



BULLETIN

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FACILITATION OF TRANSPORT AND TRADE IN LATIN AMERICA AND THE CARIBBEAN

Inland navigation and a more sustainable use of natural resources: networks, challenges and opportunities for South America

This issue of the *FAL Bulletin* explores a number of challenges and potential opportunities for inland waterway development in South America. The main focus of the discussion is on financing and policy challenges for efforts to develop inland waterways in a way that will allow them to play a key role in a more sustainable transport system in the future.

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The views expressed in this document are those of the authors and do not necessarily reflect the opinions of the organization.

Introduction

This issue of the *FAL Bulletin* discusses the results of the expert meeting on inland navigation and its potential role in promoting a more sustainable use of natural resources that was held in Rio de Janeiro, Brazil, on 19 October 2016¹ in conjunction with the Ninth International Conference on Coastal and Port Engineering in Developing Countries.

The event represented a joint effort of the World Association for Waterborne Transport Infrastructure (PIANC), the National Waterway Transportation Agency (ANTAQ) and the Economic Commission for Latin America and the Caribbean (ECLAC) and was attended by 90 participants, including government representatives from Argentina, Brazil, Colombia, Paraguay, Peru, the Plurinational State of Bolivia and Uruguay and inland navigation experts from China, Belgium, France, Germany, Netherlands, Japan and the United States of America.

The main objective of the event was to offer decision-makers, national experts and technical advisers an opportunity to share their experiences and exchange views on the challenges and potential opportunities for inland waterway development in South America.



Introduction



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UNITED NATIONS

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¹ More detailed information concerning this event and the presentations made at the conference are available at: <http://incomnews.org/index.php/events/12-pianc-eclac-antaq-workshop-copedec-2016>.

The discussions were structured around three main topics:

- Inland waterway infrastructure: identification of the economic potential of national and regional inland waterways.
- Funding schemes for inland waterway development: trends and challenges in public and private investment in inland waterways.
- Policies and governance for inland waterways: the key elements of a national and regional policy on inland waterway development and the associated institutional framework.

Particular attention was devoted to the role that inland waterways can play in promoting a more sustainable use of the region's natural resources.

The main results of these discussions are summarized below. Section II discusses the economic potential of national and regional inland waterways. Section III presents a discussion on funding schemes for inland waterway development, while section IV focuses on policies and governance for inland waterways.

This issue of the *FAL Bulletin* has been prepared as part of the ECLAC work programme on inland navigation and supplements the material presented in two previous (*Inland waterways classification as a tool for public policy and planning: core concepts and proposals for South America (FAL Bulletin Issue No. 346)* and *Connecting South America: river mobility and river navigation systems (FAL Bulletin No. 327)*). It also draws upon the results of the ECLAC International Seminar on River Mobility in Amazonia, held in Quito in May 2016.

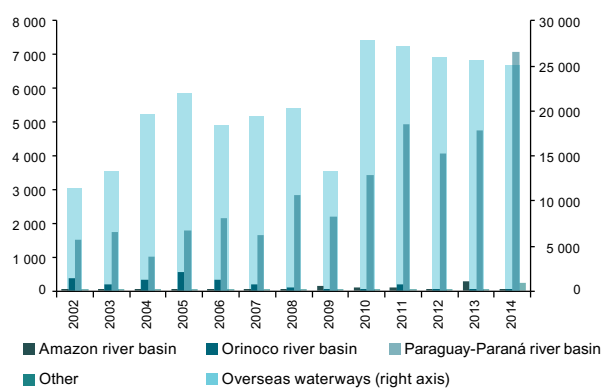
I. Inland waterway infrastructure in South America: current status and the potential for using the region's natural resources more sustainably

South America has yet to take full advantage of its extensive system of naturally navigable waterways or to integrate them into the region's transport network as a means of building the region's capacity to meet the ever-increasing demand for cargo and human mobility. The modal shares of inland shipping in the region's international transport matrix amount to less than 1% in terms of value and volume (Wilmsmeier and Spengler, 2015). Nevertheless, trends in the role that inland navigation is playing in international transport have been positive over the last decade.

