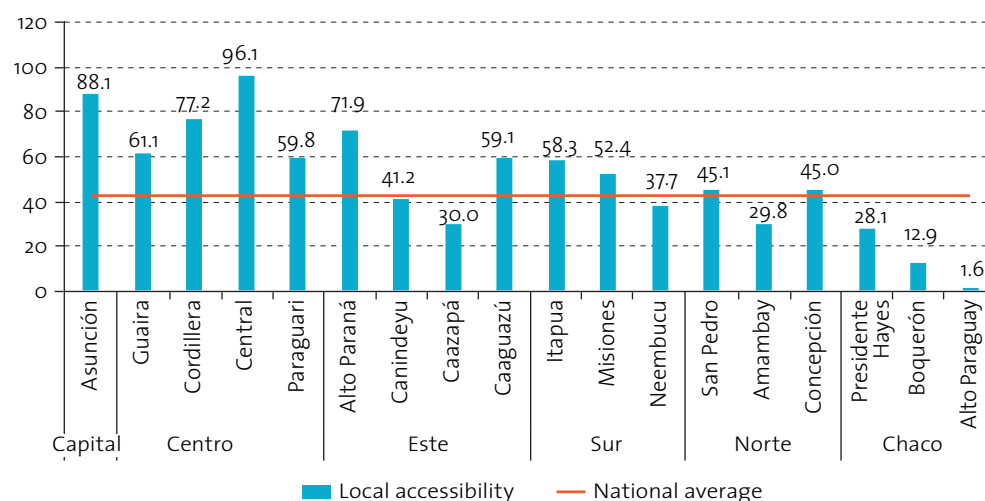
In Peru, the Rural Access Index for 2016 was estimated at 37.2%, which means that roughly 12.3 million people were not connected to the road network at the time. While rural accessibility is relatively higher in coastal areas, it does not exceed 50% in inland areas such as the departments of Ayacucho, Cajamarca and Huancavelica, and in more remote areas closer to Amazonia, such as Loreto and Ucayali, the Rural Access Index is estimated at less than 5% (World Bank, 2019).

The most recent use of the Rural Access Index in the region is in Paraguay, where the World Bank has observed that although the road network meets the mobility requirements of 90% of the population, this stems in large part from the fact that inhabitants are concentrated around major routes, which means that connectivity with the rest of the territory is lower, as shown in figure 1.

As shown in figure 1, 42.4% of the rural population of Paraguay has access to paved and passable roads, which means that approximately 1.8 million rural dwellers remain disconnected from a reliable all-season road network. Although the national average is low, barely above that of Sub-Saharan African countries, trends are mixed within the country itself. While rural accessibility is higher than 96% in the central part of the country, in other areas such as Misiones, this figure is 52.4%. At the other end of the spectrum, the department of Alto Paraguay in the region of Chaco recorded accessibility of 1.6%, meaning that more than 98% of that rural population does not have access to reliable roads (Sethi, 2019). This limited accessibility also stems from the small number of people living in these areas and how dispersed they are across the national territory. This poses a tremendous challenge for the authorities, as even if the design and quality of all rural roads in this province are upgraded, these investments may not guarantee significant improvement in connectivity if no roads are built to improve rural accessibility.

**Figure 1**

Paraguay: access to paved roads by province, 2019  
(Percentage of the population)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of information from K. Sethi, *Paraguay – Roads Sector Public Expenditure Review (English)*, Washington, D.C., World Bank, 2019.

### III. The lack of investment in rural roads is an obstacle to sustainable development

One of the significant limitations on territorial integration between and even within countries comes from the lack of connectivity. Indeed, although the countries of Latin America and the Caribbean share strong cultural, historical and economic ties, there are still considerable differences between subregions, countries and even within countries themselves. For this reason, it is important to keep in mind the heterogeneity of the region in terms of social and economic development, provision of transport and infrastructure, and international and territorial connectivity. It is a great challenge, therefore, to improve internal connectivity within countries, mainly with regard to secondary roads and in rural areas, where the lack of investment in infrastructure is compounded by isolation and often inefficient, costly, unsafe and insecure logistics and mobility services, further increasing the precariousness of these areas (Pérez and Sánchez, 2019).

