Paper 108 – Development Plan for the Peruvian Commercial Waterways: A Synthesis

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ABSTRACT: The description and diagnosis of the current situation of the Peruvian commercial fluvial system allowed to identify and to evaluate development opportunities as well as to define a set of programs – the "Development Plan for the Peruvian Commercial Waterways" – oriented to organize fluvial transport activities promoting their integral development and improving navigability, river transport and river infrastructure (encouraging the integration of a vast region of Peru).

1 INTRODUCTION

Under a technical cooperation granted to the Republic of Peru, the Inter–American Development Bank (IDB) issued a call for expressions of interest and – subsequently – a proposal request for the provision of consulting services related to the "Development Plan for the Peruvian Commercial Waterways" (the so called "Waterways Plan").

The consortium formed by SERMAN & Asociados SA (Argentina) – CSI Ingenieros SA (Uruguay) – ECSA Ingenieros SA (Peru) was awarded this process.

The present paper summarizes the description and diagnosis of the current situation of the Peruvian commercial fluvial system as well as a set of programs – the "Development Plan for the Peruvian Commercial Waterways" – oriented to organize fluvial transport activities promoting their integral development and improving navigability, river transport and river infrastructure (encouraging the integration of a vast region of Peru).

2 THE PERUVIAN COMMERCIAL FLUVIAL SYSTEM

2.1 *The Commercial Fluvial Network*

The Peruvian commercial fluvial system comprises 4,081 km of rivers navigable throughout most part of the year that define six main corridors (Table 1): a) Marañón (Sarameriza – Ucayali confluence), b) Amazonas (Ucayali confluence – Santa Rosa), c) Ucayali (Marañon confluence – Pucallpa – Atalaya), d) Urubamba (Atalaya – Las Malvinas / Camisea), e) Huallaga (Marañón confluence – Yurimaguas), and f) Napo (Cabo Pantoja – Amazonas confluence).

Due to the almost total lack of roads, the commercial fluvial system represents the engine for economy development and for internal and external integration of the Peruvian Amazon region as well as the main means for mass communication.

Consequently, any action aimed to improve navigation, river transport and/or waterway infrastructure will generate significant impacts on the river and social integration of a vast region of Peru.

River	Stretch	Length (km)
Amazonas	Ucayali confluence – Santa Rosa	598
Marañón	Sarameriza – Ucayali confluence	621
Ucayali	Pucallpa – Marañon confluence	1.248
	Atalaya – Pucallpa	517
Urubamba	Las Malvinas / Camisea – Atalaya	293
Huallaga	Yurimaguas – Marañón confluence	220
Napo	Cabo Pantoja – Amazonas confluence	584
	Total Length	***4.081***

Table 1: The Peruvian commercial fluvial system

2.2 *The influence area*

The influence area of the "Development Plan for the Peruvian Commercial Waterways" comprises all land and water areas where the proposed measures could lead to trade and traffic flows impacting on

local economic activities and social relationships between population centers and major cities.

For delimitation purposes various criteria were considered: a) the political – administrative division, b) the fluvial transport flows (the most important ones focused on the cities of Iquitos, Pucallpa and Yurimaguas), c) river accessibility (tributaries to the main rivers were also considered within the political boundaries of the influence area), and d) environmental aspects (mainly represented by the natural protected areas near or superimposed to the previously defined areas).

Based on such criteria the influence area (Figure 1) comprises almost all the regions of Loreto (excluding the basin of the Putumayo and Yurúa rivers) and Ucayali (excluding the basin of the Purus and Madre de Dios rivers) and part of the Cusco region (provinces involved in the basin of the Lower Urubamba). Such area covers around 415,000 km^2 (32.3% of the Peruvian territory) with a population of 1,486,978 inhabitants (2012 census) and estimated as 1,640,735 inhabitants (2013 projection).