Inland waterways not only are used for transport between countries of the region that are located along river basins, but also serve as the first leg of international transport

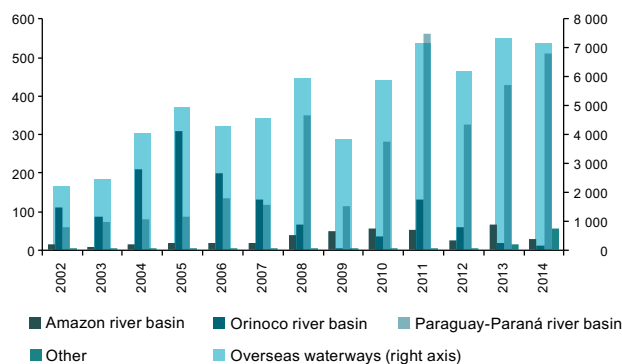
flows with other regions of the world in the case of such goods, for example, as soybean products and aluminium from the Paraguay-Paraná and Orinoco river basins that are destined for Europe, the United States or Asia. In these cases, seagoing vessels are deployed directly from the ports along these river systems. While the value of these exports has more than tripled since 2002, volumes have been declining over the last few years (see figures 1 and 2).

Figure 1
Trends in international inland shipping, by river basin: exports in metric tons, 2002-2014



Source: Economic Commission for Latin America and the Caribbean (ECLAC) and International Transport Database (ITD) (various years).

Figure 2
Trends in international inland shipping, by river basin: exports in millions of United States dollars (at current prices), 2002-2014



Source: Economic Commission for Latin America and the Caribbean (ECLAC) and International Transport Database (ITD).

From a macro perspective, the use of inland waterway systems in the region is limited by various factors, including:

- Incomplete, outdated or absent national and regional standards and regulatory frameworks.
- Lack of common inland waterway classifications in South America as a basis for the standardization of inland navigation protocols at the national and regional levels.

- Lack of standardization of fleet, vessel and control procedures.
- Lack of investment in the construction and maintenance of waterway infrastructure and inland ports.
- Lack of administrative structures and delays in building institutional capacity, especially in terms of human and financial capital.
- Lack of navigational aids, including updated maps, electronic charts, signals and other navigational services.
- Lack of qualified human resources and institutions for capacity-building and the training of highly skilled personnel.

These shortcomings limit the current and future potential of inland navigation. The current situation not only impedes the wider use of this mode of transport, but also interferes with its integration with other modes. They also generate inefficiencies, such as cargo losses, and result in relatively high transport costs at the local, regional and national levels.

One challenge is the lack of information and, in some cases, political visibility of the region's waterways' existing and potential capacity for freight and passenger transport. In this context, the first session of the seminar was devoted to discussing policymaking and planning tools for promoting more analysis and gaining more visibility for the current and potential status of inland waterway infrastructure in South America.

Drawing on the experience of other regions of the world and technical contributions from the PIANC experts, the participants discussed a proposal for the development of a common classification of inland waterways for South America. It was pointed out that the European experience (European Conference of Ministers of Transport (ECMT); also commonly referred to by its French-language acronym: CEMT) has demonstrated that inland waterway classifications, far from being a formality or a purely academic exercise, are an essential, powerful and dynamic tool for supporting and implementing inland waterway policies and projects. Such classifications facilitate the identification of constraints and the economic potentials of navigable waterways. In addition, they pave the way for promoting and monitoring the development of these waterways' capacity for transporting goods and people (Jaimurzina et al., 2016).

The discussions held at the meeting addressed the first proposal for a South American classification, based on the ECLAC/PIANC working document entitled "Inland waterways classification for South America: core concepts and initial proposals". The PIANC reports from Working Groups 9 and 16 and the report entitled "Calibrating the navigable waterways of the Mekong river system

into a classification standard" were also cited as useful background documents (PIANC, 2009).

There was a general consensus among country representatives and experts as to the direct and indirect benefits of a harmonized classification system. From the policy and planning perspectives, having standardized parameters for waterways, including their structures (locks, bridges etc.), is expected to contribute to:

- The preparation of an overview of the current status of existing waterways that will, in turn, facilitate their integration into overall logistics chains at the national and regional levels.
- The provision of a basis for estimating the impact of new infrastructure investment on infrastructure capacity.
- The development of a system for monitoring and assessing the status of the corresponding infrastructure.
- Facilitated access to financing.
- A more sustainable use of inland waterways if the classification incorporates the appropriate environmental and social standards from the outset.
- A common basis for binational and regional agreements on inland waterway infrastructure and its use.

From both users' and the industry's perspective, such a classification would offer: (a) more reliable information regarding navigation conditions; (b) facilitated and safer inland navigation; (c) more favourable conditions for industry development (i.e.; ship building) and; (d) clear parameters for the analysis of the costs/benefits of constructing new waterways and infrastructure and for maintaining and replacing existing facilities.

At the same time, the participants emphasized several challenges that will have to be met in developing a common classification for South America.

