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A South American interoceanic network: bioceanic corridors and the role of connecting states

Background

The world economy has undergone major changes over the past two decades. Particularly visible have been the ascent of China and East Asia, the shift of the dynamic centre from the North Atlantic to the Asia-Pacific region, and the increasing debate about climate and environmental challenges. Inevitably,

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In recent years, the external sector of the state of Mato Grosso has shown impressive growth rates. The state's exports per capita are three times higher than those of China. This phenomenon seems to be on the verge of overcoming one of the main obstacles to South American integration: the Atlantic-Pacific barrier. The hypothesis analysed in this issue of the *FAL Bulletin* is that certain ongoing exogenous and endogenous "tectonic changes" in five Brazilian states that have been intensifying for some time will finally make bioceanic corridors viable. The challenge is to form an interoceanic network connecting the different corridors with waterways and coastal shipping in the South American Pacific.

The authors of the paper are Pedro Silva Barros, Researcher at the International Directorate of the Institute of Applied Economic Research (IPEA, Brazil); Luciano Wexell Severo, Professor at the Federal University of Latin American Integration (UNILA); and Helitton Christoffer Carneiro, Research Assistant at IPEA. The authors are grateful to Cristovão Henrique Ribeiro da Silva for his support in preparing the maps in this *FAL Bulletin*. For further information, please contact Ricardo.Sanchez@cepal.org.

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Brazil has been impacted by these changes, and in turn, within the country, important transformations are taking place, including with respect to production on the country's western border and on the fringes of the Amazon region from where exports are moving westward and northward.

The external sector of the state of Mato Grosso has shown impressive growth rates in recent years. The state's exports per capita are three times higher than those of China. This phenomenon seems to be on the verge of overcoming one of the main barriers to South American integration: the Atlantic-Pacific barrier. Brazilian production is becoming increasingly removed from the traditional Atlantic ports, moving closer to the Andes and, therefore, to the Pacific ports and their main buyers.

This new reality highlights both new possibilities for overcoming South America's historical challenges (infrastructure development, adding value to exports and promoting intra-regional trade), and the need to overhaul regional governance by giving centrality to environmental and social issues.

The hypothesis analysed in this issue of the *FAL Bulletin* is that certain ongoing exogenous and endogenous "tectonic changes" that have been intensifying for some time will finally make bioceanic corridors viable. The challenge is to form an interoceanic network connecting the different corridors with waterways and coastal shipping in the South American Pacific. The various bioceanic corridors are complementary do not compete with each other. On the contrary, the creation of one increases the possibilities of success of the others. Map 1 shows the world centred on Cuiabá, capital of the state of Mato Grosso and geodetic centre of South America, with four alternative routes to China. The least structured route is precisely the one that could be possible with an interoceanic network.

The paper is divided into four parts. The first presents the exogenous and endogenous "tectonic changes" that open up the unique possibility for the creation of an interoceanic infrastructure network in South America. The second looks at Brazil's connecting states, characterizing them and analysing their recent development. The third part discusses the institutional framework for infrastructure integration and the need to update it. The fourth presents three of the main integration projects involving five landlocked connecting states in Brazil (that, in turn, border other South American nations and are notable for their export growth) and the ports of neighbouring countries. The paper also proposes a new approach to regional governance based on interoceanic network infrastructure.

Map 1 Azimuthal projection from the geodetic centre of South America

Cuiabá/MT, Brasil 15°35'23"S 56°5'24"W



Source: Prepared by the authors.

I. Tectonic changes

Today's world has been undergoing accelerated geoeconomic transformations that encompass multiple issues, including environmental, scientific, political, military, social, technological and productive ones. The shifts taking place include exogenous and endogenous "tectonic changes" that stand out for their scale and impact (ECLAC, 2016; Barros and others, 2021a).

One transformation in full swing is the debate on environmental issues and the drive to move past productive development models based on disharmonious, predatory and unsustainable exploitation of available resources (Mathias and others, 2021). Associated with development are pandemic-exacerbated socioeconomic challenges, difficulties in planning and implementing effective public policies for recovery and the return to growth of Latin American economies in the post-COVID-19 world. East-West polarization and uncertainties stemming from a possible escalation of the conflict in Ukraine are worsening the situation.

Another major exogenous change underway, also identified by ECLAC (2016) and which has become more marked in the last three decades, is the increase in the economic and commercial importance of Southeast Asia on the global stage and the consequent shift of the most dynamic axis of the world economy from the North Atlantic to the Asia-Pacific region.

The Pacific region has been growing in geo-economic importance at least since as far back as the 1970s, and in recent years has become the most buoyant area of the world economy. As its economic performance has gone from strength to strength, the region has become a stage for political disputes and the projection of military power. The economic growth and technological progress of the Southeast Asian economies, massive trade and investment flows, the establishment of international agreements and the geographical shift of economic and productive activities have made the Asia-Pacific region a bigger player.

These exogenous changes with a global impact have led to endogenous transformations in Brazil's interior. Asia's strong economic growth has exerted an undeniable power of attraction. In 2000, less than 2% of Brazil's exports, amounting to a total of US\$ 1.1 billion, went to China. In 2021, that Asian country accounted for 31.3% of total Brazilian sales abroad, equivalent to US\$ 87.9 billion.¹

The state of Mato Grosso, which supplies a significant portion of China's demand for agricultural products, continues to be —by a wide margin in relation to the other states— the most productive in terms of Brazilian agribusiness. Its importance is such that it strongly affects the economic dynamics of nearby states, as happened most recently in the case of Rondônia.



Demographically and economically, especially in the export

sector, Brazil is advancing westward. The strong agricultural performance in parts of Brazil's western border transcends national boundaries and impacts a number of provinces and departments in neighbouring countries. Undoubtedly, some economies, such as Argentina's and Paraguay's, are also benefiting from the growing demand from the Asia-Pacific region.

In recent decades, Brazilian agricultural output has experienced a major geospatial realignment. Among other factors, this is the result of the westward expansion of productive areas of the country and, consequently, of the growing distance of farm crops from the traditional Atlantic ports. At the same time, this productive march westward brings the Brazilian products nearer to logistic alternatives available on the Pacific coast, just as for 20 years it has been bringing the grain production of Brazil's Centre-West closer to the multimodal routes of the Amazon.

Of course, the debate on Amazon integration infrastructure has its own unique issues. The problems, possibilities and multiple intraregional dependencies of physical integration in the Amazon, particularly the orbits of intraregional circulation and the national and subnational scales are addressed by Virga, Miranda do Nascimento and Consolmagno de Marchi (2021). It is also important to consider, in the environmental context, the challenge of developing sustainable economic activities, such as the circular bioeconomy, in the Amazonian environment, an issue raised by Denny, Martins and Burnquis (2022).

