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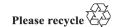
Inland Transport Committee

Working Party on Transport Trends and Economics

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Review and monitoring of emerging issues and
sustainable development goals:
Technical assistance to countries with economies in transition:
Sustainable Inland Transport Connectivity Indicators

National Connectivity Report - Jordan and Paraguay

Executive Summaries (Compiled by Prof. Khair Jadaan, National SITCIN Consultant in Jordan and Ms. Mical Rodriguez Laconich, National SITCIN Consultant in Paraguay)



'2020'

National Connectivity Report

Executive Summary



Jordan

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1. Introduction

Landlockedness is a major contributor to the relatively high incidence of extreme poverty and structural constraints in landlocked developing countries (LLDCs) which globally constitute 32 countries, made up around 509 million of the global population, and are among the poorest of developing countries with their average GDP per capita (constant 2010 US\$) in 2018 is just over US\$1,600 versus global US\$10,8812. ¹ Jordan, although not landlocked, was considered in the project due to its role as a bridging country between the East Mediterranean and Europe from one side and the Gulf countries from the other side.

Connectivity, within the context of this project, refers to "connectedness" in terms of transport, trade, customs and logistics processes. A developed inland transport connectivity system would allow transport modes to be well-interlinked. Transport connectivity is a national priority with a strong public and private sector interest, this can be observed in Jordan by initiatives such as "NAFITH" and the Unified National Window, both of which aim at improving information exchange between the different entities involved in transport, in order to achieve better facilitation, and improve overall connectivity.

The last decades have witnessed a significant increase in the amount of transport of persons and goods resulting in economic growth and connectivity becoming high on the political agenda of countries around the world, in particular Landlocked Developing Countries (LLDCs). In view of the lack of a unified methodological approach for countries to measure their degree of connectivity in terms of transport, trade and logistics network, UNECE developed earlier in the United Nations Development Account (UNDA) funded project "Sustainable transport connectivity and implementation of transport-related Sustainable Development Goals (SDGs) in selected landlocked and transit/bridging countries" a set of Sustainable Inland Transport Connectivity Indicators (SITCIN).

The SITCIN are designed to enable meaningful comprehensive measurement of transport connectivity of LLDCs and transit/bridging countries at an adequate level of detail that depicts the performance of these countries at strategic, tactical and operational levels. Furthermore, SITCIN allow the countries to report on the progress they are making towards achieving the UN SDGs, the 2030 Agenda for Sustainable Development and ultimately the Vienna Program of Action.

This project, funded by UNDA, is led by the United Nations Economic Commission for Europe (UNECE) Sustainable Transport Division and implemented in partnership with its two sister regional commissions the United Nations Economic and Social Commission for West Asia (UNESCWA) and the United Nations Economic Commission for Latin America and the Caribbean (UNECLAC). This National Connectivity Report (NCR) is developed to measure the transport connectivity of Jordan using indicators designed by the project, based on a preliminary set of indicators framed earlier by UNECE.

In the SITCIN data collection process a large spectrum of private and public sectors were involved, including relevant NGOs:

-

¹ Vienna Program of Action for Landlocked Developing Countries for the Decade 2014-2024

- Agaba Container Terminal
- Agaba Development Corporation
- Agaba Special Economic Zone Authority
- Association of Owners of Clearance and Transport Companies
- Central Traffic Department
- Jordan Maritime Commission
- Jordan Railway (Hijazi Railway Corporation and Agaba Railway Corporation)
- Jordan Shipping Association
- Jordan Standards and Metrology Organization
- Ministry of Environment
- Ministry of Finance (Customs department)
- Ministry of Internal Affairs (Jordan Traffic Institute)
- Ministry of Public Works and Housing (Roads Department)
- Ministry of Transport
- NAFITH Group

Around 19 representatives of different private companies were interviewed, most of them participated in the specially designed survey ...

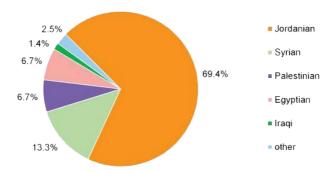
It was pointed out during the meetings held with stakeholders representing the above sectors that the data collected at the time was negatively influenced by the COVID-19 pandemic. This was taken into consideration during data analysis.

2. Country information

Jordan's geography as a strategic nexus connecting Asia, Africa and Europe has given it an important role to play as a conduit for trade and communications, connecting east and west, north and south. Jordan is located in Southwest Asia, in the rocky desert of the northern Arabian Peninsula, covering about 90,000 square kilometers, mostly desert plateau in the east, and highland area in the west.

According to the 2015 population and housing census, the country hosts a population of nearly 10 million inhabitants (2018), of which approximately 2.9 million(2018) are Syrian and Iraqi registered refugees (Figure. 1), among others while the estimated number is twice as big. Urban population accounts for more than 80% of the total with 4 million people concentrate in the Greater Amman area and more densely populated areas located in the north. The population annual growth rate during the period 2010-2018 was about 4% Compound Annual Growth Rate (CAGR).

Figure 1: Jordan Ethnic Composition (2015)



Besides unprecedented refugee inflows, the recent regional conflicts have affected Jordan at other levels including disrupted trade routes, and decreased investments and tourism inflows.

The population structure is predominantly young; persons under age 15 constitute more than one-third of the population. The birth rate is high, and the country's population growth rate is about double the world average. The average life expectancy is about 75 years. Internal migration from rural to urban centers has added a burden to the economy; however, a large number of Jordanians live and work abroad.

2.1. Key economic indicators

... Table 1 summarizes the socioeconomic context in Jordan with further information with population evolution are given in Annex 4

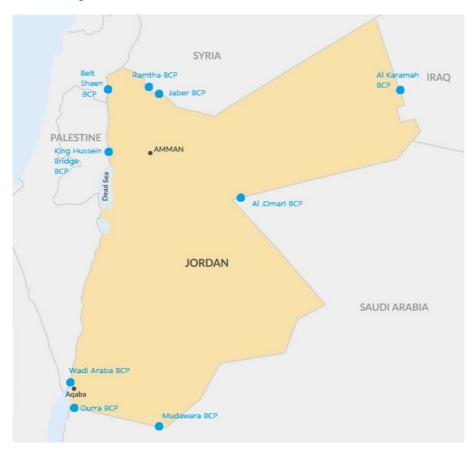
Table 1: Key economic indicators

Population (Population& Housing Census on 30/11/2015)	9,531,000
Population (2020 Estimate)	10,580,000
Country Size	90,000 m ²
Population density	114 / km ²

Human Development Index	0.723
Exports and imports (% of GDP)	89.5

Source: UNDP 2019, Department of Statistics - Jordan, Population" 2019

Figure 2: Map of Jordan



2.2.International connectivity of Jordan inland transport

1. International cooperations:

Existing Transport corridors passing through the country are:

- Highway 15 ("Al-Tariq Al-Sahrawy" or Desert Highway) which is a four-lane, dual carriageway connecting Amman to the Syrian border in the north, and to the port of Aqaba in the south. Amongst the main highways in Jordan, the desert Highway stands out as the most relevant corridor in the country, it is a crucial route to Jordan's international gateways, accordingly registering high traffic levels along its pathway, especially through those sections closer to Amman. The Government is currently upgrading the road at some stretches.
- Highway 35 (King's Highway): This is also an important corridor, with high traffic volumes through its northern section, which links Irbid and Amman and connects both cities to the border crossing to Syria. Its section between Irbid and Amman is a four lane dual carriageway
- Other relevant corridors in the country are HW-65 which connects Aqaba to the
 northwestern region of Jordan, HW-40 connecting Amman to the Dead Sea on the
 west, HW-30 (connecting Zarqa to KSA, HW10 connecting Mafraq to the Iraqi border,
 and HW-5 connecting Ma'an to KSA. There is also the Jordan Highway which encircles
 the city of Amman and connects it to the historic city of Jerash and Irbid. Fig 3shows
 the locaion of the main highways in Jordan.

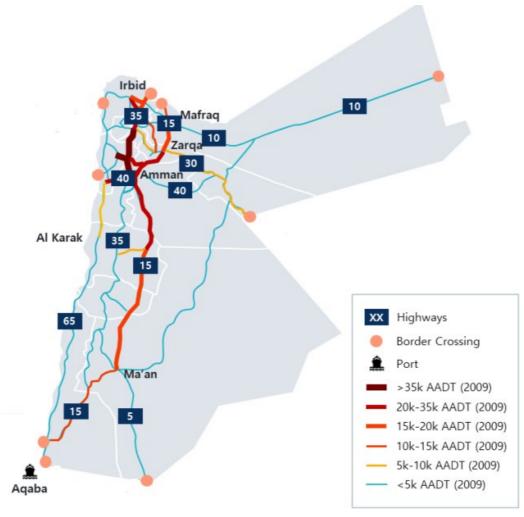


Figure 3: Jordan map - corridors

• Development of New Transit Routes and Corridors

Roads

According to Jordan Long Term National Transport Strategy and Action Plan report, higher importance is given to maintenance and safety-enhancing measures of the existing network, rather than investments in new roads or major improvements. The latter have been carefully selected and phased according to model results, to focus the investments only where they are really needed. This approach is also motivated by the need of optimising the available financial resources and the decision of developing a competitive and more environmentally sustainable alternative to the road mode (such as a new railway system).

The focus of new links is on incomplete projects, specifically in urban areas where congestion occurs or is expected. Some of the new links planned for the Long-Term National Transport plan include:

- 1- Amman Ring Road Phase 2 Sect. 4
- 2- Madaba Ring Road Phase 1 (East)
- 3- Madaba Ring Road Phase 2 (West-North)

Railway

The Jordan National Railway Project aims at developing a modern and reliable freight railway network linking the nation's key cities (i.e. Amman, Mafraq, Zarqa), the country's

gateway port (the Port of Aqaba on the Red Sea) and the largest phosphate mine (Shidiya Mine).