First, because the region's dialogue on a common classification is as yet at such an early stage, agreement still needs to be reached on the key elements of the classification, such as the corresponding goals or objectives (which can differ based on the modes of navigation concerned —freight, passenger, tourism— or include other economic objectives, such as those of ports, the industry, communities, hydropower suppliers, etc.), geographical scope or areas of interest (regions, waterways to be considered), the need for one or more classifications (depending on how waterways or regions can be linked to each other, as well as the relevant fleets), the types of waterways to be considered (rivers, canals, lakes), classification parameters (existing ones or future parameters to be developed, depending on what goals and objectives are identified) and, possibly, the consideration of additional waterway uses (flood control/



protection, water management, irrigation, hydropower, other water-related businesses), etc. The PIANC/ECLAC working document offers preliminary responses to these questions, which now need to be confirmed by the countries concerned.

Second, based on the results of the countries' discussions on these issues, it will be necessary to collect and analyse a certain amount of geographical, economic and social data, including, but not limited to, information on the following:

- The current status of inland waterways, including their hydrological and morphological conditions.
- Existing and future inland waterway fleets and the parameters and technologies being used.
- Data from surveys of commodities, other cargo and passengers carried by the inland navigation system (both current and future, including potential niches).
- Existing technologies, such as River Information Services (RIS), for intermodal connections (the roll-on /roll-off system for the transport of trucks or trailers, short-sea navigation and ports, etc.).
- Transport policies and the current and future demands associated with infrastructure plans in the countries of the region.
- Data from existing studies on the economic potential of inland waterways in the region.

Third, it was emphasized that insufficient consideration had been given to the sustainability dimension of existing classifications in other regions of the world, such as the ECMT/United Nations Economic Commission for Europe (UNECE) classification, and that it would be necessary for the operational and technical parameters of the classification to incorporate conditions and criteria for achieving a more sustainable use of inland navigation, both in terms of the provision of infrastructure and in terms of its use over time.

Finally, it was recognized that the development of a classification requires that the countries of the region take on a proactive role in further developing the methodology and tailoring the classification for its regional application. This also entails the development of monitoring indicators, instruments and systems. In this

context, a dialogue and collaboration between the public and private sectors and academia, as well as with potential donor agencies, is of key importance, as financing for these initiatives and activities will be essential in order to ensure the sustainability of these efforts over time. Since river basins are often transnational in nature, the involvement of regional integration initiatives such as the Union of South American Nations (UNASUR), the South American Infrastructure and Planning Council (COSIPLAN), the Initiative for the Integration of Regional Infrastructure in South America (IIRSA) and the Latin American Integration Association (LAIA/ALADI) is a core element in the process of reaching agreement on all of these issues.

The overall recommendation of the participants in the ANTAQ/ECLAC/PIANC Workshop was to create a special working group, to be chaired by ECLAC and PIANC/INCOM, to focus on the establishment of a regional classification for South America.

The preliminary terms of reference for this working group would include:

- Provide a forum for initial technical meetings among South American experts, to be joined by international experts, on a future inland waterway classification for South America.
- Collect data on inland waterways, inland fleets, traffic volumes and other relevant factors for the development of technical and operational parameters that can be harmonized at the regional level.
- Based on the initial proposals made in this working paper, formulate an advanced draft outline of the technical and operational parameters that would be used for the classification and present the preliminary results to (selected) countries of the region.
- Develop a proposal concerning a regional mechanism for the classification's implementation and maintenance and for its further development.

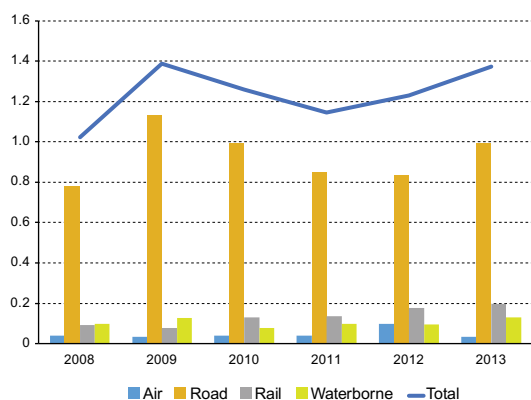
II. Funding schemes for inland waterway development

It is generally accepted that South America suffers from a shortfall in transport infrastructure investment. While the investment gap is significant from an overall perspective, it is even more pronounced when viewed from a modal perspective. Although inland waterways are repeatedly referred to as a solution and contribution towards a more sustainable transport system, the reality in terms of investment in this mode tells a different story.