In light of the large infrastructure gap in the region, it is important to distinguish between the types of road (national, regional, provincial, local and access) and to incorporate territorial development into the evaluation of projects with a more systemic approach to national development. This derives from the fact that the variables normally used to justify investments are not applicable to these roads, precisely because of their low utilization. Some authors even point out that time-saving, which is normally considered a significant variable in the justification of urban or interurban roadworks, may not be entirely applicable to rural communities if the social or economic interactions that make time an economic benefit in these territories are not accurately assessed. In these cases, journey time is no longer a numerical variable representing discreet changes in time owing to improvements in infrastructure, but should be seen as a catalyst for qualitative leaps in the quality of life in the areas concerned (Smith and González, 2000). Lastly, a mere economic or social assessment of an investment project may fail to include the effects on the rest of the network, thereby losing the systemic vision.

The provision of basic infrastructure services is also fundamental to the achievement of the Sustainable Development Goals. Meeting the target of providing universal access to



inhabitants, including those living in rural areas and peripheral territories, represents an enormous financial and technical challenge as it implies reaching isolated and dispersed communities. The magnitude of the infrastructure deficit and the technical complexity involved in achieving these targets means that countries must examine public-private mechanisms to address this challenge, along with innovative mechanisms to expand capacity and improve the quality of infrastructure available in rural areas.

Private actors, in particular, may be willing to partly or fully finance rural infrastructure projects, for example, in mining, aquaculture and special interest tourism. One example is the involvement of the National Association of Coffee Exporters of Colombia (ASOEXPORT) in the development and construction of a large share of tertiary roads in coordination with the local and national governments, to increase access and sources of employment thanks to the sowing of an additional 100,000 hectares of coffee in post-conflict areas (Portafolio, 2017). Another interesting initiative in the same country is the government mechanism implemented via Law No. 1819 of December 2016 which, through a structural tax reform, established tax incentives to close socioeconomic inequality gaps in the areas most affected by armed conflict (ZOMAC). These incentives include article 238 on public works for taxes, a mechanism enshrined in the law that allows companies to pay up to 50% of income tax in kind, through the direct execution of projects relating to investment in education infrastructure and public services such as the improvement of tertiary roads in the areas most affected by violence and poverty. Thanks to this mechanism, additional resources have been allocated to rural communities and have allowed the implementation of municipal priority projects relating to education, health, energy, drinking water, sewerage and road infrastructure. In 2018, the year this programme was launched, 28 contributing companies invested more than 220 billion Colombian pesos. In the second year, the number of participating companies rose to 41 and the additional amount invested through this mechanism was 247 billion Colombian pesos, mainly in municipalities included in development programmes with a territorial approach, meaning those in territories most affected by the armed conflict, marked by higher poverty indices, illicit economies and institutional weakness (Agencia de Renovación del Territorio, 2020).

In such cases, the State must contribute to fluid project development and the creation of forums for local participation to ensure that the benefits are also enjoyed in neighbouring settlements that are not necessarily involved in the specific project. A special type of case to consider is isolation caused by the lack of connectivity, but which adds value to a certain business, for example tourism activities on islands, in national parks or in environmentally protected areas, where the number of tourists must be limited and therefore the construction of major transport infrastructure is not required. Other impacts on the social sphere should be considered, for example in the case of ethnic minorities whose way of living depends precisely on isolation.

It is essential to understand the most critical unmet needs and to monitor the efforts made over time. The different ways of classifying national roads, and the different jurisdictions that influence their financing and maintenance, are some of the elements that complicate, both on the national and regional levels, the generation of reliable and updated information on the Latin American road network. As indicated by the Board of Directors of Roads in the Iberian Peninsula and Latin America (DIRCAIBEA), knowledge of the configuration and characteristics of road networks is fundamental to accurate and efficient road management, and also provides important information to correctly manage road infrastructure and enable better and more efficient regional road links (DIRCAIBEA, 2007).

