



Improving Transport Connectivity for LLDCs and Building of Resilient Transport Infrastructure to Support Accelerated Progress Towards the SDGs: Experiences and Learning Materials for LLDCs and Transit Countries

These learning materials were developed for capacity building activities to strengthen capacity to develop bankable transport infrastructure projects and transport connectivity in landlocked developing countries and transit countries. The learning materials were commissioned by the United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS) in collaboration with its partners. UN-OHRLLS and partners worked with Ms. Fadiah Achmadi in preparing the training materials. The views expressed do not necessarily reflect those of the United Nations.

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Module 1

Transport Connectivity in the Global Frameworks of Sustainable Development

1. Module Objectives

This module aims at raising the awareness of participants about the importance of improving transport connectivity of LLDCs to access global markets and to achieve the SDGs, and about the importance of contemporary transport policy and its integration into the development strategies, and strengthening LLDCs' capacity to design and implement policies that promote transport connectivity.

2. Landlocked Developing Countries and Transit Countries

LLDCs as a group constitutes 32 countries across South America, Africa, Europe, and Asia (see Figure 1). Their sea borne trade depends on transit through other countries and in most cases their transit neighbours are also developing countries. There are 34 transit developing countries and these are: Algeria, Angola, Argentina, Brazil, Bangladesh, Benin, Cambodia, Cameroon, Chile, China, Cote d'Ivoire, Democratic Republic of Congo, Eritrea, Ghana, Guinea, Djibouti, India, Iran, Kenya, Mozambique, Myanmar, Namibia, Nigeria, Pakistan, Peru, Senegal, Somalia, South Africa, Tanzania, Thailand, Togo, Turkey, Uruguay, and Vietnam.

The World's 32 Landlocked Developing Countries

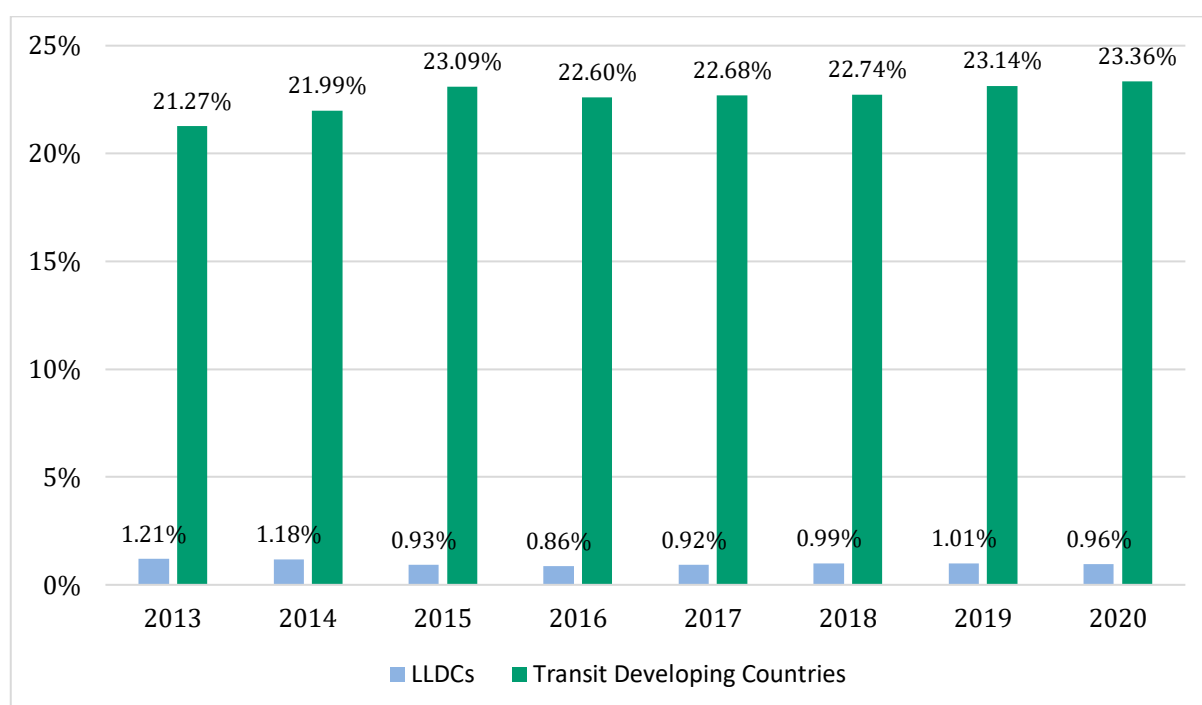
SOUTH AMERICA	AFRICA	EUROPE	ASIA
Bolivia (Plurinational State of) Paraguay	Botswana Burkina Faso Burundi Central African Republic Chad Eswatini Ethiopia Lesotho	Armenia Azerbaijan North Macedonia Republic of Moldova	Afghanistan Bhutan Kazakhstan Kyrgyzstan Lao People's Democratic Republic
	Malawi Mali Niger Rwanda South Sudan Uganda Zambia Zimbabwe		Mongolia Nepal Tajikistan Turkmenistan Uzbekistan

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

3. What is transport connectivity and why is it important?

The lower level of LLDCs' transport connectivity is characterized by missing links and poor maintenance that cause high trade costs and as such, low competitiveness of LLDCs. Furthermore, the LLDCs face many non-physical barriers that lead to cumbersome border crossing. As a result, LLDCs lag behind transit countries in terms of their share in global trade (Figure 2).

Figure 2: Share of LLDCs and transit countries in global merchandise exports



Source: UNCTADstat

A developed transport connectivity system will promote improvement in accessibility expressed in terms of reduction in travel time and transportation costs. Having an efficient inland connectivity is necessary to face effectively the challenges arising from LLDCs' geographic location and to exploit alternatively the remoteness and isolation from world markets.

Improving connectivity depends on the development of:

- a. Hard infrastructure, which covers road, rail, inland waterway, air transport, and the intermodality that enables seamless vehicular transfer between them.
- b. Soft infrastructure, namely policies, trade facilitation and legal and regulatory frameworks.

4. Global Frameworks for Sustainable Development in LLDCs

4.1 Vienna Programme of Action

The Vienna Programme of Action (VPoA) is the principal programme of the United Nations that charts a plan for the sustainable economic and social development of LLDCs for the Decade 2014-2024. It aims to help transform LLDCs into land-linked countries by, among others, the development of efficient transit systems, enhancement of competitiveness, and regional cooperation.



Table 1: Priorities in the Vienna Programme of Action

Priority 1: Fundamental transit policy issues

The priority area stresses the important role played by freedom of transit and transit facilities in providing the LLDCs with access to the sea, in helping them to fully integrate into the global trading system. It underscores that harmonization, simplification and standardization of rules and documentation should be promoted, with the full and effective implementation of international conventions on transport and transit and bilateral, sub-regional and regional agreements. Cooperation on fundamental transit policies, laws and regulations between landlocked developing countries and their transit neighbours is crucial for the effective and integrated solution to cross-border trade and transit transport problems. The specific objectives include: (i) reducing travel time along corridors with the aim of allowing transit cargo to move 300-400 kilometres per 24 hours; (ii) significantly reducing the time spent at land borders; and (iii) improving intermodal connectivity.

Priority 2: Infrastructure development and maintenance

This priority has two sub-priorities: (i) transport infrastructure, and (ii) energy, and information and communications technology infrastructure. On transport infrastructure, the VPoA has the specific objectives of: significantly increasing the quality of roads, including increasing the share of paved roads, by nationally appropriate standards; expanding and upgrading the railway infrastructure in LLDCs, where applicable; and completing missing links in the regional road and railway transit transport networks.

On energy and ICT infrastructure, specific objectives require LLDCs: to expand and upgrade, as appropriate, infrastructure for the supply, transmission and distribution of modern and renewable energy services in rural and urban areas; to make broadband policy universal; to promote open and affordable access to the Internet for all; and to address the digital divide.

Priority 3: International trade and trade facilitation

The priority area has two interrelated sub-priorities: (i) international trade, and (ii) international trade facilitation. On international trade, the Programme recognizes the need to diversify the export structures of LLDCs, increase value-added and manufactured component of their exports, strengthen intra-regional linkages and trade and enhance their productivity and competitiveness, in order to take full advantage of the multilateral trading system and achieve greater integration into world markets. There are four specific objectives related to international trade. First, to significantly increase participation of LLDCs in global trade, with focus on substantially increasing exports; second, to significantly increase the value added and manufactured component of LLDC exports; third, to strengthen economic and financial ties between LLDCs and other countries in the same region so as to increase the share of LLDCs in intraregional trade; and fourth, invite Member States to consider the specific challenges and needs of LLDCs in international trade negotiations.

On trade facilitation, the specific objectives of the Programme are to further simplify, harmonize and streamline border crossing and transit procedures and improve transit facilities and their efficiency with the aims of reducing port and border delays and transaction costs for LLDCs, respectively. The third objective on trade facilitation is to ensure that all transit regulations, formalities and procedures for traffic in transit are published and updated in accordance with the WTO Trade Facilitation Agreement.

Priority 4: Regional integration and cooperation

Regional integration, and coherent and harmonized regional policies provide an opportunity to improve transit transport connectivity and ensure greater intraregional trade, common regulatory policies, border agency cooperation and harmonized customs procedures to expand regional markets. A particularly important area of promoting regional integration and coherent harmonized regional policies in transit, transport and other related areas is through regional infrastructure activities and development of transport corridors, which have the potential to address the challenge of fragmented approach of national transport policies. The priority area emphasizes the promotion of deeper and meaningful regional integration to encompass cooperation among countries in a broader range of areas than just trade and trade facilitation, to include investment, research and development, and policies aimed at accelerating regional industrial development and regional connectivity.

Priority 5: Structural economic transformation

It is imperative that LLDCs structurally transform their economies if sustained economic growth and poverty eradication is to be achieved by 2024. Structural transformation is a process that involves the reallocation of economic activity from low value-added and low productivity to higher value-added and high productivity activities and sectors. The VPoA identifies the following specific objectives: (a) increase value addition in the manufacturing and agricultural sectors; increase economic and export diversification; (c) promote service-based growth and (d) encourage the inflow of FDI in high-value added sectors.

Priority 6: Means of implementation

Landlocked developing countries and their transit neighbours need to effectively mobilize adequate domestic and external resources for the effective implementation of the VPoA.

4.2 United Nations Sustainable Development Goals (UN SDGs)

Although there is no stand-alone SDG on transport, transport is considered as a cross-cutting issue throughout the 17 SDGs. Table 2 highlights the SDG goals and targets related to transport connectivity.

Table 2: UN SDGs goals and targets related to transport connectivity

Goal	Target
3. Ensure healthy lives and promote well-being for all at all ages	<ul style="list-style-type: none"> 3.6: By 2020, halve the number of global deaths and injuries from road traffic accidents 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.
7. Ensure access to affordable, reliable, sustainable and modern energy for all	<ul style="list-style-type: none"> 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix 7.3: By 2030, double the global rate of improvement in energy efficiency
9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	<ul style="list-style-type: none"> 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure 9a: Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States
11. Make cities and human settlements inclusive, safe, resilient and sustainable	<ul style="list-style-type: none"> 11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those

	in vulnerable situations, women, children, persons with disabilities and older persons
13. Take urgent action to combat climate change and its impacts	• 13.2 Integrate climate change measures into national policies, strategies and planning
17. Strengthen the means of implementation and revitalize the global partnership for sustainable development	• 17.14: Enhance policy coherence for sustainable development

5. Transport policy

5.1 Definition and structure

In promoting transport connectivity and building resilient transport infrastructure to achieve the SDGs, it is essential to ensure that contemporary transport policy is in place and that capacity exists to develop and implement the policy. A transport policy has the following characteristics:

- Transport policies contain the following components: Vision; Policy; Goals and Objectives; Programming; Decision Making Criteria; Planning Framework for projects and measures; Evaluation Criteria
- Transport policy has details and propositions to guide decision-making to achieve specific objectives relating to social, economic and environmental conditions, and the functioning and performance of the transport system. It provides clear strategic direction, framework or road map for country's transportation industry, acts as a reference point for ministries and agencies for planning towards developing an efficient, integrated and sustainable transport system and assures appropriate allocation of resources and developments.
- Policies are required to answer the 'what' and the 'why' for decision making. Policies need to reflect the vision and values of a nation and be able to stand the test of time. Policies
- The national transport policy should be developed in a consultative manner reflecting a consensus of views: the views of national-level governments on the basic objectives and principles of sector policy; the views of lower-level governments; and the views of the different stakeholders. The draft policy has to be developed from extensive technical assessments and analysis of existing data which can also be used to develop the benchmark for monitoring policy. The absence of a national transport policy can lead to misallocation of resources, inappropriate developments and projects or disintegration within transportation industry.
- Transport planning deals with the preparation and implementation of actions designed to address specific problems.

5.2 Developing a transport policy

- Policies should be generic, robust and provide the framework for most specific policies for subsectors.
- The general framework might usefully be based on a PESTLE analysis, an analysis of the Political, Economic, Social, Technological, Legal, and Environmental factors to encourage strategic thinking and to inform planning and to allow more decisive and knowledgeable decision. This tool was initially used by enterprises to analyze and monitor the macro-environmental factors that have an impact on an organization, but it has gained popularity in

the public planning. The result of PESTLE analysis is used to identify opportunities and threats in the SWOT analysis.

- A variation of PESTLE that might be appropriate for transport policy that promotes connectivity to achieve the SDGs, is denoted STEER analysis.

S	T	E	E	R
Social	Technical	Economic	Environment	Reform
Employment	Innovation	Development	Climate Change	Integration
Health & Safety	Infrastructure	Diversification	Severance	Deconcentration
Quality of Life	Vehicles	Trade facilitation	Noise	Deregulation
Hunger	Infotech	Competitiveness	Pollution	Smart Planning
Poverty	Operations	Private Sector	Biodiversity	Management
Gender	Choice	Productivity	Land Use	Subsidies User Pays
Education	Research	Intensity	Energy	Citizens Rights

5.3 Key policy objectives to be considered

- To implement economically and financially feasible projects.
- To obtain optimal modal balance
- To keep transport infrastructure in good condition (design condition)
- To improve transport productivity
- To improve travel times
- To improve transport safety and security
- To minimize the impact that mobility causes to the environment
- To contribute to improving rural social and economic development
- To expand and enhance transport networks and systems in line with economic needs and capacity and the National Physical Development Plan
- To maximize synergies between transport and communications
- To ensure that skills are fully aligned to job descriptions in the transport sector
- To ensure transport statutory instruments are contemporary and relevant
- To strengthen state enterprises, autonomous agencies, regional and district councils to better meet the needs of transport users
- To inculcate an enterprise culture in the provision, maintenance and operation of transport systems and services.
- To secure the participation of transport operators and users at various levels of the transport sector
- To fully integrate land use, spatial and transport planning
- To realign legislation to the transport policy
- To lower the transport component of the cost of trade
- To enhance choice and improve the quality of goods as well as passenger transport
- To increase the regional engagement of LLDCs' transport industry

Recap of key points

A developed transport connectivity system is important to addressing the LLDCs' challenges arising from their geographic location in particular for reducing trade costs and increasing the trade capacity of LLDCs;

- Improving transport connectivity requires enhancing both the hard and soft infrastructure.
- Promoting transport connectivity for the achievement of the SDGs needs to be based on a more contemporary approach that involves all stakeholders and taps into their various interests, to ensure a more robust and sustainable solution.

References

UN-OHRLLS, 2014, Vienna Programme of Action for LLDCs for the Decade 2014-2024

Module 2

Transport Connectivity of LLDCs: status, achievements, major challenges and recommendations

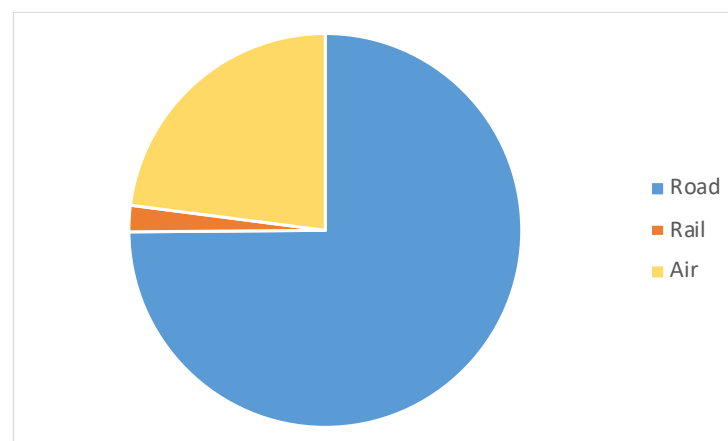
1. Module Objectives

- To inform participants about the current status and key achievements on transport infrastructure development in LLDCs.
- To elaborate the major challenges faced by LLDCs and transit countries to close transport infrastructure gaps in order to improve their transport connectivity, and to give recommendations on how to address these challenges.

2. Road Transport Infrastructure

Road transport is the primary mode of transport for freight and passengers, as shown by its highest share of freight volume compared to rail and air transport (Figure 3).