The figures given below show not only that current levels of investment in inland waterways are low, but also that there is a wide investment gap between this and other

modes of transport. In the period between 2008 and 2013, on average, investment in waterborne transport did not exceed 10% of total annual investment in transport infrastructure. In some countries in the region, the relevant government agencies do not even have specific budgets for inland infrastructure and inland port development.

Figure 3
Investment in transport infrastructure, by mode, as a percentage of GDP, 2008-2013



Source: Economic Commission for Latin America and the Caribbean, Infrastructure Services Unit, based on data from Economic Infrastructure Investment Data in Latin America and the Caribbean (INFRALATAM).

Note: Includes private and public investment. The following countries are included: Bolivia (Plurinational State of), Brazil, Chile, Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru and Uruguay.

Infrastructure investments are needed to facilitate economic growth that can in turn provide the necessary fiscal cushion for government expenditure and debt. However, actual analyses of fiscal multipliers of government infrastructure investments are, as a rule, not included in current feasibility studies. If they were, it is likely that the story that they would tell would be discouraging, as the catalytic effects of value-adding industrial investment is the only genuine source of such a fiscal cushion. These industrial investments are not under the control of the government, however, and are rather volatile in the presence of changes in locational competitiveness.

Viewed against this backdrop, the seminar offered a valuable overview of various funding schemes for inland waterway development that are in place in Europe and in some countries of the region.

The case of the Rhone River was presented as an example of long-term concessions and the contribution that they can make to the local economy. The concession-holder for the Rhone River is a land developer that is called upon to perform three important functions for the community: (a) producing hydroelectricity; (b) developing navigation; and (c) facilitating irrigation for agricultural use. This global concession has been in operation for 75 years and

started with the commissioning of the first dam in 1948. The concession-holder is a listed company on the stock market with a balance of public and private shareholders. It works under a redistributive model that enables it to share its added value among the State, the public authorities of the Rhone River Valley, the neighbouring population, the shareholders and the company's employees.

Between 1936 and 1986, 19 multipurpose development schemes and the Port of Lyon were financed by the State based on loan guarantees. The loans were repaid out of the revenues achieved using hydropower resources. At present, hydroelectricity is the main source of revenues (3,005 MW of installed capacity). The Compagnie Nationale du Rhône (CNR) redistributes part of the value that is created to the State (via a hydropower fee of 24% of net electricity sales) and to community development via what are known as "missions of general interest" (five-year plans in place since 2004). At the same time, the use of locks and passages is free of charge.

Table 1
Key figures on the Rhône concession, France

1. Installed capacity	2. 3 005 MW
3. Average annual output	4. 14 400 GWh
5. Net turnover (2015)	6. 650 M€
7. Total contribution to State (2015)	8. 283 M€
9. Contribution to community development	10. 32 M€/yr
11. Specific concession expenses (2015)	12. 184 M€
13. Share of navigation of the above	14. ~13%

Source: Compagnie Nationale du Rhône (CNR), 2016.

The concept and principles exemplified by the Rhone River case are being replicated in the Mekong River basin in Laos, where a series of hydropower river projects are being undertaken by different developers under a build-own-operate-transfer (BOOT) scheme. The resources acquired from the use of hydropower are then to be used to build a lock. The resulting reservoirs will progressively extend the length of the navigable sections of the Mekong. The application of lessons learned from the Rhone River case in the Mekong River basin underscores the potential and need for coordinating different operators in different phases of the project life cycle (design, maintenance, operation).

To attract private investment and fiscally sustainable public financing for inland navigation infrastructure, it is important to consider the multidimensional and logistics aspects of waterway transport. A public-private partnership (PPP) approach should incorporate socioeconomic impacts and the associated added values in order to ensure a satisfactory level of fiscal returns. This will involve the introduction of a new regulatory and contractual network along with business models that

will enable the various stakeholders to work together to develop local potential in a way that will take account of the different environmental and social issues involved.

By way of example, in Argentina, the toll paid by infrastructure users over the last 21 years has been a feasible tool for financing inland waterway concessions and has made it possible for the infrastructure to be properly maintained, despite national economic problems. The usual types of concessions and PPP models now in use are not universally applicable, however, as they require at least minimally mature demand markets.

Conventional public funding systems, including the use of loans, remain a solution only in particular situations and need to be reviewed further for the case of South America.