Road infrastructure investment between 2008 and 2015 in the region<sup>2</sup> accounted for 0.7% of annual GDP, which is similar to or even higher than the amount invested by developed economies. The ratio of total road length to land area increased by about 8% between 2007 and 2015, which allowed the region (17 countries) to record an average of 18 km of

<sup>2</sup> Includes a group of 14 Latin American countries, which account for 78.5% of the region's GDP and more than 80% of its population (Chauvet and others, 2019).

roads for each 100 km<sup>2</sup> of territory (Chauvet and Albertone, 2019). However, despite this significant growth, just under 18% of the total road network was paved in 2015, representing 3 km of roads for each 100 km<sup>2</sup> of territory. The corresponding figures for countries such as Germany, India and Japan are 10 or even 20 times higher. These differences stem from the fact that in developed countries such as the United States and Germany, as well as other countries in the European Union (27 countries), road infrastructure is already advanced, which is why the investment is focused mainly on maintaining and improving the road network, unlike in Latin America where the basic paved road network is still being developed, as shown in table 2.

**Table 2**

Latin America (selected countries): paved roads  
(Percentage of national total)

Country	Total network (km)	Percentage of road network that is paved	Year data were updated
Argentina	509 090	15	2018
Belize	4 536	19	2017
Bolivia (Plurinational State of)	191 545	18	2018
Brazil	1 720 700	12	2017
Chile	82 133	34	2016
Colombia	206 627	12	2016
Costa Rica	44 316	27	2018
Dominican Republic	14 597	40	2018
Ecuador	43 670	35	2014
El Salvador	6 543	63	2019
Guatemala	17 178	44	2019
Honduras	16 861	23	2019
Mexico	407 959	43	2018
Nicaragua	24 172	16	2015
Panama	16 366	42	2016
Paraguay	80 127	9	2018
Peru	172 094	13	2016
Uruguay	68 729	12	2018

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of information provided by the respective countries and the Board of Directors of Roads in the Iberian Peninsula and Latin America (DIRCAIBEA).

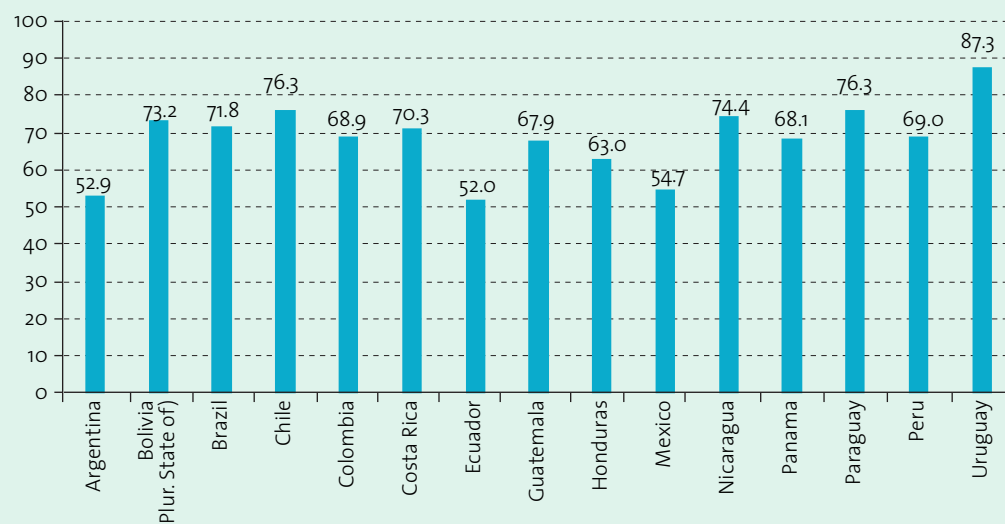
Many of the differences between countries stem from their heterogeneous sizes and historical levels of investment in road infrastructure. However, this indicator does not provide information on the density or quality of the local road network.

In Latin American countries, while it is precisely rural roads that facilitate the transport of agricultural production and non-renewable natural resources for export, national investment is normally concentrated on major logistics corridors and external trade infrastructure such as ports, airports and urban roads. This is despite the fact that tertiary (rural) roads in much of the region account for more than half of the national road network, as shown in figure 2.