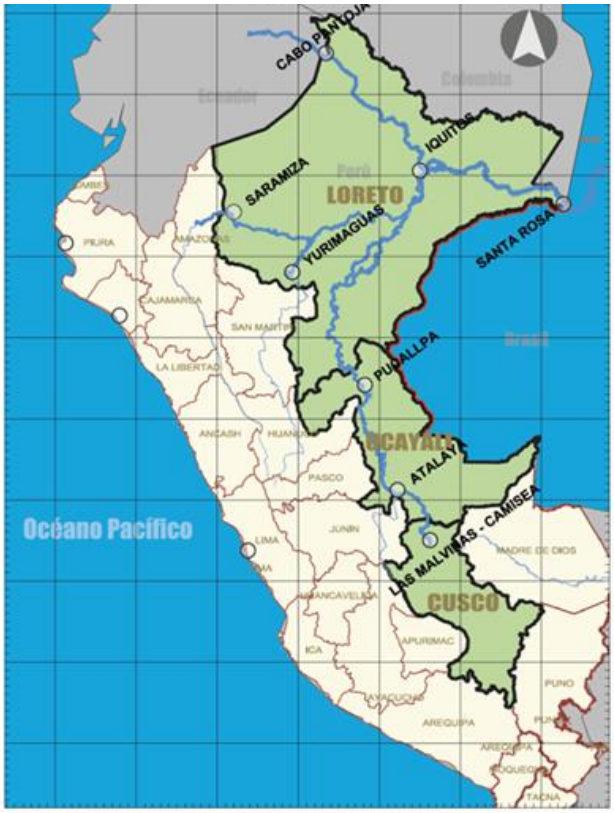

Figure 1: The influence area of Peruvian commercial waterways in the context of the whole territory

2.3 *The general transport network*

According to the Global Competitiveness Report 2011 – 2012, in the Republic of Peru: a) despite having evolved positively in recent years, road infrastructure is far away from the Latin America average (according to the Ministry of Transport and Communications – MTC, the year 2011 network had a length of 129,163 km of which 13.3% – 17,214 km – were paved meanwhile the rest – 86.7% or 111,949 km – were unpaved), b) rail infrastructure is similar to the Latin American average being characterized by its low development (only eight lines with a total length of 2,021 km), c) airport infrastructure and services are better than the Latin America average (according to Apoyo Consultoria, 2012 it is represented by a total of 116 facilities under different administration regimens), and d) port infrastructure is similar to the Latin America average (according to information from the National Port Development Plan, Revised on year 2012, it is represented by around 80 facilities).

Figure 2 shows the major elements of the Peruvian transportation network and the high degree of complimentarily (multimodality) of the commercial river system with land, air and maritime transport.

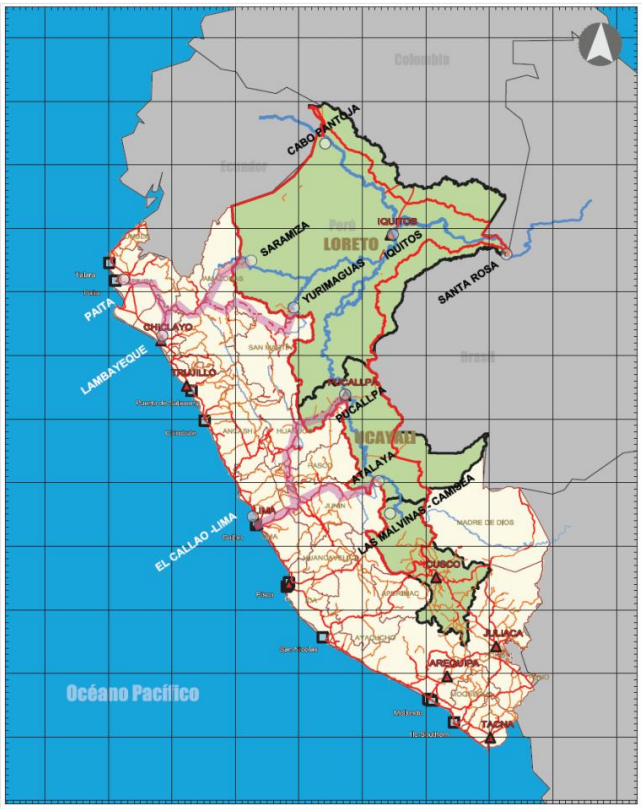

Figure 2: The Peruvian commercial waterways and their main multimodal connections

3 THE CURRENT SITUATION

3.1 *The river fleet*

The current fleet sailing on the Peruvian commercial river system is composed by a diverse set of vessels with particular characteristics: a) river boats and river sliders, b) motor barges (a naval construction for cargo transport), c) motor ships (a

naval construction for both cargo and passenger transport), d) deck barges and e) fluvial pushers.

Table 2, based on information from the Ministry of Transport and Communications (MTC), shows the evolution (2003 – 2012 period) of the Peruvian sea, river and lacustrine fleet. The table allows recognizing the high participation of the fluvial transport (however, part of the evolution could be assigned to an improvement of the records or to a greater compliance with the rules related to vessel registration).