Figure 3: Mode share of freight transport in LLDCs in 2017



Source: Based on United Nations SDG Indicators Database

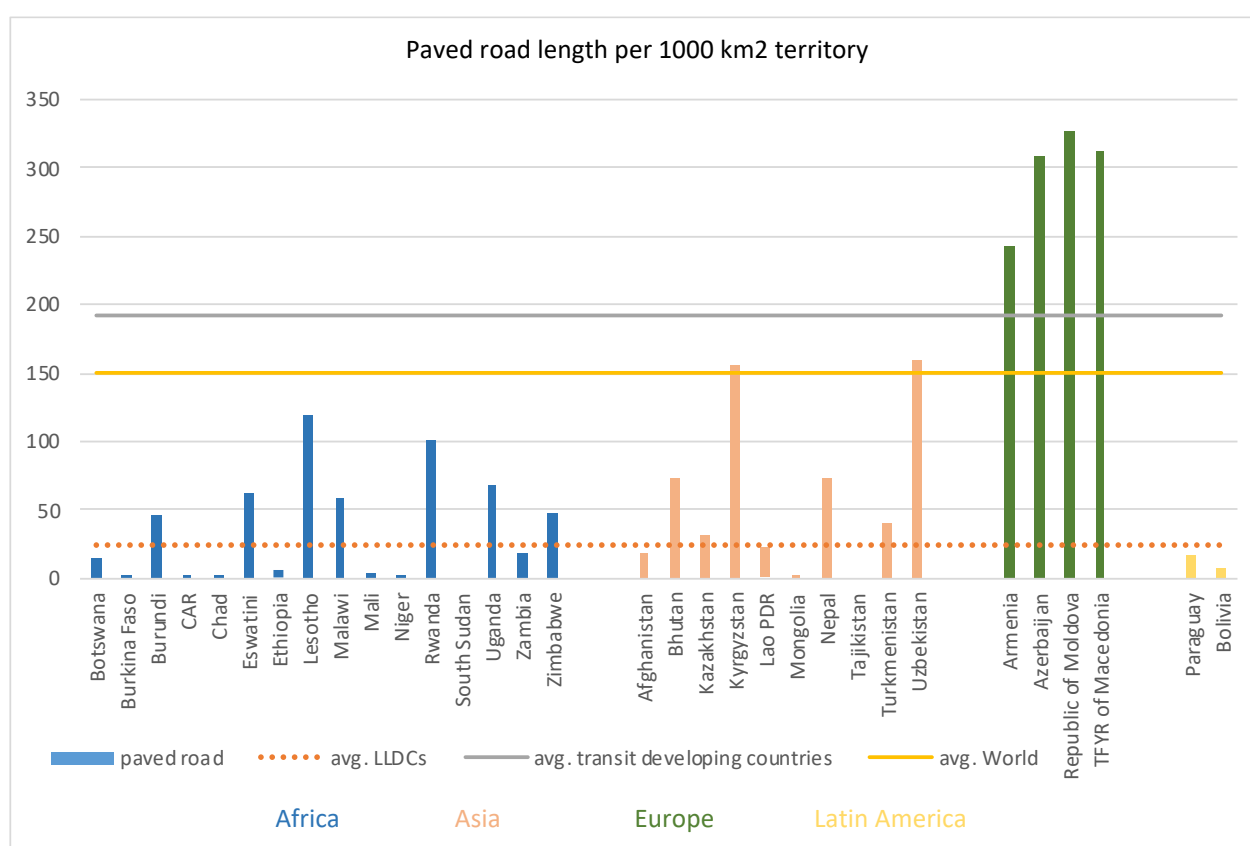
(<https://unstats.un.org/sdgs/indicators/database/>). Accessed on 16 February 2021.

Note: Inland water transport excluded

2.1 Current Status

In terms of road quality, measured in paved road density, LLDCs generally have relatively poor performance compared to their transit neighbours and they lag behind the global average (Figure 4).

Figure 4: Paved road density of LLDCs



Source: Based on data by UNCTAD (2014), UN-OHRLLS (2019b), UN-OHRLLS (2019c)

Note: Data used is the most recent available, ranging from 2009 to 2015.

For LLDCs as a group to reach the global average of paved road, nearly 200,000 kms of paved roads would need to be constructed (Table 3).

Table 3: Additional paved road needed in LLDCs

Region	Additional road length (km)
Sub-Saharan Africa East	53,900
Sub-Saharan Africa West	53,100
East Asia	8,300
South Asia	7,700
Eastern Europe and central Asia	57,900
Latin America	15,200
Total LLDCs	196,100

Source: UN-OHRLLS (2018)

2.2 Ongoing efforts and key achievements

Eastern European, Central Asian, and European LLDCs perform well in terms of their paved road density. Being part of the Asian Highway network certainly contributes to it as infrastructure quality is incorporated in the Intergovernmental Agreement on the Asian Highway Network, aimed at enhancing the efficiency and development of the road infrastructure in Asia, supporting

the development of Euro-Asia transport linkages and improving connectivity for landlocked countries.

In Africa, the regional connectivity is fostered by the Trans-African Highway (TAH), a network of 10 routes with a total length of 54,120 km. It is meant to provide direct routes between capital cities and provide connectivity to sea ports for the African landlocked countries. However, the network is characterized by missing links situated in all corridors (Figure 7) that are yet to be completed. In the framework of the Programme of Infrastructure Development in Africa (PIDA), projects are commissioned to close the missing links (Table 4).

Table 4: Projects to close missing links on TAH network in African LLDCs

Country	Line section	TAH corridor	Current status
Central African Republic	Lagos to Mombasa	TAH8	No data
Chad	Ndjamena to Djibouti	TAH6	Project definition
Niger	Algiers to Lagos	TAH2	Construction
Niger, Libya, Nigeria	Tripoli to Cape Town	TAH3	No data

Source: PIDA website (<https://www.au-pida.org/pida-projects/>). Accessed on 12 February 2021

For Latin America, both LLDCs have paved road density under the LLDC's average. Most roadways in the countries are not all-season roads and cannot be passed during the rainy seasons. This situation leads to direct road transport costs. The lower performance of Latin American LLDCs, compared to the other regions, shows the importance of being an active part of regional initiatives, through which efforts can be bundled together and effectiveness and efficiency can be ensured.

2.3 Challenges in developing road infrastructure and recommendations

1. Completing missing links

Although efforts have been made in completing missing links, significant challenges remain and more needs to be done to close the gap. LLDCs need to adopt innovative national transport policies and programs such as establishing a dedicated road fund to ensure funding for road maintenance. A Road Fund is an institutional device through which a selected stream of revenues is put at the disposal of a government road department or agency without being subjected to general budget procedures and reviews (Gwilliam and Shalizi, 1996). The establishment of a Road Fund can substantially reduce the problems of disruption to the planning and execution of maintenance work.

Table 5: Road Funds in Selected African LLDCs

Country	Legal basis	Status	Type of work financed
Central African Republic	Decrees, 1984, 1985 and 1992	Public utility	Routine and periodic maintenance
Chad	Law, 1993 and Decree, 1994	Bank account	Routine and periodic maintenance
Mozambique	Decrees, 1989 and 1990, amended in 1993	Bank account	- Routine and periodic maintenance - Rehabilitation

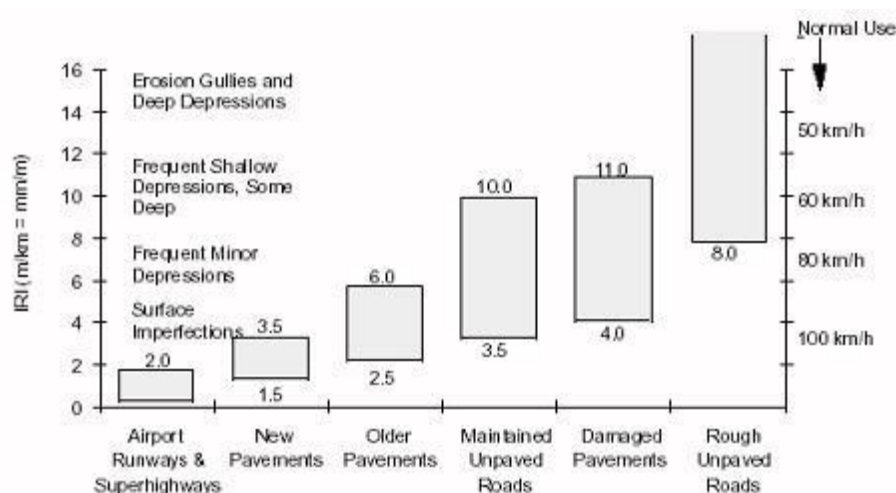
Rwanda	Act, 1989 and Decree, 1990	Bank account	Maintenance
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Source: World Bank (1995)

2. Developing robust maintenance programs

The deterioration of road infrastructure is a result of the lack of maintenance. Monitoring the road pavement condition regularly using international standards such as International Roughness Index/IRI (Figure 5) is essential for two reasons. Firstly, it ensures standardization of data and transferability among countries. Secondly, it can help countries to develop robust and systematic road maintenance programs for various scenarios. As an example, Table 6 shows a guideline used by Indonesia Directorate General of Highways to determine the necessary maintenance needed for every scenario, using the IRI standard.

Figure 5: IRI Scale



Source: Elghriany et al. (2015)

Table 6: International Roughness Index and maintenance categories

Road condition	IRI (m/km)	Type of maintenance
Good	$IRI \leq 4.0$	Routine maintenance
Fair	$4.1 \leq IRI \leq 8.0$	Periodic maintenance
Lightly damaged	$8.0 \leq IRI \leq 12.0$	Road improvement
Heavily damaged	$IRI \geq 12.0$	Road improvement

Source: Simamora et al. (2018)

3. Ensuring technical standards are harmonized

Monitoring the level of harmonization in road provision maintenance and operations would be necessary. Further work should be done to implement prioritized actions such as standardizing vehicle loading, pavements design, signage and regulations. LLDCs are encouraged to ratify international conventions and agreements that aim to harmonize technical standards across the region. Mechanisms and procedures to translate the agreements should be developed.

3. Rail Transport Infrastructure

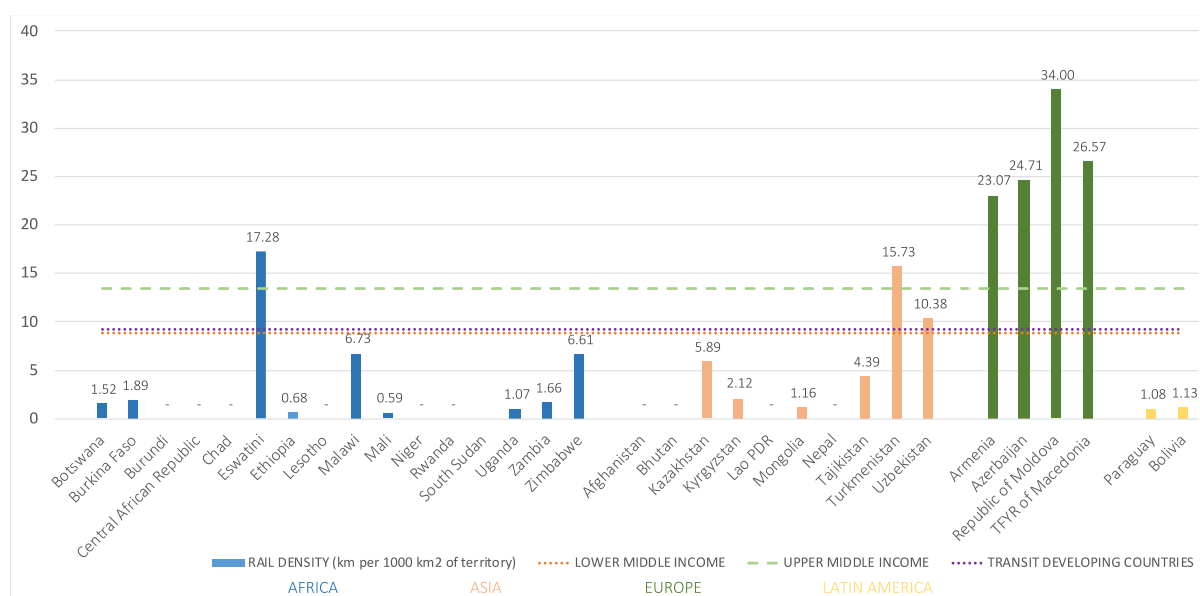
After road, rail is the leading transport mode for most LLDCs. Rail transport has potential advantages over road transport:

- lower tariffs, which makes it ideal for LLDCs to transport their low-value bulk goods;
- shorter and more reliable total transit times due to fewer stops in transit and shorter border-crossing wait times;
- fewer en-route delays.

Current Status

The European LLDCs have much higher rail density than other regions and the average of both low-middle income and upper-middle income economies (Figure 6). Despite this, they have very low rail freight volume, as their railway is mostly used for passenger transport (Figure 7). While for Asian LLDCs, particularly in Central Asia, railway plays a central role in regional transport network to transport goods. A common set of technical standards and operating procedures enjoyed by the national railways of the CIS countries plays a role in their cross-border rail traffic.

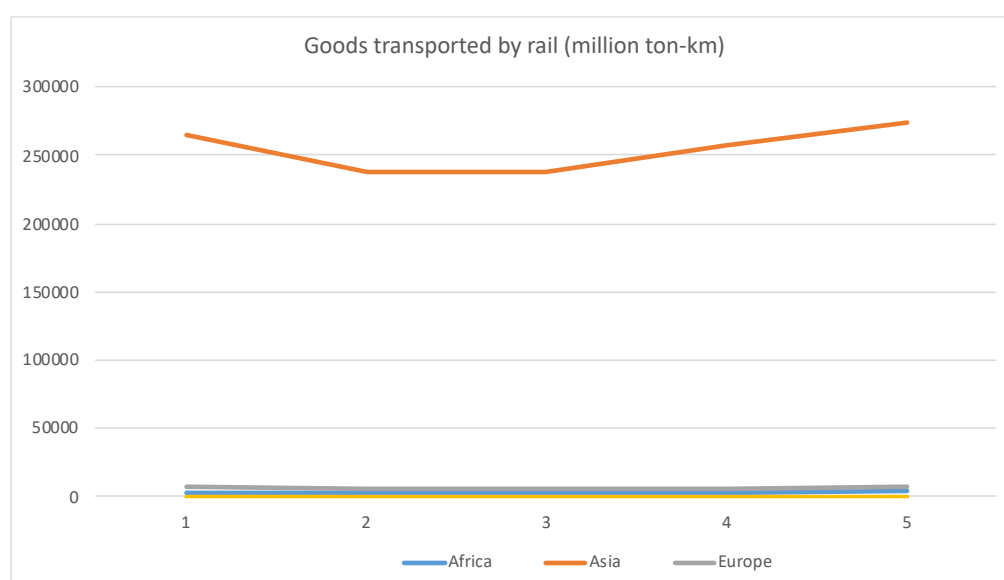
Figure 6: Rail Density



Source: Based on data by World Bank Open Data. Available at <https://data.worldbank.org/indicator/IS.RRS.TOTL.KM> (accessed on 12 February 2021) and <https://data.worldbank.org/indicator/AG.SRF.TOTL.K2> (accessed on 20 January 2020).

Note: Data is most recent available ranging from 2000 to 2019

Figure 7: Rail freight in LLDCs in the last 5 years



Source: Based on data by World Bank Open Data. Available at <https://data.worldbank.org/indicator/IS.RRS.GOOD.MT.K6>. Accessed on 12 February 2021.

Note:

- Data is 5 last years available, ranging from 1996 to 2019.
- No data available for Latin America.

Ongoing efforts and key achievements

Despite the position of many Asian LLDCs as transit countries between Europe and Asia, the low rail density shows the low investment committed to this infrastructure. 6 Asian LLDCs have ratified the Intergovernmental Agreement on the Trans-Asian Railway Network. The network is characterized by:

- 117,500 km across 28 ESCAP member countries
- 10.5% of the network still needs to be constructed, which equals to 12,400 km and US\$75.6 billion of investment. Projects in Asian LLDCs to close the missing links are ongoing or completed (Table 7).
- A challenge to harmonize gauges and rolling stocks across several countries.

Table 7: Missing links in the Trans-Asian Railway network in Asian LLDCs

Country	Length (km)	Costs (US\$ million)
Armenia	316	3,200
Kyrgyzstan	631	4,100
Lao PDR	1,328	12,782
Mongolia	2,484	6,956
Nepal	920	No data

Source: ESCAP (2017)

Although Eswatini has the highest rail density among African LLDCs and above average of transit countries, in general, the pace of provision of railway infrastructure in Africa is low and characterized as here below:

- there are over 26,362 km of missing links
- the network is deteriorating due to poor maintenance

Under the framework of PIDA, projects have been commissioned to revitalize and upgrade railway networks in African LLDCs.

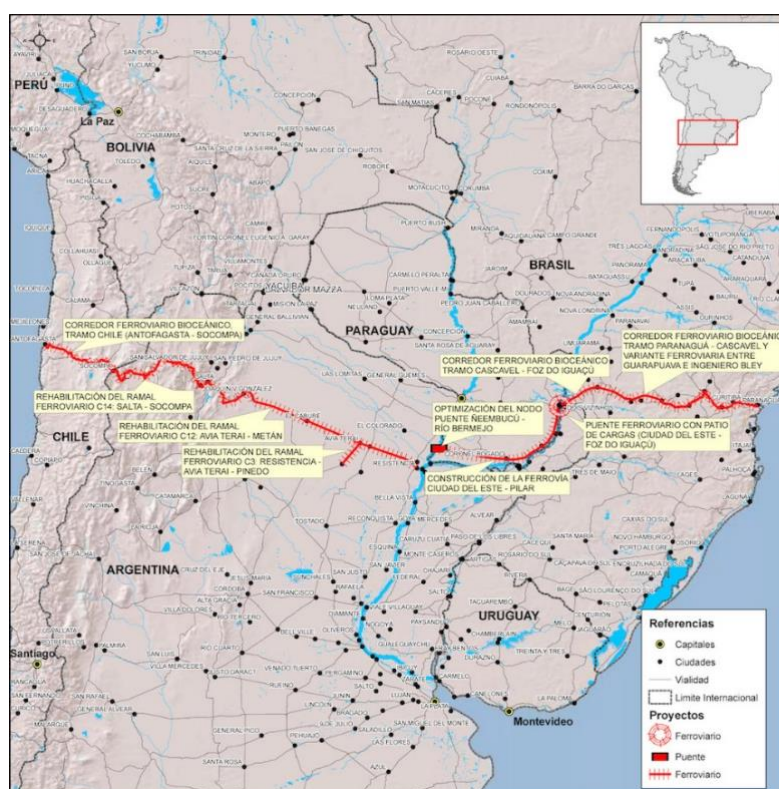
Table 8: Railway development projects in African LLDCs

Country	Description	Status
Burkina Faso	Upgrading of 1,200 km narrow gauge railway between Abidjan and Ouagadougou	No data
Burundi	New high-speed railway from Mombasa to South Sudan, DR Congo and Burundi for US\$5.2bn (will be mostly funded by China).	To be constructed
Chad	Construction of ± 2,000 km Douala to N’Gaoundéré to N’Djamena	No data
Mali	Upgrade the Mali section of the 1,228 km to standard gauge between Bamako and the border with Senegal	Feasibility
Rwanda	Construction of Mirama Hills to Kigali standard gauge railway (part of Mombasa - Kigali Railway Project)	Project structuring
South Sudan	New railway Juba-Bor-Malakal-Renki-Sudan border	Project definition
Uganda	Construction of Kampala to Kasese standard gauge railway (part of Mombasa - Kigali Railway Project)	Project structuring
	Construction of Kasese to Mirama Hills standard gauge railway (part of Mombasa - Kigali Railway Project)	Project structuring
	Construction of Malaba to Kampala standard gauge railway (part of Mombasa - Kigali Railway Project). Length: 1084 km.	Tendering
	Construction of Tororo to Gulu to Pakwach standard gauge railway (part of Mombasa - Kigali Railway Project).	Project structuring
Zambia	Extend Chingola - Solwezi Railway to the border with Angola (length 536 km) as part of North-South Multimodal Transport Corridor.	Feasibility
Zimbabwe	Beira-Harare (part of the Beira-Nacala Multimodal Transport Corridors)	Construction

Source: African Union (n.d.). PIDA website (<https://www.au-pida.org/pida-projects/>), accessed on 12 February 2021.