The project itself is organised to integrate the Jordan railway network with the regional, mainly under development, network by establishing effective rail connections with neighbour Countries.

According to the project, the Jordan National Railway should consist of three parts:

- 1- The "North-South Line", from the Syrian border to the Port of Aqaba via Amman (509 km), including rail links to the country's largest phosphate mine (Shidiya Mine) and to the South Terminal of the Port of Aqaba
- 2- The "Zarqa-Iraq Link" from the city of Zarqa to the Iraq border (290 km)
- 3- The "Link to Kingdom of Saudi Arabia" (91 km) that will complete the bridge between Saudi Arabia and Syria and will be an important component of a rail transport corridor between GCC countries and Europe

The new network will be single track, standard gauge, diesel traction, "AGC-AGTC" speed standard (120 km/h for freight traffic and 160 km/h for the passenger traffic), 30 tons maximum axle load, 1,5% maximum vertical gradient and 7,1m maximum vertical clearance, suitable for double-stacking of containers and possible future electrification.

Maritime

Strategies for the port and maritime sector have been developed in continuity with the work undertaken by the ASEZA and Aqaba Development Corporation (ADC). The proposal is therefore based on (a selection of) measures included in the Aqaba Ports Master Plan (Aqaba Development Corporation, 2007) and subsequent updates and modifications, which have been re-phased.

Infrastructure measures (mainly reference scenario's measures) are related to the development and the reconfiguration of Aqaba Port. The objectives are to increase capacity to accommodate large vessels, growth in cargo, increase efficiency in operation, allow good quality of services, be competitive at the regional level to attract new cargo. Key aspects are the disposal of the Main port (to be converted to other urban and touristic developments with only a cruise ship terminal), the relocation of the existing facilities from the Main port to the South (Industrial) port and the development of the Middle Port:

- 1- Relocation of Main Port facilities to South Port
- 2- New cruise ship terminals at Main port
- 3- Further expansion of Container terminal at Middle port
- 4- Development of Mustarak & Mo'ata Berths (bulk commodities) at Middle port
- 5- Upgrade of the existing passenger ferry terminal at Middle port (new halls and security facilities, new logistics facilities and yards)
- 6- Rehabilitation of Oil terminal at South port (to boost handling capacity and enhance safety and environmental protection)
- 7- New miscellaneous liquids, LPG (Liquid Petroleum Gas), LNG (Liquid Natural Gas) terminals at South port
- 8- Rehabilitation of the existing Industrial terminal and building one additional jetty at South port
- 9- New general cargo, Ro-Ro and grain terminals at South Port
- 10- New port area infrastructures at South Port

The Aqaba port is the stronghold of the upgraded national railway, being the main access gate to the Country for freight. Importantly, as soon as the first implementation step of the new railway network (the segment Aqaba port - Amman, see section above)

will be operational (2024), the new phosphate terminal at South port should be seamless connected to the new railway.

International agreement by transport mode

Road

Jordan was one of multiple EuroMed countries considered a contracting party for a number of agreements including:

- The Convention on the Contract for the International Carriage of Goods by Road (CMR)
- The Protocol to the Convention on the Contract for the International Carriage of Goods by Road
- The Customs Convention on the International Transport of Goods under Cover of TIR Carnets (TIR Convention)
- The International Convention on the Harmonization of Frontier Controls of Goods
- The Customs Convention on the Temporary Importation of Private Road Vehicles

Railway

Agreement on International Railways between Arab Mashreq (The Parties to the Agreement, conscious of the salient characteristics of railways with respect to construction and running costs, speed, safety, regularity, personal comfort and environmental conservation, and affirming the importance and necessity of providing railway links between the countries of the region in accordance with a well-studied plan for the construction and development of an international railway network in order to meet future transport needs)

2. Transport infrastructure:

- The total length of Jordan's roads amount to 8,000 km of paved roads (2018), with no significant network growth in recent years. The quality of the road infrastructure in Jordan obtained a score of 4.2/7 in the Index of Economic Competitiveness (World Economic Forum, 2019), where estimates indicate that 30% of the country's roads were in very good surface condition, 40% in fair condition, and 30% in poor or very poor condition.
- Jordanian railways comprise 509 km of narrow gauge (1,050mm) track operated by two entities: Aqaba Railway Corporation (ARC) used to operate the line in southern Jordan, serving the transport of phosphates from the mines in Ma'an to the port of Aqaba. This service is currently suspended due to lack of connectivity with the New Phosphate Terminal at the port. The second entity is the Hedjaz Railway Corporation which runs the only passenger railway currently operating (very light operation) in Jordan. The network connects Amman to Damascus, in Syria, passes through Zarqa and Mafraq, and extends all the way down south to Ma'an and Aqaba, reaching Saudi Arabia (although most of the line in Saudi Arabia is non-operational). Jordan's railway was originally the old Hejaz railway, with a gauge of 1,050 mm. The railway system extended from Medina in Saudi Arabia, all the way north to Damascus in Syria, covering the length of Jordan, and passing through the capital Amman. Much of the line in Saudi Arabia was destroyed although most of the route through Jordan

remained intact. A new branch of this railway system was constructed in 1972, connecting parts of the line just south of Ma'an to Aqaba, with the purpose of transporting phosphate rock for export, with operations being run by the Aqaba Railway Corporation. Today, this section remains the only truly operational part of the railway system. In terms of passenger transportation, only a short sections of the line between Amman, Mafraq, and Al-Jeezah station operates charter passenger trains on an intermittent basis, and at a very low average transportation rates of eight to twelve passenger trains per month. Most of the remaining line is largely unused or abandoned. In a most recent reform, the government transformed the old ARC owned by the MOT into a new RAC company owned by ASEZA responsible for the execution of the new 160 km railway link between Aqaba port and Ma'an dry port.

• *IWW (NA)*

2.3. Jordan's current position in international trade

The Logistics Performance Index (LPI)

... The World Bank developed LPI in 2007 as a tool to measure the logistics performance of any country. The index is measured on a scale of 1 (1 being low) to 5 (5 being high). The LPI international score uses six key dimensions to benchmark countries' performance and also displays the derived overall LPI index. The logistics performance (LPI) is the weighted average of the country scores on the six key dimensions:

- 1) <u>Customs</u>: Efficiency of the clearance process (i.e., speed, simplicity and predictability of formalities) by border control agencies, including customs;
- 2) <u>Infrastructure</u>: Quality of trade and transport related infrastructure (e.g., ports, railroads, roads, information technology);
- 3) <u>International Shipments</u>: Ease of arranging competitively priced shipments;
- 4) <u>Logistic Competence</u>: Competence and quality of logistics services (e.g., transport operators, customs brokers);
- 5) Tracking and Tracing: Ability to track and trace consignments;
- 6) <u>Timeliness</u>: Timeliness of shipments in reaching destination within the scheduled or expected delivery time.

Addressing the logistics performance sector in Jordan over the last nine years, Table 2 shows the World Bank overall LPI for a number of countries with different income status during the time period 2010 to 2018. It can be seen that Jordan's LPI was fluctuating over time reaching rank 84 in 2018 with LPI score value of 2.69. This represents a major drop compared with Jordan's best ranking of 2016 rank 67 and LPI value 2.96.

Table 2: LPI scores and (ranks) for Jordan, countries in the region, other landlocked countries relevant to the study, and top scoring countries for the years 2010-2018

Country	2010	2012	2014	2016	2018
Egypt	2.61(92)	2.98(57)	2.97(62)	3.18(49)	2.82(67)
Georgia	2.61(93)	2.77(77)	2.51(116)	2.35(130)	2.44(119)
Germany	4.11(1)	4.03(4)	4.12(1)	4.23(1)	4.2(1)
Jordan	2.74(81)	2.56(102)	2.87(68)	2.96(67)	2.69(84)
Kazakhstan	2.83(62)	2.69(86)	2.70(88)	2.75(77)	2.81(71)
Kuwait	3.28(36)	2.83(70)	3.01(56)	3.15(53)	2.86(63)
Lebanon	3.34(33)	2.58(96)	2.73(85)	2.72(82)	2.72(79)
Oman	2.84(60)	2.89(62)	3(59)	3.23(48)	3.2(43)
Paraguay	2.75(76)	2.48(113)	2.78(78)	2.56(101)	2.78 (74)

MENA Region	2.6	2.58	2.5	2.89	2.78
Unites States	3.86(15)	3.93(9)	3.92(9)	3.99(10)	3.89(14)
United Arab Emirates	3.63(24)	3.78(17)	3.54(27)	3.94(13)	3.96(11)
Turkey	3.22(39)	3.51(27)	3.5(30)	3.42(34)	3.15(47)
Tunisia	2.84(61)	3.17(41)	2.55(110)	2.5(110)	2.57(105)
Syria	2.74(80)	2.6(92)	2.09(155)	1.6(160)	2.3(138)
Sudan	2.21(146)	2.1(148)	2.16(153)	2.53(103)	2.43(121)
Serbia	2.69(83)	2.80(75)	2.96(63)	2.76(76)	2.84(65)
Saudi Arabia	3.22(40)	3.18(37)	3.15(49)	3.16(52)	3.01(55)
Qatar	2.95(55)	3.32(33)	3.52(29)	3.6(30)	3.47(30)

Figure 4 illustrates the results of further investigation into Jordan's LPI sub-dimensions for the time period 2007-2018. Examining these sub-dimensions and comparing their values for the years 2018 and 2016 reveals why Jordan's overall LPI score value and rank dropped significantly in 2018. While the ranking and score of the infrastructure for logistics did not show much variation over time, the sub-dimension relating to the efficiency and effectiveness of the customs clearance processes and other border control agencies, showed heavy fluctuation accompanied by a significant drop in 2018 reflecting on the overall score of the country. Table 3 lists some of these values numerically.