Achieving universal rural access in compliance with the 2030 Agenda for Sustainable Development poses an enormous challenge in terms of infrastructure financing. For many developing countries, this would imply providing access for more than half of the rural population, which could represent an investment of US\$ 100 per capita on higher volume rural roads using traditional methods, and may take 10 to 20 years to implement. However, the investment required for basic access and all-season roads for pedestrians, cyclists and motorcyclists would range from US\$ 5 to US\$ 10 per capita, making this target much more achievable for the poorest countries (Sustainable Mobility for All, 2019).

**Figure 2**

Latin America (selected countries): importance of rural (tertiary) roads  
(Percentage of the national network)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of information provided by the respective countries and Board of Directors of Roads in the Iberian Peninsula and Latin America (DIRCAIBEA).

In very remote areas, which are typically poor and rural, the national budget would be the main source of financing for road construction, rehabilitation and maintenance, unless areas of collaboration with the private sector can be identified, as well as other new sources of financing, such as infrastructure investment funds, institutional investors, social impact bonds (SIB) and climate bonds (Cipoletta Tomassian, 2015). For example, basic infrastructure projects have been developed in Brazil since the 1990s, such as the Alvorada Programme, which began in Minas Gerais and was later expanded to other Brazilian states, with the additional intersectoral participation of the ministries of education, health, social security and social welfare, among others (Fort, 2019).

Investment in rural connectivity can therefore be seen as a continuous and long-term improvement process. Initially, if national income is not enough to finance traditional solutions, authorities can focus on basic access, which requires low investment in construction and maintenance, is not technically complex, and can be carried out by a local labour force. These works generally involve levelling the road surface, channelling small watercourses and reducing slopes with the aim of providing all-season roads for pedestrians, cyclists and light motorized traffic. These improvements will allow the people living in these areas to improve their living conditions, access social services, expand their economic activity and increase their income, in the medium term. The stronger momentum will increase traffic to a point where road design must be improved through engineering works to increase the level and safety of transport flows. When this happens, the local economy will have expanded and there will be more available resources to cover the costs of investment and future maintenance. The same occurs with the construction of small docks or aerodromes, which connect these rural territories with regional hubs or larger cities where complex health services and other services are available at affordable prices. This has the advantage of encouraging an equitable and rapid approach to achieving universal basic access, avoiding the risk of investing prematurely in infrastructure works that are more costly and excessive for existing needs.

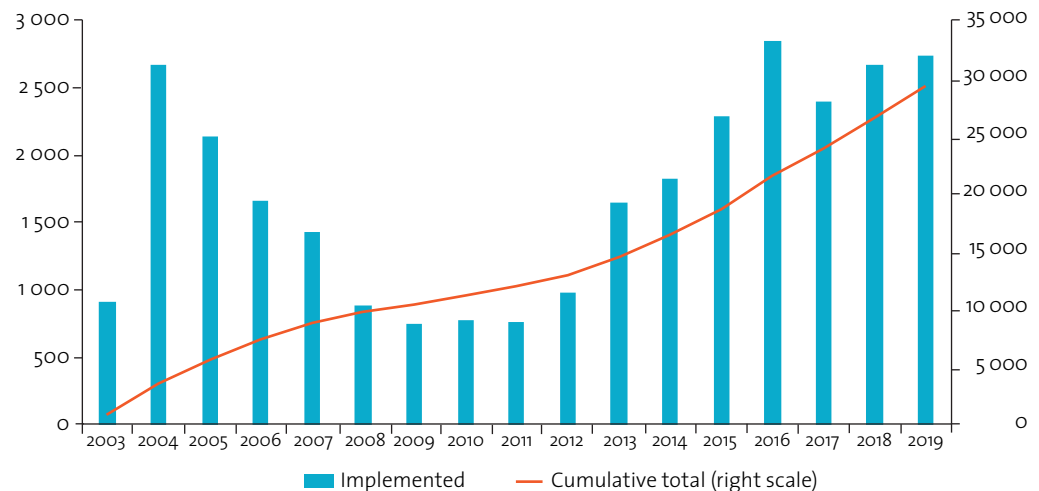
One example of this type of basic investment is in Chile, which has a road network of more than 85,000 km, of which only one third is paved, with the deficit mainly concentrated in the secondary and tertiary routes of the national network. The Ministry of Public Works, through the Road Management Office, began implementing the Caminos Básicos programme in 2003, to improve the conditions of the surface layer of unpaved roads. Given