	Year									
Mode	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Maritime	90	90	52	60	71	52	66	79	96	123
Fluvial	440	456	572	622	637	503	637	799	1.113	972
Lacustrine	99	132	145	117	115	27	21	21	13	13
Total	***629***	***678***	***769***	***799***	***823***	***582***	***724***	***899***	***1.222***	***1.108***
Fluvial mode participation (%)	***69,95***	***67,25***	***74,38***	***77,85***	***77,40***	***86,43***	***87,98***	***88,88***	***91,08***	***87,72***

Table 2: Evolution of the Peruvian fleet by transport mode

In order to obtain primary information regarding the number and characteristics of the vessels corresponding to the fluvial fleet a "census" was made based on the information published at the so–denominated "State Module for Aquatic Transportation Companies" (Ministry of Transport and Communications – MTC). Such information was verified and supplemented from: a) the registration of water transport means of the Supervisory Body for Investment in Energy and Mining (OSINERGMIN), b) the registration of arrivals and departures at the three main fluvial ports (Iquitos, Pucallpa and Yurimaguas) made by the National Port Authority (APN) during the period 2010 – 2012, c) the Iquitos port vessel registry prepared by the Regional Directorate for Transport and Communications (corresponding to the period June, 2011 – June, 2012), and d) vessel characteristics (gross tonnage, length, beam and depth) according to the data published by the General Directorate of Captaincy and Coastguards (DICAPI).

According to such information a total amount of 1,361 vessels was obtained: a) 956 (70%) were enrolled at Iquitos, 293 (22%) at Pucallpa and 112 (8%) at Yurimaguas; b) 497 (36%) were classified as motor boats and river sliders (86% of them had a gross tonnage lower than 10 GT, 3.00 to 28.00 m in length, 0.60 to 4.00 m wide and 0.40 to 1.80 m depth), 378 (28%) were classified as motor barges and motor ships (70% had a gross tonnage between 100 and 1,000 GT with 19.50 to 74.11 m in length, 4.20 to 13.0 m wide and 1.20 to 3.40 m depth), 312 (23%) were classified as deck barges (89% had a gross tonnage between 100 and 1,000 GT with 19.0 to 72.0 m in length, 5.44 to 14.00 m wide and 1.20 to 3.65 m depth) and 174 (13%) were classified as fluvial pushers (94% had a gross tonnage between 20 and 500 GT with 10.97 and 38.00 m in length, 3.36 to 10.10 m wide and 1.00 to 5.20 m depth).

With regard to antiquity, the analysis of a sample including 646 vessels (48.2% of the fleet) showed that about 10% of the sample and just over 40% of the deck barges and fluvial pushers and 15.8% of motor barges and motor ships had an antiquity equal to – or greater than – 25 years; while about 18% of the sample and just over 9% of the fluvial pushers, 11% of the deck barges and 29% of the motor barges and motor ships had an antiquity equal to – or less than – 10 years.

3.2 *The river infrastructure*

The main facilities of the Peruvian commercial river system are located at the cities of Iquitos (71 facilities: three of them classified as formal ones meanwhile the others are characterized by their infrastructure and equipment deficiencies), Pucallpa (98 facilities that do not meet the minimum standards) and Yurimaguas (12 facilities: two of them classified as formal ones meanwhile the others are characterized by their infrastructure and equipment deficiencies).

The rest of the commercially important river infrastructure corresponds to the towns of: a) Saramiriza, San Lorenzo, San José de Saramuro, Nauta, Yanayacu, San Pablo, Pebas and Santa Rosa (on the Marañon and Amazon Rivers), b) Contamana and Requena (on the Ucayali River), c) Atalaya (on the Urubamba river), d) Lagunas (on the Huallaga river), and e) Cabo Pantoja and Mazán (on the Napo river).

The remaining towns and river communities are characterized by the complete lack of infrastructure so – for goods loading / unloading or for passengers boarding / unboarding – most of the vessels simply approach to the riverside. Additionally, some river communities have small wood or concrete stairs (typically with erosion damage at the lower part).

Finally it must be noted that, currently, two new – well equipped – port terminals are being constructed at Pucallpa and Yurimaguas towns.

3.3 *Cargo movements*

From various analyzes, based on statistical information gathered by the Ministry of Transport and Communications (MTC) supplemented with data provided by the National Port Authority (APN), three charges represent, approximately, 60% of the movements: "oil and its derivates", "wood and its derivates" and "beer and empty beer bottles".

The rest includes various products such as "food", "cement", "vehicles and machinery" and "iron and steel products" as well as the concept "other

loads" that – in addition to the not specified ones – includes loads with relatively lower incidence such as "other beverages", "pharmaceutical and toiletry products", "clothes", "cleaning supplies", "chemical products", "electric articles" and "building materials".