3.6
3.4
3.2
3.0
2.8
2.6
2.4
2.2
2.0
2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018

Jordan / Overall
Jordan / Customs
Jordan / Inferstructure
Jordan / Tracking & tracing

Jordan / Tracking & tracing

Figure 4: Jordan's LPI sub-dimensions for the time period 2007-2018 ²

Table 3: Jordan's LPI ranking and score

	2010	2012	2014	2016	2018
LPI Rank	82	1 102	68	67	84
LPI Score	2.74	2.56	2.87	2.96	2.69
Cus	toms 2.3	1 2.27	2.60	2.55	2.49

² The World Bank Group, Country Score Card: Jordan 2018 | Logistics Performance Index

-

Infrastructure	2.69	2.48	2.59	2.77	2.72
International Shipments	3.11	2.88	2.96	3.17	2.44
Quality Logistics Services	2.49	2.17	2.94	2.89	2.55
Tracking and Tracing	2.33	2.55	2.67	2.96	2.77
Timeliness	3.39	2.92	3.46	3.34	3.18

Ease of Doing Business Ranking & Ease of Doing Business Score

... The Doing Business project was launched in 2002 and it provides objective measure of business regulations and their enforcement. The ease of doing business score measures an economy's performance with respect to a measure of regulatory best practice across the entire sample of 41 indicators for 10. Economies are ranked on their ease of doing business, from 1–190. A high ease of doing business ranking means the regulatory environment is more conducive to the starting and operation of a local firm.

Higher scores refer to an environment which facilitates the establishment and operation of a local firm.

Table 4:: Jordan's 2020 EODB Ranking 3

DB Rank	Economy	DB Score	Trading Across Border Score
75	Jordan	69.0	79.0

With a score of 69.0, Jordan ranks 6th in the region in terms of ease of doing business, 8.8 points above the regional average.

Table 5: Border and Documentary Compliances – Jordan vs The Region

	Border Co	mpliance	Documentary Compliance		
Economy	Time to Export Cost to Export Time to Export		Cost to Export		
	(hours)	(USD)	(hours)	(USD)	
Jordan	53	79	6	100	
The Region	52.5	441.8	66.4	240.7	

Over the past 12 years, Jordan has made many business reforms that allowed it to climb the EODB ranking. Below we highlight some of those reforms:

- Most recently, Jordan introduced a new secured transactions law, amended the insolvency law and launched a unified, modern and notice-based collateral registry, which strengthened access to credit.
- Paying taxes was made easier by creating an online filing system and introducing electronic filing and payment for labor taxes and other mandatory contributions.
- Jordan made resolving insolvency easier by introducing a reorganization procedure.

³ The World Bank DOING BUSINESS data, available online at : https://www.doingbusiness.org/en/data

- Jordan made trading across borders easier by streamlining customs clearance processes, advancing the use of a single window and improving infrastructure at the Aqaba customs and port.
- Jordan made starting a business easier by reducing the minimum capital requirement from 1,000 Jordanian dinars to 1 dinar.

3. Data Collection

The data collection process was ensured by SITCIN national consultants in aim to measure and monitor all connectivity indicators. The data that are used to compile SITCIN can be categorized as follows:

- 1. Quantitative data, which is subdivided by
 - a. Discrete data, such as a number of accidents and a number of vehicles that are usually expressed in absolute terms or as ratios.
 - b. Continuous data, which is used to measure the length of infrastructure (in kilometres), goods transported (in tonnes) or waiting time at borders (in minutes).

2. Qualitative data

In most cases qualitative data is used, which categorizes performance by very good to very poor – such as infrastructure condition - to produce an ordinal scale where the higher the value the better the performance.

Difficulties during data collection mostly were related to the COVID-19 pandemic and its conseuences on lockdown and working remotely. Given the impossibility to hold in-person meetings due to COVID-19 restrictions, two zoom meetings were held with the stakeholders to clarify all the issues. Further challenges were faced at a later stage such as the delay in response by stakeholders, unwillingness to provide data, and inaccuracy and inconsistency of the provided data.

<u>Introductory meetings</u> [describe in brief...]

<u>Fact-finding mission</u> A fact-finding mission by the project team started on 6th October 2019 to review the national transport and logistics situation. These included reviewing transport system information and statistics and gathering views and approaches from competent national authorities and relevant stakeholders.

The mission aimed at

- 1. Conducting extensive consultations with national stakeholders,
- 2. Collecting relevant data and information (on hardware/software, policies, and regulations),
- 3. Identifying connectivity gaps and challenges.

In the frame of the mission the team visited:

- 1. Ministry of Transport
- 2. Amman Customs Center
- 3. Al Omari Customs Center
- 4. Aqaba Port Authority

And held meetings with:

- 1. HE Minister of Transport Anmar Alkhasawneh who approved the proposed program and advised a visit to Agaba Port. The program was modified accordingly.
- 2. Amman Customs Centre
- 3. Director of Alomari Customs Centre Colonel Raed Alnimry and his staff
- 4. Majd Al-Asmar of Aqaba Container Terminal
- 5. Hakam Aboveilat of the Logistic Village
- 6. Captain Mansour Qawkaza, General Manager of Aqaba Company for Ports Operation & Managment

7. Vincent Flament, Executive Director at Aqaba Container Terminal

Questionaires Following the identification of indicators, a list of relevant stakeholders was prepared. A preliminary questionnaire was designed in a manner that directly addresses all 215 indicators. This was translated into Arabic, and an electronic version of it was created and sent to a number of stakeholders. Although the data obtained through this questionnaire was mostly unreliable, it did provide some valuable insight in cases were the stakeholder was familiar with some of the indicators, and could provide accurate assessment of the situation in Jordan. It also paved the way for a better data collection methodology. Improved and targeted questionnaires were afterwards prepared for each stakeholder individually, these questionnaires took into consideration factors such as the applicability and local equivalence of some attributes, the position and knowledge of the targeted stakeholder, and the language used. All the questionnaires were translated into Arabic, and both English and Arabic versions were sent across. Meetings were held with each stakeholder individually, questions were fully explained, answers were recorded, and the process of providing follow up data was agreed upon.

<u>Interviews</u> In order to address some issues and secure gathering information necessary to evaluate relevant indicators, direct interviews were conducted with the most relevant and most cooperative stakeholders using focused questionnaires specific for each stakeholder (or group of stakeholders).

Data collection phase included direct interviews with top officials of each stakeholder. A scheduled program of interviews was organized with support of the national liaison officer at the Ministry of Transport (MOT) who sent the questionnaire to each stakeholder before the time of the interview.

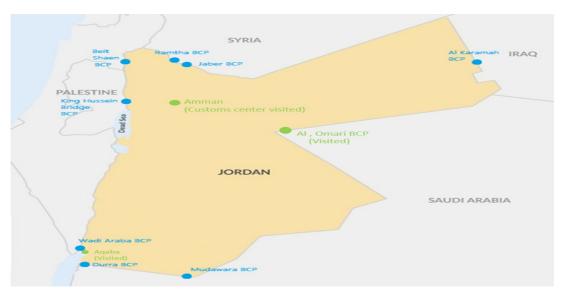


Figure 5: Map of BCPs Surveys

4. Country Score

Table 6 summarizes the data evaluation results. The country overall score is 745 points out of total 1724 points.

In the column (from left) of Table 6 is shown the country connectivity index (progress) for each subchapter, each mode of transport and overall.

Table 6: Jordan score

NCR Chapters	Max score	Score	Progress
Road	330 points	136 points	41%
Rail	238 points	0 points	0%
IWW	96 points	82 points	85%
4.1 Border Crossing Facilitation	100 points	33 points	33%
Road	120 points	83 points	69%
Rail	70 points	4 points	6%
IWW	20 points	20 points	100%
4.2 Infrastructure	100 points	51 points	51%
Road	160 points	114 points	71%
IWW	50 points	50 points	100%
4.3 Safety and Security	100 points	78 points	78%
Road	250 points	108 points	43%
Rail	30 points	10 points	33%
IWW	60 points	50 points	83%
4.4 Transport of perishable foodstaffs & dangerous goods	100 points	49 points	49%
Road	40 points	25 points	63%
Rail	40 points	6 points	15%
IWW	10 points	7 points	70%
4.5 Interoperability	100 points	42 points	42%
Road	130 points	30 points	23%
Rail	50 points	0 points	0%
IWW	30 points	20 points	67%
4.6 Environment and energy	100 points	24 points	24%

Transport mode	Max score	Score	Progress	Weighted max score	Weighted score	Weighted progress
Road	1030 points	496 points	48.2%	309 points	149 points	48%
Rail	428 points	20 points	4.7%	0 points	0 points	0%
IWW	266 points	229 points	86.1%	186 points	160 points	86%
Total	1724 points	745 points	43.2%	495 points	309 points	62.4%

Country final/overall score is a weighted number in accordance the approved score weighting methodology. The country weighted score is 309 points and the calculated connectivity index is 62.4%.

5. Conclusions and Recommendations

Conclusions and recommendations are developed and summarized based on results of data collection (surveys, interviews, consultations, desktop research, etc) and their detailed analysis, considering findings and statements defined in the SWOT analysis in the NCR.

Around 16 indicators (10%) were not evaluated, a large percentage of those belong to the Railway Sector, which is currently not operational as mentioned earlier, which explains the lack of data to provide necessary indicator evaluation.