Latin America has the lowest rail density. Bolivia and Paraguay only have 3,000 km and 400 km functional railways respectively. The feasibility of the Bi-Oceanic Railway Corridor is currently being studied, which will connect Bolivia-Paraguay, Brazil and Peru (figure 8).

Figure 8: Bioceanic Railway Corridor



Source: IDB (2015)

Challenges in developing rail infrastructure and recommendations

Despite the ongoing efforts, more than 46,000 kms of railways would still need to be constructed in LLDCs to reach the global average of railway density (Table 9).

Table 9: Additional railways needed in LLDCs

Region	Additional road length (km)
Sub-Saharan Africa East	12,700
Sub-Saharan Africa West	8,000
East Asia	5,100
South Asia	4,700
Eastern Europe and Central Asia	13,900
Latin America	1,800
Total LLDCs	46,300

Source: UN-OHRLLS (2018)

In order to close this gap, LLDCs need to address the following challenges:

1. Increasing the provision of railway network

Maintenance, upgrading, and rehabilitation of rail infrastructure typically rely on public funds. LLDCs are encouraged to undertake efforts to mobilize investment and to use it effectively to ensure the highest benefits. This can be achieved by harmonizing regional initiatives with national transport/infrastructure plans to ensure interoperability, to provide seamless logistics chains and to maximize value added. This will apply to design and construction standards such as track gauge and loading gauge (which should adhere to the regional/global technical standards), and railway signaling systems. To achieve these, being member of international railway organizations (Organization for Cooperation of Railways (OSJD) and/or Intergovernmental Organization for International Carriage by Rail (OTIF)) is highly recommended to encourage and help LLDCs to comprehensively address the legal issues of international rail transport across the entire continent.

2. Increasing the transport planning and economics capacity

Transport economics is not strongly represented in the rail sub-sector while it is more common in the road subsector. There is a case for increasing the capacity of LLDCs' rail subsector transport planning and economics capacity.

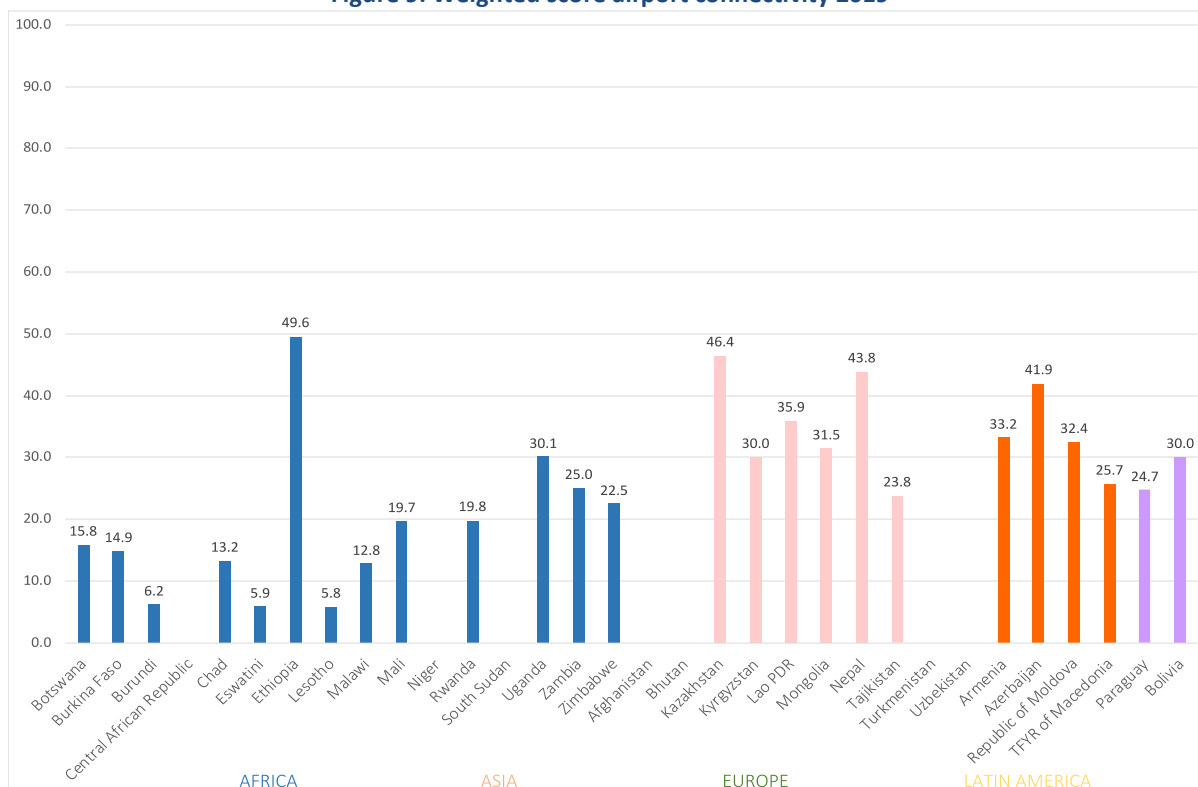
4. AIR TRANSPORT

Air transport has a vital role in promoting connectivity of LLDCs, because it is not subjected to borders and other impediments as in the case of surface transport modes.

Current Status

Based on the International Air Transport Association (IATA) Airport Connectivity Indicator, the LLDCs' air connectivity is limited (figure 9) because most airports in LLDCs receive limited number of flights a week.

Figure 9: Weighted score airport connectivity 2019



Source: Based on data by World Economic Forum (2019)

Ongoing efforts and key achievements

Within the framework of the Single African Air Transport Market (SAATM), the African Union has been putting effort to push for further liberalization of the skies through the implementation of the Yamoussoukro Decision (a treaty that allows for open skies among most African countries). Several Asian countries have commissioned new international airports that have resulted in increased air freight volume. Latin American LLDCs have relatively low air freight volume compared to the other regions mainly due to difficulties in securing financial capital to expand the aviation infrastructure.

Challenges in developing air connectivity and recommendations

1. The reluctance of African Member States to sign the Memorandum of Implementation (MoI) of the Yamoussoukro Decision due to unnecessary local procedures. These countries are encouraged to simplify the procedures at the national level, establish national implementation committees, and harmonize the Yamoussoukro Decision with the national laws.
2. LLDCs have difficulties in securing financial capital to expand the aviation infrastructure. Therefore, their capacity in mobilizing sufficient financial resources needs to be improved.

The first step would be to give more priority to the aviation sector in their national infrastructure development plans.

3. LLDCs need to liberalize their air transport services, pursue bilateral agreements by including fifth freedom, intermediate or beyond, especially in regions and country-pairs that lack strong local carriers.

5. INLAND WATER TRANSPORT

Inland water transport could be an ideal mode for LLDCs due to, among others, its competitive freight rates for low-value high-bulk commodities, positive impact on the environment, lower investment per kilometre compared to road and rail.

Current Status

Fifteen LLDCs have navigable inland waterways with various utilization levels.

Table 10: Inland waterways in LLDCs (km)

Asia		Africa		Latin America	
Afghanistan	1,200	Burundi		Paraguay	3,442
Kazakhstan	4,000	Central African Rep.		Bolivia	5,784
Kyrgyzstan	600	Rwanda			
Lao PDR	4,600	Uganda			
Mongolia	580				
Tajikistan	200	Europe			
Turkmenistan	1,300	Moldova	558		
Uzbekistan	1,100				

Source: UN-OHRLLS (2019a; 2019b; 2019c)

Ongoing efforts and key achievements

- For Asia, in 1995, an agreement was signed between the governments of Cambodia, Lao PDR, Thailand and Viet Nam to establish the Mekong River Commission (MRC) as a joint effort to manage the shared water resources and developing the economic potential of the river.
- For Africa, under the PIDA framework, inland port and waterway projects have been initiated in Burundi, Uganda, and Central African Republic.
- For Latin America, Bolivia and Paraguay, together with Brazil, Argentina and Uruguay, signed several intergovernmental agreements in 1969 (as part of the Cuenca del Plata Treaty) to provide investments to carry out works, promote feasibility studies for the implementation of new terminals and to guarantee the sustainability of the use of the Paraguay and Paraná rivers.

Challenges in developing IWT and recommendations

- There is no complete and updated inventory of the current and potential capacity of inland waterway networks needed to plan this transport infrastructure. As a result, IWT gets lower

priority than road and rail. LLDCs are encouraged to start developing inventories of current and potential capacity of inland waterways in their countries, including but not limited to:

- sections that do not comply with the requirements of regional or international waterways
 - sections that meet the requirements of regional and international waterways but further work is needed to improve the capacity and performance
 - an inventory of missing links (necessary sections to complete the network)
- Investment channeled to IWT normally cannot cover the high initial dredging costs and maintenance costs. Based on the inventories, a prioritization of projects can be made to be proposed and integrated into the national infrastructure plans and regional integration projects.
 - LLDCs need to pursue bilateral agreements with transit countries with connecting waterways, in line with regional and international legal instruments.
 - Most LLDCs do not have dedicated institutions in charge of the waterway's development and division of responsibilities and coordination mechanisms has not been effective. Where navigable waterways exist from LLDCs through maritime countries to the sea, it would be expedient for the LLDCs to build its capacity based on those of the maritime country.

6. DRY PORTS

Definition

A dry port/inland port/inland container depot is an inland location as a logistics center connected to one or more modes of transport for the handling, storage and regulatory inspection of goods (moving in international trade) and the execution of applicable customs control and formalities.

Benefits of developing dry ports for LLDCs are:

- high economic prospects as activities are moved from coastal area to hinterland
- increased logistic performance of LLDCs
- reduce transport and trade logistic costs as customs clearance can be done at dry ports to relieve capacity constraints at seaports
- positive impact on the environment through the promotion of intermodality

Ongoing efforts and key achievements

- 5 Asian LLDCs have ratified the Intergovernmental Agreement on Dry Ports (2013) that identifies 44 existing and 28 potential dry ports in 10 Euro-Asian LLDCs.
- 8 African LLDCs have dry ports, and some of them were built through PIDA.
- Inland ports in Latin America are characterized as river ports.

Challenges in developing dry ports and recommendations

- Securing funding to cover the high initial costs for establishing the facility and shortage of skilled manpower to manage the dry port operation. To address these, a BOT (Build-Operate-Transfer) principle can be adopted. This mechanism will guarantee initial capital and ensure

the availability of high skills from the private sector. Furthermore, incentives to private operators need to be provided, including low-cost land and tax breaks.

- Determining good locations with adequate network of road, rail transfer points and/or inland waterways. Focus to build dry ports along the corridors is necessary.
- Lack of coordination between different stakeholders. It is therefore encouraged to establish a dry port authority to oversee and coordinate all activities related to the operation and management of dry ports including ensuring policy coherence.
- LLDCs that have not been parties to or have not ratified intergovernmental agreements on dry ports are encouraged to do so. Being part of regional and international agreements on dry ports can create greater awareness of policy makers about the benefits and opportunities of the development of dry ports through a knowledge-sharing forum.

7. SEA PORTS

Ongoing efforts and key achievements

For LLDCs, having cooperation agreements with transit countries with sea ports, can be very beneficial. Some examples are:

- Afghanistan – India – Iran (Chabahar Agreement)
- Nepal – India – Bangladesh – China (to access the Visakhapatnam port in India)
- Kazakhstan has joined forces with Iran to build a terminal in the port of Bandar Abbas, and Kazakhstan's National Railway Company owns a terminal in the Port of Lianyungang (China).
- In Africa, several transit countries construct and rehabilitate their sea ports to serve LLDCs, such as Kenya (Mombasa and Lam Ports), Mozambique (Beira and Maputo Ports), Namibia (Port of Walvis Bay), and Tanzania (Dar es Salaam Port).
- In Latin America, Paraguay and Bolivia utilize the maritime ports of Uruguay, Argentina, Brazil, Chile, and Peru.

Challenges and recommendations

Having no seaboard should not preclude LLDCs from taking a material interest in ports development, although this endeavor might be challenged by:

- The lack of financial capacity to jointly develop sea ports in host nations or to have a share in the ports. LLDCs with sufficient financial means are encouraged to cooperate with their transit countries in joint development of sea ports to derive significant benefits. LLDCs with low financial means might start with a lease mechanism.
- The type of ownership of the port (a 100% state-owned port means no possibility for LLDCs to have a share in the port). To address this, LLDCs through political relations should encourage the host country to privatize the ports.

8. TRANSPORT CORRIDOR INFRASTRUCTURE DEVELOPMENT

Definition

Transit transport corridors are designated routes (unimodal, multimodal/intermodal) between two or more countries along which the corridor partners have agreed to cooperate, to apply and

facilitate procedures and to provide support services, and promote regional integration and economic cooperation between neighboring states.

Ongoing efforts and key achievements

- Africa has been adopting the corridor concept as a mechanism for development of transport networks that have led to the development of good road and border infrastructure, such as: Trans-African Highways, Dakar-Bamako-Niamey Multimodal Transport Corridor, North-South Multimodal Transport Corridor, and Northern Multimodal Transport Corridor.
- In Asia, major corridor initiatives include the Euro-Asian Transport Links (EATL), Central Asia Regional Economic Cooperation (CAREC) Program, and Greater Mekong Subregion (GMS) economic corridors. CAREC has identified six transport corridors extended to 29,350 kms in 2020.
- In Europe, Armenia and Azerbaijan are part of the Transport Corridor Europe-Caucasus-Asia (TRACECA), and together with Tajikistan, are also part of the International North-South Transport Corridor (INSTC).
- Active corridors in Latin America are the Ciudad del Este (Paraguay) – Ponta Grossa (Brazil) and the Santa Cruz (Bolivia) – Arica (Chile) corridors, and the inland waterways of the Paraná and Paraguay Rivers.

Challenges and recommendations

The success of a transport corridor depends on the provision of physical infrastructure and the corridor management that oversees the performance of the corridor. Therefore it is important to build the capacity of the corridor management staff in the areas of:

- Coordinating the roles of participating countries and other agencies such as ports, railway companies, road authorities, shipping lines and other logistic players.
- Providing training for stakeholders in trade and transit
- Assisting participating countries to domesticate the corridor policies into their national laws and legislations.
- Measuring the corridor performance to assess how corridor goals can be achieved and to identify under-performing areas. For this, the CAREC Corridor Performance Measurement and Monitoring (CPMM) is a good example.

Finally, LLDCs should incorporate integrated and harmonized planning from regional policies into their national plans.

9. ENERGY AND ICT INFRASTRUCTURE

9.1. Energy Infrastructure

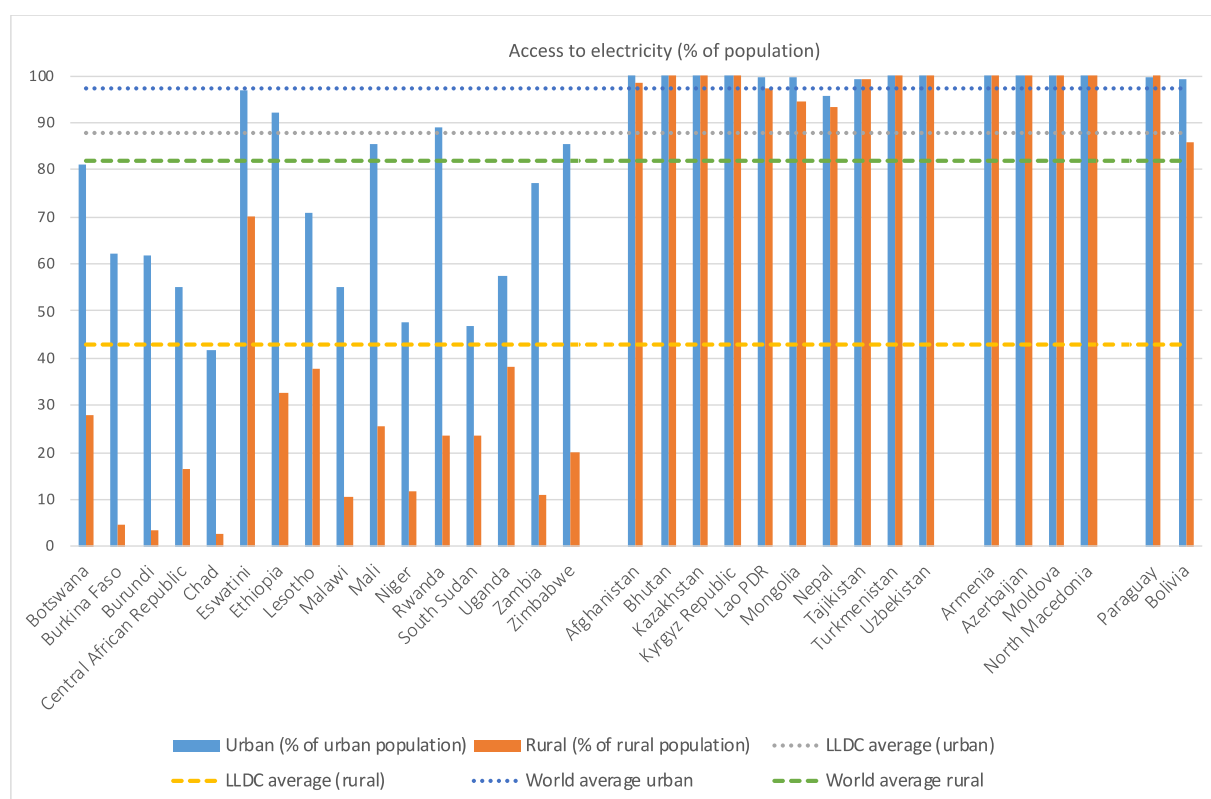
As outlined in the VPoA, energy infrastructure and access to affordable, reliable and renewable energy and related technologies are critically important for facilitating trade.

Ongoing efforts and key achievements

- European LLDCs already achieved 100% electricity coverage, while most of Asian and Latin American LLDCs in 2017 has nearly reached the same level.
- Despite this, the average electricity coverage of LLDCs is still behind the world average, due to the low coverage of the African LLDCs (Figure 10). To address this, African regional

economic communities, such as COMESA, EAC, ECCAS, ECOWAS and SADC, have adopted a number of national power generation and cross border interconnector plans as regional projects into the master plans under the auspices of PIDA.

Figure 10: Access to electricity in 2018



Source: Based on:

- World Bank Open Data. Available at <https://data.worldbank.org/indicator/EG.ELC.ACCS.UR.ZS> and <https://data.worldbank.org/indicator/EG.ELC.ACCS.RU.ZS>. Accessed on 15 February 2021.
- United Nations SDG Indicators Database (<https://unstats.un.org/sdgs/indicators/database/>). Accessed on 3 January 2020.