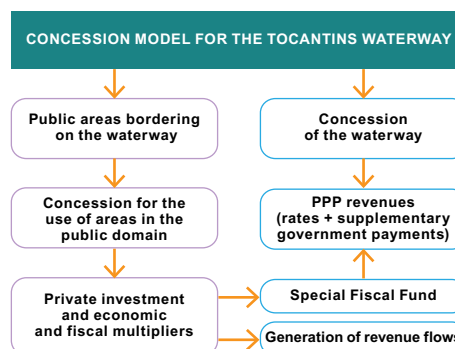
One of the participants, Joaquim Aragão, gave a presentation on the case of Brazil as an example of challenges and possible solutions for inland waterway financing. For decades now, the Brazilian economy has been grappling with the problems caused by the obsolescence and incompleteness of its infrastructure network. High logistic costs hurt the competitiveness of Brazilian exports. As the wave of high world market values for the commodities that represent a major part of its exports has passed, the fiscal leeway for funding infrastructure has dwindled. Consequently, concessions and partnerships with the private sector have been chosen as the main solution. On the other hand, there is a specific feature of Brazilian geography that must be dealt with: infrastructure investment is needed in long stretches that run through areas with high future growth potential, but where the logistics market is still not mature enough to attract private investment. The assumption of market risk in such projects by the government will usher the risks of fiscal unsustainability through the back door.

This approach has been tested on the Tocantins Waterway with respect to its economic and fiscal multiplier effects (see diagram 1). Its intended purpose is to cope with the challenges discussed above, and it is designed to achieve the following aims:

- To assure systemic efficiency and overcome the fragmentation of different ventures by bundling together different public and private projects related to infrastructure, industry and public services into an integrated, geographically based programme;
- To assure the fiscal sustainability of the various public investments and expenditures by screening the economic and fiscal multiplier effects of the investments (both public and private) that are included in the programme;
- To contract a private development company to organize clusters and chains with a view to

subsequently achieving economic performance targets in such areas as the number of contracts with local small and medium-sized enterprises (SMEs), job creation, the level of traffic generated and fiscal multiplier effects. This company will be entitled to use a strategically located public area and to open a bank or another type of financial institution to serve the project's needs.

Diagram 1
Concession model for the Tocantins waterway, 2008-2013



Source: National Waterway Transportation Agency (ANTAQ), 2016.

In this example, the contracting procedure should be preceded by a general transportation and spatial planning process and by an economic and commercial infrastructure consolidation programme in which the corresponding responsibilities of the private and public stakeholders are defined. Provision should also be made for the conclusion of a conventional PPP agreement with an infrastructure construction company and an exploratory enterprise (e.g. an airport, a port, a railway or a waterway), along with a procurement procedure for the selection of a private development company. The contract should then be awarded to the bidder who offers the most contracts that provide for the participation of local SMEs and local job creation, provided that the set targets for overall fiscal-multiplier and traffic-generation effects are assured.

Based on these case studies, together with the outcomes of the discussions on the main issues related to funding inland waterway infrastructure, the participants in the session put forward the following recommendations:

- To attract private investment and fiscally sustainable public financing for inland navigation infrastructure, it is important to consider the multidimensional and logistics aspects involved in waterway transport.
- A public-private partnership (PPP) approach should take into account the socioeconomic impacts and their added values in order to ensure a suitable level of fiscal returns. This will call for new regulatory and contractual networks and for business models that will work together in developing local and regional

potential while taking into consideration the different environmental and social issues involved.

- The current concessions and PPP models are not universally applicable, as they require at least minimally mature demand markets. Otherwise, government payments and guarantees designed to make projects attractive to private investors may usher in fiscal erosion through the back door.
- In some countries, the rates paid by infrastructure users have been a suitable and feasible tool for financing the operation of concessional inland waterways and have made the infrastructure's proper maintenance feasible, despite national economic problems. For these countries, the ways in which rates have been deployed have been shown to be quite sustainable and are expected to continue to be sustainable in the future as well.
- Support for conventional public funding systems, which includes the use of loans, remains a sound approach in particular situations.

III. Towards national policies and a regional dialogue on inland waterway development

The last session of the seminar was devoted to the role of national and regional policies in promoting inland navigation.

The participating country representatives and experts emphasized the crucial role of inland navigation in advancing towards the goals of sustainable development and physical, economic and social integration.

More specifically, inland shipping can offer:

- Greater security, as services are delivered along waterways with low traffic density that are not in the vicinity of human settlements, and the accident level is therefore lower than it is for other modes of transport. Precautionary and regulatory measures are needed, however, for localities where freight operations take place in proximity to human settlements and in parallel with passenger and local transport.
- A high degree of flexibility in moving significant volumes of different types of cargo (liquid, bulk, general cargo, roll-on/roll-off), particularly where the inland waterway infrastructure allows the deployment of convoys in different configurations.
- A high level of predictability, as the probability of unexpected service interruptions is more limited. This risk can be reduced further when a river information system is available. In addition, nighttime service restrictions can be eliminated if inland water transport information systems and signalling are in place.