Data analysis showed that the country has:

- the maximum score (10 points) in 49 indicators (31%)
- the minimal score (0 points) in 63 indicators (39%)
- 36 indicators (22%) were not scored by points, because they were verification indicators
- Results of the rest 124 indicators range between 0 and 10 points (78%).

Data analysis results

5.1. Conclusions

Border Crossing Facilitation

General: The cross-border trade accounts for 30% of total Jordanian trade (in tons, 2018), led by land trade with KSA (9%). Trade with Iraq and Syria used to play a major role in cross-border transport, but borders were closed following regional turmoil, only to reopen in 2018-2019, and are still performing significantly below pre-closure levels.

Road transport: There is a growing awareness of the importance of cross-border areas for the future of the region. There is also a high political commitment for border crossing facilitation coupled with a set of political declarations, laws and agreements/treaties for cooperation.

Well trained experienced staff (of all categories) available 24/7 at all road BCPs and inland clearance stations. Their background and experience are enhanced by effective multi-level training programs. However, there is limited institutional and human resource capacities with insufficient Custom staff at some border posts that fully satisfy existing demand on the relevant services

A good coordination exists at all Border Crossing Points (BCPs) between customs, security and all other related authorities at all BCPs. Information and data are shared among different border authorities with many studies and publications on cross-border cooperation

(CBC), mainly national approaches. Furthermore, several cross-border areas cooperate with economic and social partners active in CBC (informal cooperation).

Road connectivity to the seaport of Aqaba is in reasonable condition with unutilized capacities in some road routes.

New technologies such as electronic tracking and X-ray inspection systems, eCustoms, electronic system of Permits and Licenses, eTIR and the most recent eSingle window are implemented. However, application of fleet management and Electronic Toll eCollection (ETC) system is not in place. However, some equipment especially the X-ray inspection devices are old and need replacement.

Rail transport: Currently, no BCP exists for rail. There was one BCP (with Syria) but stopped to be operational in 2010 until now.

Water Transport :The maritime transport sector is not receiving sufficient attention (that it deserves) from the government with limited government financial resources affecting the investment potent

Aqaba is the only trade gateway in Jordan and has a distinguished geographical location but the limited Jordanian coast restricts the expansion of economic, industrial, tourism and social activities

Internationally, Jordan is a part of agreements related to maritime transport. The country has also signed bilateral agreements in maritime transport with all countries of the region. The road network that links Aqaba Port with many countries in the region facilitates transit operations. This is negatively affected by the security concerns, especially with regard to border attachment with several countries and political uncertainty...

Transport Infrastructure

General...

Road transport...: Jordan's strategic geographical location creates strong demand for transport and utilities infrastructure. In addition, robust tourist arrivals into Jordan, is driving demand for infrastructure.

Jordan exhibits sustained growth as a result of it being large beneficiary of the funding agencies support for infrastructure investment, and large contractors have a major presence in the Jordanian market

All roads, including those at the BCPs, are designed and have technical specifications according to the international standards. The roads at all BCPs are of the same class with fully harmonized traffic control devices (traffic signals, traffic signs and road markings) in accordance with the international standards. However, the roads suffer from the absence of climbing lanes on steep grades.

The local working-age population serving the construction sector has strong skills base, but the high levels of unemployment in the construction industry leads to high and rapid emigration of skilled workers to the neighboring rich gulf countries

Jordan's transport infrastructure suffers from discouraging regulatory and legislative framework for investors together with some reliance on funding to drive construction growth.

Rail transport...: The Jordanian's railway infrastructure is very weak and was receiving very low maintenance before becoming completely nonoperational in 2018. There is severe shortage of experienced local railway engineers and trained staff leading to foreign consultants becoming the dominant experts. However, there is a growing awareness of the importance of this mode and its role in improving the GDP of the country, together with a growing number of training activities.

Water transport..: . Jordan has strong infrastructure in the field of port construction with a new port system in Agaba and the specialized docks

- The development of maritime education in Jordan provides qualified marine personnel to support the growth of the marine sector. Workers in the maritime transport sector (maritime administration, port system, and the private maritime sector) have a knowledge base, advanced expertise, and skills. However, the limited financial resources affect the maintenance of offshore facilities besides affecting the completion of interconnection projects between Aqaba and the land port.

Safety and Security

General...

Road transport...: Although, in view of the regional political, social and economic instability, the issues of safety and security are considered major concerns, the collected data revealed

they are at a normal level with road signs and signals installed on all roads and road traffic rules are being enforced resulting in a normal level of road safety. The number of road accidents remains problematic. According to the latest WHO data published in 2018, road traffic accidents fatalities in Jordan reached 2,244 or 6.77% of total deaths. The age adjusted Death Rate is 27.46 per 100,000 of population ranks Jordan #49 in the world.

Rail transport...: The current level of safety and security of Jordanian's railway infrastructure is very low and may be classified as dangerous at some parts. There is a severe shortage of effective safety and security measures and even those existing do not comply with any standards.

Water transport ... Jordan has a distinguished relationship with all relevant international organizations, especially the IMO and the European Maritime Safety Agency. Jordan joined all international agreements related to maritime security and safety (ISPS Code) and international ships/port security code was implemented on board of Jordanian ships and at all Agaba ports.

The highest standards of maritime safety and security are implemented in all constructions and port berths. Safety exercises are performed periodically.

-Qualified marine personnel.

There is an advanced and qualified marine communication system implemented together with licensing systems for all port berths and all are periodically inspected. There is also a system for responding to accidents and marine accidents in the gulf of Aqaba.

An advanced control system exists for all ships flying the Jordanian flag and for foreign ships that come to Aqaba port to ensure that they comply with all safety and security regulations. The main factors negatively influencing water transport are government bureaucracy, affecting the speed of decision-making and leading to large delays in implementing recommended measures; insufficient coordination and cooperation between the parties concerned; and the emigration of specialized Jordanian talents due to low pay.

Transport of perishable foodstuffs and dangerous goods

General...

Road transport...: The state agency (Jordan Food and Drug Administration JFDA) is responsible for the harmonization of national legislations with international standards and internationally agreed rules and provisions and with ATP requirements

All issues related to the transport of perishable foodstuffs and dangerous goods are harmonized with international standards and agreed provisions. These issues include definition, classification, procedures for the approval of inspection bodies, marking and more. The information on the requirements and restriction of transport of dangerous goods are available free to the public. The provisions related to transport of dangerous good are fully harmonized with European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR).

There were no reported accidents /incidents involving transport of dangerous goods in Jordan.

There is only limited adequate data base on all aspects of transporting perishable food stuff and dangerous goods. Similarly, there is limited (insufficient) adequate studies necessary for improving the services of transporting perishable foodstuffs and dangerous goods. The number of trained people involved in this sector is insufficient.

Rail transport... Not applicable

Water transport.: There are specialized docks in Aqaba to deal with hazardous materials in Aqaba.

Safety exercises and drills are conducted to deal with cases that include leakage of these materials in accordance with the International Maritime Dangerous Goods (IMDG) Code

All facilities are subject to strict inspection procedures to ensure their conformity with international requirements.

Jordan is a party to all international agreements related to hazardous substances, which cover the same issues mentioned under road transport

On the other hand, the number of people trained to combat accidents of this nature is insufficient. Similarly, the quality and quantity of the available studies necessary to improve services for the transport of food and dangerous perishable goods are inadequate. Finally, the limited financial resources weaken the ability to respond to potential risks.

..

Intermodality

General...

Road transport...: The geographical strategic location of Jordan, gives it the opportunity to choose from a wide variety of transportation intermodality.

-The Jordanian law related to multimodality is harmonized in accordance to the international intermodal transport agreements

Aqaba port terminals are well-connected with the road network and railways.

The average handling time of consignments (mainly phosphates and potassium)in terminals is relatively short. On the other hand, there is a lack of specialized human resources in transport and logistics, necessary for the development of efficient and competitive multimodal / intermodal transport, forming a bottleneck on intermodality.

Rail transport...: Intermodality does not exist in view of the absence of the rail services after stopping operation in 2018

Water transport: ... Aqaba port terminal is well-connected with road network and railway lines

Jordan is a party to the Multimodal Transport Development Agreement and of the League of Arab States Agreement for Multimodal Transport participating in all relevant meetings and events

The Aqaba port stations are linked to the road and rail network, but there is a lack of financial resources to develop efficient and competitive multimedia / media transport

-Political instability in the countries of the region affects the flow of goods.

The intermodality will be significantly enhanced by the execution of the recently funded 160 km connection between Aqaba and the dry port in Ma'an

Environment

General...

Road transport...: The average age of the passenger cars, buses and trucks are 10, 20 and 17 years respectively with about 15% of total vehicle fleet (passenger cars only) are using alternative fuels. The truck fleet is over aged and have significant impact on environment especially urban noise and air pollution.

The national noise and vehicle emission legislations are in accordance with international standards and agreements. However, there is a lack of control of these regulations.

Rail transport....: Does not exist (no operations

Water transport.: All related legislations are in accordance with international standards and agreements, and Jordan has joined all the agreements related to the marine environment.

The Aqaba Gulf region is classified, according to the IMO, as a special area and must be protected from pollution from ships.

The Jordanian government attaches special importance to the Gulf of Aqaba, its environmental set up and the preservation of coral, and recently, amendments to reducing carbon in ship fuel have entered into force.

Other factors affecting the water environment in Aqaba is the limited Jordanian coast and the presence of many industrial and economic activities in a narrow area.

..

5.2. Recommendations

Recommendations are divided by 4 main pillars: (1) Transport policy, (2) Facilitation, procedures and institutions, (3) Infrastructure, and (4) Environment, Safety and Security.