Twenty-five years ago, few questioned the near exclusivity of port movement and the flow of national output through the ports of the South and Southeast regions of Brazil. However, despite initial misgivings, the allure of the logistics infrastructure of the Northern Arc ports, including Porto Velho-RO, Manaus/Itacoatiara-AM, Santarém-PA, Itaituba/Miritituba-PA, Barcarena-PA, Belém/Vila do Conde-PA, Santana-AP and Itaqui-MA, has been growing. The Northern Arc comprises the transportation infrastructure leading to the ports of the North and Northeast regions located on the 16°S parallel (Chamber of Deputies, 2016).

This scenario for the distribution of agricultural output underlines the need to promote infrastructure investment and adopt public policies for regional development in the Centre-West and North of Brazil, both areas with high logistical potential associated with Pacific growth.

Maps 2 and 3 provide an indication of the fast growth in exports from the western states of Brazil, which will play a central role in linking of the interoceanic infrastructure network.

The data are from Comex Stat, of the Ministry of Industry, Foreign Trade and Services (MDIC), currently part of the Brazilian Ministry of Economic Affairs.



Map 2 South American interoceanic network



Source: Prepared by the authors.

The planning and execution of physical integration projects to create an interoceanic multimodal network comprising complementary bioceanic corridors, would make it possible to connect the most dynamic region in Brazil with the most dynamic region in the world: the Asia-Pacific. By potentially solving the age-old problem of overcoming the Andes mountain range at different latitudes, this complex web of non-competing roads

will connect Centre-West South America to the world market, expanding the possibilities of productive complementarity, intra-regional circular trade and energy integration.²

Map 3

 Image: series series

Change in Brazilian exports, by state, between 2010 and 2021 (*Percentage growth*)

Source: Prepared by the authors, on the basis of information from Comex Stat-MDIC.

II. Connecting states: Mato Grosso, Mato Grosso do Sul, Rondônia, Acre and Roraima

Before 1500, the so-called Qhapaq Ñan was a complex network of pre-Inca roads used for the transport of goods and the movement of people. It was consolidated as the Tahuantinsuyo network of roads, which comprised a sophisticated system of trails that covered enormous distances. The roads had retaining walls, canals, drains and stone walls. They ran for thousands of kilometres, crossing deserts, high grasslands, mountains, valleys and jungles (Beltrán, 2016).

The connection to Brazil was via the Peabiru road network, which played an important role in communications between the southern coast of Peru and the Atlantic Ocean. According to Colavite and Barros (2009), these roads were the most important transcontinental route in South America, passing through latter-day Bolivia, Paraguay, Mato Grosso do Sul, Paraná and São Paulo. Along their 3,000-kilometre length, the trails linked the Peruvian cities of Arequipa, Moquegua and Tacna with the Brazilian cities of Corumbá, Guaíra, São Paulo and Santos.

In addition, according to Beltrán (2016), the Spaniards, using the existing structures, established outlet roads from the lands of the Altiplano to the Pacific, the so-called silver

² The work done by the Centre-West South American Integration Zone (Zicosur) is noteworthy.

roads, in the sixteenth century, and the fish roads, in the eighteenth century. The colonizers also reinforced the interconnections between the poles —the silver-producing areas and the regions that guaranteed the supply of necessary inputs: food, beverages, clothes, shoes and pack animals. Those poles played an important role as multipliers of economic activities and functioned as the "suns" of a system (Furtado, 1970, p.35; Mello Franco, 1958, p.24). Towards the south of the continent, the Argentine provinces of Jujuy, Salta, Tucumán, Santiago del Estero, Córdoba and Buenos Aires, as well as regions of Chile, acted as "satellites" of the Bolivian pole of Potosí. To the north and east were Lake Titicaca, the mercury mines of Huancavelica and the ports of Arica and Callao, the latter in Lima.

Since the beginning of the twentieth century, scholars of regional geopolitics have considered that Centre-West Brazil plays a fundamental role both for Brazilian national integration —as an area of interconnection between the Amazon and River Plate basins—and its projection into the rest of South America and its location between the Pacific and Atlantic oceans. According to Travassos (1935, p.129), the former territory of Mato Grosso stood out for its ability to attract neighbouring countries to the Brazilian Atlantic ports,³ extending the territories of São Paulo and Paraná and expanding their power of penetration. The territory of Mato Grosso also has the potential to be a platform of Brazilian projection towards the Pacific, through the central party of South America,⁴ as well as attracting neighbours towards the Atlantic Ocean.

Given this situation, the author proposed the construction of bioceanic routes connecting the Brazilian Atlantic ports to South America's Pacific ports, including rail links from Santos and Corumbá, which would reach the Pacific coast via Santa Cruz de la Sierra in Bolivia. At that time, Travassos (1935, p. 203) had already identified the region between the modernday cities of Corumbá, Campo Grande and Ponta Pora as a "landlocked Santos".

Opinions about the importance of the region continued to emerge. Couto e Silva (1965) referred to a "Continental Geopolitical Fusion Area" (Área de Soldadura Geopolítica Continental) that encompassed Paraguay, Bolivia and the Brazilian states of Mato Grosso, Mato Grosso do Sul and Rondônia (Freitas, 2004, pp.49–50). Almost two decades earlier, Ostria Gutiérrez (1946) had already expressed himself in very similar terms, even using the term "fusion" (soldadura). The landlocked countries and areas of South America, including Centre-West Brazil, Bolivia and Paraguay, are located in the heart of the continent. Despite the disadvantages of being landlocked and far from the sea, the geographical position of these "fusion zones" (zonas soldadoras) gives them huge potential roles to play as platforms for productive interconnection and regional and bioceanic trade, and for becoming logistical and production hubs in regional chains (Couto and Silva, 1965).

In the Centre-West of South America there are geographic barriers associated with the region's three great geological features: the Andes Mountains, which split the continent from East to West, and the Amazon and Plata basins, which create a division between North and South. Thus, parts of the territories of the Brazilian Centre-West, Bolivia and the Paraguayan Chaco unite and tie together the North, South, Atlantic and Pacific slopes (Severo, 2012, page 154).⁵ For Mendoza (1935), the so-called Bolivian Massif constitutes the thickest and most powerful link in the Andean chain, stretching eastward towards the heart of South America, as if to join hands with the Brazilian massif.

Therezinha de Castro (1994, p. 86) points out that in this region, considered a "transition area", the headwaters are located of three tributaries of the Amazon basin: the Madre de Dios, Mamoré and Guaporé. At the same time, the Bolivian altiplano adjoins the Paraguay River, which offers direct access to the Plate basin.