the positive economic and social outcomes, the Pavimentos Básicos Quince Mil programme was implemented one decade later, in 2014, with the aim of completing 15,000 km of roads during the government's four-year term, resulting in the improvement of more than 30,000 km of basic roads in total, as shown in figure 3.

**Figure 3**

Chile: development of basic road network, 2003–2019  
(Kilometres of improved roads)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of information provided by the Road Management Office of the Ministry of Public Works of Chile.

Of the total 15,000 km target for 2014–2018, most of it —12,000 km— were rural roads and the remaining 3,000 km were roads located in indigenous communities, representing a total investment of 1.2 billion Chilean pesos including the contributions from local governments. The strategy included the implementation of solutions in which the geometry of the road design was not altered, which facilitated execution, and simple improvement techniques were encouraged to avoid creating mud in winter and airborne dust in summer. The reduction of dust had other positive effects such as diminishing airborne dust levels and the associated environmental pollution. It also improved road visibility and thereby reduced road accidents, and lastly, improved environmental conditions to grow fruits and other crops alongside the roads. The use of materials and techniques was adapted to the context:

- Roads connected to existing paved road networks, or in areas with residences, schools and rural health centres.
- Low traffic, with annual average daily traffic of less than 200 vehicles per day.
- Horizontal and vertical geometry of the road route consistent with traffic levels, with a road width of at least 6.0 metres.
- Roads with a consolidated granular surface and drainage to ensure the durability of the basic solution.

Lastly, there was also a methodological change allowing the evaluation of social returns of the programme as a whole, and not road by road, as was done traditionally. This change allowed the achievement of a price per kilometre standard under which construction with public investment was authorized.

This case reflects how this type of programme, despite limited investment, produces high social returns, contributing to territorial development, the elimination of poverty and support for the rural productive economy. Improved connectivity encourages productive activities in the sectors that benefit and helps to reduce logistical costs given the greater durability and performance of transport vehicles, which will generate, in the medium and long term, stronger economic activity that at some point will require new types of investment.

Mexico is developing the Rural Roads Programme launched in 2019 with the aim of paving access roads to indigenous municipal capitals in the State of Oaxaca, which will benefit 50 local municipalities and more than 187,000 inhabitants. The programme includes intensive use of local labour in order to create new sources of paid work in these territories and thus reduce the migratory flows of the families who live there. Another characteristic is the provision of resources by municipal authorities in order to ensure that work in the community is well-paid, and that in these towns the people benefit and the economy is reactivated (SCT, 2019).

Yet another interesting example is the Programme of Rural Roads for Development implemented by the Ministry of Public Works, Transport, Housing and Urban Development of El Salvador, which aimed to: (i) reduce vehicle operating costs, (ii) diminish journey times and (iii) ensure that roads are passable all year round. When the programme was completed the operating costs of automobiles had been reduced by 32% while those of passenger buses had declined by 20%. The average speed increased from 24 km/hour to 55 km/hour for automobile users and from 23 km/hour to 50 km/hour for buses, while the number of days on which the roads were impassable was reduced to zero. Other impacts were also observed six months after the works were completed. For example, 40% of students said that their journey time to school had been reduced significantly, school enrolment increased by 20% and there were other improvements in economic activity as a result of better agricultural crop yields, higher employment and improvement in the population's income (IDB, 2019).

The fact that the solutions are basic does not mean that construction should not incorporate a methodology or professional design. Road construction is part of civil engineering, which requires considerable knowledge and practical experience, mainly in the structural design of rainwater drains and the canalization of tributaries, which are fundamental elements of a suitable solution (*Revista Vial*, 2019b).