Challenges and recommendations

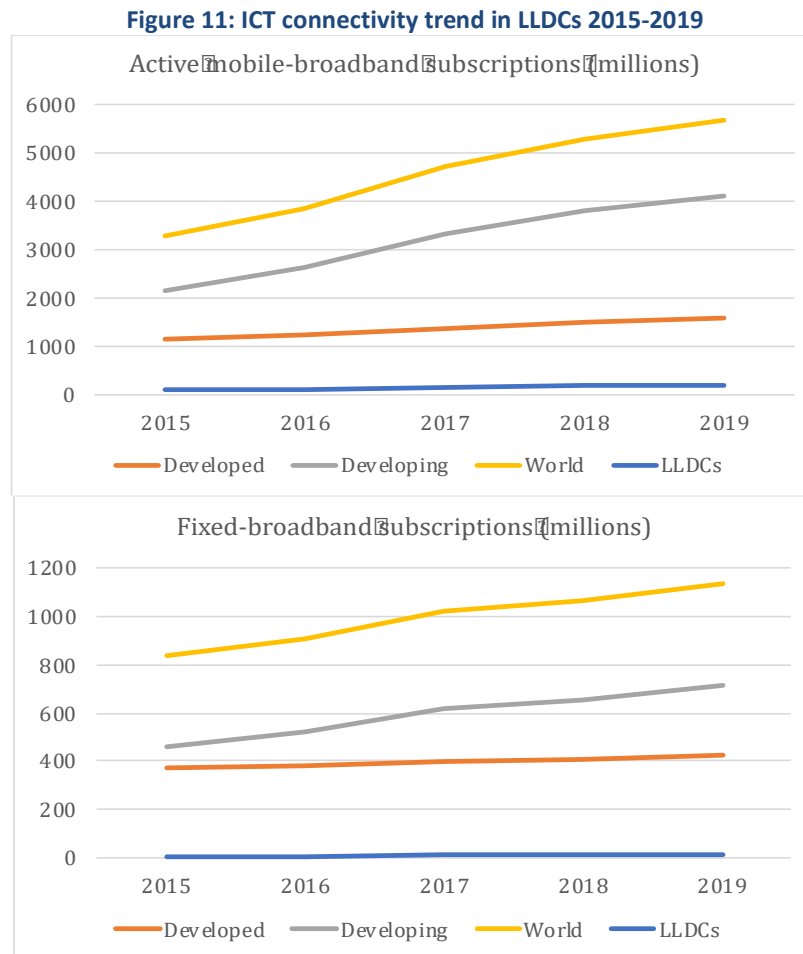
The main challenge faced by LLDCs in implementing energy infrastructure projects is the long gestation period that has resulted in slow project pace and slow increase in electricity access in LLDCs. Therefore, the LLDCs capacity in the following areas need to be strengthened: project planning, projects restructuring to include all regional and international initiatives, project implementation, and project monitoring. LLDCs are encouraged to reach out to UNOPS to get assistance to apply the tools it has developed to helping governments assess and improve their capacity to plan, deliver and manage infrastructure systems.

9.2 ICT Infrastructure

When considering connectivity, it is important to note that most value-added services do not depend primarily on highways and railways but on fast and efficient internet and telecommunications, which is essential for border crossing facilitation, boosting the competitiveness of enterprises and facilitating international trade.

Ongoing efforts and key achievements

- LLDCs have been making progress in terms of mobile and fixed broadband subscription rate (Figure 11).



Source: Based on ITU. Data available at <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>. Accessed on 15 February 2021.

Note: LLDCs included in the charts are 16 LLDCs (12 in Africa and 4 in Asia)

- Nearly all European LLDCs and half of the Asian LLDCs already have fixed-broadband prices that are lower than 5 per cent of their Gross National Income per capita (GNI p.c.). However, 94% of African LLDCs still have fixed-broadband prices that are higher than that.

Challenges and recommendations

The main challenge faced by LLDCs in increasing the penetration level of fixed-broadband, is to increase the affordability. To address this, LLDCs are encouraged to:

- formulate national broadband policy to improve access to international high-capacity fiber-optic cables and high bandwidth networks, and to ensure that the policies provide enabling environment to attract investment.
- ensure the harmonization of policy and regulatory frameworks at the regional level with the national regulatory framework, to ensure consistent and higher pace of implementation.

Recap of Key Points

- The inadequacy and low quality of transport infrastructure results in the high costs and low competitiveness of LLDCs. Furthermore, sufficient attention to maintaining infrastructure assets is essential not only to preventing assets to deteriorate, but also to decreasing the costs of operation and minimizing disruption.
- The high cost of ICT services, in particular fixed-broadband services, has been hindering the progress of trade facilitation in many LLDCs. Lowering the price of these services to be in line with the purchasing power of people is essential to fully harness the potential of the digital economy that facilitates trade and promote sustainable development.

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Module 3

Resilient Transport Infrastructure – Experiences and Best Practices

1. Module Objectives

- Participants understand the impact of climate change on transport Infrastructure
- Raise awareness of participants to the needs to develop an adaptation policy framework to integrate climate change scenarios in transport infrastructure development.

2. Climate Change Impacts on Transport Infrastructure

Road transport is responsible for the highest freight volume in LLDCs. As such road network is the largest part of infrastructure stock in most LLDCs. The road network is most vulnerable to the climate change impacts, due to poor condition, a high proportion of unpaved roads and limited resources and technology to adapt. Its damage creates high asset losses. But this does not mean that climate change impacts on other infrastructure such as rail, airports and waterways, can be neglected.

Table 11: Illustrative impacts of climate change in transport sector

Temperature changes	<ul style="list-style-type: none">- Melting road surfaces and buckling railway lines- Damage to roads due to melting of seasonal ground frost or permafrost (pavement deterioration)- Changing demand for ports as sea routes open due to melting of arctic ice
Sea-level rise	Inundation of coastal infrastructure, such as ports, roads or railways
Changing patterns of precipitation	<ul style="list-style-type: none">- Disruption of transport due to flooding- Changing water levels disrupt transport on inland waterways- Increased frequency of landslides
Changing patterns of storms	<ul style="list-style-type: none">- Damage to assets such as bridges- Disruption to ports and airports- Increased accident rates

Source: OECD (2018b); Baker (not dated.)

Table 12: Examples of infrastructure damage costs associated with extreme weather events

Countries	Weather event (Year)	Cost of damage to transport infrastructure (US\$, millions)
Malawi	Cyclone Idai (2019)	36
Mozambique	Cyclone Idai (2019)	546
Belize	Hurricane Keith (2006)	40
Fiji	Flooding (2009)	28.5
Solomon Islands	Flooding (2014)	12

Source: USAID (2019)¹; Mozambique Government (2019); World Bank (2017).

In light of the need to expand and improve transport infrastructure in LLDCs, addressing climate change impacts in the countries' transport infrastructure planning and management is essential. To improve transport connectivity, it is of utmost importance that transport infrastructure can provide service at all time.

¹ <https://www.usaid.gov/cyclone-idai/fy19/fs10>

Figure 12: Washed away bridge in Zimbabwe due to Cyclone Idai



Photo: REUTERS/Philimon Bulawayo

3. Challenges and Sustainable Solutions

The main challenges that need to be addressed by LLDCs in building climate resilient transport infrastructure are:

- It is a very new concept to embed into infrastructure planning. Increasing awareness that investments in resilient infrastructure will be cost-effective in the long run, needs to be enhanced with cost-benefit analyses that include assessment of the lifetime costs of infrastructure, integrate climate change scenarios, and quantify climate-related costs.
- Limited funding resources channeled to transport infrastructure. To address this, the first step that can be taken by LLDCs is to make a priority list of projects based on the urgency of climate change impacts on transport infrastructure performance.
- In terms of reducing GHG emissions resulted from infrastructure development, creating a law that mandates institutional investors to measure and reduce the carbon footprint of their investment portfolio is needed.
- LLDCs must enhance their capacity to:
 - integrate climate change scenarios into the planning and design of infrastructure, including spatial planning frameworks to redirect development away from high-risk areas
 - require strategic environmental assessments and environmental impact assessments during the project planning phase.
 - effectively monitor asset condition over time to identify the most vulnerable infrastructure elements and prioritize investments.
 - adapt decision options for each phase of the infrastructure life cycle (Table 13).

Table 13: Adaptive decision points for each infrastructure life cycle phase

Life cycle phase	Example adaptive decision points
Policy and planning	Location of asset Capacity of asset Design life of asset Funding mechanisms and risk sharing Design codes and construction standards
Conceptual design	Conceptual design parameters Conceptual modeling Investment plans
Detailed design	Detailed design parameters Modeling Environmental impact assessment Financial evaluation Cost-benefit analysis
Construction and establishment	Construction methods/materials
Asset management	Maintenance program of the asset base
Monitoring and adaptation	Retrofitting existing assets

Source: UNDP (2011)

As the related expertise are mostly not yet readily available, it is strongly recommended that LLDCs become members of the Coalition for Disaster Resilient Infrastructure (CDRI), a new multi-country and multi-stakeholder Coalition that aims to promote knowledge exchange and provide technical support to countries on implementing disaster and climate resilient infrastructure. As this is a new cooperation body, being members will give opportunities to LLDCs to co-create the form of the coalition and play a key role in setting its substantive agenda, and finally leverage change in their home countries.

Recap of key points

- LLDCs and transit countries need to build climate resilient infrastructure.
- Financial and technical assistance from international financial institutions and organizations is needed to support the building of the above-specified capacities of LLDCs to develop policies and strategies on creating sustainable and resilient transport infrastructure.
- LLDCs need financial and technical support and affordable technologies to increase the use of low-carbon fuels.

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Module 4

Financing Transport Connectivity

1. Module Objectives

- Participants are aware of the available sources of financing and the importance of mobilizing funding for infrastructure development and maintenance from all sources
- Participants understand the enabling environment needed to attract various funding sources
- Participants are aware of and understand the importance of developing a pipeline of bankable infrastructure projects.

2. Investment Needs to Close Infrastructure Gap

The investment needs to close infrastructure gaps in LLDCs are estimated to be ranging from 1.4% to 4.5% of GDP (Table 14). Therefore, LLDCs will require all sources of infrastructure financing to close these gaps. Yet, the business environment of most LLDCs is not ideal in attracting funding, as shown by:

- Doing Business ranking, in which 21 LLDCs, out of 190 assessed countries, are ranked below 80th.
- Corruption Perceptions Index, where over 80% of LLDCs rank below the world's average (in the bottom half of 180 countries).

Table 14: Investment cost to bring road and rail infrastructure of all LLDCs to global benchmarks

Region	Additional length		Cost	
	Road km	Rail km	US\$ billion	% of GDP
East Asia	8,300	5,100	37.2	4.2
Eastern Europe and central Asia	57,900	13,900	171.6	1.4
Latin America	15,200	1,800	37.7	1.7
South Asia	7,700	4,700	34.1	3.9
Sub-Saharan Africa East	53,900	12,700	158.5	1.9
Sub-Saharan Africa West	53,100	8,000	70.3	4.5
Total LLDCs	196,100	46,300	509.3	2.0

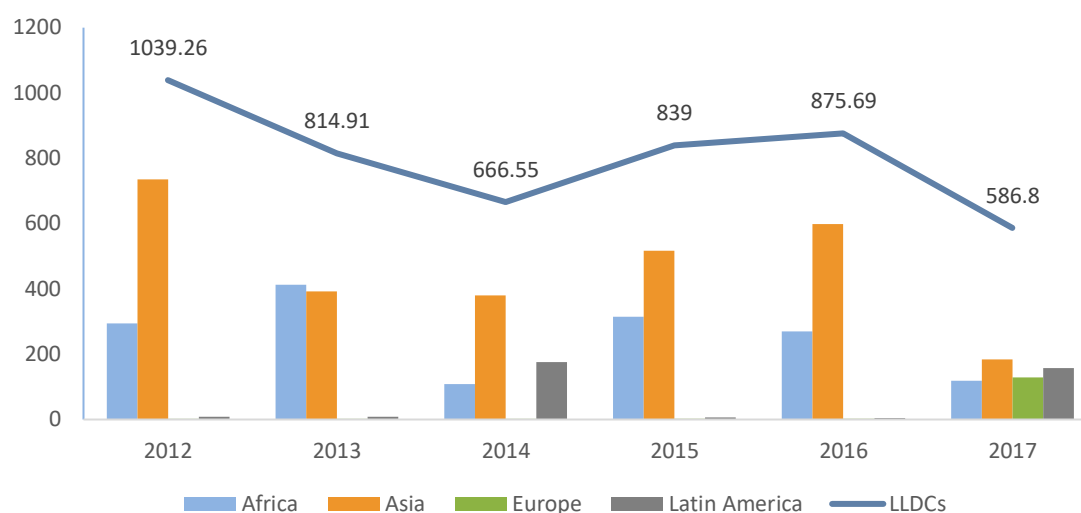
Source: UN-OHRLLS (2018)

3. Sources of Infrastructure Financing

3.1. Traditional funding sources

- a) Domestic Resources, which includes direct and indirect taxes, such as income taxes, fuel duties, tolls and vignettes.
- b) Official Development Assistance (Figure 13)

Figure 13: ODA disbursements to transport and communications sector in 2012-2017 (US\$ million)



Source: Based on OECD.Stat (<https://stats.oecd.org/Index.aspx?DataSetCode=TABLE2A>). Accessed on 17 February 2021.

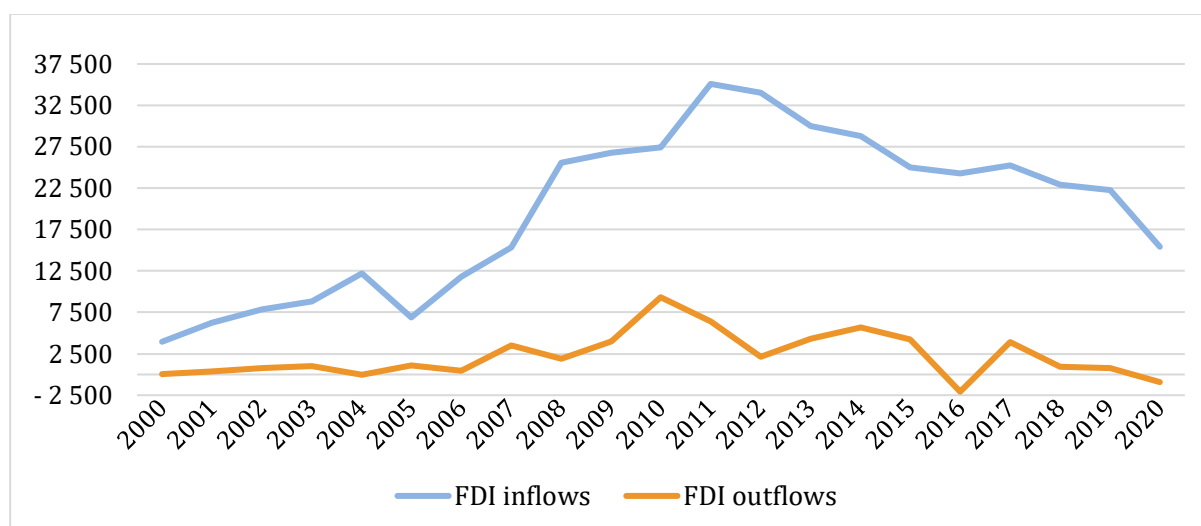
Table 15: Bilateral and multilateral ODA flows to LLDCs in 2019

	US\$ billion	% of total ODA received
United States	5.6	18%
International Development Association	5.5	18%
EU Institutions	2.7	9%
United Kingdom	1.8	6%
Japan	1.3	4%
Germany	1.7	6%
Global Fund	1.2	4%
Asian Development Bank	0.9	3%
African Development Fund	0.6	2%
France	1.0	3%

Source: Own elaboration based on OECD.Stat. Available Available at <https://stats.oecd.org/Index.aspx?DataSetCode=TABLE2A#>. Accessed on 18 February 2021.

- c) Foreign Direct Investment, mainly based on a Built-Own-Operate (BOO) framework

Figure 2: Foreign Direct Investment inflow and outflow in LLDCs, 2000-2020 (US\$ million)



Source: UNCTADstat. Available at <https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=96740>. Accessed on 17 February 2021.

- d) Funding by Commercial Banks, such as International Finance Corporation (IFC), Netherlands Development Finance Company (FMO), German Investment and Development Corporation (DEG), Kreditanstalt für Wiederaufbau (KfW), European Bank for Reconstruction and Development (EBRD), and Asian Development Bank (ADB). The 753km Ethiopia-Djibouti Railway Line Modernizations project is a best practice of infrastructure co-funded by government and a commercial bank. The Ethiopian section of the line costs \$3.4bn, 70% of which was provided by China Exim Bank and 30% by the Ethiopian government.

- e) Public-Private Partnerships (PPP)

There are various mechanisms of PPP, such as Build-Operate-Transfer (BOT), Build-Own-Operate-Transfer (BOOT), Lease-Rehabilitate-Operate-Transfer (LROT), Build-Transfer-Lease (BTL) and Joint Ventures (JVs). An advantage of PPP is that investment in infrastructure and services can be delivered quickly and to specified standards, without resulting in high levels of government capital expenditure.

Some examples of PPP in LLDCs:

- Africa: Sena Rail Line (Mozambique) and Kenya-Uganda Railway
- Asia: Shar-Oskemen Railway (Kazakhstan)
- Europe: Skopje and Ohrid Airports Concession (North Macedonia)
- Latin America: Bolivia Airport Concession

3.2. Innovative funding sources

- a) Pension Funds and Insurance Reserves

This is relatively new terrain for infrastructure funding and the main challenge is the need to ensure that the funds get good returns. Efforts have been ongoing in Africa where NEPAD initiated 5% Agenda in 2017, which aimed at increasing the allocations of African asset

owners to African infrastructure from its currently low base of approximately 1.5% of their assets under management (AUM) to an impactful 5% of AUM, by working together with Pension and Sovereign Wealth Funds.

b) South-South and Triangular Cooperation

It refers to developing countries' engagement in mutually beneficial activities on the basis of solidarity, self-help and self-reliance. Examples of South-South institutions are Asian Infrastructure Investment Bank (AIIB) and China's One Road One Belt initiative.

c) Specific Initiatives

The shared concern for the infrastructure deficit in LLDCs has led to a proliferation of initiatives at the regional level, such as:

- Africa: Programme for Infrastructure Development in Africa (PIDA) and Africa50 (an infrastructure investment platform promoted by the AfDB, aims at accelerating project preparation and financing on the continent).
- Asia: ASEAN Connectivity 2025 and Investment Facility for Central Asia (IFCA).
- Latin America: Integration of the Regional Infrastructure of South America (IIRSA).

d) Climate Finance

This type of fund is provided by international institutions to support LLDCs in sustainable and resilient transport infrastructure development to support economic growth and to achieve SDG targets through the following investment channels: Bilateral Channels (e.g. Germany's International Climate Initiative), Multilateral Channels (e.g. the World Bank's Climate Investment Fund), the Global Environment Facility (GEF), the Adaptation Fund (AF), the Green Climate Fund (GCF).