³ The territory that currently comprises the state of Mato Grosso do Sul officially broke away from the state of Mato Grosso on 1 January 1979.

⁴ In publications concerned with regional geopolitics, this area is also referred to as the South American Heartland, the South American Centre-West or Fusion Area (Área de Soldadura).

⁵ In addition to Brazilian geopoliticians, several authors of other nationalities have also offered analyses about the importance of the South American Centre-West. In the case of Paraguay, Philip Kelly and Julia Velilla de Arellaga. On Bolivia, Jaime Mendoza, Alipio Valencia Vega, Alberto Ostria Gutiérrez, Guillermo Francovich and Valentin Abecia Baldivieso. For Chile, see Generals Ramón Cañas Montalva and Julio Canessa Robert. For more reflections on the Amazon in Brazilian geopolitical thought, see Padula and Brozoski (2021).

Over the past two decades, Chinese and Southeast Asian production, finance and trade have driven global demand for food, raw materials and commodities. This, combined with government policies to spatially deconcentrate Brazil's economy and population, the internal displacement of rural producers, the technological development of the Brazilian Agricultural Research Enterprise (Embrapa), and technological advances, allowed Cerrado and other areas to become highly productive, triggering profound geoeconomic transformations in some Brazilian states and making them central players in the expansion of the country's agricultural frontier (Embrapa, 2020). This is especially true of Mato Grosso and Mato Grosso do Sul and, to a lesser extent, Rondônia, Acre and Roraima. It is also necessary to consider the negative environmental costs of this expansion —to some extent the result of years of weak state oversight and preservation— and to consolidate a green recovery plan for the Amazon in which subnational governments play a strong role (Alvares, Rodrigues and Narita, 2022).

After examining the characteristics of the 27 units of the Brazilian Federation, it was decided to divide them into three groups: (1) 17 states bathed by the Atlantic Ocean (Amapá, Pará, Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe, Bahia, Espírito Santo, Rio de Janeiro, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul); (2) four landlocked states that do not border neighbouring countries, i.e., non-Atlantic and non-border states (Goiás, Minas Gerais, Tocantins and the Federal District); and (3) six landlocked states that border other South American nations (Mato Grosso do Sul, Mato Grosso, Rondônia, Acre, Roraima and Amazonas).

This document focuses mainly on five of those six frontiers, connecting, landlocked states, which have of late been seeing major transformations in terms of population, production and foreign trade. The state of Amazonas was not included because of its industrial history and a riverine connection to the Atlantic that crosses through only one neighbouring state.⁶

Their frontier location means that the productive model of these Brazilian states transcends national borders and generates a similar impact in contiguous areas of neighbouring countries. The westward expansion of soybean production, which crossed Brazil's borders into Bolivia and Paraguay, is a prime example. A similar dynamic could be repeated with pulp in Paraguay; with cotton in northern Paraguay and eastern Bolivia; and beef in northern Bolivia and southern Peru, bringing Brazil's production frontier closer to the Pacific and away from the Atlantic.

Brazil's connecting states are, therefore, constituted by the grouping of non-Atlantic states that form the border strip between Brazil and its South American neighbours, with the exception of Amazonas. These areas are fundamental for overcoming the geopolitical barriers that divide South America. The group comprises Mato Grosso, Mato Grosso do Sul, Rondônia, Acre and Roraima. Despite the fact that these five states have accumulated high socioeconomic growth in recent years, there are great disparities between them, whether from the point of view of territorial and population size, scale and type of production, their stage in the value chain or growth in international trade.

These five Brazilian landlocked border states, whose production is moving towards the western frontier (increasingly far from the Atlantic), tend to be equidistant from the Atlantic and Pacific ports, or even from the Caribbean in the case of Roraima.⁷ These are states with no history of industrial policy that have managed above-national-average demographic, economic and commercial growth over the last two decades. See table 1.

⁶ The Manaus Free Zone, established in 1957, is administered by a public authority, the Superintendency of the Manaus Free Zone (Suframa). The journey between Manaus and Belém, a distance of 1650 kilometres, is made via the Amazon River.

⁷ The distances are as follows: Corumbá is 1,475 km from Santos and 1,790 km from Arica (Chile), while Assis Brasil is 3,850 km from Santos and 1,165 km from Matarani (Peru). The Fortuna Military Detachment, in Porto Esperidião, is 1,673 km from Arica and 2,071 km from Santos. The city of Guajará Mirim, is 3,400 km from Santos and 1,520 km from Ilo, Peru.

Table 1

Distances between the capitals of the connecting states and selected border cities (*Kilometres*)

State capital	Border	Distance	Roads
Campo Grande,	Corumbá, MS - Puerto Quijarro, Bolivia	435	BR 262
Mato Grosso do Sul (MS)	Porto Murtinho, MS - Carmelo Peralta, Paraguay	439	BR 060, BR 419, BR 267
	Bela Vista, MS - Bella Vista Norte, Paraguay	324	BR 060
	Ponta Porã, MS - Pedro Juan Caballero, Paraguay	313	BR 060, MS 162, BR 267, MS 164
Cuiabá, Mato Grosso (MT)	Cáceres, MT - San Matias, Bolivia	310	BR 070
Porto Velho, Rondônia (RO)	Guajará-Mirim, RO - Guayaramerin, Bolivia	328	BR 364, BR 425
Rio Branco, Acre (AC)	Assis Brasil, AC - Iñapari, Peru	341	BR 317
	Brasiléia, AC - Cobija, Bolivia	232	BR 317
Boa Vista, Roraima (RR)	Bonfim, RR - Lethem, Guyana	132	BR 401
	Pacaraíma, RR - Santa Elena de Uairén, Venezuela	213	BR 174
Manaus, Amazonas (AM)ª	Bonfim, RR - Lethem, Guyana	855	BR 174, BR 432, BR 174
	Pacaraíma, RR - Santa Elena de Uairén, Venezuela	959	BR 174, BR 432, BR 401

Source: Prepared by the authors on the basis of information from Google Maps.

^a The borders of neighbouring countries are only accessible from Manaus via the modal highway through other Brazilian states, which is why Amazonas is not included.

These five Brazilian states are termed connectors because they have specific characteristics and a key role in overcoming the barriers between Brazil and the Pacific and Caribbean. Their distinguishing characteristics include the fact that they are landlocked states (without direct access to the sea, meaning that non-air freight and passengers must pass through other Brazilian states to reach the Atlantic) and share borders with neighbouring South American countries, through which they can connect to the Pacific or, in the case of Roraima, to the Caribbean. In addition, the Brazilian connecting states have direct road links to neighbouring countries, so traffic does not need to traverse any other state to reach the international border. Over the last two decades, the five connecting states have seen significant cumulative growth in their populations and, in particular, their exports (both in absolute terms and as a share of the national total), and accounted for more than half of Brazil's trade surplus between 2010 and 2020.