During year 2012, the total flow of cargo reached 3,545,000 tons (Table 3) and, compared to the estimates made by previous studies, evidences the sustained growth of river transport: 1,300,000 tons/year (DGTA, 1998), 2.000.000 tons/year (Bara Neto, Sánchez & Wilmsmeier, 2006), 2.300.000 tons/year (INDESMAR – EGP, 2009), y 3.053.000 tons/year (EIH – H&O, 2010).

Origin	Destiny				
	Iquitos	Pucallpa	Yurimaguas	Others	Total
Iquitos	– – –	505.000	80.000	375.000	***960.000***
Pucallpa	520.000	– – –	55.000	100.000	***675.000***
Yurimaguas	190.000	20.000	– – –	110.000	***320.000***
Others	800.000	505.000	135.000	150.000	***1.590.000***
Total	***1.510.000***	***1.030.000***	***270.000***	***735.000***	***3.545.000***

Table 3: Total load movements at the Peruvian commercial waterways during year 2012

3.4 *Passenger movements*

Based on the same information sources, an analysis of passenger movements at the three main nodes of the region (Iquitos, Pucallpa and Yurimaguas) was also carried on (Table 4).

Origin	Destiny				
	Iquitos	Pucallpa	Yurimaguas	Others	Total
Iquitos	– – –	25.000	30.000	150.000	***205.000***
Pucallpa	25.000	– – –	0	10.000	***35.000***
Yurimaguas	30.000	0	– – –	10.000	***40.000***
Others	150.000	10.000	10.000	50.000	***220.000***
Total	***205.000***	***35.000***	***40.000***	***220.000***	***500.000***

Table 4: Total passenger movements at the Peruvian commercial waterways during year 2012

4 DIAGNOSIS OF THE FLUVIAL SERVICES AND INFRASTRUCTURE

On the Peruvian commercial fluvial system, river transport services are provided by vessels with very different characteristics (river boats and river sliders, motor barges, motor ships, deck barges and river pushers) being the "gross tonnage" the parameter that identifies the transport capacity of such vessels. Table 5 shows the classification of the river fleet by "gross tonnage" ranges considering – exclusively – the part of the fleet dedicated to cargo transport (motor barges, motor ships and deck barges).

Gross tonnage (ranges)	Motor barges, motor ships and deck barges	
	#	%
< 10	5	1
10 a 20	3	0
20 a 50	32	5
50 a 100	76	11
100 a 300	228	33
300 a 500	179	26
500 a 1.000	132	19
1.000 a 2.000	30	4
> 2.000	1	0
	686	***100***

Table 5: Gross tonnage distribution of the river fleet assigned to cargo transport

The amount and characteristics of the river infrastructure located at the major cities (Iquitos, Pucallpa and Yurimaguas) as well as at the towns and river communities located along the Peruvian commercial fluvial system has been analyzed previously. Such infrastructure characterizes by its extremely diverse typology: from formal port terminals (operated by Petroperu SA and the National Ports Enterprise – ENAPU) to cases where the vessels simple approach to the riverside for cargo loading / unloading or for passengers boarding / unboarding.

In almost all cases there is no equipment for cargo handling between vessels and land so cargo management it is left to informal stevedores performing their labor in an absolutely precarious form, without the most basic health and safety conditions and by means of inefficient operational procedures.

Consequently, the production of loading and unloading operations is extremely low and cargo losses are very frequent (damages due to an inappropriate cargo handling or to an excessive duration of the river transport).

The number of fluvial transport services providers is very high and most of them are small–scale and operates a small number of vessels (with very low rotation rates).

As for the procedures, they are clearly identified and, where possible, they allow the use of informatics tools; resolution times are also clearly specified (as soon as the required documentation is submitted in its complete form).

Regarding to the operators of the fluvial infrastructure the situation is different: the degree of informality is high and most of them operate without any kind of licenses or controls and – in most cases – without meeting the minimum requirements for the development of its activity.

Training issues – mainly for stevedores and onboard personnel – represents a major

shortcoming; nevertheless nobody – in the public or private sectors – seems to be interested in providing some kind of training.

In fact, most of the stakeholders develop "old" operating practices (product of habit). This is particularly reflected both in the design of ships and the repudiation of the technological elements associated with the navigation (considering "experience" as the main value for navigation purposes).

Moreover, are allowed – and considered as "normal" – various illegal practices such as (among others): a) the inaccurate record of the cargo and passengers; b) the loading / unloading of cargo and boarding / unboarding of passengers at not authorized places; and c) losses of cargo and fuel (usually marketed as a personal benefit to the crew).