Table 16: GCF Trust Fund transport projects in LLDCs

Country	Title	Replenishment Period	Grant (US\$)/ Co-financing (US\$)	Implementing Agencies
Armenia, Azerbaijan, Bangladesh, Brazil, Cote d'Ivoire, China, Costa Rica, Georgia, India, Jamaica, Montenegro, North Macedonia, Mauritius, Mexico, Peru, Philippines, Russian Federation, Uruguay, Viet Nam	Stabilizing GHG Emissions from Road Transport Through Doubling of Global Vehicle Fuel Economy: Regional Implementation of the Global Fuel Economy Initiative	2010-2014	2,261,819/ 9,203,606	UNEP
Bangladesh, China, Mongolia	Asian Sustainable Transport and Urban Development Program	2010-2014	0/153,842,000	ADB
Bhutan	Bhutan Sustainable Low-emission Urban Transport Systems	2014-2018	2,639,726/ 10,318,000	UNDP
Botswana	Incorporating Non-Motorized Transport Facilities in the City of Gaborone	2002-2006	891,630/0	UNDP
Burkina Faso	Ouagadougou Transport Modal Shift	2006-2010	909,000/ 3,590,000	The World Bank
Ethiopia, Kenya, Uganda	Promoting Sustainable Transport Solutions for East Africa	2006-2010	2,850,000/ 4,335,000	UNEP
Kazakhstan	Sustainable Transport in the City Of Almaty	2006-2010	4,886,000/ 76,526,000	UNDP
Lao PDR	Vientiane Sustainable Urban Transport Project	2014-2018	1,840,000/ 76,450,000	ADB
Mongolia	Mongolia Urban Transport Development Investment Program	2010-2014	1,389,000/ 76,900,000	ADB
Nepal	Kathmandu Sustainable Urban Transport Project	2006-2010	2,520,000/ 27,900,000	ADB
Regional	GHG Assessment Methodologies in Public Transport	2006-2010	1,000,000/ 1,000,000	ADB
Tajikistan	Support to Sustainable Transport Management in Dushanbe	2006-2010	970,000/ 5,861,127	UNDP

Source: <https://www.thegef.org/projects>

4. Challenges and How to Address Them

- One of the key challenges faced by LLDCs is the availability of a sustainable plan for infrastructure maintenance. Therefore, domestic resources need to be strengthened and earmarking to specific road funds should be determined.
- It is essential to increase the institutional capacity of LLDCs to undertake PPP projects and to build the necessary negotiations, commercial and communications skills. The first step is to

develop PPP laws, as they will deliver confidence to government officials to adopt PPPs and highlight the government's commitments and the mechanisms of risk transfer.

- For inland waterways, which is not yet seen as an important part of the transport infrastructure by multilateral development banks (MDBs) and bilateral donors, PPP with substantial public investment and strong guarantees for private investors is essential.
- Appropriate reforms of national and regional regulatory frameworks need to be developed by LLDCs to create an enabling environment for private companies to invest in large-scale infrastructure projects in LLDCs. This includes improving the Doing Business ranking, the Corruption Perception Index, and other relevant international rankings.
- Another challenge is the lack of bankable infrastructure projects in LLDCs, which makes it difficult to attract interests of commercial banks, pension funds and insurance reserves. To address this, LLDCs, with the support of multilateral development banks and other international and regional institutions, need to improve their capacity to develop a pipeline of bankable infrastructure projects to meet the investors' requirements. The first step is to have a long term national transport infrastructure plan, which is necessary to secure project pipelines.
- The needs to improve South-South cooperation is hindered by the lack of institutional capacity of LLDCs to manage such a complex cooperation. Ongoing support from international institutions need to be strengthened.

Recap of key points

- Very high investments are needed to bring LLDCs' transport infrastructure to the level of global benchmarks. Attracting finance from many sources is therefore necessary.
- Improving the legal environment in LLDCs is essential in order to give assurance to potential investors.
- Developing a pipeline of bankable infrastructure projects is important for mobilizing funds.

Module 5

Improving Soft Infrastructure for Transport Connectivity

1. Module Objectives

- Participants are aware of the importance to address soft infrastructure to improve transport connectivity
- Participants understand that soft infrastructure deals with policy and regulatory reforms to facilitate faster movement along transport corridors and requires greater coordination and cooperation of different stakeholders in the LLDC and with transit country

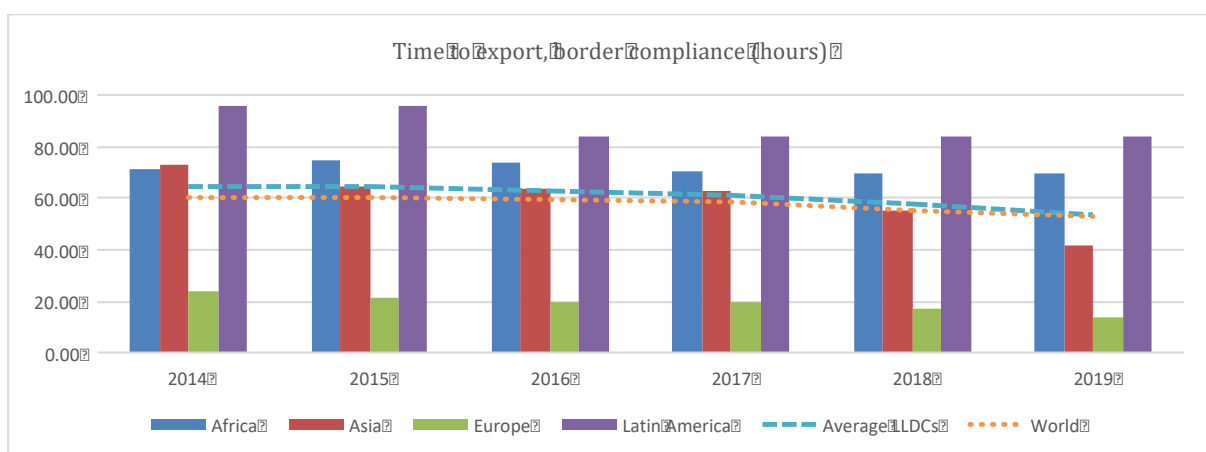
2. Trade Facilitation

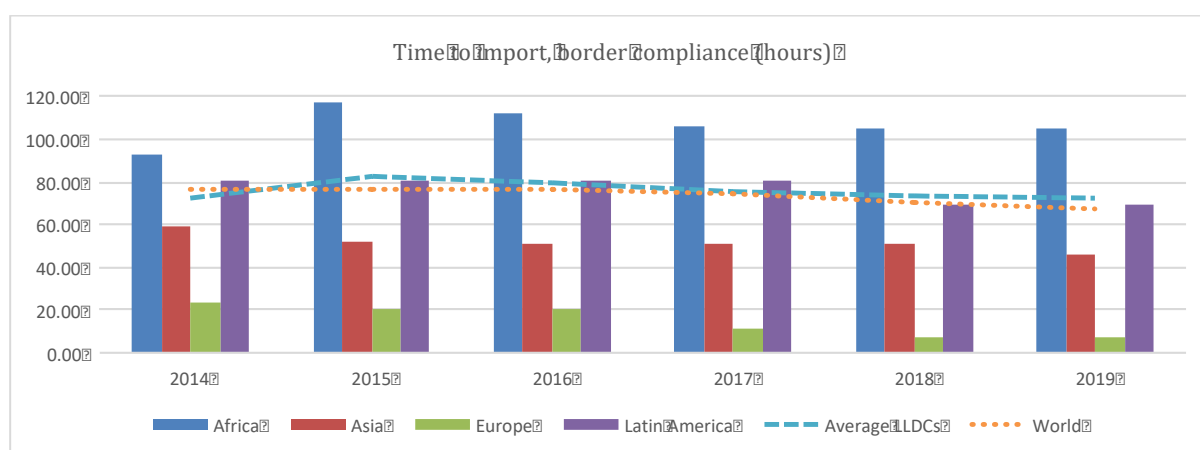
Trade facilitation refers to facilitating products to move across borders efficiently by streamlining administrative procedures, harmonizing and standardizing rules and documentation and simplifying border control and procedures.

Transparency is also one of the key pillars of trade facilitation and it promotes openness which helps to increase the predictability of trade transactions.

Asian and European LLDCs have been doing well in reducing time to export and import, even below the World's average (Figure 14).

Figure 14: Time to export and import (border compliance) in LLDCs

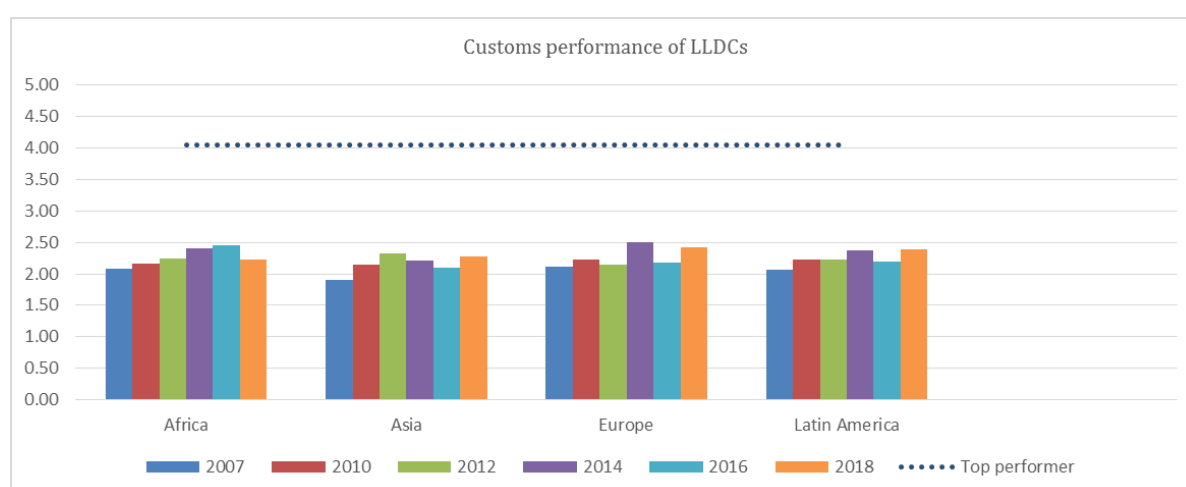




Source: Based on World Bank Open Data. Available at <https://data.worldbank.org/indicator/IC.EXP.TMBC>. and <https://data.worldbank.org/indicator/IC.IMP>. Accessed on 17 February 2021.

However, the efficiency of customs and border clearance management in LLDCs still needs to be improved (Figure 15).

Figure 15: Customs performance based on LPI 2007-2018



Source: Based on Aggregated LPI 2012-2018 by World Bank.

2.1. Key achievements in trade facilitation

One Stop Border Post (OSBP)

- Chirundu OSBP between Zambia and Zimbabwe: reduced border delays from days to hours
- Rusomo OSBP between Rwanda and Tanzania: reduced border compliance time
- Dansavanh OSBP between Lao PDR and Vietnam: reduced cargo processing time (from 4 hours to 70-80 minutes, and is expected to go further to 30 minutes) and passenger cars processing time (from 2 hours to 30 minutes, and is expected to go further to 10 minutes).

Single Window

Asian and European LLDCs are the most active in implementing single window (Table 1). Most of Asian LLDCs are CAREC countries and CAREC has been implementing Joint Customs controls programme, in which single window development projects are part of. Azerbaijan, for instance, has been implementing single window since 2009 and reduced border-crossing time from 180

minutes to 20 minutes. African LLDCs are the least active in implementing single window, most likely due to the high broadband prices in the region.

Table 17: LLDCs implementing single window

Region	Number of countries	% of total LLDCs
Africa	4	25%
Asia	9	90%
Europe	3	75%
Latin America	1	50%
Total	16	50%

Source: Compiled from various sources.

Customs Automation

Nearly all LLDCs have automated their customs system although the implementation progress varies. In Africa, the majority of LLDCs have adopted Automated System of Customs Data (ASYCUDA), while LLDCs in Latin America adopted SINTIA (Sistema Informático de Seguimiento de los Tránsitos en el MERCOSUR). One of the best practices is the Zimbabwe Revenue Authority that has migrated to the ASYCUDA World system in 2018, which resulted in faster clearance of goods at ports of entry, simplified compilation of trade statistics, and 44% increase of revenue compared to the previous year.

2.2. Legal Framework

WTO Trade Facilitation Agreement (TFA)

- 26 of the 32 LLDCs are WTO members and all of them had ratified the TFA, although the implementation rate varies. The average percentages of the TFA that LLDCs notified under categories A, B and C are 35%, 27% and 39% respectively. Measures that are most notified by LLDCs under category C are Information Available through Internet (article 1.2), Enquiry Points (article 1.3), Test Procedures (article 5.3), Risk Management (article 7.4), Trade Facilitation Measures for Authorized Operators (article 7.7), and Border Agency Cooperation (article 8).
- Implementing the TFA will result in:
 - the reduction of trade costs by 12.5% - 17.5%.
 - two thirds of the \$1 trillion in gains from the trade expansion resulting from the Agreement, received by developing countries
 - the reduction of the time to import by 47% and the time to export by 91%.

UNECE Transport Agreements and Conventions

The UNECE manages more than 50 international transport agreements and conventions that have contributed to a high level of efficiency, safety, environmental protection and sustainability in transport, through the harmonization of national regulations in a large and varied number of areas. Despite its importance and benefits, many LLDCs have not yet ratified them.

Table 18: Status of ratification of UNECE conventions related to border crossing facilitation

Convention	LLDCs				Total
	Africa	Asia	Europe	Latin America	
1975 Customs Convention on the International Transport of Goods under Cover of TIR Carnets (TIR Convention), entered into force on 20 March 1978	0	7	4	0	11
1982 International Convention on the Harmonization of Frontier Controls of Goods (Geneva Convention), entered into force on 15 October 1985	1	7	0	0	8
1972 Customs Convention on Containers	1	3	3	0	7
1968 Convention on Road Signs and Signals	1	6	4	0	11
1956 Convention on the Contract for the International Carriage of Goods by Road (CMR)	0	6	4	0	10
1956 Customs Convention on the Temporary Importation of Commercial Road Vehicles	0	3	3	0	6
Total	2	32	18	0	

Source: United Nations (<https://treaties.un.org>). Accessed on 29 November 2019.

Revised Kyoto Convention

It is the main trade facilitation Customs convention designed to harmonize and simplify Customs procedures, developed by the World Customs Organization. Only 19 LLDCs have ratified this convention (12 African and 7 Asian LLDCs).

Regional and sub-regional agreements

Integrating into regional economy is of utmost importance for LLDCs to promote partnerships with transit countries. The LLDCs' participation to regional trade agreements is higher than that to international conventions on transport and transit.

3. Recommendations

- LLDCs that are yet to ratify conventions and agreements facilitating border crossing are encouraged to do so. Lack of ratification could be considered a commercial risk by investors.
- LLDCs should reach out to the international entity that manages a particular agreement/convention, for technical assistance to interpret the agreement/convention, understand its benefits, reflect it in the national laws and legislations as well as assistance to facilitate implementation.
- Policy measures that are developed to facilitate border crossing trade should ensure sustained political support by the government, incorporate the interest of the private sector and the interest of donors.
- UN-OHRLS and other relevant international organizations should facilitate sharing of information on international best practices.

Recap of key points

- Establishing coordinated border management systems including enhanced cooperation between countries that share common border has proved to reduce delays at the border.
- Implementation of international agreements is one of the main ways to facilitate faster, cheaper and more efficient transport.
- Participating in regional initiatives contributes to improve trade facilitation as it promotes partnerships and allows knowledge sharing among LLDCs and with transit countries.
- Enhanced support to LLDCs and Transit countries is necessary to facilitate implementation of agreements/conventions.

Module 6

Assessing the Impact of COVID-19 on Transport Connectivity – Experiences and Lessons

1. Key objectives of the module:

- To provide participants with empirical evidence on the impact of COVID-19 on LLDCs' transport connectivity
- To train participants on how to strengthen the preparedness of LLDCs to handle future pandemic and emergency situations

2. Introduction

The COVID-19 pandemic has a major impact on the global health system and brought major disruption to economic activity across the world. After over a year since the virus outbreak, it is evident that the transport sector has been severely affected. In the wake of the pandemic, nearly all countries closed their land, air and sea borders in order to curtail the spread of the virus. Travel restrictions that were put in place have caused financial turbulence for transport companies and operators, especially when the business model relies heavily on passenger transport.

The crisis also hinders transport infrastructure development in many countries due to the obligatory physical distancing measure, which is not always possible in construction sites. Even though many countries resumed infrastructure projects in the beginning of third quarter of 2020 applying safety measures for construction workers, progress was still slow due to disruptions on the transport of materials. It is however noteworthy that the reasons for the project delays are temporary issues. According to the World Bank², over 250 infrastructure projects (not exclusively transport) in developing countries have been reported as cancelled or delayed. The number of projects facing disruptions peaked in April-May 2020 and decreased afterwards. As of November 2020, nearly 20% of disrupted projects have resumed activity. This indicates that further improvement can be expected once the pandemic is better controlled. On the other hand, many countries chose to delay (non-essential) or downgraded physical infrastructure projects due to a significant loss in road toll revenue and a concern that the number of air passengers will not reach the pre-covid level before 2023.

Cross border facilitation

At the onset of the COVID-19 pandemic, many countries introduced various restrictions to cross-border and transit freight transportation. Along with additional inspections and reduced operational hours at border crossing points, these have driven an increase in transit costs and time. Again, a challenge that LLDCs already have to address during normal circumstances due to their geographical locations and challenge to access the international market. The imposition of border restrictions by transit countries has impacted the timely delivery and access to basic goods for LLDCs, as most of LLDCs rely heavily on imports to cover their basic needs.