The rapid growth of the states under consideration is visible on several levels. Between 2000 and 2021, Brazil's population increased by 26%, from 169.6 million to 213.8 million. According to estimates by the Brazilian Institute of Geography and Statistics (IBGE), the rate of population growth in Brazil's connecting states was much higher than the national rate. Over the same period, that population increased by 43%, from 6.84 million to 9.78 million. Thus, the share of the population of Mato Grosso, Mato Grosso do Sul, Rondônia, Acre and Roraima in Brazil as a whole rose from 4% to 4.6%. See table 2.

Table 2

Population growth in the connecting states

(Number of people)

Year	Acre	Rondônia	Mato Grosso	Mato Grosso do Sul	Roraima	Connecting states, total ^c	Brazil	Brazil connecting states, total (percentages)
2000 ^a	557 226	1 377 792	2 502 260	2 074 877	324 152	6 836 307	169 590 693	4.0
2010 ^a	733 559	1 562 409	3 035 122	2 449 024	450 479	8 230 593	190 755 799	4.3
2021 ^b	906 876	1 815 278	3 567 234	2 839 188	652 713	9 781 289	213 800 000	4.6

Source: Prepared by the authors on the basis of information from Brazilian Institute of Geography and Statistics (IBGE).

^a IBGE, Demographic Census by Main Regions and Units of the Federation (resident population).

^b IBGE, estimated population.

^c Mediterranean states bordering South American countries, except Amazonas.

Clearly, Brazil has been moving westward in economic, demographic and, above all, export terms. As for Brazilian sales abroad, the group comprising the connecting states stood out for its growth. In 2000, according to Comex Stat-MDIC data, total exports from the five states amounted to US\$ 1.35 billion, equivalent to only 2.5% of total Brazilian exports. In 2021, those same states combined to reach US\$ 30.62 billion in foreign sales, representing 10.9% of the national total. See table 3.

Table 3

Growth in exports in the connecting states, selected years (Dollars, nominal)

Year	Acre	Rondônia	Mato Grosso	Mato Grosso do Sul	Roraima	Connecting states, total ^a	Brazil	Brazil connecting states, total (percentages)
2000	1 545 989	59 257 410	1 032 963 884	253 068 683	2 586 176	1 349 422 142	54 993 159 648	2.5
2010	20 734 285	424 784 595	8 458 937 195	2 888 971 566	11 305 053	11 804 732 694	200 434 134 826	5.9
2021	48 837 789	1 687 185 205	21 651 401 820	6 894 838 479	336 625 403	30 618 888 696	280 814 577 460	10.9

Source: Prepared by the authors on the basis of information from Comex Stat-MDIC.

^a Mediterranean states bordering South American countries, except Amazonas.

Brazil's per capita exports in nominal terms grew fourfold, from US\$ 324 to US\$ 1,313, between 2000 and 2021. In the same period, per capita exports from the connecting states (Acre, Rondônia, Mato Grosso, Mato Grosso do Sul and Roraima) saw a fifteenfold increase, on average, from US\$ 197 to US\$ 3,130. See table 4.

Table 4

Growth in exports per capita, by connecting state (Dollars, nominal)

Year	Acre	Rondônia	Mato Grosso	Mato Grosso do Sul	Roraima	Connecting states, total ^a	Brazil
2000	3	43	413	122	8	197	324
2010	28	272	2 787	1 180	25	1 4 3 4	1 051
2021	54	929	6 070	2 428	516	3 130	1 313

Source: Prepared by the authors on the basis of information from Brazilian Institute of Geography and Statistics (IBGE) and Comex Stat-MDIC. ^a Mediterranean states bordering South American countries, except Amazonas.

An individual analysis of each state in this group further demonstrates the region's buoyancy. Between 2000 and 2021, Acre's per capita exports expanded 19.4 times in nominal terms (from US\$ 2.8 to US\$ 53.9). In the case of Rondônia, there was a 21.6-fold increase (from US\$ 43 to US\$ 929); Mato Grosso, 14.7 times (from US\$ 413 to an impressive US\$ 6,070); Mato Grosso do Sul, 19.9 times (from US\$ 122 to US\$ 2,428); and Roraima, 64.6 times (from US\$ 8 to US\$ 516). The values for exports, population, and exports per capita are detailed in Tables 2, 3 and 4.

In recent years, the five states have also seen a large increase in their share of Brazil's total trade surplus. The trade balance for the periods 2000–2010 and 2011–2021 was considered. In the former, it is estimated that 15.5% of Brazil's accumulated trade surplus came from the export drive of Mato Grosso and Mato Grosso do Sul for the most part, as well as Rondônia, Roraima and Acre. In the latter period, between 2011 and 2021, the relative share of these connecting states in Brazil's trade surplus reached new heights, totalling 53.2%. This is striking, given that the five states contain less than 5% of Brazil's population and GDP but account for more than half of its trade surplus. See table 5.

Table 5

		Trade balance per year	 Share of the connecting states 	
Year	Brazil	Sum of the connecting states	(percentages)	
2000	-1.98	1.04	-	
2001	1.46	1.45	99.2	
2002	11.87	1.53	12.9	
2003	23.47	1.98	8.4	
2004	31.31	2.63	8.4	
2005	43.91	3.99	9.1	
2006	45.05	3.48	7.7	
2007	37.77	3.8	10.1	
2008	21.06	5.21	24.7	
2009	22.39	6.97	31.1	
2010	17.1	7.16	41.9	
2011	25.7	8.94	34.8	
2012	14.79	11.33	76.6	
2013	-8.96	13.97	-	
2014	-9.9	13.38	-	
2015	13.68	13.36	97.7	
2016	40.2	13.52	33.6	
2017	56.04	15.95	28.5	
2018	46.57	18.23	39.2	
2019	35.2	18.54	52.7	
2020	50.39	21.35	42.4	
2021	61.41	24.26	39.5	
Total	578.5	212.1	36.7	
2000–2010 total	253.4	39.2	15.5	
2000–2010 total	325.1	172.8	53.2	

Brazil's trade balance and share of the connecting states in Brazil's trade surplus *(Billions of dollars, nominal, and percentages)*

Source: Prepared by the authors on the basis of information from Comex Stat-MDIC.