Another important element of infrastructure investment is the conservation of existing structures. Suitable road conservation, as established by ECLAC, not only maintains the level of service of roads, but also extends their useful life. Specifically, road conservation is a set of activities aiming to preserve the condition of roads and the services they provide in the long term, by protecting the basic road structure and surface. Road maintenance, meanwhile, involves the localized repair of small defects in the roadway and pavement, such as: levelling unpaved surfaces and shoulders; regular maintenance of drainage and lateral slopes; clearing right-of-way; vegetation control and other minor actions carried out periodically throughout the year (Bull and Schliessler, 1994).

The conservation of rural roads also provides an opportunity to create new sources of employment, mainly for the people living in areas bordering these roads. This not only generates savings for the State, but also leads to improvements in the quality of service, as the employees of these maintenance microenterprises are also regular users of the roads, which means that they are well aware of maintenance and improvement needs when they arise.

In the region, another aim is the empowerment of the local population through the creation of microenterprises dedicated to local routine maintenance. In rural areas of Ecuador, Nicaragua, Paraguay and Peru, investment projects over the past 15 years have also incorporated women into the organizations responsible for road maintenance, where they perform the same tasks as their male colleagues: filling potholes, clearing drains and vegetation, removing small obstacles and carrying out general emergency tasks. Providing paid employment opportunities outside traditional roles empowers women and allows them to generate their own income, which they use mainly on their children's education, their family's nutrition and health, and home improvements, thereby creating a virtuous circle of development (World Bank, 2014).

## IV. Recommendations

Infrastructure planning with a long-term and territorially balanced perspective will allow effective support to be provided for industrial transformation, as well as enabling better adaptation to economic changes and new social and environmental concerns that emerge as development progresses (Pérez-Salas, 2017).

Despite the importance of rural roads to countries' social and territorial development and the crucial role they play in productivity and external trade competitiveness, the countries of the region invest very little in the construction and maintenance of domestic infrastructure such as secondary roads, bridges, tunnels and other engineering works. Although transport flows of people or goods are smaller on these roads, the lack of investment has contributed to a gradual decline in the coverage and quality of infrastructure, thereby driving up the cost of infrastructure use and journey times and costs for users and goods from these areas. It also affects the quality of life of the population given the impassability of roads during the rainy season or excessive airborne dust during the dry season.

Therefore, the road network should not only allow communication via national routes or highways, and their linkage with provincial roads, but should also allow the development of services that effectively link people with social services and the labour market, and with productive sectors, through an efficient, competitive and economically affordable logistics system.

Adequate land-use planning and management is essential for infrastructure development, in order to overcome short-term approaches that ignore the needs of the communities where infrastructure projects are developed and that sometimes ended up being detrimental to the well-being of the communities. In this sense, infrastructure development must place people at the centre of development to ensure that the expected improvements in their standard of living are made a reality (Ramos Suárez and Pérez, 2018). A connected territory will thus contain a network of different types of corridor (land, sea, river and air) that support the movement of goods, services, information and people between different points of origin and destination in the territory. The connectivity of these elements (goods, services, information and people) depends on transport capacity, the connection of single points, and transport costs and times.

Suitable rural access requires equitable and affordable access for everyone, taking into account differences in income and age, as well as gender and disability. In line with the 2030 Agenda for Sustainable Development, connectivity should be based on infrastructure that is resilient and adapted to climate change, and made possible through investment in the construction and maintenance of basic works that guarantee all-season access as a means of supporting sustainable development and human well-being (Sustainable Mobility for All, 2019).

Actions that encourage territorial development require a series of project evaluation tools that can quantify social impacts and their costs in terms of the environment, heritage and culture. It is also important to bear in mind that some strategic objectives, for example improved access to health care, can be achieved by setting up doctors' offices in the area, or by ensuring that users are suitably connected to neighbouring towns with more complex health care infrastructure and services.

Lastly, it is important to acknowledge the heterogeneity of actors in rural areas and the specific demands of each group, as well as the multidimensional nature of poverty. These elements require differentiated and multidisciplinary interventions that address multiple deficiencies and increase the asset base. An effective connectivity policy should seek to resolve territorial rather than individual household poverty (Fort, 2019). Therefore, ministries of public works, transport and other sectors must be strengthened in order to ensure that these new dimensions are incorporated into the design process. The aim is to address problems from several government perspectives in a coordinated manner, so as to leverage synergies and successively reduce territorial inequalities and gaps in order to achieve the Goals of the 2030 Agenda for Sustainable Development.



