



BULLETIN

ISSN 0256-9779

FACILITATION OF TRANSPORT AND TRADE IN LATIN AMERICA AND THE CARIBBEAN

# Diagnosis of constraints on development and on further economic integration

## Background

The efficient provision of infrastructure services is one of the most important aspects of development policies, at both the national and regional levels. Lack of suitable infrastructure and inefficient service provision are therefore primary obstacles in the effort to implement social development policies effectively, achieve economic growth rates in excess of international averages and attain integration goals.

Given the need for economic development and greater competitiveness in international markets, which can only be achieved if economic agents are more productive, the countries need to expand and modernize their basic infrastructure to bring it up to international technological standards. They also need to achieve the highest levels of coverage in each national territory and effectively meet the requirements associated with the provision of infrastructure services.

Networked energy, transport, telecommunications and drinking water and sanitation infrastructure services are also a key element in the integration of a country's economic and territorial system, making it possible for transactions to be carried out within a particular geographical/economic space and with other countries. In other words, such networks serve to bind together the economic structure of countries and their markets and act as concrete mechanisms linking national economies with the rest of the world, as it is they that make trade flows possible.

The purpose of the present document is to set forth the diagnosis of infrastructure services in Latin America and the Caribbean carried out by the Infrastructure Services Unit of ECLAC. Although much of the diagnosis presented is applicable to all economic infrastructure services, this document places a strong emphasis on transport infrastructure and services, as their characteristics make them a potential constraint on the region's economic and social development and on its continuing integration. For further information, contact: [trans@cepal.org](mailto:trans@cepal.org)



Background



I. Infrastructure services provision



II. Private-sector involvement in the provision of infrastructure services



III. The strains on economic infrastructure in Latin America



IV. The transport infrastructure gap in Latin America



UNITED NATIONS

ECLAC

## I. Infrastructure services provision

Adequate infrastructure and efficient provision of the services associated with it enable a country to offset any deficiency in its endowment of particular natural resources. Furthermore, developing infrastructure within the framework of regional integration policies sometimes allows infrastructure services provision to be internationalized, helping to generate more efficient production scales. Besides this, sufficient availability of infrastructure works and efficient provision of related services can help a country or region to develop competitive advantages and attain a higher degree of industrial specialization. This has a bearing on the specialization advantages a country can obtain in segmented production processes, in accordance with the new parameters of economic organization diffused around the world by the globalization process. In most cases, the participation of local firms in international production and/or commercialization systems makes it possible to generate economies of both scale and agglomeration, which in turn increases the productivity of production factors.

Thus, infrastructure investments help to reduce the costs associated with consumption of services and to improve access to markets for goods and inputs, while increasing the coverage and quality of the services provided to the population and thus its welfare. Given certain problems with the efficient provision of infrastructure services that are observable in the region, it is safe to say that there is considerable scope for action to improve their implementation and maximize the positive effects referred to above.

When the importance of efficient infrastructure services provision for economic and social development and for integration is considered in the light of the situation that actually prevails in Latin America and the Caribbean, it can be said that **the main challenge for the region and the countries in it is to orient the conception, design, execution and follow-up, oversight and evaluation of infrastructure and related services policies so that their development impacts are maximized.** In other words, the region needs to review its infrastructure services policies, and it would be advisable for this review to form part of the development agenda in the region and its countries right from the outset.

If the role of infrastructure services in the development agenda is to be strengthened, the main components of the challenge articulated in the previous paragraph can be summarized as follows:

- The proliferation of uncoordinated public-sector approaches to infrastructure and services, and the consequent lack of overall perspective when dealing

with the different policy processes (conception, design, implementation and follow-up, oversight and evaluation).

- The physical inadequacy or shortage of infrastructure and services as currently provided.
- Institutional and regulatory failures or obstacles in both policy implementation and the organization of markets.
- The absence of sustainability criteria in infrastructure services policies, especially for transport.

Access to financing, the quality and functioning of public-private partnerships, regulatory institutions and regulatory accounting and the conditions for infrastructure markets to operate and mature are the other issues that will need to be reviewed in order to maximize the potential of infrastructure services in the interests of better economic and social development in the region. In the field of transport and logistics, furthermore, transport and trade facilitation continues to be affected by problems associated with technical regulations and the bureaucratization of trade processes, among other factors.