A look at the main export destinations by Brazilian states in the years 2000, 2010 and 2021 in the three images in Map 4, shows the growing prominence of China as the main importer of Brazilian goods. The Asian giant has replaced the United States and other traditional partners. This situation is the reflection of a sustained change over the last two decades.

Map 4

Main destinations of Brazilian exports, by state, 2000–2021



Source: Prepared by the authors, on the basis of information from Comex Stat-MDIC.

In 2000, the largest importers from the Brazilian connecting states were: Holland from Mato Grosso and Mato Grosso do Sul; the United States from Rondônia; Venezuela from Roraima; and Argentina from Acre. By 2010, the scenario had already changed somewhat, with China in the cases of Mato Grosso and Mato Grosso do Sul, Egypt in the case of Rondônia, Venezuela in the case of Roraima, and the United Kingdom in the case of Acre. By 2021, relations with China had expanded and it had become the largest buyer from Mato Grosso, Mato Grosso do Sul and Rondônia, with Venezuela in the case of Roraima and the United States in the case of Acre.

The role of the Asia-Pacific region as a destination for Brazil's exports is not limited to China. Several Asian countries have overtaken traditional European partners. The situation is very different from two decades ago. In 2021, Brazil exported more to Vietnam than to France, more to Singapore than to Italy and more to Korea than to the United Kingdom.

Another very significant aspect is the fact that the group comprising Brazil's connecting states has become the main exporter of a number of commodities, including cotton, beef, soybean and pulp. The five states were considered as a group, even though in many instances some of them individually did not excel in sales of these goods.

In 2000, for example, the group accounted for only 6.2% of Brazilian cotton exports (SH2 52), for a value of US\$ 16.1 million. In 2021, the connecting states where responsible for 69.3%, totalling US\$ 2.5 billion. Of the 40 Brazilian cities that export the most cotton, 20 are in Mato Grosso. In 2021, the state sold 67.6% of the Brazilian total. The main cities are Sapezal,⁸ Campo Verde, Rondonópolis and Campo Novo dos Parecis, which accounted for more than 26% of Brazil's total.

Fresh or refrigerated beef (SH4 02.01) is equally relevant. In 2000, the five states combined accounted for 14% of Brazilian exports of this product, with a total value of US\$ 23.8 million. In 2020, their share was 67.7% of the total. In 2021 they accounted for 63.4% or US\$ 631.3 million. In the case of frozen beef (SH4 02.02), the increase was from 14.6% of the total in 2000 (equivalent to US\$ 48.7 million) to 38.3% in 2021, totalling an impressive US\$ 2.67 billion. Brazil is the world's largest producer and exporter of beef. The Centre-West region is the largest producer in Brazil, with the states of Mato Grosso and Mato Grosso do Sul ranking first and third as the largest national producers.

⁸ Sapezal is exactly equidistant from Santos and Arica in Chile.

In the case of crushed soybeans (SH4 12.01), there was also an increase in the share of the five connecting states in total Brazilian exports. In 2000, the group accounted for 26%, with US\$ 568.3 million, while in 2021 its share was 35.1%, equivalent to US\$ 13.5 billion. In the ranking of soybean exporters, Brazil appears in first place, selling a large part of its output as grain to China, the world's largest importer, which restricts purchases of derivatives in order to process them internally (Barros and others, 2020). The state of Mato Grosso is Brazil's biggest producer and exporter, with 26.5% (in tons) and 27% (in dollars) of the national total, respectively. The cities of Sorriso, Querência, Sinop and Campo Novo do Parecis stand out in particular.

As for pulp (SH2 47), none of the five states exported that product in 2000. In 2021, they accounted for 22.1% or US\$ 1.49 billion, all of which was due to the state of Mato Grosso do Sul. Brazil is one of the most competitive countries in this sector, with a share of more than 46% of world exports of eucalyptus pulp; Mato Grosso do Sul is the country's main exporter. The city of Três Lagoas is known as the pulp capital of the world.

Finally, the grouping of five Brazilian connecting states has also greatly expanded its importance as a fertilizer importer (SH2 31). In 2000, the group accounted for 4.3% of Brazilian purchases of fertilizers and agricultural correcting agents, worth a total of US\$ 55.3 million. By 2021, their share was 20.8% of the total, equivalent to US\$ 3.15 billion.

The main fertilizer suppliers for the Brazilian Centre-West are located in the Asia-Pacific region (Canada, United States, China and Russia). In spite of that, the products mainly enter the country via Atlantic ports. This is due to the lack of infrastructure and logistics for intraregional connection between countries and for linkage to external supply markets. In that sense, inter-oceanic connections could transform this reality by allowing fertilizers to reach Brazil's largest agricultural producing region more efficiently, not only for local use but also to supply other regions, saving time and money.

III. Institutional framework for infrastructure integration

Historically, the construction of an interoceanic infrastructure network is justified, as it would offer the landlocked regions of South America the possibility of accessing both Atlantic and Pacific coasts and, consequently, and enable them to act as fusion zones, connecting the region and the rest of the world. Since the sixteenth century, shipping has travelled between the Atlantic and the Pacific by rounding the southern tip of South America, either by circumventing the region via Drake Passage, near Antarctica, or negotiating the 600 kilometre-long Strait of Magellan. The weather and navigation conditions in both cases are rather hostile. The 75 kilometre-long, Panama Canal was opened at the beginning of the twentieth century, facilitating the movement of ships between the two oceans.

Hundreds of regional physical integration projects have advanced, including tens of thousands of kilometres of roads, railways and waterways in almost every country on the continent (Costa and Gonzalez, 2014). In recent decades, investment in transportation infrastructure in Latin America has been below the needs of the region, where infrastructure remains deficient (Lardé, 2016; Chauvet and Baptiste, 2019).

At the First Meeting of South American Presidents in Brasilia in 2000, the Initiative for the Integration of Regional Infrastructure in South America (IIRSA) was created under Brazilian leadership, with the objective of organizing the physical integration of the region.⁹

IIRSA has presented 10 Integration and Development Hubs (shown in map 5).¹⁰ Hubs 1 and 2 are integrate the Andean countries longitudinally, while Hubs 4, 6 and 10 connect

⁹ To access the database on the amounts invested (in millions of dollars) and the share of investment in transportation infrastructure in relation to the GDP of Latin American countries, see [online] http://infralatam.info/.