- Lower economic costs. Inland shipping carriage can be from 30% to 60% less costly than road or railway transport.
- High levels of energy efficiency. In the case of the majority of bulk services, inland shipping consumes from three to six times less energy than road transport and up to two times less than railway transport.
- Lower emissions. The CO₂ emissions of inland shipping are lower than they are for other modes of transport. However, in the case of other emissions, such as particulate matter (PM) and sulphur oxides (SO_x), the advantages of inland shipping are limited or non-existent because the regulation of road transport emissions has advanced more rapidly than the regulation of emissions in the case of inland shipping operations has. By way of example, Euro VI trucks do have a better performance than inland shipping vessels per ton-km for PM and SO_x emissions.
- Lower noise emissions. Inland shipping performs better in terms of noise pollution, although port and terminal areas may be an exception.
- Lower infrastructure costs than other modes of transport are found in some cases, but this depends on geographic and climatic conditions and the natural navigability of the inland waterways concerned. In the case of Latin America, the natural geography favours the use of inland waterways; depending on the waterway in question, from 20% to 100% of the available capacity is not being used.

Thus, inland navigation has untapped potential, not only for its traditional markets (such as the transportation of bulk commodity cargo or recreational or local passenger transport), but also for other possible new niche markets. The environmental effects of developing this system are not negligible, but their scale can be controlled more easily and, often, at a more reasonable cost than those deriving from other transport options, particularly road transport. Its social impact is or can be very important, especially in South America, whose waterways (the Solimões, the Paraguay-Paraná, the Ucayali, and the Napo, among others) are closely bound to the local culture, employment and mobility concerns.

However, the extent of the contribution that Inland navigation can make to a more sustainable transport and logistics system depends on several factors and cannot be derived simply by switching traffic towards this mode or increasing investment. Traditionally, factors such as security, flexibility, predictability, economic costs, high energy efficiency, good environmental (noise and emissions) performance and lower investment costs are considered "natural" attributes of inland shipping. However, the possible advantages of these factors can

only be reaped if they are incorporated into an integrated vision and strategy for this mode of transport.

Such a policy approach entails the integration of public policies across various levels and sectors. One fundamental requirement is to integrate inland navigation into a long-term, sustainable transport and logistics policy that encompasses all modes of transport and takes all the various mobility needs and requirements into consideration. In other words, Inland navigation should be an integral part of a region's logistical and co-modal transport system.

Another challenge is to deal with the wide range of requirements that must be met in order to achieve the necessary level and quality of performance in inland navigation operations. This involves developing and maintaining infrastructure, but also addressing the need for legal and regulatory frameworks that will be effective in facilitating inland navigation without compromising its security and safety, promoting innovation, taking labour and social aspects into consideration, dealing with environmental requirements, etc.

A fully fledged inland navigation policy needs to address such issues as Infrastructure planning and oversight, quality certification, management of facilities and services (infrastructure, vessels, water levels, etc.), crew requirements, traffic rules and regulations, pollution prevention, appropriate information systems and specific logistics based on the transport and storage systems that are in use. The scope of these issues extends far beyond investment in infrastructure.²

It is in this context that the representatives of countries and regional institutions, such as the Administrative Commission for the Uruguay River (CARU), discussed national and regional plans and policies for promoting inland navigation.

The representatives of Brazil shared their experience with the elaboration of the Strategic Waterway Plan, which was prepared by the Ministry of Transport with the aim of improving the waterway transportation of cargo and passengers. The initiative stemmed from an acknowledgement of the unexploited potential of inland navigation in the country, where, of the 42,000 km of potentially navigable rivers, only approximately 20,000 km are being used. The overall goals of the plan are to increase the share of inland navigation in the transport of goods and passengers, reduce logistics and transport costs, increase national competitiveness, promote more

sustainable and safer forms of transport and increase the availability of data on inland navigation. With these goals in mind, the plan analyses the existing navigation conditions, socioenvironmental aspects, economic factors, governance and institutional issues, and data and benchmarking processes, while devoting special attention to all economic, social and environmental sustainability impacts. The associated plan of action aims to increase the volume of transported goods from 25 million (2011) to 120 million tons by 2031 by investing 17 billion reais in waterway infrastructure, 5.5 billion reais in river terminals and 4.5 billion reais in the inland shipping fleet.