## II. Private-sector involvement in the provision of infrastructure services

The coverage and quality of services associated with the availability of physical infrastructure and networks has improved in most of the Latin American countries since the mid-1980s. There has been a striking expansion, for example, in the mobile telephony and Internet market, with the region now having one of the world's highest development indices. The coverage of electricity and of water and sanitation has also grown, and many ports have been modernized thanks to port reforms and concessions. In the highways segment, however, although the performance of trunk roads has improved, coverage has not changed much, and in the meantime the railways segment has deteriorated across large sectors; shortcomings in these areas remain a factor of great concern (ECLAC, 2004; Fay and Morrison, 2005; Sánchez and Wilmsmeier, 2005; Doerr and Sánchez, 2006; Rozas, 2008a).

When the level of development achieved is compared to that of other emerging economies, however (to say nothing of the standards of the developed economies), and the ability of the region's countries to respond to projected demand for infrastructure services over the coming years is analysed, the conclusion is that the growth of infrastructure services coverage has been inadequate. The main reason for this inadequacy is that the countries of Latin America struggled to sustain an appropriate rate

of investment in the different infrastructure areas during the 1997-2006 period, with the situation probably having worsened over the three years since then because of the latest international crisis. Measured as a percentage of gross domestic product (GDP), infrastructure investment in the region's countries declined steadily between 1997 and 2006, even though Latin America almost doubled its GDP growth rate during this period relative to the average for 1980-2002 (Rozas, 2008b).

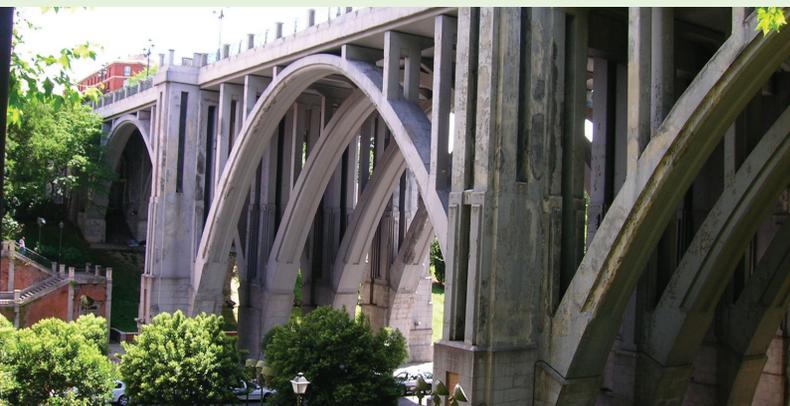
In the specific case of road transport infrastructure, low investment levels have contributed to a challenging situation in which growing demand for transport infrastructure has come up against stagnant supply, with the emergence of numerous bottlenecks including, in particular: inadequate land connections along the main corridors; inadequate land transportation from the main centres of production to processing, consumption and export markets; physical constraints on bridge capacity; problems of access to the main cities; and physical and organizational shortcomings at border crossings. Furthermore, the sector's development is affected by problems associated with what has been called "skimming", a term that refers to the targeting of private investment on the most profitable sections of the network and chiefly on conservation and improvement activities, the result being low growth in the installed capacity of the sector. In addition, there are security problems for equipment and property ("asphalt piracy"), high accident rates, and problems of financing and virtually non-existent operating capacity for the conservation of tertiary roads, exacerbated by corrupt practices of various kinds (Sánchez and Wilmsmeier, 2005).