In each pillar recommendations are addressed to 4 main shareholders:

- 1. Government and its agencies (G)
- 2. International organizations (I)
- 3. Transport business private companies and relevant associations (P)
- 4. Non-governmental organizations (N)

Based on SITCIN data analysis, specific recommendations are formulated and addressed to the relevant governmental and non-governmental.

Recommendations are divided by 4 pillars as follows: Transport policy, Facilitation, procedures and institutions, Infrastructure and Environment, Safety and Security.

Transport Policy

- 1 The capabilities and resources of concerned public bodies need to be adapted, most significantly the MOT units involved in the governance of land transport i.e. Capacity building, which this project is addressing.
- 2 Eliminate irrational regulations limiting the productivity (such as existing ban on two 20ft containers being transported on a truck which is technically suited to perform a limited number of trips),
- 3 Regulate transport operations to secure quality standards and improve productivity
- 4 The government should continue to make every effort to further simplify, as much as possible, the institutional setup for the port of Aqaba. This would tackle the challenges such as delays faced by stakeholders and investors in the region, due to inadequate managerial structure and slow decision-making processes.
- 5 Development and preparation of national strategy for transport of dangerous goods as comprehensive strategy for the whole field of transport in order to promote advance

- of safety of transport, traffic and the environment together with functionality of logistics chains.
- 6 Establishment of coherent legislative framework for regulation of intermodal transport with the involvement of all stakeholders from logistics chain with the aim of identification of all bottlenecks, challenges and future trends.
- Efforts should continue to invest on the interest from bilateral donors in the region for financing some of the transport projects' cost given their national interest. In this regard, the government, most recently, transformed the old ARC (owned by the MOT) into a new company owned by ASEZA. Most recently, the new ARC was able to secure financing for the construction of a new railway line (160 km long) linking Aqaba port with the dry port in Ma'an.

Facilitation, procedures and institutions

- Applying stricter criteria for the access to the transport market (such as financial viability and sustainability requirements on transport companies). Effective enforcement of strict regulatory conditions to secure they are efficient, safe, sustainable transport operations which also comply with quality standards. More specifically, performing strict control on the driver's conditions (driving and rest periods) and on technical conditions of the vehicles (weight and dimensions on the road)
- 2 Create and institutionalize an observatory for the land transport and logistics sector, this would provide useful data in order to properly assess the sector, and establish and monitor its reform, tackling multiple challenges at once.
- 3 Relevant data sources do exist in Jordan but there is still room for improvement as per information, frequency, accuracy and public availability.
- 4 All concerned parties should actively cooperate to provide necessary trainings and Education courses. This is particularly needed in the area of perishable food and dangerous goods
- Apply IT systems and solutions at every step of the transport chain including fleet planning and management, and customer relationship
- 6 Carry out periodic evaluation of SITCIN and ensure effective cooperation between neighboring countries to facilitate connectivity of inland transport. UNECE can play an important role in this regard.
- 7 Full implementation of the recent National Window Trade project. The project is currently only partially implemented

Infrastructure

- 1 Ensure a continued access to regional and international funding (in the form of grants and loans) together with involvement of private sector lead to the continued growth of the sector
- The MPWH need to pay more attention to the road network especially those connecting BCPs with inland. In particular, HWY 15 (the desert road) should get special attention to make fully operational and safe as early as possible.
- 3 The Jordanian government should put every effort and secure necessary funds to enable railways play its present and future role in both freight and passenger

transport. Therefore, decisions regarding the national railway project should be made as early as possible

4 The government need to secure fund and execute the rehabilitation of Hijaz railway and the construction of the new Aqaba- Maan link (160 km)

Environment, Safety and Security

- Assess the potential of HRC to operate some touristic and passenger services. The HRC should continue in a reasonable scale -- the operation of steam powered locomotive which is part of the unique Jordanian cultural heritage.
- Review national legislation related to perishable foodstuffs to ensure that it is comprehensive and cover the necessary requirements for all issues including transport conditions, testing, classification of special equipment, approval, and certificate of compliance and that all these requirements are in compliance with international standards and regulations
- 3 Implement fleet renewal programs through a variety of public policy tools such as buyback programs (compiled in a booklet available for the public), some of which are already in place in Jordan.
- 4 All concerned parties should take advantage of the great attention given to rectify the conditions caused by COVID-19

2020

National Connectivity Report

Executive Summary



Paraguay

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1. Introduction

The National Connectivity Report report covers and measures the performance of inland transport modes: namely railway, road and inland waterway (IWW) transport modes. In the Paraguayan case, railway transport is not developed as of NCR preparation period. All modes of transport are studied through three key pillars: economic, social and environmental sustainability.

The NCR is the next step after the development of Sustainable Inland Transport Connectivity Indicators (SITCIN) which is a tool developed under the UNDA funded project "Sustainable transport connectivity and implementation of transport-related Sustainable Development Goals (SDGs) in selected landlocked and transit/bridging countries". This project is managed by the United Nations Economic Commission for Europe (UNECE) in collaboration with the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) and the United Nations Economic and Social Commission for West Asia (ESCWA). Five (5) pilot countries, were selected from different regions of the world in order to measure inland transport connectivity, compare each country performance and evaluate connectivity progress in the next years. Paraguay is one of the pilot countries where the SITCIN will be tested and based on the results, the indicators will be further finetuned.

These indicators evaluate both the institutional and legal set-up as well as the regulatory and administrative environment related to border crossings, customs and transit procedures, appraise the quality of the administrative framework (including consignment and transport documentation regimes) surrounding road and rail transport respectively, analyse the quality and effectiveness of transport and logistics infrastructure, determine the robustness of the road traffic management and road traffic infrastructure system, assess the quality of the regulatory framework surrounding transport of dangerous goods and perishable foodstuffs and evaluate efforts aimed at reduction of greenhouse gases, age and maintenance of vehicle fleet and air and noise emissions.

SITCIN can be used by LLDCs and non-LLDCs in and outside the UNECE region, to voluntarily assess and report their progress towards achieving UN SDGs, the 2030 Agenda for Sustainable Development and ultimately the Vienna Programme of Action. In total, SITCIN includes 215 different indicators, but in the Paraguayan case, data was collected to evaluate 161 indicators for road and Inland Waterway transport (54 railway indicators were excluded from Paraguay's NCR because railway transport mode is not used to transport goods). The indicators, SWOT analysis and recommendations are divided into 6 chapters: 1. Border Crossing Facilitation, 2. Transport Infrastructure, 3. Safety and Security, 4. Transport of perishable foodstuffs and dangerous goods, 5. Intermodality, 6. Environment.

Fact-finding missions were held by the project team to review the beneficiary country's transport system information. In the frame of the fact-finding missions SITCIN's team met with representatives of various public institution and visited the Border Crossing Point at Jose Falcón and the Border Crossing Point in Ciudad del Este. The following private and public stakeholders were consulted during the SITCIN data collection process that took place from February to December 2020: Ministry of Public Works and Communications , Ministry of Foreign Affairs, National Transport Authority, National Authority for Navigation and Ports, TERPORT, Merchant Navy Administration, Ministry of Industry and Trade, Ministry of Sustainable Development and Environment, National Customs Authority, National Agency for Road Safety, National Institute for Food and Nutrition, National Service for Plant and Seed Quality and Health.

2. Country information

2.1. Key economic indicators

Table 1. Key economic indicators

- GDP (current USD billion 2019) 38
- GDP per capita PPP (current international USD) 13,210.3
- Annual GDP growth average (2003-2015) 4.7
- Population (million inhabitants) 7.0
- Surface Area (sq.km) 406,752
- Human Development Index 0.710 female/ 0.734 male
- Trade (exports and imports as a percentage of GDP) 69.8

Source: HDR ranking, World Bank

Figure 1. Location of the country



Source: Encyclopædia Britannica, Inc.

2.2. International connectivity of Paraguay's inland transport

1. International cooperation:

- Development of New Transit Routes and Corridors
 - O The Bioceanic Corridor is the most important project carried out by the Ministry of Public Works and Communications (MOPC) in the Chaco region. The project uses the 'turnkey' modality put in place by Law 5074 and entails an investment of USD 445 million. The corridor will connect the most important seaports of the Pacific and Atlantic Ocean. According to the Ministry of Public Works" the construction of this Corridor has a high strategic value for Paraguay because it will turn the Western Region into an international logistics center by becoming the shortest route between Chilean and the Brazilian ports. The Bi-oceanic corridor already has 106 kilometers of paved and signposted roads of the total of 277 km planned¹.

¹ https://www.ip.gov.py/ip/corredor-bioceanico-avanza-con-la-ejecucion-del-505-en-todos-sus-subtramos/

Figure 2: map - corridors



Source: Ministry of Public Works and Communications. Accessed on 10 November 2020

2. Transport infrastructure: o Road

The Ministry of Public Works and Communications (MOPC) is in charge of proposing and executing the policies and provisions regarding infrastructure and basic services for the integration and economic development of the country. The Directorate of Roads is responsible for national and departmental routes. The Directorate of Neighborhood Roads is in charge of neighborhood roads. Both divisions are part the Vice Ministry of Public Works and Communications.

The road system in Paraguay is classified into the following three groups of roads: National Routes, Departmental Routes and Neighborhood Routes. According to the Workd Bank, Paraguay's "road network length is estimated at 100,000 km, of which only 32,208 km are classified and managed by the Ministry of Public Works and Communications (MOPC). Around 68,000 km of the network is under the administration of local authorities. Surveys carried out in 2011 and 2014 over approximately 4,860 km of paved roads indicate that roads are deteriorating rapidly possibly as a result of insufficient maintenance. As such, while in 2011 some 68 percent of the paved network was in good condition (measured through its roughness, International Roughness Index [IRI] < 3), in 2015 surveys this figure has gone down to 59 percent, with an increased share of roads in fair condition up to 33 percent (3 < IRI < 5) and 9 percent that are in poor condition (IRI > 5)." The following table shows the road network classification in 2020 according to the MOPC.