² <https://blogs.worldbank.org/ppps/what-can-ai-tell-us-about-covid-19s-impact-infrastructure>

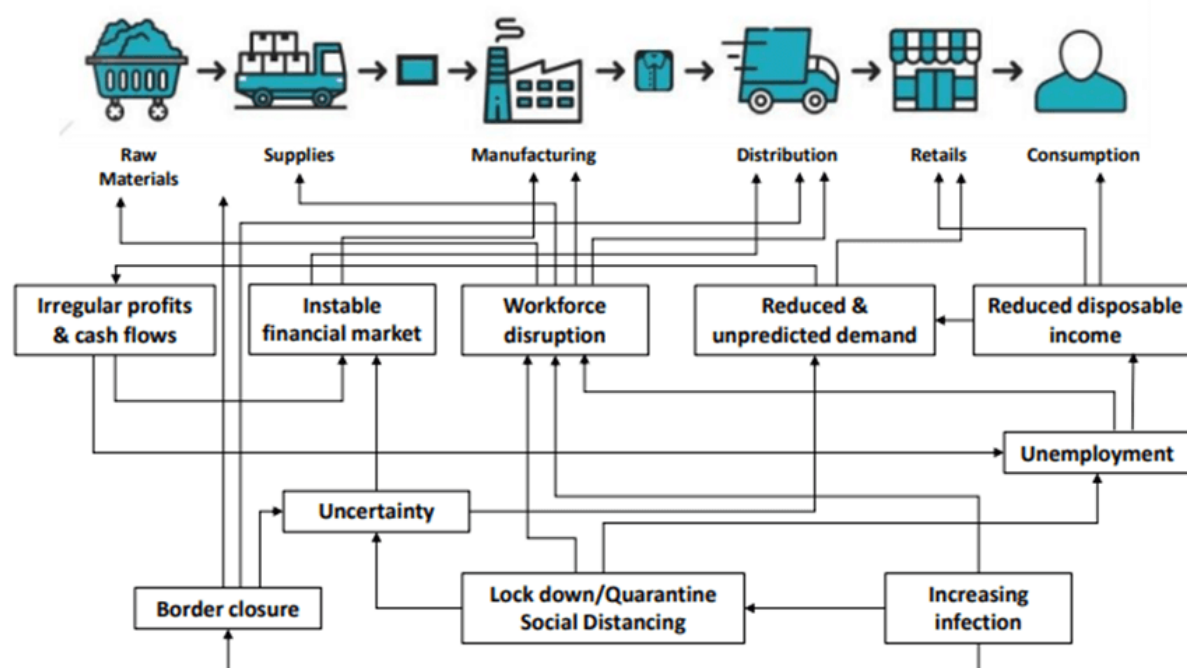
According to ESCAP (2020a), during the COVID crisis, many countries implemented regulations at border crossing points without consulting their integration partners. Some countries implemented partial or complete lock down of border crossing points or introduced new requirements at the borders. Rapidly changing new restrictions, new requirements, as well as lack of clarity and limited information further increased cross-border transport waiting time and costs, making transported goods less affordable.

COVID-19 impact on supply chain and economy

The restrictions to cross-border and transit freight transport have deeply affected supply chains and aggravated the economic and social impacts of the pandemic to the global economy. In the first quarter of 2020, many countries experienced a lack of basic goods at supermarkets, not only caused by consumers' panic buying, but also due to truck delays at borders. Furthermore, imposed lockdowns have slowed or temporarily stopped the flow of raw materials and finished goods, disrupting manufacturing and causing financial problems for companies, which forces them to lay-off employees and this led to job losses and increase in unemployment. As an example, Botswana declared a State of Public Emergency in April 2020, as an effort to curtail the spread of COVID-19, that includes closure of borders. Consequently, the manufacturing industry could not import raw materials or had their raw materials stuck at Sea Ports. This has negative financial impact due to non-production and accumulated storage costs at Sea Port facilities.

The impacts go further to include decline in commodities price, increasing the vulnerability of many commodity-dependent LLDCs. The far-reaching implications of supply chains disruptions due to the COVID-19 pandemic and the measures taken by many governments to contain the virus is depicted in the following figure.

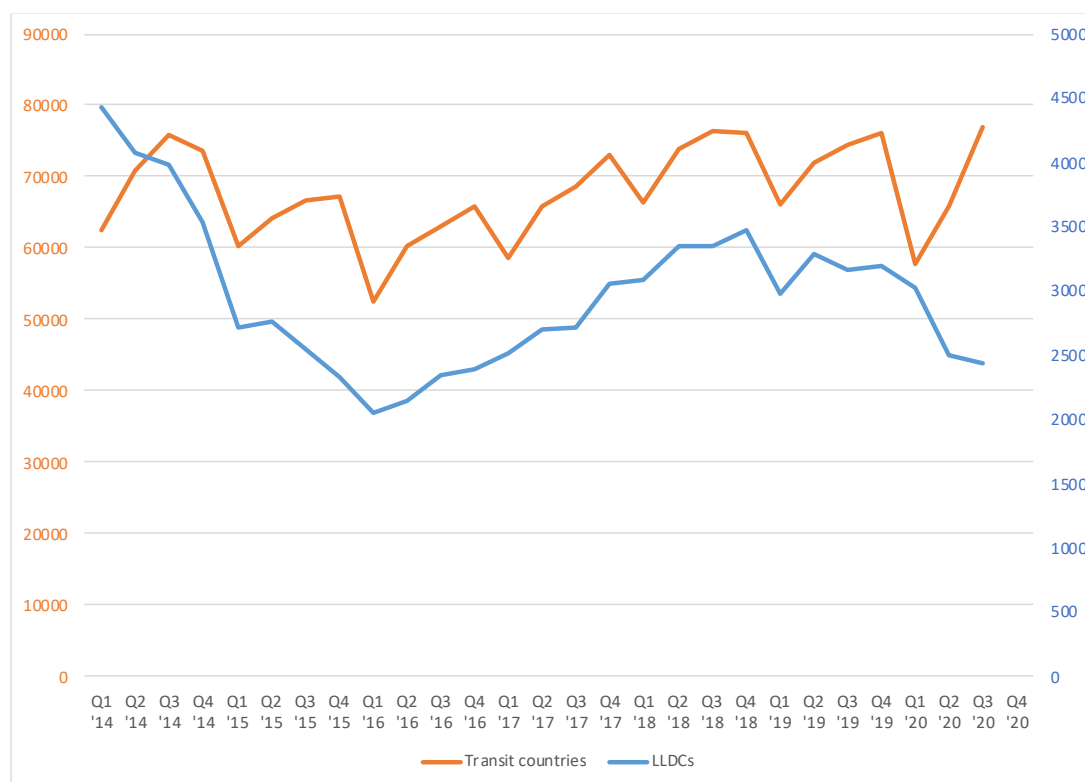
Figure 16: Supply chain disruptions have far-reaching effects



Source: International Economics Consulting (https://www.tradeeconomics.com/iec_publication/impact-covid19-transport-logistics/). Accessed on 29 March 2021.

The severe disruptions on supply chain operations are reflected in export decrease of LLDCs. Figure 17 below presents the average total merchandise exports in LLDCs and transit countries in each quarter period over the past seven years. Exports of LLDCs dropped in 2020, while those of transit countries increased. By April 2020 exports from LLDCs were 40% lower than what they were in April 2019.

Figure 17: Average total merchandise exports 2014-2020 (million \$US) of LLDCs and transit countries



Source: WTO. Available at <https://data.wto.org/>. Accessed on 30 March 2021

Note: Data available for LLDCs (Armenia, Bolivia, Kazakhstan, Kyrgyz Republic, Moldova, North Macedonia and Paraguay) and transit countries (Algeria, Argentina, Bangladesh, Brazil, Chile, China, India, Iran, Kenya, Nigeria, Pakistan and Peru).

It is clear that the smooth functioning of the transport sector was not prepared for the interruptions brought in by the pandemic situation. The disruptions of supply chain have negatively affected not only trade and economic growth of LLDCs, but also their effort to improve their transport connectivity. COVID-19 has also brought severe hardship to LLDCs that are more vulnerable to the pandemic's effects than other countries. These have put more pressure on LLDCs in achieving the Sustainable Development Goals (SDGs).

3. COVID-19 impacts on transport system

Supply chain disruptions are caused by disruptions in the transport system as transport is the crucial part of the supply chain. The transport system is the first to be affected by the impact of the COVID-19 pandemic. In the beginning of the pandemic, many cargo ships were denied entry to ports causing sharp increase of freight prices that negatively affected the supply chain in LLDCs that are dependent on seaports in maritime countries. As shown in [Table 19](#), border closures were implemented in several African LLDCs and transit countries in the period of March - June 2020 in order to reduce the movement of people while allowing essential freight.

Table 19: Border closures in African LLDCs and transit countries

Country	Land borders closed	Maritime borders closed
Angola		
Benin		
Burkina Faso		
Burundi		
Cameroon		
Central African Republic		
Côte d'Ivoire		
Democratic Republic Congo		
Djibouti		
Eswatini		
Ethiopia		
Ghana		
Guinea		
Malawi		
Mali		
Mozambique		
Namibia		
Niger		
Nigeria		
Rwanda		
South Africa		
South Sudan		
Sudan		
Togo		
Uganda		

Source: UN-OHRLLS (2020)

Asian LLDCs and transit countries also imposed measures on cross-border transport as a response to the COVID-19 from March 2020 (and generally lasted until June 2020). As in the case with African LLDCs, freight flows of essential products are exempted although this does not mean that the freight could flow freely across the borders as some countries imposed quarantine measures for road transport operators.

Table 20: Border closures in selected Asian LLDCs and transit countries

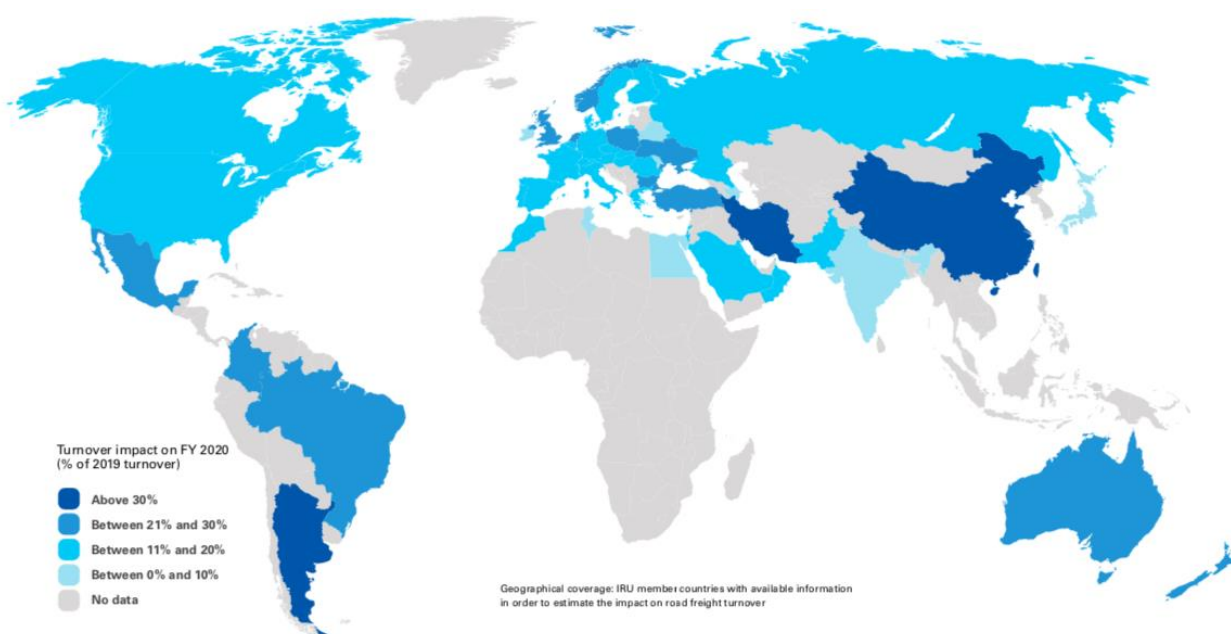
Country	Land/maritime borders close
Armenia	Partially
Azerbaijan	Partially
China	Partially
Georgia	Partially
India	Yes
Iran	Yes
Lao PDR	Partially
Kazakhstan	Yes
Kyrgyzstan	Yes
Mongolia	Yes
Pakistan	Yes
Russian Federation	Partially
Tajikistan	Partially
Thailand	Yes
Uzbekistan	Yes
Vietnam	Yes

Source: ESCAP (2020)

3.1 Road transport

International road transport sector was hit hard by the pandemic as a result of border closures. Tens of thousands of trucks being stuck at land border crossing points, affecting the delivery of essential goods, such as foods, pharmaceuticals, medical supplies and fuels. Non-essential goods such as automotive parts, clothing and construction materials came to a near complete standstill during the first confinement period (March 2020). The impact is significantly felt by economically vulnerable countries that often rely heavily on imports to cover their basic needs. According to IRU, as of April 2020 the estimated average decline for goods road transport operators in annual turnover for 2020 is 18% compared to 2019 figures (see Figure 18).

Figure 18: Estimated COVID-19 impact on road freight turnover in fiscal year 2020 as of April 2020



Source: IRU (2020)

Decrease in traffic flow was also seen in passenger road transport. In Bolivia, for example, where since 2014 traffic in the first quarter of the year was always higher than the other months, in March 2020 it decreased under the monthly average, while April saw a drastic reduction of 99% (Table 21).

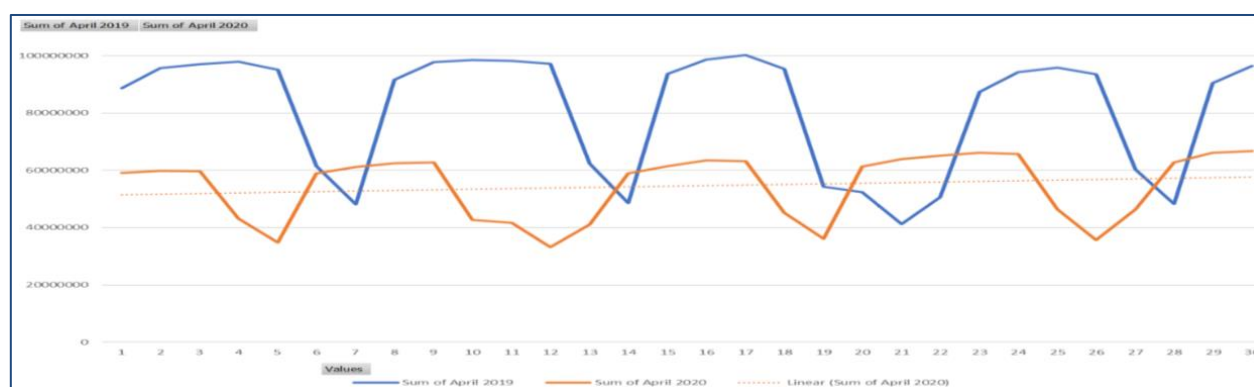
Table 21: Bolivian passenger road traffic in 2020

Time Period	Passengers by ROAD	Percentage Change
Monthly avg. (2019)	9,115,858	
Jan-20	11,002,721	20.70
Feb-20	10,773,181	18.18
Mar-20	8,626,715	-5.37
Apr-20	128,228	-98.59

Source: ECLAC (2020)

Figure 19 illustrates the decrease of truck traffic volume by 40% in April 2020 compared to the same month of the previous year in Eastern and Southern Africa region based on a sample of logistic providers. Although the data is indicative and needs to be treated with a degree of caution, it is most likely a representative picture as similar incidents occurred across the world.

Figure 19: Total number of vehicles moving by day in April 2019 and April 2020 in Eastern and Southern Africa

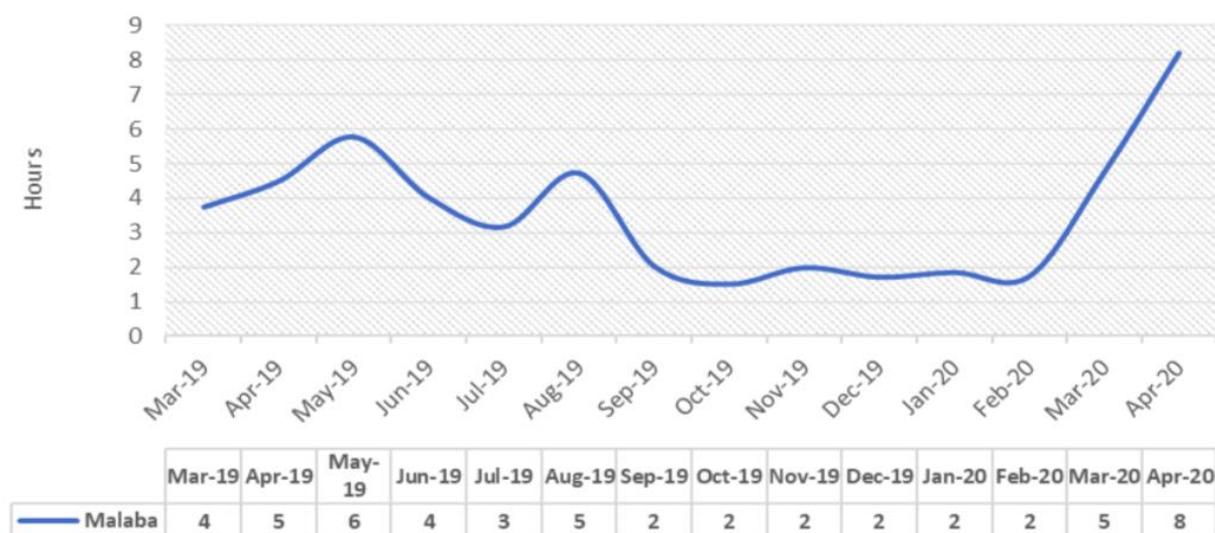


Source: World Bank (2020).

In Africa, where 90% of all freight on the continent is carried by road transport, major delays occurred at some borders (e.g Malaba on the Kenya/Uganda border, Beitbridge on the South African/Zimbabwe border, Kazungula on the Zimbabwe/Zambia border) due to health requirements introduced by different countries, but also different restrictions on the cargo types that are allowed through from the beginning of April until the second week of May³. Rwanda required all trucks to be offloaded and sanitized before being handed over to truck drivers from their own countries.

Figure 20 below shows delays at Malaba border that have increased between February and April 2020, with April registering a delay of 8 hours due to measures such as testing at entry points.

Figure 20: Median stop duration at Malaba border



Source: NCTTCA (2020).

³ Results of a weekly worldwide survey undertaken by the International Association of Ports and Harbors for six weeks to May 19, 2020.

Such delays and stoppages on route have further negatively impacted cargo volumes through the ports. As a result, LLDCs' exports and imports were disrupted and threatened stocks of (essential) goods.