The problems affecting road infrastructure are not the only ones to be found in the field of transport infrastructure. A brief summary can be given of problems observable in the other types of transport infrastructure: regulatory or capacity constraints in maritime corridors, connectivity problems, inadequacies and "missing links" in railway networks, the inability of railway networks to withstand the weight of trains run at full capacity, or to operate larger or faster trains; inadequate land access to the region's main ports, where there are also problems of draft and a lack of handling areas (Sánchez and Wilmsmeier, 2005). Congestion is one of the risks of greatest concern at present, as the pace of port development projects has slowed. In any event, it is necessary to emphasize that where port infrastructure and services are concerned: (i) there is a contrast in the region between continuing traffic growth, dealt with by increasing the productivity of assets, and the slow pace of increase or improvement in maritime access, logistics and internal connectivity infrastructure; and (ii) the main ports in Latin America and the Caribbean have generally kept pace with the

evolution of economic activity in recent years, although there is concern about the time being taken to complete the reforms that will be needed if they are to develop sustainably in future. In comparison, connectivity into the countries' interiors is affected by backlogs and organizational failings that are adding to overall logistics costs and hindering improvements in the productivity and competitiveness of the region's economies.

The development of transport and trade is not being held back by inadequate infrastructure in all cases, and this highlights the importance of institutional issues in the sector. Indeed, some analyses of the obstacles to international land transportation of cargo in MERCOSUR (such as Cipoletta and Sánchez, 2003) have concluded that institutional problems weigh more heavily than those caused by physical shortfalls in infrastructure. The main institutional problems identified include bureaucratic obstacles, delays and uncertainties in securing international authorizations, lack of continuity in public-sector agencies and the tenure of officials, a multiplicity of overlapping national rules, non-compliance with subregional regulations, the build-up of delays and extra costs in border procedures and in loading and unloading operations at origin and destination points, differences between countries in the professionalism of transport firms, excessive numbers of cargo transfers at borders, the highly seasonal and unidirectional nature of traffic flows and the level of deadheading, asymmetries between countries in their fiscal arrangements and tax pressures, and highway safety problems.

Inadequate development of transport infrastructure translates into high logistical and transport costs. It is often noted that, in most of the countries, logistics costs are a larger component of total trade costs than tariffs. A number of studies have carried out the exercise of estimating these costs. The World Bank and Inter-American Development Bank (2009) estimate that logistics costs in the countries of Latin America account for between 16% and 25% of the total, which compares badly with the 9% average in the OECD countries. Both agencies have emphasized that these costs have come to eclipse traditional trade barriers, a development that hinders greater participation in international trade by the region's economies because it erodes the competitiveness of Latin American producers and puts up the price of imported goods. Thus, for example, the study cited points out that ad valorem tariffs in the food sector range from 3% to 12%, but by the time the product reaches the final consumer the logistics component is often in excess of 50% of the final price. The economic agents that suffer most from high logistics costs are small firms, the engine of growth and employment in the region, as they average



48% of the total value of their turnover. According to González, Guasch and Serebrisky (2008), meanwhile, logistics costs in Latin America range from 18% to 32% of a product's value, as opposed to around 9.5% in the United States and 8.5% in Singapore. Lastly, a more recent study puts the cost of logistics at between 10% and 15% of the final product, but the author calculates that in the case of developing countries this figure can exceed 20% (Martínez Rivas, 2010).

Again, weak and inadequate development of transport infrastructure has been a factor in the difficulty of integrating the countries of Latin America, impeding the necessary physical integration of the region's territories and markets and thereby undermining the different initiatives undertaken in this area, which on more than a few occasions have lacked the physical basis for implementation.

The scale of the problem entailed by the infrastructure deficit, and the importance this has taken on in the debate about development policies, make it safe to say that there is an increasingly pressing need for the countries to undertake an analysis of the main issues involved in the behaviour of infrastructure investment and service provision, particularly where transport infrastructure is concerned. It is essential for the following to be considered when investment in infrastructure and related services is analysed and executed: (i) the degree of coverage provided; (ii) the quality of provision; (iii) sustainability; (iv) coordination with complementary infrastructure services (intermodality in the case of transport). Again, infrastructure investments need to make provision not just for the expansion of capacity but also for its maintenance. In the current situation, poor conservation or maintenance policies tend to aggravate problems deriving from intensive or excessive usage of installed infrastructure.

A large part of the problem derives from the policies applied over the past four decades in respect of the creation, conservation and expansion of transport infrastructure and of activities to support the sector, which have usually meant public investment being substantially reduced and responsibility for the sector's development being transferred to private-sector agents, which have targeted the most profitable segments of the business and have not

provided anything like the financial resources required to meet the needs of the countries and their development.