¹⁰ The Integration and Development Hubs made it possible to identify and coordinate integration infrastructure projects under a common vision of the region's countries within the framework of an indicative territorial planning process. Based on the economic, social and environmental assessment of the area of influence of the hubs, the aim is to directly interlink the projects with their spaces.

landlocked areas in Brazil with ports in neighbouring countries (South Atlantic, Caribbean and Pacific, respectively). Finally, Hubs 3, 5, 7, 8 and 9 are bioceanic. This work considers the hubs configured latitudinally, whose main purpose is to promote the construction of connecting arteries for infrastructure, linking the Atlantic and the Pacific in both directions. The bioceanic hubs are #3, Capricorn Hub; #5, Amazon Hub; #7, Southern Hub; #8, Central Interoceanic Hub; and #9, Mercosur-Chile Hub.

The hub #10 (Peru-Brazil-Bolivia Hub) is a case apart. Despite not being bioceanic, this hub is included in this paper because it represents a multimodal interconnection route between the landlocked areas of Brazil and Pacific ports, as well as linking Bolivia and Peru to the Atlantic Ocean via the Madeira River (Madre de Dios) waterway and its connection with the Amazon waterway.

Map 5

South America: Integration and Development Hubs



Source: Prepared by the authors on the basis of information from the Initiative for the Integration of Regional Infrastructure in South America (IIRSA).

In 2009, IIRSA was incorporated into the South American Infrastructure and Planning Council (Cosiplan) of the Union of South American Nations (UNASUR), so that discussions on infrastructure directly involved South American governments with the aim of ensuring that projects follow a common political-strategic orientation in the area of regional infrastructure integration. It is understood as a political and strategic conception of regional integration that essentially seeks the projection and political and economic insertion of the region in the international system, ensuring its industrial development, the resolution of socioeconomic problems and overcoming spatial asymmetries, without being constrained by an economic and commercial vision driven solely by market forces (PADULA, 2010).

Although one of the merits IIRSA was its coordination of a portfolio of more than 560 transportation, energy and communications infrastructure projects worth almost US\$ 2 billion, investments in the area did not advance as fast as expected. In addition, the vast majority of projects were concentrated on road transport and only 2.5% (or 14 projects) were multimodal initiatives. IIRSA/Cosiplan stopped being updated in December 2017, when South American planning ministers met for the last time, on the eve of the collapse of Unasur and regional infrastructure governance (Barros, Gonçalves and Samurio, 2020, p.129).

It is necessary, however, to move past the vision of competing bioceanic corridors and isolated integration and development hubs. The objective of complementary physical interconnection networks linked by multimodal logistic connections is to expand trade opportunities with the Asia-Pacific region and enhance intraregional production with added value in South America.

Thanks to the endogenous and exogenous "tectonic changes" underway, there are new conditions for the potential formation of an inter-oceanic infrastructure network finally capable of overcoming the Atlantic-Pacific barriers. Thus, the aim is to contribute with an approach that transcends the concepts of export corridors and IIRSA/Cosiplan integration and development hubs and incorporates legitimate environmental and social concerns.

IV. Interoceanic integration networks

Infrastructure integration should be regarded as a priority strategy, capable of overcoming the obstacles preventing the interconnection of South America's societies and economies. The challenges include, above all, better watershed utilization, multimodal connections, inter-oceanic networks, energy integration and environmental conservation. Ultimately, the greatest difficulties lie in making physical transport, energy and communications connections in areas with high mountain ranges, deserts and regions of great biodiversity, rich archaeological heritage, national parks and indigenous reserves.

Discussions on the need for regional infrastructure integration networks are nothing new. The subject has been addressed, among others, by Ricardo J. Sánchez and Georgina Cipoletta Tomassian (2011) and by Sánchez Di Domenico (2020, p.21). The latter summarizes the issue in two sentences: "All the countries of South America must meet the challenges of competitive efficiency, geographical accessibility and environmentally sustainable development. To secure a competitive advantage, South America's segmented economy requires integrated, efficient networks."

Care to minimize negative socioenvironmental and heritage externalities should be central, and local productive structures should be strengthened through sustainable projects capable of generating employment and income for the population along the routes and their areas of influence. Discussions on development and the physical integration of Brazil's connecting zones, the South American Centre-West and the Pacific must consider all these aspects.

At the same time, it is necessary to establish joint structures for the governance of bioceanic routes. Following the example of the Working Group on the Bioceanic Road Corridor between Porto Murtinho and the ports of northern Chile, continuous understanding is important between national, regional and local governments, universities and public and private institutions. Progress depends on permanent institutional coordination in such areas as productive complementation, standardization of norms, customs procedures, digital connectivity, service provision and phytosanitary adjustments, among others (Barros and others, 2020); Sánchez and Pinto, 2015).

In the coming years, with the realization of the logistical benefits provided by the eventual use of the South American interoceanic connection networks via multimodal corridors, the Brazilian Atlantic border will encounter new challenges and opportunities. The reconfiguration of export and import routes for Brazilian goods through the Pacific will also require greater efficiency from traditional Atlantic ports, especially in the South and Southeast regions, particularly the cities of Santos and Paranaguá. Those port terminals will continue to be strategic points in Brazil's infrastructure as a whole and could gain a great deal of competitiveness by being connected via roads and bioceanic railways to ports in Chile and Peru.

Improved infrastructure conditions are among the main factors capable of raising Brazil's position on the international stage. In this way, conditions can be created to sell

part of Brazilian output through alternative channels to the traditional ones, either to neighbouring countries or the rest of the world, and to acquire the goods that the country's economy needs to function from abroad.

The various bioceanic pathways making up the corridor on network in South America could be better exploited if they were connected to each other and could also offer South America's landlocked countries (Bolivia and Paraguay) new trade options through ports on the Brazil's Atlantic coast (Perez and Jansen, 2016). The bioceanic corridors are therefore complementary and not in competition with each other. The increase in traffic along the routes connecting the Atlantic and Pacific oceans could lead to the activation of other branches. In that regard, the infrastructure initiatives constituting the bioceanic pathways should be understood, not as isolated projects that compete with each other for greater utilization, but as routes in different latitudes that could greatly benefit each other, with enormous potential for expanding intraregional and extraregional circular trade.

Likewise, there are the challenges of adapting part of the port structures of Chile and Peru to the technical specificities required by exportable containerized goods from Brazil and the South American Centre-West, which would expand the options beyond traditional mineral exports (Sánchez and Barleta, 2018). At the same time, it would be advisable to expand the interconnection between these port infrastructures, strengthen coastal shipping, optimize trans-shipment for loading and unloading ships, and accumulate sufficient scale in new products to consolidate direct routes with the Asia-Pacific region.