Impact on road infrastructure projects

In the beginning of the outbreak (first quarter of 2020), road construction projects were postponed due to the obligatory physical distancing measure, which is not always possible to obey while installing certain products. Even though many countries resumed road infrastructure projects in the beginning of the third quarter of 2020 applying safety measures for construction workers, progress was still slow due to disruptions on the transport of materials.

Another concern is that many countries chose to delay (non-essential) or downgrading road infrastructure projects in place and in planning, due to a serious loss in funding. The increase in numbers of people working remotely has reduced revenues from toll roads/bridges and fuel taxes which are important sources of funding for road improvement and maintenance projects. Delays and downgrades of transport projects will reduce the infrastructure quality, while it is the conduit for trade and mobility. This has an even important meaning for LLDCs that are already confronted by challenges and constraints, even before the pandemic hit, to develop and maintain the infrastructure quality to reduce transit times and costs and ultimately to integrate into regional network and the world's market.

Key takeaways/lessons:

- The transport sector has been severely affected by the COVID-19 pandemic as a result of land borders closures and imposed travel restrictions.
- After passenger air transport, road transport may have been the second most affected mode of freight transport. The heavy dependence of LLDCs on road transport in freight transport operations has paid its toll during the COVID-19 pandemic as road transport is vulnerable to bottlenecks and operational restrictions, along with additional costs.
- The pandemic also hinders the pace of transport infrastructure development in LLDCs. Road construction projects have been postponed not only due to the obligatory physical distancing measures, but also due to a significant decrease in revenues from toll roads/bridges and fuel taxes that are funding sources for road improvement projects.
- There is need to set standards at road border crossing points to uphold public health whilst allowing the smooth flow of trucks, as such border closures could be limited to a few days or even avoided. Travel restrictions that significantly interfere with international traffic may only be useful at the beginning of an outbreak to give time to countries to rapidly implement effective preparedness measures.
- It is time to promote a higher share of other modes of transport, such as rail, and intermodal transport that is efficient, safe, reliable and environmentally friendly.

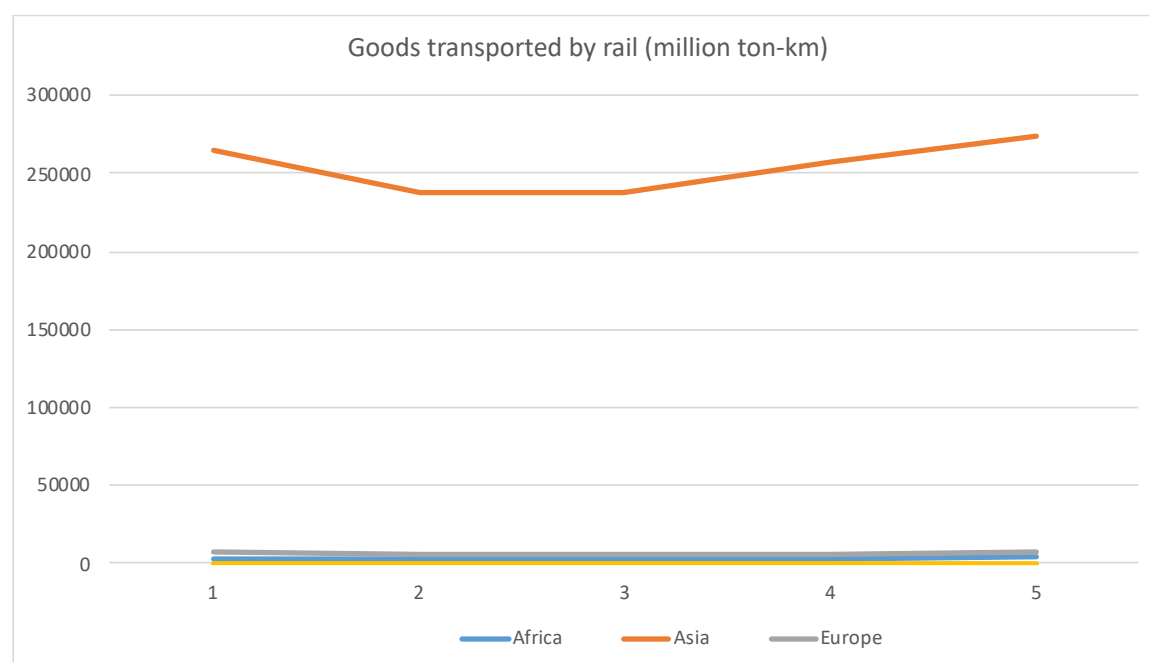
3.2 Rail transport

In Europe region, rail freight has proven to be resilient during the COVID-19 pandemic as it has benefited from the impact of the pandemic on air, sea and road transportation. The pandemic gave rise to a shift from road to rail mainly because international rail transport uses less manpower over long distance, hence less frequent human interactions and lower potential of spreading the virus during transport process. The China-Europe Railway Express saw steady growth in 2020, with a total of 10,108 trips run by freight trains carrying 927,000 TEUs of containers, an increase of 54% year-on-year as of 5 November 2020 (Rakhmatov, 2021). In Europe, international freight trains have been deployed to transport medical supplies and equipment since the beginning of the outbreak. Several European countries have reduced or waived track access charges for rail freight undertakings during the pandemic, making rail freight more competitive in terms of cost and transit time and ultimately to advance the modal shift⁴.

Despite reduced economic activities as a result of international lockdowns, the rail freight sector in Euro-Asian covered by the Belt and Road Initiative grew in the first quarter of 2020. As a result, LLDCs along this corridor such as Kazakhstan and Mongolia saw huge volumes transported through their infrastructure. The freight flows for transit Euro-Asian routes via Kazakhstan, notably via Dostyk and Russian Federation and Belarus, were 75% higher in the second quarter of 2020 than for the same quarter in 2019 (ESCAP, 2021). Although to a lesser extent, Uzbekistan and Afghanistan also experienced significant growth in rail freight in 2020⁵.

The growth of rail freight in Asian LLDCs could be explained by the fact that this region has been performing best in this sector since before the pandemic. As illustrated in Figure 21, the volume of rail freight transported in Asian LLDCs has always been far above its counterparts.

Figure 21: Rail freight in LLDCs in the last 5 years



⁴ <https://www.railfreight.com/railfreight/2021/03/15/belgium-reduces-track-access-charges-until-end-of-june-2021/>

⁵ <https://www.railfreight.com/specials/2020/12/28/new-silk-road-in-review-covid-19-increased-traffic-and-empty-containers/>

Source: World Bank Open Data. Available at <https://data.worldbank.org/indicator/IS.RRS.GOOD.MT.K6>. Accessed on 12 February 2021.

Note:

- Data is 5 last years available, ranging from 1996 to 2019.
- No data available for Latin America.

Furthermore, as part of the framework of the Intergovernmental Agreement on the Trans-Asian Railway Network, Asian LLDCs and transit countries have been implementing measures to promote international rail transport along the Trans-Asian Railway Network during the pandemic.

Table 22: Measures implemented by Asian LLDCs and transit countries along Trans-Asian Railway Network

Online and digital services piloted	Fees reduced or cancelled	Rail freight rates lowered	New routes/business introduced
China	China	Kazakhstan	China
Kazakhstan	India	Kyrgyzstan	India
Kyrgyzstan	Kazakhstan	Uzbekistan	Kyrgyzstan
Russian Federation	Kyrgyzstan		Uzbekistan
Turkmenistan	Uzbekistan		
Uzbekistan			

Source: Rakhmatov (2021)

Other LLDC regions could not utilize the opportunities presented by the rail sector during the pandemic. In these regions, the rail sector has been severely affected, very likely because the sector did not perform well before the pandemic due to poor rail infrastructure. In Bolivia, for example, rail passenger traffic in the first quarter of 2020 was less than half of the average number of monthly passengers in 2019 before coming to a complete halt in April. Although to a lesser extent, freight rail has also experienced a significant decrease in the first four months of 2020 (see Table 23).

Table 23: Bolivian passengers and freight rail traffic in 2020

Time Period	Passengers by RAIL	Percentage Change*	Freight (tons) by RAIL	Percentage Change*
Monthly avg. (2019)	10,829		262,343	
Jan-20	18,531	71.13	190,083	-27.54
Feb-20	7,210	-33.42	182,019	-30.62
Mar-20	4,271	-60.56	217,141	-17.23
Apr-20	0	-100.00	103,151	-60.68

Source: ECLAC (2020)

While the COVID-19 pandemic could be considered as a momentum to raise the awareness of LLDCs to turn this crisis into an opportunity to utilize the comparative advantages of railway transport as a sustainable mode, at the same time international private sector investment in SDGs related sectors in developing economies (to which LLDCs belong) fell sharply in 2020. According to UNCTAD (2020), infrastructure greenfield investment and project finance (that includes transportation infrastructure, non-renewable power generation and distribution, and telecommunications) fell by 62% in 2020, making the pandemic impact more pronounced in countries that were already vulnerable even before the COVID-19 outbreak.

Key Take Away:

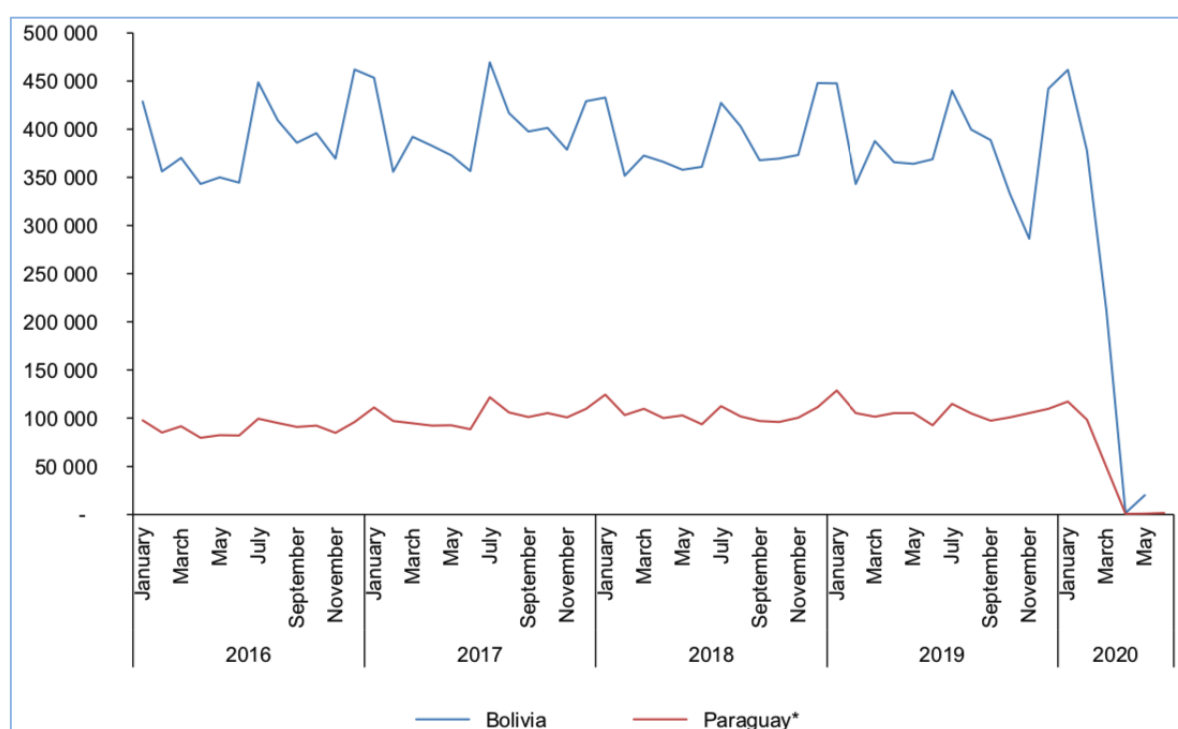
- Euro-Asian LLDCs have experienced higher freight volumes transported through their rail infrastructure during the pandemic (the first half of 2020). Compared to the other LLDC regions, the rail infrastructure in this region has been performing well even before the pandemic hit.
- In the long-term, rail freight could become more competitive for international connectivity as it is faster than sea, cheaper than air, and requires less staff than trucks.

3.3 Air transport

Air transport has been the hardest hit transport mode while it has a vital role in LLDCs as it is not subjected to borders and other impediments as in the case of surface transport modes. In the beginning of the outbreak, nearly all countries suspended regular flights leading to the collapse of passenger airline services and a dramatic capacity reduction of air freight. The whole year 2020 saw a decline of nearly 65% of global passenger traffic⁶.

In Latin American LLDCs, as shown in Figure 22, the impact of COVID-19 restrictive measures in March 2020 is evident. The number of passengers in April 2020 was around 99% less than the pre-covid monthly average.

Figure 22: Total air passengers in Latin American LLDCs



Source: ECLAC (2020)

⁶ <https://aci.aero/news/2021/03/25/the-impact-of-covid-19-on-the-airport-business-and-the-path-to-recovery/>

Decline in passenger air traffic in Asian LLDCs in 2020 was also predicted by 66% compared to the figures in 2019 (Table 24). Tajikistan has the largest drop because it has virtually no domestic air travel, as such its passenger aviation sector relies fully on international visitors. The second largest drop is experienced by Uzbekistan as it also relies heavily on international visitors.

The sharp decline in passenger air traffic during the pandemic has also led to a significant decrease in overall cargo capacity globally, as such also in LLDCs, because in the normal circumstances a majority of air cargo flew in the passenger aircraft' bellies. IATA has reported double digit monthly reductions in cargo tonne kilometers every month since March 2020. However, the decline in air cargo traffic is much less than that in passenger traffic due to a significant increase in cargo flights.

Table 24: Passenger air traffic in Asian LLDCs in 2019 and 2020 projections

Country	Domestic 2019	International 2019	Total 2019	Domestic 2020 est	International 2020 est	Total 2020 est	Y-o-Y drop
Afghanistan	0.7	1.5	2.2	0.4	0.4	0.8	64%
Azerbaijan	0.6	4.4	5	0.3	0.9	1.2	76%
Kazakhstan	5.4	6.3	11.7	4.2	1.2	5.4	54%
Kyrgyz Republic	0.6	2.5	3.1	0.3	0.5	0.8	74%
Mongolia	0.4	1.2	1.6	0.4	0.2	0.6	63%
Tajikistan	...	2.1	2.1	...	0.4	0.4	81%
Turkmenistan	1.3	0.9	2.2	0.6	0.2	0.8	64%
Uzbekistan	0.7	4.7	5.4	0.3	0.9	1.2	78%
Total	9.7	23.6	33.3	6.5	4.7	11.2	66%

Source: ADB (2021)

... = data not available, CAREC = Central Asia Regional Economic Cooperation, est = estimate, Y-o-Y = year-on-year

Notes:

Tajikistan domestic market has less than 100,000 annual passengers.

Afghanistan and Turkmenistan 2019 figures are estimated based on seat capacity.

Uzbekistan 2019 figures are estimated on seat capacity and Tashkent traffic.

All other 2019 figures are based on calendar year.

The Q1 and Q2 of 2021 are expected to show signs of improvements due to the vaccination rollout. The increase of vaccine uptake should allow for staged opening of air travel and many predict that more passengers are expected to return to travel with the biggest surge in Q3 and Q4 of 2021.

Impact on airport construction projects

As in the case in the road transport sector, many airport construction projects have also been postponed or scaled back due to a concern that air travel will not return to pre-coronavirus levels until 2023. The growth witnessed by the industry in several years before the pandemic led to the initiation of capital-intensive expansion projects, which resulted in major capital expenditure across the board. The continuation of these projects is under pressure as decline in air traffic has led to enormous losses to airport revenues.

Recommendations

- Although changes in operation have already been partially adopted during the pandemic, airports will need to strengthen the passenger journey to comply the likely ongoing guidelines on social distancing as passenger volumes begin to increase. Furthermore, aviation business operations should be adapted to become more agile to better align with quick changes in demand, as such being more prepared for future pandemics or other emergency situations.
- Promoting intra-region tourism could help boost air connectivity in LLDCs as routes could potentially be resumed quickly, for example by implementing visa-free travel. Improved connections within the region will also help attract more long-haul flights and visitors. Countries could also consider providing incentives to support the launch of new routes connecting major cities with tourist destinations in other CAREC countries.

4. LLDCs' responses to facilitate cross border activities

Facilitation of trade is as important as, or even more important than, infrastructure provision. Providing infrastructure is a long process that can take at least 10 years before the infrastructure is operational, while facilitating trade is mainly policy-related action. The COVID-19 pandemic has brought to light the importance of facilitating cross border activities and that it can be done in a relatively short period of time. Table 254 shows some good examples of measures taken by LLDCs to facilitate cross border activities during the pandemic, such as setting up priority lanes for essential goods, extending opening hours of border crossing points and temporary extension and/or exemption of duties and taxes. A full list of measures taken by Governments is available on the UNECE Observatory on Border Crossing Status due to COVID-19⁷.

Table 25: Measures taken by LLDCs to facilitate cross border activities during pandemic

Country	Measures
Bhutan	Ensuring uninterrupted supply chain by extending working hours, simplifying the import clearance procedure, implementing fast track clearance of essential cargo related to Covid-19, and deferring custom duties and taxes payment.
Kazakhstan	Government is promoting green corridors for road freight movement of medical and socially- significant goods.
Nepal	Nepal Customs formed a Quick Response Team to ensure essential goods are cleared within two hours. ⁸
Uzbekistan	<ul style="list-style-type: none">▪ Government set up an operational headquarters to ensure expedited passage of goods through border customs posts, their uninterrupted customs clearance, as well as the issuance of permits for exported and imported goods.▪ Starting 1 April 2020, a mechanism for customs clearance of imported food products is introduced in an expedited manner, including by issuing permits before the goods arrive in the country.
Central African Republic	<ul style="list-style-type: none">▪ Fast track procedures for medical supplies▪ Immediate release of goods and direct collection▪ No value-added tax (VAT) levied on medicinal products.
Rwanda	<ul style="list-style-type: none">▪ Established a dry port near the border that operates 24/7 and extended all customs services to facilitate faster clearance of essential and relief goods at the first point of entry.

⁷ <https://wiki.unece.org/display/CTRBSC>

⁸ <https://blogs.worldbank.org/endpovertyinsouthasia/covid-19-highlights-need-digitizing-and-automating-trade-south-asia>

Country	Measures
	<ul style="list-style-type: none"> Enforced the use of online services available in the Rwanda Electronic Single Window System among which is online payment.
Armenia	The State Revenue Committee has ensured 24/7 operation of certain functional units of the Customs Service, including particular divisions of IT Department
Paraguay	The delivery services of food, medicine, hygiene products, cleaning products and other basic necessity supplies are exempted from the new health emergency measure, as well as logistics services (ports, river ships, maritime lines, transport land freight), customs services for loading and unloading of goods.
Bolivia	Expedite the clearance of goods by determining the maximum length of clearance time for the customs administration.