The weakening of the role of the State has meant not just lower public investment but a retreat by the State from the use of strategic planning instruments and tools. This has exacerbated two key problems referred to earlier, which now come very clearly to light when the sector's development is evaluated: (i) the absence of integrated policy approaches in the fields of transport, infrastructure and logistics, and (ii) a failure to apply sustainability criteria in the design and execution of infrastructure services development and regulation policies, particularly where transport is concerned. Consequently, the policies applied have segmented the development of what are naturally interrelated activities, have been deficient in long-term vision, and have not been supported by a suitable institutional structure including effective regulatory frameworks and proper oversight instruments.

### III The strains on economic infrastructure in Latin America

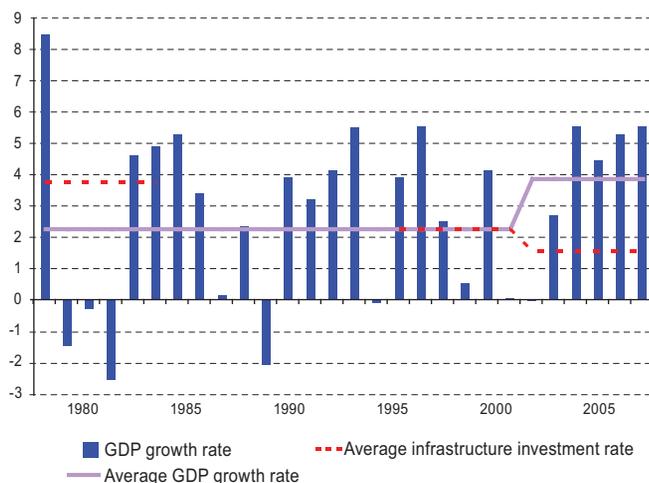
Economic infrastructure in Latin America has been severely strained in recent decades, owing most particularly to the volatility of investment in the sector, the instability of both economic policies and those relating to infrastructure and maintenance (factors that influence the evolving supply of infrastructure) and continuous growth in demand. The mismatch in the evolution of supply and demand has combined with the lack of policy integration and certain institutional and regulatory problems to exacerbate the strains on infrastructure. One result of these strains has been a widening of the infrastructure gap, measured by the differing evolution of supply and demand. In consequence, the decline in infrastructure investment has led to effects of two kinds:

- (a) a growing backlog in the endowment of infrastructure and related services by comparison not just with developed countries but with other developing economies whose levels of service provision were below those of Latin America in the early 1970s, and
- (b) with the single exception of telecommunications, there have been a variety of effects on the quality of services, which once again are less well thought of by users than is the case in other emerging economies.

There has been a remarkable fall-off in infrastructure investment in Latin America (see chart below) since the mid-1980s. This has led to major deficiencies in infrastructure generally and transport infrastructure in particular. Furthermore, comparing the region with other emerging economies makes it plain that the shortfall is

both quantitative and qualitative. One of the reasons for the shortfall is that total transport investment in the region has halved over the past two decades, while as a proportion of GDP it is down by two thirds on its mid-1980s level, by contrast for example with the Asian countries, which have increased their infrastructure investment over the period (Rozas, 2008c).

Figure 1  
**LATIN AMERICA (SEVEN COUNTRIES)<sup>a</sup>: INFRASTRUCTURE INVESTMENT AND ANNUAL GDP GROWTH, 1980-2007**  
*(Percentage growth rates and percentages of GDP)*



Source: Prepared by the authors on the basis of ECLAC data for GDP growth rates and Rozas (2008c) for average infrastructure investment rates.  
<sup>a</sup> Argentina, Brazil, Chile, Colombia, Mexico, Peru and Plurinational State of Bolivia.

To estimate the evolution of the infrastructure gap, the analysis looks at developments in the stock of infrastructure (understood as supply) and in the volume of trade (as a proxy for demand). Where the supply of infrastructure is concerned, information was available from the KLEMS-ECLAC project on the stock of capital in the form of machinery and equipment and non-residential construction. On the demand side, trade liberalization reforms in recent decades and the role of new economic actors have stimulated a large volume of trade, and a substantial proportion of all the infrastructure in the region's countries is occupied in transporting this.