Table 2. Classification and surface type the national road network in 2020

	Paraguay road network								
		Data from 7/1/2020 Total II			I Inventoried Depa	rtamental N	etwork (km):	78.811	
				TYPE O	F SURFACE				
	PAVED (KM) NON-PAVED (km)					VED (km)			
Type of network	PCA*	SURFACE TREATMENT**	HCP***	Cobblestone (portland cement concrete)	Stone	Stone-Gravel	Gravel	Earth	Total by network type (km)
National (km)	4.702,27	321,16	15,00	34,65	83,34	66,17	0,00	3.553,32	8.775,91
Departamental (km)	2.056,24	84,90	0,00	0,00	474,44	384,53	0,00	4.825,81	7.825,93
Neighbourhood roads (km)	1.320,66	33,08	0,00	5,34	688,54	646,26	0,00	59.515,27	62.209,14
Total by surface type (km)	8.079,17	439,13	15,00	39,98	1.246,32	1.096,96	0,00	67.894,41	
Percentage %				13,85%			86,	15%	

*PCA: asnhalt laver

Source: Directorate for Road Planning. Ministry of Publics Works and Communications (2020)

The road network grew from 2016 to 2020. The Ministry of Public Works and Communications (MOPC) carried out a new classification and recategorization of the Paraguayan road network, after the last update carried out in 1962. According to this update, the Eastern Region of the country had 3,494 km of national roads and now has 5,502 km of paved routes. The Paraguayan Chaco added 4 more roads, totaling 3,554 km². Figure 2 shows the layout of the national road network in 2020.

o Rail

Rail infrastructure is not used for cargo transport. Therefore, rail transport indicators are not included in this report. Nevertheless, it is important to indicate that Paraguay is planning to develop rail infrastructure for cargo transport. These plans include the construction of a freight train in the southern city of Encarnación. Another freight train that connects the northeast cities of Concepción and Pedro Juan Caballero. This freight train would provide multimodal links between the Paraguay-Paraná Waterways and Ponta Porá - Campo Grande Brazilian Railways and increase the amount of private investment in the north of the country. Lastly the bi-oceanic railway corridor will connect the Atlantic and Pacific Ocean and will enhance integration between the MERCOSUR member countries in aspects related to the interoceanic transport of goods and merchandise. According to the South American Council of Planning and Infrastructure (COSIPLAN), the railway integration projects that include Paraguay are the following: 1) a project to connect the port of Santos in Brazil and the port of Illo in Peru, passing through Bolivia and connecting Asuncion-Paraguay, 2) a project to connect the port of Paranaguá in Brasil and the port of Antofagasta in Chile, passing through Paraguay and Argentina, 3) a project to develop a north-south rail in order to connect all the rail projects in South America³.

The need for rail infrastructure is a cause of concern for the Paraguayan government since it is important to develop this mode of transport in order to meet the increasing demand for movement of goods, to keep costs competitive and to make transport more resilient in the face of weather related risks. For instance droughts can prevent navigation throughout the year even if appropriate maintenance and dredging of rivers

^{**}Surface treatment: Layers with surface treatment

^{***}HCP: concrete pavement with portland cement

² https://www.mopc.gov.py/index.php/actualizacion-de-la-red-vial-de-rutas-nacionales-del-paraguay

³https://www.parlamentomercosur.org/innovaportal/v/16971/1/parlasur/comision-deinfraestructura-apruebarealizacion-de-seminario-sobre-transporte-ferroviario-en-america-del-sur.html

are carried out. Rail infrastructure can also serve as a low cost contingency mode of transport for this type of scenario.

o IWW

Paraguay's Inland Waterway system is very rich. The most important rivers are the Paraguay River (length 1260 km) and the Parana River (length 850 km) because of their flow, extension and navigability. Nevertheless, all the rivers that run through the Paraguayan territory are part of a large hydrographic basin called the River Plate Basin, a channel that ends in the River Plate and then flows into the Atlantic Ocean⁴.

Paraguay is part of the Paraguay-Paraná Waterway which consist of 3,442 km of inland waterway that unite 5 countries and runs from Puerto Cáceres (Brazil) to Nueva Palmira (Uruguay). The Paraguay-Paraná Waterway Agreement is one of the most important and extensive axes of political, economic and social integration in South America. Its area of influence is approximately 5 million square kilometers, and includes a population of about 70 million inhabitants.



Figure 3. Paraná Paraguay Waterway System

Source: Diálogo Chino (2020). Available at https://dialogochino.net/en/infrastructure/37072chinese-company-could-run-crucial-argentine-shipping-route/. Accessed on 10 November 2020

Paraguay has the third-biggest fleet of tug-steered barges in the world, behind the US and China. This fleet transports more than 90% of the intra-zone cargo in the Paraguay-Parana Waterway. That is, the intra-zone imports and exports of all the countries that signed Waterway Agreement, which are Brazil, Bolivia, Paraguay, Argentina and Uruguay. The traffic exceeds 30 million tons per year⁵.

⁴ https://cicplata.org/es/una-cuenca-cinco-paises/ http://perfil.cepal.org/l/es/pdf/Area1-Par.pdf

⁵ https://www.clubdeejecutivos.org.py/revista/hidrovia-paraguay-parana-arteria-de-la-economia-paraguaya

Table 3. Characteristics of the Paraguavan Fleet in the Paraguay-Paraná Waterway

Type of vessels & barges	Quantity	Static transport capacity (tones)	Static transport capacity (TEUs)
Dry-bulk Barges	2.700	3.694.034	-
Tank Barges	247	473.900	-
Container Barges	33	128.399	4.085
Tugboats and pusher boats	380		-
Self-propelled Barges	85	211.404	6.726
Total	3.445	4.507.737	10.812

Source: 5th World Forum (2020). Cities and Logistics Platforms. The future of IWW transport. Available at https://www.youtube.com/watch?v=uTUAeXwm48w Accessed on 25 December 2020

In 1989, there were fewer than 100 vessels flying the Paraguayan flag and today there are over 2722. Paraguay implemented a very flexible regime for incorporating vessels to its flag, such as a leasing law that allowed the incorporation of capital goods with benefits and also tax benefits. As a result of these measures, a large number of vessels were incorporated in the 90's'6.

With regard to port infrastructure, the country has public and private ports. There are 9 private ports in the Parana River and 38 private ports in the Paraguay River. The National Authority for Navigation and Ports manages 17 ports. Lastly, concerning prices, public ports have fixed costs set by decrees while private ports set costs depending on a series of factors, for instance the location of the port, the volume of cargo that each client manages, the dynamics of supply and demand in certain scenarios such as drought, pandemic, etc.⁷

2.3. Country's current position in international trade

The Logistics Performance Index (LPI) 2018

Country	Rank (out of 160 countries)	Overall Score	Score - Customs	Score - Infrastructure	Score- International Shipments	Score- Logistics competence
Paraguay	74	2.78	2.64	2.55	2.69	2.72
Bolivia	131	2.36	2.32	2.15	2.54	2.21
Uruguay	85	2.69	2.51	2.43	2.73	2.71
Argentina	61	2.89	2.42	2.77	2.92	2.78
Brazil	56	2.99	2.41	2.93	2.88	3.09

https://www.clubdeejecutivos.org.py/revista/hidrovia-paraguay-parana-arteria-de-la-economiaparaguaya

https://www.ft.com/content/4c086044-56cf-11e9-8b71-f5b0066105fe

Merchant Navy Administration

https://www.presidencia.gov.py/archivos/documentos/decretos_1_20201028121740303_fq4k6aou.PDF https://www.abc.com.py/nacionales/2020/06/30/annp-habla-de-aumento-de-los-ingresos-aunque-eso-se-dio-en-6-de-17-puertos/

https://www.ip.gov.py/ip/annp-deroga-resolucion-que-modificaba-tarifas-por-servicios-portuarios/
https://abogadoparaguayo.blogspot.com/2015/01/decreto-n-1229708-tasas-portuarias.html
https://www.mundomaritimo.cl/noticias/terport-y-tecplata-logran-acuerdo-para-abaratar-costos-de-fletes-en-la-hidrovia-paraguay-parana

Source: World Bank (2020) Source: www.lpi.worldbank.org

Ease of Doing Business Ranking & Ease of Doing Business Score

Economies are ranked on their ease of doing business, from 1–190. A high ease of doing business ranking means the regulatory environment is more conducive to the starting and operation of a local firm.

Rank (out of 190 countries)	Score	Trading across border
125	59.1	128

Source: Data retrieved from https://www.doingbusiness.org/en/data/exploreeconomies/paraguay

3. Data Collection

The data collection process was ensured by SITCIN national consultants in aim to measure and monitor all connectivity indicators. The data that are used to compile SITCIN can be categorized as follows:

- 1. Quantitative data, which is subdivided by
 - a. Discrete data, such as a number of accidents and a number of vehicles that are usually expressed in absolute terms or as ratios.
 - b. Continuous data, which is used to measure the length of infrastructure (in kilometres), goods transported (in tonnes) or waiting time at borders (in minutes).

2. Qualitative data

In most cases qualitative data is used, which categorizes performance by very good to very poor – such as infrastructure condition - to produce an ordinal scale where the higher the value the better the performance.

4. Country Score

The following table summarizes the data evaluation results by chapter. The overall score for road transport is 175 out of 340 (51%). The overall score for IWW transport is 103 points out of total 136 points (76%).