Colombia presented its Master Plan for Inland Navigation, prepared by the National Planning Department. The Master plan is part of a larger strategic framework that is set out in the National Development Plan for 2014-2018, which places priority on restoring the navigability of the main river basins of the country, and the Master Plan for Intermodal Transport, which establishes a 20-year commitment on the part of the State to organize the country's growth in an efficient and strategic manner by building an infrastructure network that connects cities, regions, borders and ports and placing priority on the projects that will have the greatest impact for the country. The main objective of the Master Plan for Inland Navigation is to achieve a more competitive, cleaner, safer and more accessible river transport system. At present, less than 1% of all cargo is moved by waterways and, out of a total of 24,274 km of navigable waterways, only 18,225 km are actually being used. The Plan addresses both freight and passenger transport and has five components: infrastructure, promotion, operation, financing and institutional setting. It includes selection criteria for the national portfolio of infrastructure projects based on what is needed in order to maintain and rehabilitate existing infrastructure, ensure the continuity of navigation along inland waterway corridors, interconnect river basins and allow intermodal connections to be made. The Plan provides for a selection of waterways of strategic importance for freight transport (navigability by inland vessels with tonnage of more than 25 tons, the current or potential capacity for transporting 50,000 tons per year and existing or planned intermodal connections to the road network) and for passenger transport (existing public transport services, the current or potential capacity for transporting 50,000 passengers per year and the integration of remote areas or regions). Furthermore, it establishes financing modalities based on the commercial or social nature of the projects. The commercial projects are to be financed through international cooperation funds, infrastructure tolls, distribution of possible PPP and other royalties and carbon credits. The social projects are to be funded out of international cooperation funds, the

² Background information: Wilmsmeier, G. (2013) "Connecting South America: River Mobility and River Navigation Systems". November 2013, FAL Bulletin, Issue No. 327, ECLAC. <http://www.cepal.org/en/publications/37621-connecting-south-america-river-mobility-and-river-navigation-systems>.

State budget and income from royalties. Finally, the Plan also plots out an institutional setting that is designed to improve the governance of the sector.

Representatives of Paraguay gave a presentation on some elements of its national policy on inland navigation in which it highlighted the importance of inland waterways and, in particular, the Paraguay River, in its national logistics and transport system, given the landlocked status of the country. The Paraguay-Paraná waterway is a central part of the National Transport Master Plan. Currently, the Paraguay River carries approximately 19 million tons per year (9 million of which are domestic cargo) with the potential for growth amounting to up to 90 million tons (a 380% increase) over the next 15 years. In all, 80% of this future demand is expected to come from intraregional trade. However, this level cannot be achieved without significant investments in inland waterway (and other) infrastructure and in the inland navigation fleet, the development of the logistics industry, improvements in the regulatory framework and the development of human resources in this sector. An important part of this effort is the facilitation of international transport via inland waterways by harmonizing and developing common standards and regulations at the bilateral and regional levels and by addressing sustainability issues. The major focus of the current navigation policy is to improve shipping conditions and guarantee that minimum shipping standards are met. The main source of infrastructure investment in Paraguay is the public sector, as the existing legal framework does not permit the mobilization of private investment for this purpose.

For the Plurinational State of Bolivia, another landlocked country of the region, development of inland navigation is one of the areas covered by the Strategic Development Plan (Economic and Social Development Plan 2016-2020 within the Framework of Integrated Development for Living Well). The conditions for shipping exports of soya and steel through the Paraguay-Paraná waterway are currently sub-optimal owing to shortcomings in the necessary infrastructure. There are also issues related to freedom of transit on the Paraguay-Paraná River as a result of some parties' failure to implement commonly agreed rules, the outdated legal framework and difficulties being experienced by institutions such as the Intergovernmental Committee on the Paraguay-Paraná Waterway. Overcoming these obstacles will call for a joint effort on the part of all the institutions and countries involved.

Moving from the realm of national policies to the topic of regional dialogue, the participants recognized that the experiences of other regions of the world, including Europe, in particular, indicate that, while the status of inland shipping is largely determined by

local, geographical features, the development of inland navigation also goes hand in hand with wider regional integration efforts. An early consideration of the regional context when developing national policies for the promotion of inland navigation is therefore essential, particularly given the cross-border nature of the region's waterways systems, even if an integrated regional policy framework appears, at this point, to be a long-term goal. For example, in Europe, a common core framework of principles and regulations has emerged over time which defines such elements as coordinated infrastructure development and harmonized conditions for the carriage of goods (e.g. the classification of inland waterways based on harmonized technical and safety regulations). The emergence of such a regional framework in Europe is the outcome not only of the work of river navigation commissions and other regional integration bodies, but also of a high-level regional policy dialogue that has been conducted at regular meetings of ministerial conferences on inland navigation with a view to identifying common priorities and actions for its development.