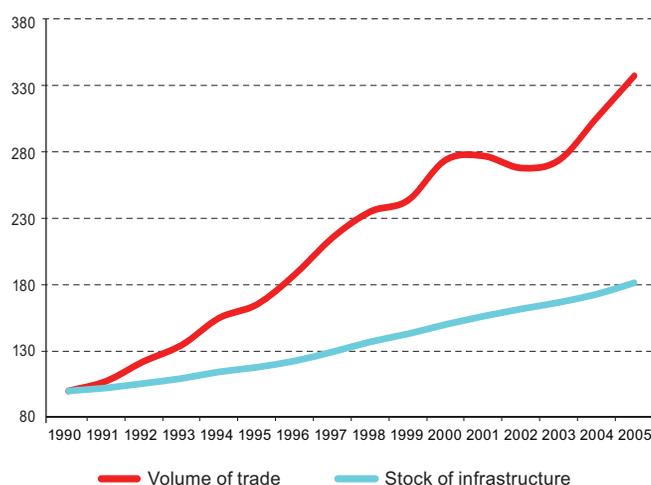
The estimates are presented with information from eight of the region's countries<sup>1</sup> for the 1990-2005 period. Constant value series are used, with an index whose base is 1990 = 100. The gap in 1990 is zero by construction, but this does not mean there was no gap that year. The purpose of this methodology is to

<sup>1</sup> Argentina, the Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Costa Rica, Mexico and Peru.

show the evolution of the gap over time, rather than estimating particular values. Consequently, a positive value for the gap is not necessarily to be interpreted as an infrastructure deficit; rather, it means that demand (the volume of trade) is growing faster than supply (the capital stock).

The results of the analysis, presented in Figure 2, show that in the selected countries as a group, the rate of growth in the stock of infrastructure was 5.4% a year, while the rate of demand growth was 15.8%, both values being for the 1990-2005 period.

Figure 2  
**INFRASTRUCTURE GAP, INDEX OF SELECTED COUNTRIES<sup>a</sup>**



Source: Infrastructure Services Unit, Natural Resources and Infrastructure Division, ECLAC, 2010. The stock index was constructed using each country's weighting in the aggregate GDP total.  
<sup>a</sup> Argentina, Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Costa Rica, Mexico and Peru.

This shortfall in infrastructure endowment (and in the operation of services) could severely hamper the development of the Latin American countries by limiting the scope for economic expansion over time as they are deprived of the benefits of economies of scale and specialization at the subnational, national and regional levels, since the effect could be to erode the productivity of the region's economic agents and the competitiveness of its industries and economies, while denying people a better quality of life.

Accordingly, it is important to be able to identify situations of overload in the transport infrastructure of Latin America that could impose constraints on the region's future development. The Infrastructure Services Unit is working on this issue and the *FAL Bulletin* of January 2011 will be summarizing the findings arrived in this topic.

## IV. The transport infrastructure gap in Latin America

Transport infrastructure has been subject to the general strains discussed above, with a similar outcome in terms of a widening infrastructure gap, as analysed in *FAL Bulletin No. 276* of August 2009. To estimate the evolution of the transport infrastructure gap, what is calculated is first the evolution of the “available stock” of transport infrastructure (supply) and then the level of transport infrastructure needed to meet a particular international trade goal (demand).

The estimates were prepared for four countries in the region (Argentina, Brazil, Chile and Mexico) and the period of analysis is 1995-2008, with projections for 2009 and 2010. First, “effective transport stock” is defined as the stock of transport capital or transport equipment available in a country. Series were taken from national-level studies for each country. Second, the “demand for transport infrastructure” is defined as the volume growth rate of a country’s international trade. The underlying argument is that one of the main manifestations of the Latin American growth process has been trade expansion. Thus, the infrastructure employed to transport internationally traded goods, directly or indirectly, is a substantial and representative portion of the countries’ total transport infrastructure. This is why the question arises as to whether infrastructure has expanded on a sufficient scale to move this greater volume of trade.<sup>2</sup>