Table 4. Country score

NCR Chapters	Max score	Score	Progress
Road	340	175	51%
IWW	136	103	76%
1. Border Crossing Facilitation	100 points	39 points	39%
Road	100 points	77 points	77%
IWW	30 points	23 points	77%
2. Infrastructure	100 points	48 points	48%
Road	160 points	91 points	57%
IWW	60 points	43 points	72%
3. Safety and Security	100 points	61 points	61%
Road	230 points	189 points	82%
IWW	70 points	70 points	100%
4. Transport of perishable foodstuffs & dangerous goods	100 points	78 points	78%
Road	40 points	27 points	68%
IWW	20 points	11 points	55%
4.Interoperability	100 points	38 points	38%
Road	130 points	40 points	31%
IWW	50 points	21 points	42%
6. Environment and energy	100 points	27 points	27%

Country final/overall score is a weighted number in accordance the approved score weighting methodology. The country weighted score is 396 points and weighted progress is 65,2%

Table 5. Weighted final country score

Transport mode	Max score	Weighted max score	Weighted score	Weighted progress
Road	1000 points	380 points	228 points	60%
IWW	366 points	227 points	168 points	74%
Total	1366 points	607 points	396 points	65.2%

5. Conclusions and Recommendations

Conclusions and recommendations are developed and summarized based on results of data collection (surveys, interviews, consultations, desktop research, etc) and their detailed analysis, considering findings and statements defined in the SWOT analysis in the NCR.

20 indicators (12%) were not evaluated. There was not data available for 14 indicators. However, they are all verification indicators which are not taken into account for the overall score. Another 2 verification indicators were not evaluated because they were not applicable to the country as they mention the Transports Internationaux Routiers (TIR) agreement and Paraguay has not signed this agreement. Lastly, 4 scored indicators were not applicable because they concern long tunnels and Paraguay does not have long tunnels) Data analysis showed that the country has:

- the maximum score (10 points) in 51 indicators (32%)
- the minimal score (0 points) in 21 indicators (13%)
- 20 indicators (12%) were not scored by points, because they were verification indicators, 4 scored indicators were not applicable (2%)
- Results of the rest 65 indicators range between 0 and 10 points (40%).

5.1.Conclusions

Border Crossing Facilitation

Road transport:

- The highest scores are related to the following factors: the country has set joint control areas with neighbouring countries, there are inter-agency e-solutions for customs and border procedures, there are several temporary importation mechanisms available in the country, The customs office is currently implementing electronic cargo information for road cargo.
- The lowest scores are related to the following factors: BCPs do not operate 24/7, there are not enough detection equipment, scanning and non-intrusive inspection technologies including scanners for cargo (however the customs office is currently acquiring more equipment), there are no intelligent transport systems at and around BCPs, lack of appropriate parking and facilities, there are no fast lanes and no fast-track treatment for perishable foodstuffs (nonetheless, it is important to indicate that Paraguay is putting in place the Authorized Economic Operator (AEO) programme which could compensate for the lack of fast lanes), there is no application of pre-trip traffic information systems to make international drivers aware of the traffic situation and travel conditions.

IWW transport:

• The highest scores are related to the following factors: Port costs are lower than the regional average. The entire IWW network currently in use is covered by at least one River Information System technological solution, most if not all vessels have an Electronic Chart Display Information System because it is the tool that captains are trained to use, inland waterways are equipped with Automatic Identification System (AIS).

Transport Infrastructure

Road transport:

- The highest scores are related to the following factors: There are provisions covering road signs, signals, and marking.
- The lowest scores are related to the following factors: National legislation covering road signs, signals, and marking is not harmonized with international standards. The provision of rest and service areas, the number of toll and border

crossing control lanes do not take into account the volume of traffic anticipated. This type of consideration is not possible sometimes because of poor BCP physical infrastructure.

IWW transport:

- The highest scores are related to the following factors: There is a solid national framework pertaining navigations rules. National laws on IWW follows Agreement on Transport of Goods through Paraná-Paraguay Inland Waterways which in turn uses the Maritime Code and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). Inland navigation ports of international importance have a high cargo handling capacity.
- The lowest scores are related to the following factors: More investment is needed (dredging, signalling for night-time navigation, maintenance) to guarantee navigation throughout the year (It is important to note that Navigation is heavily concentrated on the Paraná-Paraguay Inland Waterways (from Puerto Caceres in Brazil to Puerto Nueva Palmira in Uruguay). There are 4 or 5 navigable rivers in Paraguay whose potential is overlooked.

Safety and Security

Road transport:

- The highest scores are related to the following factors: Law Nº 5016 on transit safety is comprehensive (i.e.: there are rules on cargo securing, distracted driving, use of safety equipment, speed limits, minimum requirements of curriculum and qualifications for driving, obtaining driving permits, etc) periodic technical inspections (PTI) are enforced and applied with increasing frequency to ageing vehicles.
- The lowest scores are related to the following factors: The rules for drivers and professional drivers are not harmonized with the UN Convention on Road Sign and Signals (1968) and the level of enforcement is not the same in every municipality, The enforcement of transit rules is not strong, currently, there is no National Road Safety System in place. MERCOSUR's provision 75/95 on periodic technical inspection (PTI) did not set rules for new vehicles and did not establish the mutual recognition of national rules pertaining PTI among member countries, commercial vehicles are not equipped with tachographs.

IWW transport:

• The highest scores are related to the following factors: Navigation rules are harmonized with global or regional standards such as Marpol/Solas, Naval Prefecture established that all vessels must use Automatic Identification Systems (AIS) (provision 63/17).

Transport of perishable foodstuffs and dangerous goods

Road transport

- The highest scores are related to the following factors: There are provisions for the transport of meat products, particularly beef (refer to indicator 1-SO-4.1), There is a solid national framework pertaining general provisions for the transport of dangerous goods and the training of personnel involved in the transport of dangerous goods. This framework comes out of the 'Sectoral Agreement for Transport of Dangerous Goods in MERCOSUR.
- The lowest scores are related to the following factors: While the transport of beef is adequately regulated, this is not the case with other perishable foodstuffs.

IWW transport

• The highest scores are related to the following factors: the Naval Prefecture issues provisions concerning transport of dangerous goods based on the SOLAS Convention, the International Maritime Dangerous Goods Code and the Code of safe practice for solid bulk cargoes. In addition, law 6438/19 approves the indefinite period of validity of the Agreement on Transport of Goods through Paraná-Paraguay Inland Waterways which has a protocol regarding the transport of dangerous goods based on International Convention for the Prevention of Pollution from Ships (MARPOL 73/78).

Intermodality

Road transport

• The highest scores are related to the following factors: The country has signed transport agreement such as ATIT (Agreement on International Ground Transport) in 1991 and MERCOSUR's intermodal agreement in 1997.

IWW transport

- The highest scores are related to the following factors: IWW transport is the most widely used transport mode, 80% of the movement of cargo for exports is performed through IWW. 63% of the movement of cargo for imports is performed through IWW.
- The lowest scores are related to the following factors: Terminals in inland waterway ports are not sufficiently connected with roads of international importance.

Environment

Road transport

- The highest scores are related to the following factors: There is a significant number of alternative fuel filling stations in the country that can accommodate dual-fuel vehicles or vehicles that use natural gas (CNG/LNG). In addition, the Itaipu dam is building electric charging stations. The quality of diesel and petrol is good and euro 3 vehicles can circulate in the country, there are provisions regarding noise pollution and maximum levels of air pollutants from auto mobiles.
- The lowest scores are related to the following factors: Fleets are old (average age of passenger cars is 18 years), Paraguay does not have regulations regarding emission of greenhouse gases. Vehicle taxation is not based on CO2 emissions, there is no application of operational models/software tools to predict weather-related risks to transport infrastructure.

IWW transport

- The highest scores are related to the following factors: The naval prefecture provisions regarding prevention of water pollution are harmonized with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78).
- The lowest scores are related to the following factors: There are top of the line vessels in the country. However, according to UNCTAD, the average age of vessels in 2019 was 33 years old, because the country has not implemented measures to address climate change impacts on inland waterways systems.

5.2. Recommendations

Recommendations are divided into 6 chapters: 1. Border Crossing Facilitation, 2. Transport Infrastructure, 3. Safety and Security, 4. Transport of perishable foodstuffs and dangerous goods, 5. Intermodality, 6. Environment. In each pillar recommendations are addressed to 3 main shareholders: 1. Public sector, 2. Private sector, 3. International organizations. Based on SITCIN data analysis, specific recommendations are formulated and addressed to the relevant governmental and non-governmental.