The constitution of these bioceanic routes can simultaneously promote the strengthening of several logistics hubs scattered along Brazil's long border strip. Some cities, which have multimodal transportation, have immense potential to manage part of the logistics distribution of the Atlantic-Pacific routes. These municipalities are located in areas of great geopolitical importance, such as Ponta Porã and Porto Murtinho (on the border with Paraguay), Corumbá (on the border with Bolivia and Paraguay), Cáceres and Porto Velho (on the border with Bolivia), and Foz do Iguaçu (bordering Argentina and Paraguay), Uruguayana (bordering Argentina and Uruguay) and Caracaraí (bordering Guyana).ⁿ

All those cities can play an important role as connectors of regional integration, by acting as logistics centres for the distribution of a significant portion of Brazil's exports and imports. They could also act as logistic hubs along the complementary bioceanic corridors, helping to boost the efficiency of cargo trans-shipment and to consolidate transformations in the organization of production, bringing to market and distribution of Brazilian goods.

A. Bioceanic Road Corridor via Mato Grosso do Sul and the Paraguayan Chaco¹²

This project promotes physical connection of the city of Porto Murtinho, in Mato Grosso do Sul with the ports of northern Chile, creating a more direct route from the Atlantic to the Pacific. This initiative was formalized in 2015 as a way to boost the development of regions not adequately included in national and regional integration processes, such as the Centre-West of Brazil, the Paraguayan Chaco, northwest Argentina and northern Chile (Barros and others, 2020).¹³

One of the main projects in this corridor is the new international bridge over the Paraguay River between Porto Murtinho and Carmelo Peralta; it has an estimated cost of US\$ 75 million and is financed by Itaipu Binacional. The bioceanic route to the Pacific continues through Paraguayan territory with the paving of some 270 kilometres of the road between Carmelo Peralta and Loma Plata (known as Section 1), which was recently opened. Part of the financing

¹¹ In 1943, in the midst of World War II and in response to the need to create "living borders" for national defence, the Brazilian government established new federal administrative entities: Iguaçu, in the states of Paraná and Santa Catarina; Maracajú, Guaporé and Jaru, in the state of Mato Grosso; Rio Branco, Rio Negro, Acre and Solimões, in the state of Amazonas; and Óbidos and Amapá, in the state of Pará.

¹² For more information on the Bioceanic Road Corridor between Porto Murtinho and the ports of northern Chile, see [online] https://corredorbioceanico.org/pb/.

¹³ So far, Mato Grosso do Sul's land connections with Paraguayan municipalities are between the cities of Mundo Novo and Salto del Guairá, Coronel Sapucaia and with Capitán Bado, Ponta Porã and Pedro Juan Caballero, and Bela Vista and Bella Vista Norte.

for this branch line, in excess of US\$ 440 million, will be guaranteed by the Development Bank of Latin America (CAF). The road will enable permanent transit between Mato Grosso do Sul and the Central Chaco area, in addition to promoting development in a strip of land between the Mennonite production areas and the waters of the Paraguay River.

The next project is the paving of the road between Cruce Centinela and Mariscal José Félix Estigarribia, known as Section 2, financing for which has not yet been approved. Section 3, which is 350 kilometres long, connects Mariscal Estigarribia with Pozo Hondo and Misión La Paz (Argentina), linking the western Paraguayan Chaco to northwest Argentina. The project involves investments in excess of US\$ 350 million, which have already been approved by Fonplata. The end of this section is also close to the trinational border between Argentina, Bolivia and Paraguay.

Continuing through Argentinean territory, the paving is required of the road between Pozo Hondo (Paraguay), Misión La Paz and Tartagal (both in Argentina). The estimated investment is US\$ 160 million. In Chile, it is necessary to pave the section linking Sico, Peine and Baquedano to Chile's ports; this section passes through the strategic region containing lithium deposits. The expected investment is US\$ 90 million but it has not yet been determined where the financing will come from.

The Porto Murtinho corridor will create advantages for Mato Grosso do Sul, Brazil's Centre-West regions and the outlying economies, especially in the case of the production and export of pulp, boneless meat and edible chicken offal. It will also create new opportunities for the connecting states of Central and Western South America including for trade in salt, olives, olive oil, wine, coffee, sugar, cotton, corn and dairy products.

B. Interoceanic Pacific Highway, via Acre and Madre de Dios

The Abunã Bridge in Rondônia was opened in May 2021. The project, which spans the Madeira River, connected the state of Acre for the first time with other Brazilian capitals, without the need for boats (Barros and others, 2021b). This undertaking completed the road infrastructure between Rondônia and the Pacific, a historic effort that took several decades. Highlights include the paving of road BR-317 under the government of Fernando Henrique Cardoso and the construction of the bi-national bridge between Assis Brasil and Iñapari (in Peru) under the Luiz Inácio da Silva administration. Work on the bridge over the Madeira River began during the Dilma Rousseff government, with most progress occurring during the administration of Michel Temer; it was completed and inaugurated during the government of Jair Bolsonaro.

The Brasiléia and Assis Brasil Bridges, inaugurated in 2004 and 2006, connect Acre with Bolivia and Peru, respectively. After delays, modifications and some postponements, and 117 years after the Treaty of Petrópolis —which formalized the agreement between Brazil and Bolivia by which Acre became part of Brazilian territory—the state will be interconnected by road to the Atlantic. Equally important, Rondônia, southern Amazonas and north-western Mato Grosso will have a fully paved road to Peru's Pacific ports.

The infrastructure work on the Madeira River, on BR-364, in the district of Abunã, connects by road one of the largest food-producing areas in the world with the port terminals of the South American Pacific. The Madeira River is also an important tributary of the Amazon basin, and the Santo Antônio and Jirau hydroelectric plants are located between Porto Velho and the district of Abunã. Such infrastructure projects could help unlock the potential of the great river which flows from the interior of Peru, where it is known as the Madre de Dios.

There is scope for promoting multimodality in the region's transport, whether through paved highways, railroads, such as the Central-West Integration Railroad (FICO) (Evaristo, 2022) or waterways that flow into the Atlantic Ocean. The Madeira River, which passes through Abunã and Porto Velho, continues to Itacoatiara where it meets the Amazon, by which boats travel west to Manaus and Tabatinga (bordering Leticia, in Colombia, and Santa Rosa de Yavarí, in Peru, respectively) and east to Santarém, Macapá and Belém.

Thus, the so-called "Interoceanic Route" or "Pacific Highway" is a paved road that runs for nearly 2,400 kilometres, linking Porto Velho to San Juan de Marcona on the coast of Peru, passing through the Peruvian cities of Iñapari, Puerto Maldonado, Urcos, Cusco, Abancay and Nazca. The Peruvian ports of Matarani and Ilo are considered maritime infrastructure with potential for the export of Brazilian containerized products, initially cotton and beef, and for the import of goods to supply part of the demand of the states of the North and Centre-West regions of Brazil, particularly fertilizers.