## V. Bibliography

- Agencia de Renovación del Territorio (2020), “Obras por Impuestos”, Government of Colombia [online] [http://www.renovacionterritorio.gov.co/Publicaciones/obras\\_por\\_impuestos](http://www.renovacionterritorio.gov.co/Publicaciones/obras_por_impuestos).
- Bull, A. and A. Schliessler (1993), *Roads: a new approach for road network management and conservation* (LC/L.693/REV.1), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), June.
- Chauvet, P. and B. Albertone (2019), “Road transport in Latin America: evolution of its infrastructure and impact between 2007 and 2015”, *FAL Bulletin*, No. 367, Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), July.
- Cipoletta Tomassian, G. (2015), “Financiamiento de la infraestructura para la integración regional: Alternativas para América del Sur”, *Development Financing series*, No. 259 (LC/L.4128), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), December.
- Diario Impacto Corrientes* (2019), “Corrientes, primera provincia en contar con un mapeo especial de sus caminos rurales”, July [online] [http://www.impactocorrientes.com/notix/noticia/170482\\_corrientes\\_primera\\_provincia\\_en\\_contar\\_con\\_un\\_mapeo\\_especial\\_de\\_sus\\_caminos\\_rurales.htm](http://www.impactocorrientes.com/notix/noticia/170482_corrientes_primera_provincia_en_contar_con_un_mapeo_especial_de_sus_caminos_rurales.htm).
- DIRCAIBEA (Board of Directors of Roads in the Iberian Peninsula and Latin America) (2017), “Estadísticas Básicas Viales” [online] <http://dircaibea.org/?q=Estadisticas>.
- Duque, D., O. Medina and M. Saade Hazin (2017), “Infraestructura logística para una mejor gobernanza de la cadena del carbón en Colombia”, *Project Documents* (LC/TS.2017/75), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), November.
- Figueroa, O. and P. Rozas (2006), “Conectividad, ámbitos de impacto y desarrollo territorial: análisis de experiencias internacionales: volumen I”, *Natural Resources and Infrastructure series*, No. 113 (LC/L.2586-P), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), September.
- Fort, R. (2019), “Infraestructura rural mínima para prosperar”, 2030 – *Alimentación, agricultura y desarrollo rural en América Latina y el Caribe*, No. 21, Santiago, Food and Agriculture Organization of the United Nations (FAO).
- IDB (Inter-American Development Bank) (2019), “Cómo fortalecer la red vial rural en El Salvador”, *Infraestructura para el desarrollo*, vol. 4, No. 2.
- LEADER (2001), “La competitividad de los territorios rurales a escala global: construir una estrategia de desarrollo territorial con base en la experiencia de LEADER”, *Fascículo 5*, February.
- Lebo, J. and D. Schelling, (2001), “Design and appraisal of rural transport infrastructure: ensuring basic access for rural communities”, *World Bank Technical Paper*, vol. 496, Washington, D.C., World Bank.
- Leguizamón, G. I. (2019), “Logística y accesibilidad en caminos rurales: a análisis del anegamiento en el sudeste de la Provincia de Buenos Aires”, Thesis for Bachelor’s degree in Comprehensive Logistics, National University of Central Buenos Aires Province.
- OHCHR (Office of the United Nations High Commissioner for Human Rights) (2008), “Frequently Asked Questions on Economic, Social and Cultural Rights”, *Fact Sheet*, No. 33, Geneva.
- Ramos Suárez, E. and G. Pérez (2018), “Development and conflicts linked to infrastructure construction”, *FAL Bulletin*, No. 361, Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), January.
- Revista Vial* (2019a), “Metodología para priorizar una red vial de caminos rurales”, No. 130, December [online] <http://revistavial.com/metodologia-para-priorizar-una-red-vial-de-caminos-rurales/>.
- \_\_\_\_ (2019b), “Los caminos rurales: Metodologías de buenas prácticas”, No. 127, July [online] <http://revistavial.com/los-caminos-rurales-metodologias-de-buenas-practicas/>.
- Roberts, P., K. C. Shyam and C. Rastogi (2006), “Rural access index: a key development indicator”, *Transport Papers*, No. TP-10, Washington, D.C., World Bank.
- Pérez-Salas, G. (2017), “Institucionalidad y políticas de logística: lecciones para América Latina y el Caribe del proceso implementado por la República de Corea”, *Natural Resources and Infrastructure series*, No. 185 (LC/TS.2017/126), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), December.