From the point of view of the concerned institutions (with national or regional jurisdiction), the organizational framework of the fluvial transport does not seems to be the cause of the failure in the control of cargo and passenger nor in the limitations on the competition among providers or for the access of new entrepreneurs. However, from the analysis of the public institutions performance, arise various elements that, by action or omission, seem to indicate otherwise.

At the national institutions level it is particularly relevant the poor collective functioning of the General Directorate of Captaincy and Coastguards (DICAPI) and the National Port Authority (APN) particularly on issues referred to the grant for aquatic areas and for the enablement of fluvial infrastructures (as well as for subsequent controlling duties).

The product of the above conditions is the inefficiency of the Peruvian commercial river system due to the widespread informality, the anarchy, the limited functionality of the facilities, the inefficient operations, the low quality of services, the poor work conditions, the lack of law enforcement and its consequent controls. All of this with significant cost that, ultimately, affects the regional producers and consumers.

Finally, it must be mentioned the problems associated with navigation safety particularly regarding criminal acts (assaults).

5 THE PROPOSED DEVELOPMENT PLAN

The description and diagnosis of the current situation of the Peruvian commercial fluvial system allowed to identify and to evaluate development opportunities as well as to define a set of programs – the "Development Plan for the Peruvian Commercial Waterways" (the so–called "Waterways Plan") – oriented to organize fluvial transport activities promoting their integral development and improving navigability, river transport and river infrastructure (encouraging the integration of a vast region of Peru).

The Plan has the "vision" that "by 2025, at the Peruvian commercial river system – originally formed by Huallaga, Ucayali, Urubamba, Marañón, Amazon and Napo rivers – efficient fluvial transport services has been developed and adapted to the Amazonian environment (considered fluvial transport services on a broad sense and including navigation systems, vessels, infrastructures, cargo and passenger transfer centers as well as the users and the public and private operators). Such services represent an active part of the Peruvian multimodal transport corridors and contribute to the local communities quality of life, to the sustainable development of the region and to its regional and international integration".

The "mission" is to "promote the improvement and expansion of accessibility, efficiency, safety, intermodal connectivity and competitiveness of the river transport services becoming the key for the internal and external Peruvian trade".

Consequently the "Development Plan for the Peruvian Commercial Waterways" includes five strategic objectives with their corresponding actions and programs:

1. Improvement of governance and management by means of: a) the strengthening of the General Directorate of Aquatic Transport (Ministry of Transport and Communications), of the Regional Aquatic Transport Directorates, of the Regional Port Authorities and of the General Directorate of Captaincy and Coastguard (DICAPI); b) the setting–up of a "Permanent Commission for the Peruvian Commercial Waterways" (with public – private partnership); c) the formulation and developing of training programs for the staff of the institutions involved with the fluvial transport activities; d) the evaluation of the applicable regulations and the generation of incentives focused on the formalization of the fluvial transport related activities; and e) the update of the fluvial transport rules and its compilation on an easily accessible "Compendium".
2. Improvement of management aspects – including efficiency and operations records as well as controls and supervision – by means of: a) the establishment of local / regional organizations integrated by all the stakeholders involved with river transport activities; b) the implementation of a system focused on management facilitation; c) the implementation of integrated control systems; and d) the evaluation and improvement of the applicability of the tax regime.

3. Improvement of port infrastructures in order to promote their efficiency, safety and integration with the Peruvian logistic corridors by means of: a) the elaboration of port development and management plans (in coordination with urban development and management plans); b) the improvement of formality; c) the identification of alternatives for infrastructure and equipment facilities; and e) the formulation and developing of training programs focused on port operations.
4. Improvement of navigability conditions providing continuity, efficiency and safety by means of: a) the promotion of studies related to the analysis of the hydro – morphological evolution and the determination of sedimentation rates; b) the promotion of technology development programs; c) the increase of the number of river water level measurement stations; d) the improvement of navigation efficiency and safety during the dry season by the implementation of a river information system (RIS) based on the provision of information regarding the navigable channel location and river water level condition; and e) the formulation and developing of training programs focused on vessel crews,
5. Improvement of a modern, efficient and technologically updated fleet by means of: a) the promotion of the river fleet renovation; b) the strengthening of river transport companies in order to reach efficiency standards and competitive conditions; b) the provision of greater safety for cargo services; and c) the provision of greater regularity, reliability, comfort and safety for passenger services.

ACKNOWLEDGMENTS

The study includes technical data and information from varied nature provided by government agencies and private companies from the Republic of Peru. Therefore, the authors express their gratitude to the authorities, technicians and staff of such organizations and companies as well as to all those who contributed to its development and – very especially – to the authorities and staff from the Ministry of Transport and Communications (MTC), from the Aquatic Transport General Directorate and from the Planning and Budget Office.

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