Border crossing facilitation				
Public sector	Target insitutions(s)			
1.Take steps to implement fast lanes/fast track treatment for trucks carrying live animals and perishable foodstuffs	For measures that require changes infrastructure at BCPs: ANNP Ministry of Public Works and Communications (MOPC) For measures that entail implementing programs to facilitate movement of perishable foodstuff: National Customs Authority (DNA)			
2. Publish data on border clearance time which can be obtained using SOFIA (System for the Fiscal Organization of Customs Levies)	National Customs Authority (DNA)			
3. Work closely with border agencies to integrate information systems in order to avoid repetitive work (double weighting, double scanning) at BCPs	National Customs Authority (DNA)			
4. Consider implementing pre-trip traffic information systems to make international drivers aware of the traffic situation and travel conditions. This system could also notify approaching trucks on the traffic situation at BCP such as traffic occupancy, processing and queuing time, and providing early recommendations such as postponing entry to BCPs or deviate to other BCPS8.	National Customs Authority (DNA)			
5. Consider extending BCPs working hours to facilitate an expedite movement of goods.	All the public institutions involved in activities at BCPs			
6. Consider settting up a cooperation mechanism to harmonize the use of Radio-frequency identification (RFID) tags with the Company Tape Pora.	National Transport Authority (DINATRAN)			
7. Set up a cooperation mechanism to further develop the use and integration of Radio-frequency identification (RFID) tags. For instance, the Ministry of Industry and Commerce has drafted a project called 'Cargo systems in international commerce' that aims to create a cargo module within the single window for exports (VUE) in order to register cargo, transit and transport information in a single place and improve control, traceability and obtain real time information on available transport capacity. RFID technology would help this project to attain its objectives.	National Customs Authority (DNA) National Transport Authority (DINATRAN)			
8. Take steps to implement the recognition of driving permit based on the UN Conventions on Road Traffic and Harmonization Convention.	National Agency for Road Safety (ANTSV)			
9. Take steps to harmonize and recognize international certificates (such as boat master's certificates), work on type approval and standardization.	Naval Prefecture			
Private sector	Target institution(s)			
1. Set up a cooperation mechanism to harmonize and integrate the use of Radio-frequency identification (RFID) tags with the National Transport Authority (DINATRAN).	Company Tape Pora			

⁸ Georgia uses a pre-trip traffic information systems app called megzuri https://apkpure.com/megzuri/mobility.ge.megzuri

Transport Infrastructure				
Public sector	Target institution(s)			
1. Consider setting up a mechanism to devise common actions with the private sector in order to address required steps to guarantee navigation throughout the year (ie: dredging, signaling for nighttime navigation and maintenance)	Ministry of Public Works and Communications (MOPC) Naval Prefecture			
2. Publish data on number of cases of reported cargo theft.	National Customs Authority (DNA)			
3. Consider taking account of the volume of traffic anticipated for the provision of rest and service areas, the number of toll and border crossing control lanes whenever the BCPs physical infrastructure allows for this type of consideration.	National Customs Authority (DNA)			
4.More investment is needed on dredging, signaling for nighttime navigation and maintenance to guarantee navigation throughout the year.	Ministry of Public Works and Communications (MOPC) Naval Prefecture			
Transport Businesses				
1. Consider setting up a mechanism to devise common actions with the public sector in order to address required steps to guarantee navigation throughout the year (ie: dredging, signaling for nighttime navigation and maintenance)	Paraguayan Shipowner's Association(CAFYM) Paraguayan Shipping Agents Association (ASAMAR) Paraguayan Chamber of Terminals and Private Ports (CATERPA)			

Safety & Security					
Public sector	Target insitution(s)				
 Consider recording and publishing data on the number of road traffic violations. For instance: violations of speed limit, use of safety equipment, cargo securing, carriage of passengers, distracted driving, use of mobile devices, and crashes caused because of these traffic violations. Within the sphere of competence of the institution take actions to increase the level of enforcement and compliance related to awarding driving permits and if necessary, the requirements and certification for driving schools. 	National Agency for Road Safety (ANTSV) Highway Police Municipalities National Agency for Road Safety (ANTSV)				
3. Consider including the 5 pillars of the UNRSTF Global Framework Plan of Action for Road Safety (GFPARS) in the new National Road Safety Plan. These pillars are: (1) Road safety management; (2) Safe user; (3) Safe vehicle; (4) Safe road; (5) Effective post-crash response.	The Ministry of Public Works and Communications (MOPC) National Agency for Road Safety (ANTSV)				
4. Consider including Post-Crash Response standards and procedures of the UNRSTF Global Framework Plan of Action for Road Safety (GFPARS) in the new National Road Safety Plan 9.	The Ministry of Public Works and Communications (MOPC) National Agency for Road Safety (ANTSV)				

 $^{9\} These\ standards\ consist\ of\ the\ following\ 8\ actions:$

¹⁾ Introduce legal requirement for anyone to perform first-aid activities within his/her capacity,

²⁾ Introduce standards for post-crash professional emergency response,

³⁾ Introduce framework for rehabilitation programmes,4) Establish a link between liability insurance and financing of care for crash victims, and rehabilitation programmes

⁵⁾ Enable multi-disciplinary crash rescue operation and investigation,

⁶⁾ Introduce a clear framework for crash investigation and data collection,
7) Designate authorities responsible for implementation including enforcement of the existing standards as well as for

their further development, as necessary, 8) Assess effectiveness and completeness of standards (completeness of standards benchmarked against international regulatory framework)

5. Consider publishing statistical reports to record navigation related accidents and violation of navigation rules. The Naval Prefecture could adapt the highway police statistical reports to publish navigation related data.	Naval Prefecture
Intergovernmental organizations	Target institution(s)
1. Take into account the UN Agreement on Vehicle Regulations (https://unece.org/fr/node/3492) for new vehicles to update MERCOSUR's provision 75/97 on technical inspections.	MERCOSUR (DINATRAN is the focal point in Paraguay for this activity)
Private sector	Target institution(s)
1. Assess the ability to equip the current fleet with tachographs. Propose actions to fairly distribute costs and benefits taking into consideration the context and characteristics of the cargo transport business.	Paraguayan Chamber of International Road Transport (CAPATIT)

Transport of perishable foodstuffs and dangerous goods		
Public sector	Target institution(s)	
1. Consider developing a comprehensive list of perishable foodstuffs and corresponding transport conditions. Consider developing rules concerning transport conditions of certain perishable foodstuffs when necessary.	National Institute for Food and Nutrition (INAN) National Service for Animal Health and Quality (SENACSA)	
2. Publish data regarding the percentage of traffic classified as dangerous good on the international road networks.	National Transport Authority (DINATRAN) National Customs Authority (DNA)	
3. Take steps to update national regulations in light of MERCOSUR's provision CMC N° 15/19 which takes into account the newest versions of United Nations rules, the European Agreement on the Transport of Dangerous Goods by Road (ADR) and the International Regulations on the Transport of Dangerous Goods by Rail (RID).	National Transport Authority (DINATRAN)	
4. Consider transport conditions for dangerous goods in the ongoing plans to develop rail infrastructure in Paraguay. MERCOSUR offers a solid platform to do so. The 'Sectoral Agreement for Transport of Dangerous Goods in MERCOSUR' was developed taking into account the International Regulations on the Transport of Dangerous Goods by Rail (RID).	Paraguayan Railways S.A FEPASA	
5. Publish data regarding the percentage of traffic classified as dangerous good on the Inland Waterway Network.	National Customs Authority (DNA)	

Intermodality		
Public sector	Target institution(s)	
1. Use the one-stop business service for export or e-single window (VUE) and one-stop business service for import or e-single window (VUI) to publish data that allows to diagnose the state of affairs of intermodality in the country or cooperate with research projects such as the ones carried out by PROCOMEX institute to offer a certain degree of access to these databases.	Ministry of Industry and Commerce National Customs Authority	
2. Consider holding roundtable meetings with public and private ports to address the issue concerning the connection of ports and main roads and to agree common actions.	Ministry of Public Works and Communications	
3. Include considerations on intermodal transport in the current plans to develop rail infrastructure in the country. National Connectivity Reports from the countries that were part of SITCIN (Georgia, Serbia, Kazakhstan) could shed light on common problems and solutions related to intermodal rail transport.	Paraguayan Railways S.A FEPASA	

Private sector	Target institution(s)
1. Consider holding roundtable meetings with the public sector to address	
the issue concerning the connection of ports and main roads and to agree	and Private Ports (CATERPA)
common actions.	

Environment & Energy	
Public sector	Target institution(s)
1. Consider including data concerning the number of alternative fuel vessels, passenger cars, buses and trucks in the greenhouse gas inventory report. Consider engaging and/or consulting the private sector and the Intergovernmental Committee on the Paraguay-Paraná the Waterway in the planning process concerning the impact of climate change on road transport and the inland waterways system.	Ministry of Environment and Sustainable Development
2. DINATRAN already produces high quality data on many topics in its statistical yearbook. Consider publishing indicators such as average age of trucks (weighting more than 3.5 tons), buses in international transport.	National Transport Authority (DINATRAN)
3. Consider developing provisions regarding emissions of greenhouse gases.	Ministry of Environment and Sustainable Development - National Congress
4. Include considerations related to alternative fuels in the current plan to develop railway infrastructure.	Paraguayan Railways S.A FEPASA
5. Increase efforts to draft municipal ordinances that bring into effect provisions regarding maximum levels of air pollutants from auto mobiles and the law to gradually reduce noise pollution.	Municipalities
6. Consider the application of operational models/software tools to predict weather-related risks to transport infrastructure (it concerns the application of the following tiers according to the Intergovernmental Panel on Climate Change (IPCC): tier 1- simplest method with default values; tier 2- similar to tier 1 but with country-specific emission factor and other data; tier 3: more complex approaches (models). https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter2.pdf	Ministry of Public Works and Communications Ministry of Environment and Sustainable Development Ministry of Defense (Meteorology Department)
Private Sector	Target institution(s)
1. Consider adopting measures to replace the current fleet for one that includes alternative fuel vehicles.	Paraguayan Chamber of International Road Transport (CAPATIT)
2. Collaborate with the Climate Change National Directorate to develop plans concerning the impact of climate change on transport infrastructure.	Paraguayan Chamber of International Road Transport (CAPATIT)
3. Assess the willingness and ability to replace the current fleet for one that includes alternative fuel vessels.	Paraguayan Shipowner's Association(CAFYM)
4. Collaborate with the Climate Change National Directorate to develop plans concerning the impact of climate change on inland waterways system.	Paraguayan Shipowner's Association (CAFYM) Paraguayan Shipping Agents Association (ASAMAR) Paraguayan Chamber of Terminals and Private Ports (CATERPA)