- Pérez, G. and R. Sánchez (2019), “Logistics for production, distribution and trade”, *FAL Bulletin*, No. 369, Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), October.
- Portafolio (2017), “Cafeteros construirán parte de vías terciarias”, November [online] <https://www.portafolio.co/economia/cafeteros-construiran-parte-de-vias-terciarias-511343>.
- Sánchez, R. and others (2017), “Inversiones en infraestructura en América Latina: tendencias, brechas y oportunidades”, *Natural Resources and Infrastructure series*, No. 187 (LC/TS.2017/132), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), December.
- SCT (Secretaría de Comunicaciones y Transportes) (2019), “Caminos rurales”, Government of Mexico [online] <https://www.gob.mx/caminosrurales>.
- Sethi, K. (2019), *Paraguay – Roads Sector Public Expenditure Review (English)*, Washington, D.C., World Bank.
- Sieber, N. (1997), “An Annotated Bibliography on Rural Transport”, *Default Book Series*, January.
- Smith, M. and S. González (2000), “Evaluación de los caminos rurales: hacia un enfoque orientado al usuario”, *Revista de Urbanismo*, No. 2, Department of Urbanism, Faculty of Architecture and Urbanism, University of Chile [online] <https://web.uchile.cl/vignette/revistaurbanismo/n2/4.html>.
- Sustainable Mobility for All (2019), *Global Roadmap of Action: Toward Sustainable Mobility* [online] <https://sum4all.org/global-roadmap-action>.
- UNDP (United Nations Development Programme) (2014), “Chile Rural. Un desafío para el desarrollo humano”, *Temas de Desarrollo Humano Sustentable*, No. 12.
- United Nations (2018), “Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development” (A/RES/71/313) [online] [https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework%20after%202020%20review\\_Eng.pdf](https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework%20after%202020%20review_Eng.pdf).
- World Bank (2019), *World – Measuring Rural Access: Update 2017/18 (English)*, Washington, D.C. [online] <http://documents.worldbank.org/curated/en/543621569435525309/World-Measuring-Rural-Access-Update-2017-18>.
- \_\_\_\_ (2016), *Measuring rural access: using new technologies (English)*, Washington, D.C. [online] <http://documents.worldbank.org/curated/en/367391472117815229/Measuring-rural-access-using-new-technologies>.
- \_\_\_\_ (2014), “In Latin America, Hard Hats and Tools are no longer only for Men”, M. M. Nuñez, 18 August [online] <https://blogs.worldbank.org/latinamerica/latin-america-hard-hats-and-tools-are-no-longer-only-men>.

## VI. Publications of interest



*FAL Bulletin 369*

### Logistics for production, distribution and trade

Gabriel Pérez  
Ricardo Sánchez

This *FAL Bulletin* analyses the role of logistics in production, distribution and trade in Latin America and the Caribbean.

Available in:

English

Spanish



*FAL Bulletin 367*

### Road transport in Latin America: evolution of its infrastructure and impact between 2007 and 2015

Pablo Chauvet  
Baptiste Albertone

This issue analyses data on investments in Latin American road infrastructure between 2007 and 2015, examines the subsector's evolution and emphasizes the negative repercussions of accident fatalities and carbon emissions. It aims to raise awareness about the importance of this mode of transport in the region and to underscore the need for socioeconomic evaluations of road projects and for additional, better and more transparent data and information on the sector, using a cross-cutting approach in pursuit of sustainable development.

Available in:

English

Spanish