The seminar's participants devoted special attention to the regional integration dimension of inland navigation in South America. As one example, a representative of the Administrative Commission for the Uruguay River (CARU) gave a presentation on the history and objectives behind the establishment of this bilateral river commission, which was created by Argentina and Uruguay in an effort to transform the Uruguay River into a more navigable waterway. (The Uruguay River's currently navigable stretches amount to just 339 km out of its total length of 1750 km.) The Commission stressed the need to manage the waterway as an integral geographical entity composed not only of the watercourse, but also of the ports, catchment areas and maritime zones linked to the basin, which entails taking into consideration the regional integration dimension in all waterway-related policies. The Commission also emphasized the importance of considering the overall context of logistics and production chains in making the use of the waterway more competitive. Currently, the Commission has a broad mandate that encompasses administering river bridges, formulating technical standards, improving navigation conditions, maintaining water quality, protecting the environment with the help of pollutions checks and controls, regulating fishing activities and conducting research activities.

Another example that was frequently cited by the participants from the region was the UNASUR/COSIPLAN/IIRSA regional integration initiative, which includes a core component on physical infrastructure integration, including major inland water corridors. At present, there

are 113 projects in the IIRSA transport project portfolio which provide for an estimated investment of close to US\$ 14 billion in river and maritime subsectors.

In conclusion, the country representatives and regional and international experts called for a strengthening of the regional dialogue on inland waterway development in South America with a view to promoting an efficient, equitably accessible, effective, safe and sustainable system of inland navigation. The overall objective of this dialogue should be to develop a regional inland navigation system that meets the needs and requirements of cargo and passenger mobility demand, facilitates the development of diversified production sectors and promotes local/regional, economic and social integration in South America. This dialogue should address a variety of issues related to promoting inland navigation, such as:

- Improving the image of inland navigation and identifying its role in progressing towards sustainable development.
- Promoting a sustainable use of inland navigation and addressing all of its economic, social and environmental sustainability dimensions.
- Integrating inland cargo and passenger navigation into regional and national logistics systems and into national spatial and regional planning strategies.
- Developing and improving common rules and standards for inland navigation.
- Developing strategies for converting informal activities into formal ones.
- Developing standards for more environmentally sustainable levels of performance in terms of waste, emissions and energy efficiency.
- Promoting the development of the local and national inland shipping industry.

IV. Conclusions

It is generally agreed that the development of inland navigation should receive greater attention at the national and regional levels given the economic and social importance of inland waterways in the region. While the shortfalls in inland waterway infrastructure and inland terminals are widely recognized, the possible means of closing these gaps require further exploration. Different financing models for inland waterways exist in the region, and the experiences of other regions should also be analysed in order to determine their degree of transferability to the South American context.

Numerous studies on South American waterways are available that can be used as a starting point for moving towards

the implementation of inland navigation development strategies at the national and regional levels. However, a broad consensus exists that investment in inland shipping and improvements in the navigability of the region's rivers are not a panacea and that further work is required in order to evolve inland shipping into a truly sustainable option within an integrated regional transport system.

Further substantive work will need to be done in order to harmonize the operation of services, information exchange and infrastructure. This will include updating and, where they are lacking, devising new national and regionally harmonized regulatory frameworks, harmonized methodologies and data management systems for inland shipping statistics, other information and indicators. Additionally, the facilitation of border crossing and other procedures should be reviewed and improved to enhance the competitiveness of this mode of transport vis-à-vis road and rail transport.

Development strategies for inland waterways and terminals, where they exist at all, generally overlook sustainability issues. Strategies dealing with emissions reductions, technological change, water pollution controls, energy efficiency and noise reduction potential should be given greater priority and receive wider recognition both at the local and regional levels and across the public and private sectors.

Finally, any strategy for developing inland navigation into a mode of transport that makes a more sustainable use of natural resources will call for determined capacity-building efforts on the part of the public and private sectors in order to create a knowledge base for the conversion of inland shipping into a modern, sustainable and competitive industry over the medium and long terms.

The outputs of the seminar have contributed to the identification of common interests and have paved the way for taking the next step in furthering networking activities among countries. The formation of this expert network supports the efforts of PIANC, ANTAQ and ECLAC to set up a South American working group in this area, which will lay the foundations for an ongoing regional political dialogue and will contribute to the implementation of related projects in the short and medium terms. The model provided by this type of working group may be transferred or extended by PIANC-InCom to other regions of the world such as South-East Asia (e.g. the Mekong River basin).

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