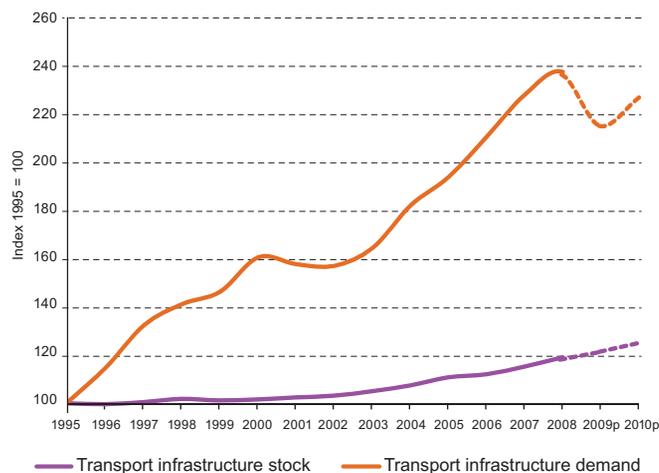
Estimates and projections for the effective transport infrastructure stock and growth in transport demand are used to calculate a transport infrastructure gap. This gap is simply the difference between the two series estimated. The gap is zero in 1995 by construction, but this does not mean there was no infrastructure gap that year. The idea is to show the evolution of the gap over time, not to estimate absolute values. Consequently, a positive value for the gap is not necessarily to be interpreted as a transport infrastructure deficit; rather, it means that demand for transport infrastructure (the volume of trade in this case) is growing faster than the supply of transport infrastructure (the transport infrastructure capital stock per inhabitant).

For Latin America as a whole, the rate of growth in the effective transport infrastructure stock per inhabitant is calculated at 1.6% a year for the 1995-2008 period, while the rate of growth in transport infrastructure demand was 6.8% a year over the same period. This tells us that there is a large growth gap. To press home the point:

<sup>2</sup> The volume of international trade is taken as a proxy for transport infrastructure demand, which is acceptable even though it may tend to underestimate it, as we do not take account of the other uses made of transport infrastructure in a country.

the estimates indicate higher growth in the demand for transport infrastructure than in the supply, and the most troubling thing is that the transport infrastructure gap widens throughout the period analysed, as can be seen in the following chart.

Figure 3  
LATIN AMERICA (4 COUNTRIES)<sup>a</sup>: EVOLUTION OF THE TRANSPORT INFRASTRUCTURE GAP, 1995-2010  
(PESSIMISTIC SCENARIO)



Source: Economic Commission for Latin America and the Caribbean (ECLAC) (2009b).

<sup>a</sup> Argentina, Brazil, Chile and Mexico.

Another aspect that needs to be emphasized is the behaviour of the transport infrastructure supply and demand growth gap relative to the economic cycle. What can be seen is that the gap widens during the expansionary phase of the economic cycle (especially in the 2002-2007 phase) and narrows in the recessionary phase (2008-2009). Although the gap narrows in 2009 owing to the contraction of GDP globally and in the Latin American countries, the expectation is that it will have begun to widen again in 2010, and that the gap will continue to increase as the region returns to a path of long-term expansion and external demand recovers.

There is a gap between supply and demand growth rates for infrastructure stock in all the countries of the sample. On the one hand, the stock of transport infrastructure per inhabitant grew at an estimated annual rate of 4.4% in Argentina, 0.9% in Brazil, 7.0% in Chile and 5.5% in Mexico, for the 1995-2008 period in all cases. On the other hand, transport infrastructure demand per inhabitant grew at an estimated 6.1% annually in Argentina, 6.6% in Brazil, 7.0% in Chile and 8.3% in Mexico in the same period. The estimates and projections produced highlight the need for intensified investment to increase the available stock of transport infrastructure and increase



the productivity of these investments by means of better logistics, the introduction of intelligent transport systems and improvements in the way services that rely on infrastructure are operated.

Although the estimates arrived at should be considered indicative only and constitute an initial approach to

the task of estimating the transport infrastructure gap in Latin America being undertaken by ECLAC, it is clear that while GDP and trade have grown in the Latin American countries over recent years, investment in transport capital has not shown the same dynamism, despite the involvement of the private sector in each of the countries analysed.