C. Roraima-Guyanas Corridor

Meira Mattos (1978) considered the existence of a linkage hub around the Negro and Branco rivers, including the connections between Boa Vista, Lethem (Guyana) and Santa Elena de Guairén (Venezuela). The region has a number of strategic projects, s including a ring road and the connection of power transmission lines throughout the Northern Arc of South America. The construction of hydroelectric power plants in Guyana and Suriname would link the development of those two countries to that of Brazil and Venezuela (Barros, 2013, p. 259). According to Wegner and Barros (2013), the Boa Vista-Bonfim-Lethem-Linden-Georgetown Highway project was also one of the priorities of IIRSA/Cosiplan, as was the recovery of the Caracas-Manaus Highway and the extension of the current transmission line between Guri (Venezuela) and Boa Vista. Those authors also noted that the 438-kilometre stretch between the Guyanese cities of Lethem and Linden was not paved and had a wooden bridge over the Esequibo River, making it the greatest hurdle to consolidating the connection between Roraima and the Caribbean Sea.

Between 2000 and 2021, the economy and exports of the state of Roraima experienced strong growth. In 2000, sales abroad amounted to only US\$ 2.6 million, while in 2021 they were US\$ 336 million, which meant that they grew approximately 130 times, in nominal terms. A significant part of that expansion is explained by trade between Roraima and Venezuela, which increased from US\$ 2.1 million in 2000 to US\$ 244 million in 2021, an increase in nominal terms of more than 116 times. More than 75% of all exports from Rondônia in recent years has gone exclusively to Venezuela, though the figure would be much higher if informal border trade were taken into account. No other Brazilian state has such concentrated foreign sales.

With the Amazon River as its main connector, the Amazonian space is projecting both towards the Pacific and the Atlantic, acting as a multimodal bioceanic axis. The Branco River connects the south of the state of Roraima —through the Negro River— to the navigable fluvial network of the Amazon River, the longest on the planet. The route is navigable from Caracaraí, 130 kilometres south of Boa Vista, to Manaus, the capital that offers access to the main ports of the world via Belém and the ocean.

The ports in the Northern Arc already account for half the shipments of "soybeans, including crushed" (SH4 12.01) and corn (SH4 10.05) from the state of Mato Grosso to foreign countries, according to data available on the Comex Stat platform. This scenario suggests a progressive loss by the traditional Atlantic port infrastructure of the logistics monopoly, especially the ports of Santos and Paranaguá. The data show that soon Brazil's main export hub for agricultural freight will be located in the Amazon region.¹⁴

Underpinning this situation, the Ferrogrão longitudinal project, which is more than 930 kilometres in length, will connect the grain-producing region of the Centre-West (especially the cities of Nova Mutum, Lucas do Rio Verde, Sorriso and Sinop) with the port of Miritituba, on the Tapajós River, in the city of Itaituba. The project will also expand trade possibilities via the Caribbean, through the port of New Amsterdam (Guyana), as an alternative to the states of Roraima and Amazonas. Guyana's strong GDP growth of 43.5% in 2020, with projections of 16% for 2021 and 33% for 2022, according to ECLAC data, should be taken into account.

¹⁴ The distance between Manaus and Boa Vista via BR-174 is 780 kilometres. The route highway BR-401 between Boa Vista and Bonfim, a city located on the border with Lethem, Guyana, is 125 kilometres long. The countries are linked by the bridge over the Tacutu River. These works, included as IIRSA projects, were delivered in 2004.

V. Towards an interoceanic network

The South American Pacific is historically more competitive in mineral exports, and the Atlantic, in agricultural products. For the first time there is sufficient productive scale in the centre of South America to overcome this barrier, turning the Pacific ports into exporters of grains and meat products, starting with goods from the western states of Brazil. It is necessary, however, to move past the vision of competing bioceanic corridors and isolated integration and development hubs. The aim should be a network of complementary physical interconnections, linked by multimodal logistic connections.

The interoceanic network should be a key part of a consensus agenda for post-COVID-19 economic recovery. A possible resumption of regional infrastructure governance, while preserving the IIRSA and Cosiplan assets and reinforcing environmental and social concerns, is key for adequately structuring an interoceanic infrastructure network that improves the connectivity of the currently most dynamic areas of Brazil with the Asia-Pacific markets and at the same time stimulates intraregional trade.

For agricultural activities in the connecting states to balance the environmental demands of conservation and local social demands for a decent life with better jobs and income, requires continuous monitoring by Brazilian state regulatory agencies, especially in the area on conservation. It is also essential to continue promoting sustainable economic activities, such as strengthening sustainable agriculture, bioeconomy and circular economy production circuits. Only then will it be feasible to break with productive development models based on the disharmonious exploitation of available natural resources. The central challenge for government in regions where there is strong growth and relatively recent economic dynamism, as is the case in parts of northern and centre-west Brazil and even in the Amazon region, is to adopt a type of responsible economic and environmental development that can correct traditional negative socioenvironmental externalities and ensure a more just, equitable and sustainable society for future generations. In this sense, it would also be desirable for the regional infrastructure agenda to include a non-flexibility pact when it comes social and environmental rights in the context of new integration projects and permanent monitoring of regions affected by them.

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VII. Publications of interest



FAL Bulletin No. 376 The evolution of modal split in freight transport in South America, 2014–2017

Silvana Sánchez

This *FAL Bulletin* analyses data on the commodities traded and modes of transport used between nine South American countries between 2014 and 2017. The aim is to identify the current modal split in intraregional freight transport and to ascertain the level and evolution of trade flows and imbalances by mode. The authors conclude with some policy recommendations.

Available in:



International Trade series No. 167 Marco para una clasificación de vías navegables interiores en América del Sur

Philippe Rigo Ricardo J. Sánchez Fabio Weikert Bicalho

Central to Latin America's development agenda is the need for public policies on infrastructure. Among these, policies designed to improve the functioning of the supply chain and the movement of people are especially important. Public policies must therefore go hand in hand with countries' sustainability objectives.

In this context, this paper seeks to address an issue that global experience has proven to improve the sustainable exploitation of inland waterways: the need for a common classification of inland waterways in order to identify and monitor the development of main and secondary inland networks, and to assess the scope of infrastructure projects that have been or will be implemented to improve network capacity.

This paper lays the groundwork for the development of a similar tool for South America: a framework for the classification of inland waterways, which also incorporates additional policy concerns, such as enhancing logistics and mobility service and improving sustainability in the provision of infrastructure and mobility. The proposed classification framework refers to shallow draft inland waterways, but not to deep waters.

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