Source: UNECE Observatory on Border Crossing Status due to COVID-19 (<https://wiki.unece.org/display/CTRBSBC>), ESCAP (2020a).

Most of the introduced policy measures have exempted freight flows of essential commodities, however this has not necessarily meant that freight transport has been able to flow freely across borders. Severe bottlenecks have been reported at many cross-border points including in LLDCs. In a number of cases, this was caused by new controls or quarantine measures on the transport crew, notably truck drivers.

5. Importance of regional and international coordination

In the previous section, various measures taken by LLDCs to facilitate cross border activities during pandemic were described. These are however focusing on domestic efforts, while international coordination is undoubtedly a crucial element of trade facilitation and its importance has become even clearer during the COVID-19 pandemic in order to ensure a seamless and efficient transport and logistics system. Imposing different measures by governments in different countries at different periods of time indicates the absence of an agreed protocol to be implemented during pandemics and possibly in other emergency situations. This brought to light the importance of efficient functioning of corridors that promote regional integration.

This is especially important for Africa, a continent with the highest number of LLDCs. African LLDCs will require continued access to the regional and global economy through transport corridors. In 2020, regional economic communities in Africa published guidelines to provide a set of standardized regulations to improve coordination, overcome border disputes and facilitate essential trade while protecting the safety of people at the same time (see Table 5).

Table 5: African regional economic communities' guidelines to facilitate movement of goods

	Date of introduction	Scope	Alignment
COMESA	14 May 2020: Adopted by the eighth meeting of the Extraordinary Council of Ministers 10 June 2020: Published and gazetted	Facilitating cross-border movement of relief and essential supplies Transport of goods and cross-border freight transport operations Cross-border road passenger transport Air transport Other modes of cross-border transport	Aligned to COVID-19 guidelines of the African Union, EAC, SADC, WCO and WHO

		<p>Regulating and controlling trucks, aircraft and vessels carrying essential goods and services</p> <p>Handling of cargo at ports of entry</p> <p>Movement of goods in transit/inland deliveries</p> <p>Customs authorities support to the economy and sustaining of supply chain continuity</p> <p>Trade in services</p> <p>Monitoring and evaluation</p>	
EAC	<p>24 April 2020: Signed and published by the EAC Adhoc Regional Coordination Committee on COVID-19 Response</p>	<p>Trade facilitation</p> <p>Gazetted transit routes</p> <p>Handling of cargo at ports of entry/ internal borders</p> <p>Movement of goods in transit/inland deliveries</p> <p>Priority treatment for cargo mitigating the COVID-19 pandemic</p> <p>Payments and communication</p> <p>Services</p> <p>Application of customs laws and interpretation</p> <p>Inspection of goods for quality and safety</p> <p>Exchange and sharing of information</p> <p>Training and capacity building</p> <p>Monitoring and evaluation</p>	<p>Aligned to the COVID19 guidelines of WCO and WHO</p>
ECOWAS	<p>17 June 2020: Guidelines were adopted by ECOWAS Ministerial Coordinating Committee</p> <p>Scheduled to be presented to the summit of the ECOWAS Authority of Heads of State and Government for adoption</p>	<p>Protection for transport sector workers and passengers</p> <p>Air transport eliveries</p> <p>Cross-border land transport and free movement of persons</p> <p>Border formalities</p> <p>Transit formalities</p> <p>Operation of seaports</p> <p>Trade facilitation of COVID-19 goods and service</p> <p>Advocacy and information sharing</p> <p>Gender considerations y Monitoring and evaluation</p>	<p>Aligned to the COVID19 guidelines of WHO, WCO, WTO, IOM, IMO, ICAO, African Union Commission, Africa Civil Aviation Council, IATA, UNCTAD and IRO</p>
SADC	<p>6 April 2020: Adopted by Council of Minister</p> <p>Revised guidelines were published on 23 June 2020</p>	<p>Cross-border freight transport operation (all goods and services)</p> <p>Cross-border road passenger transport</p> <p>Regulation of other modes of crossborder transport</p> <p>Service and facilities to be provided</p> <p>Regulating and controlling trucks carrying essential goods and services</p> <p>Monitoring and evaluation</p>	<p>Assume member States are implementing policies and measures to combat COVID-19 recommended by WHO, WCO, ICAO and IMO</p>

Source: ECA (2020)

Eurasian Economic Union (EAEU) member states⁹ adopted Recommendations of the Eurasian Economic Council Board for arranging the work of “green corridors” facilities at the customs border and the EAEU customs territory to prevent the spreading of COVID-19. These initiatives have been put forward during a working meeting of the Supreme Eurasian Economic Council members held on April 14, 2020 and aimed at:

- Preventing COVID-19 infection from entering the transport facilities
- Preventing the spread of COVID-19 infection among facilities workers
- Preventing the spread of COVID-19 infection at the facility through other organizational measures
- Ensuring self-protection of drivers and (or) persons accompanying the cargo

Key Take Aways/Lessons:

- The COVID-19 experience provides valuable lessons on how joint and regionally coordinated activities along transport corridors are much more effective than nationally developed measures in time of disruptions. This will be instrumental not only to deal with future pandemics but also with large-scale disruptive events of any nature.
- An efficient and coordinated transport corridor that is prepared for future pandemics or crises may not need to close the border crossing points along the corridor, allowing limited impact of the crisis to the economic activities of the countries.
- Regional cooperation and connectivity are needed to resume trade and growth in the post-COVID era, particularly for the LLDCs that already suffer from high transit costs and times. Regional coordination and cooperation enable more effective communication between countries along the transport corridors to preserve the functioning of the corridors during crisis.

6. Role of digitalization

Digitalization plays an important role in ensuring the continuation of cross border activities and flow of goods during the pandemic through electronic documentation which not only expedites movement of goods but also to reduce physical contact at border crossing points. This includes electronic cargo tracking systems, electronic exchange of information, paperless solutions and the use of mobile banking and payment systems. It is unsurprising that the pandemic has prompted the acceleration of innovation and digitalized facilitation of transport processes. However, implementing these systems require fast and stable broadband technologies that are currently somewhat costly in many LLDCs as a result of insufficient digital infrastructure. While parcels trade has been booming, due to the pandemic-accelerated rise of e-commerce, and leading many economies out of crisis, LLDCs were left behind as they have not been able to ride the same wave of digitalization.

In addition to declining volume of foreign trade, the relatively low level of digitalization reflects the existing transport connectivity of LLDCs that may have contributed to a greater disruption of the transport operations and higher economic costs of the crisis. The UN Global Survey on Digital and Sustainable Trade Facilitation 2019 reveals that the average implementation of the majority

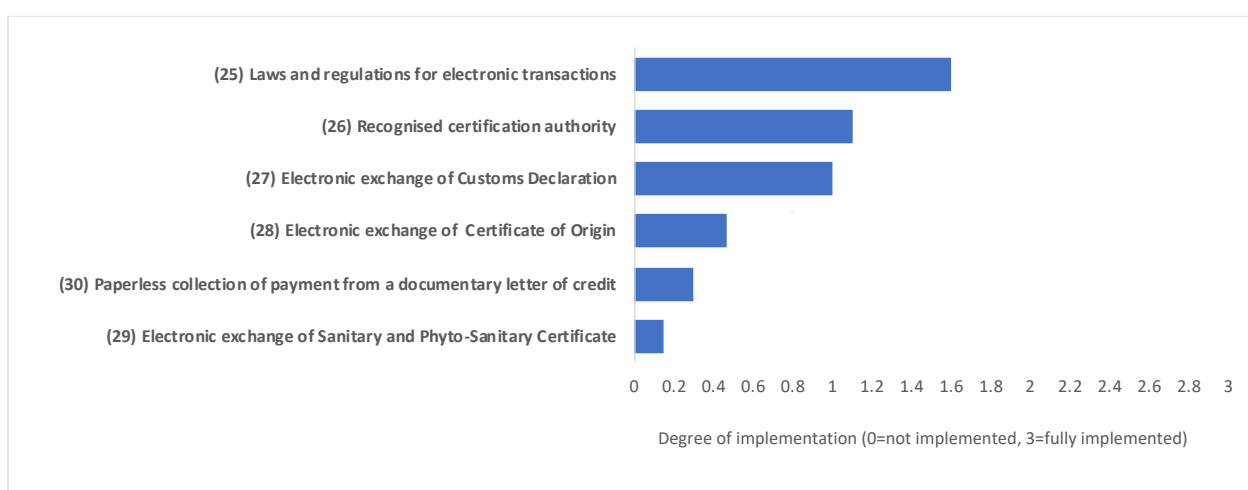
⁹ Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia

of the Cross-Border Paperless Trade measures in LLDCs has barely reached 50%. These involve the following measures:

1. Laws and regulations for electronic transactions
2. Recognized certification authority
3. Electronic exchange of Customs Declaration
4. Electronic exchange of Certificate of Origin
5. Paperless collection of payment from a documentary letter of credit
6. Electronic exchange of Sanitary & Phyto-Sanitary Certificate

As illustrated in Figure 23, only Laws and Regulations for Electronic Transactions has the highest implementation rate, i.e. 53%. It is worth mentioning that only 20 LLDCs¹⁰ are included in this survey.

Figure 23: State of implementation of “Cross-border paperless trade” measures in LLDCs in 2019



Source: UN Global Survey on Digital and Sustainable Trade Facilitation 2019 (<https://untfsurvey.org>).

However, positive endeavors have been undertaken by several LLDCs in Asia and Africa (Table 66) to quickly respond to the need to digitize their trade and transit procedure in order to ease both bilateral and transit freight transport movement across borders during the pandemic, especially for relief and essential supplies.

Table 6: COVID-19 digital solutions as policy responses of LLDCs

Country	Digital solutions
Botswana	On line processing of declarations and e-payment
Kazakhstan	<ul style="list-style-type: none"> Road transport carriers do not need to carry paper permits as of 15 April 2020. Verification will be carried out using the information and analytical system of the transport database. All railways-related processes are carried out remotely in electronic form. The system allows customers to pay fees, fines without leaving home.

¹⁰ Paraguay, Armenia, Azerbaijan, Kazakhstan; Kyrgyzstan; Moldova; Republic of North Macedonia; Tajikistan; Uzbekistan; Afghanistan; Bhutan; Nepal; Lao P.D.R.; Mongolia; Botswana; Ethiopia; Malawi; South Sudan; Zambia; Zimbabwe.

Country	Digital solutions
Uzbekistan	Uzbekistan Railways has developed a software for processing and providing preliminary electronic information to customs authorities for goods transported by rail.
Lesotho	Programmed ASYCUDA risk management to route Relief Supplies to green lane
Zambia	Mandatory pre-registration and electronic payment options

Source: ESCAP (2020a); UNECE Observatory on Border Crossing Status due to COVID-19 (<https://wiki.unece.org/display/CTRBSBC>), accessed on 30 March 2021.

Nearly all LLDCs have automated their customs system although the implementation level varies. This should be standard practice, especially in African LLDCs that have been severely impacted economically by the international lockdowns. If all African countries implement harmonized electronic customs systems and more comprehensive single window solutions (only 25% of African LLDCs are currently implementing single window), the multiplier effects, not only for intra-Africa trade but also for trade with the rest of the world, would be significant¹¹.

Improved digitalization is also a powerful catalyst to recover the LLDC's economy as the rise of e-commerce amidst the COVID-19 pandemic will stay beyond it.

eTIR International System

As the only global customs transit system, TIR simplifies and harmonizes the administrative formalities of international road transport (can also be in combination with other transport modes) and establishes an international customs transit system with maximum facility to move goods by guarantying that goods compartments are sealed from the departure country until the destination country. To date, the countries implementing TIR are still limited to Europe, Central Asia and parts of the Middle East. All four European LLDCs and seven Asian LLDCs have been implementing TIR. According to IRU (2015) that studies the selected countries in the Asia-Pacific region, the benefits of implementing the TIR Convention range between 0.14% and 1.31% of national GDP. This figure will likely be significantly higher for LLDCs.

In the wake of the COVID-19 pandemic, it was decided to accelerate the implementation of the eTIR international system that has been developed by UNECE and IRU since 2003. This contactless system assists in reducing the spreading of the virus. In April 2020, the secretariat initiated a campaign calling upon Contracting Parties to interconnect their national customs systems with the eTIR international system. 17 Governments and the European Union (28 Member States) responded positively, either by way of official letters through diplomatic channels or by official e-mails and requested to connect their National Systems to the eTIR International System.

Key Takeaways/Lessons:

- It is crucial to accelerate digitalization of Customs procedures and enhanced use of technology in order to respect social distancing at borders. LLDCs and transit countries are encouraged to digitize remaining paper-based procedures, introduce electronic payment and invest in non-intrusive inspections and use data analytics for risk management. Single Window and IT interoperability is another important step to enhance connectivity.

¹¹ <https://www.tralac.org/blog/article/14702-digitalise-transport-and-trade-procedures-to-ease-the-supply-of-essential-goods-during-covid-19-and-beyond.html>

- For LLDCs that have been implementing TIR, the eTIR international system should be promoted to increase the preparedness of the countries for future crises. LLDCs that are not yet contracting parties of the TIR Convention, are encouraged to do so as this convention provides the legal framework for a harmonized digital transition in trade and transport, complementing other digital tools used at the national level.

7. Case studies

This section provides case studies on how LLDCs have addressed the challenges posed by the COVID-19 pandemic in transport connectivity.

7.1 Ethiopia

This case study is extracted and summarized from The Impact of COVID-19 on Trade and Trade Facilitation Along the Ethiopia-Djibouti Corridor by Pan African Chamber Of Commerce and Industry (2021).

The Ethiopia-Djibouti corridor is a main conduit for trade in the IGAD (Intergovernmental Authority on Development) region. It is the dominant gateway for Ethiopia, accounting for over 95 percent of the country's exports and imports, with other routes (e.g. Port Sudan, Berbera and Mombasa) being of limited importance. This corridor connects landlocked Ethiopia to the world market via access to the sea port in Djibouti.

Figure 24: Addis Ababa – Djibouti Railway Corridor



Source: Wikimedia Commons (https://commons.wikimedia.org/wiki/File:Map_of_Addis_Ababa-Djibouti_Railway.png). Accessed on June 4, 2021.

Countries' responses in the wake of the pandemic

The governments of both Ethiopia and Djibouti acted fast in trying to stop the spread of coronavirus in their respective countries. Djibouti introduced a lockdown, excluding essential services, for Djibouti city on March 7 and a national one on March 23, 2020. The country banned all international flights and closed its borders. However, cargo movement was not restricted and commercial traffic to and from Ethiopia was permitted through the Galafi border crossing. Ethiopia declared a national state of emergency on March 8 for five months. It imposed mandatory quarantine of 14 days for all passengers arriving to the country from March 20. It suspended movement across land borders except cargo and essential goods from March 23 and introduced other measures including social distancing and face mask requirements.

COVID-19 impact on trade and economy

Like many others, the Ethiopian economy is experiencing a decline in external revenues and weakening of trade due to COVID-19. The government of Ethiopia has launched a comprehensive reform agenda to systematically address the issues facing business during the crisis. To date, various activities have been undertaken, comprising financial, non-financial, regulatory and policy interventions, to mitigate the impact of the pandemic on the economy and address the most pressing structural constraints. These activities are targeted to support businesses through a set of financial and non-financial packages.

Support to trade infrastructure and logistics reducing the cost of transport

These measures specifically focus on operational facilitation of trade logistics and trade facilitation. Specific measures put in place by the Ministry of Transport together with the Ethiopian Shipping and Logistics Service Enterprise (ESLSE) and the Ethio-Djibouti Railway (EDR) to reduce the cost of transport include:

- Export manufacturing industries who do not use railway services due to location distances from rail lines have been given a 50% discounted export freight services;
- Transport services dedicated for freight from Hawassa Industrial Park to Mojo is currently operating under a 50% discounted price and 73% discount for manufacturing sector exports using the services of ESLSE;
- EDR provides free rail transport for export products from industrial parks and export manufacturing industries that come through Mojo dry port to Djibouti free of charge. This measure has been in place since 01 May 2020, initially planned for three months, but is now in place until at least 30 September 2020;
- There has been a 50% cost reduction on inland transfer from industrial parks to Mojo railways; while demurrage cost at the port has been suspended until the situation on COVID-19 pandemic subsides;
- Finally, manufacturing export freights passing through Mojo port to Djibouti will have the entrance gate payment waived and all other charges will have a 50% discount from their initial prices.

Trade facilitation

A number of measures that the Governments of Ethiopia and Djibouti are implementing will reduce the impact of COVID-19 by facilitating trade. The use of ICT-enabled trade facilitation

measures has expanded and has become ever more important in the face of the the pandemic. Measures include the following ones.

- Establishment of Electronic Single Window to facilitate clearance processes for import, export, and transit of goods by automating the submission of documents. This electronic platform, launched in January 2020, is expected to significantly enhance the trading environment and remove some of the bureaucracy surrounding customs by replacing the need for physical, manual and duplicate processes.
- Electronic Customs Management System for customs control and clearance, to maximize operational efficiencies and improve service delivery; this was developed from 2017 to 2020 and launched and rolled out during the pandemic.
- Cargo Tracking System for its main cargo corridor from Djibouti to manage and monitor the movement of trucks and reduce the need for checkpoints and physical inspections, which is planned to be fully operational in 2022.¹⁸ In addition, use of scanning machines for cargo transiting along the Ethio-Djibouti corridor.
- Online Trade Registration and Licensing System to process the issuance and renewal of business registration and licensing online.

Key Take Away

As many others, trade along the Ethiopia-Djibouti corridor was affected by restrictions on transport and the movement of persons. However, these negative effects of the pandemic, at least to some extent, have been ameliorated. Good cooperation between the two countries has facilitated cross-border trade through technical solutions and better communication. Although border closure was in effect, there were no restrictions on cargo movements between the two countries and custom offices keep operating on both sides. Furthermore, port communities have raised awareness among Ethiopian drivers on compliance with barrier measures and brochures in Amharic language produced and disseminated to the latter.

7.2 Tajikistan

This case study is extracted and summarized from International Trade Centre news dated 18 September 2020¹².

Despite the COVID-19 pandemic, and its impact on trade, Tajikistan has been taking great strides to remove regulatory and procedural barriers. Exporting from and importing to this country has become easier. Since August 2020, companies can apply to become an “Authorized Economic Operator” (AEO) through an innovative mechanism set up by the local authorities. This new trade facilitation regulation aims to enhance international supply chains security and facilitate legitimate trade in Tajikistan. It allows companies, which meet pre-defined criteria that prove they conduct their business in a transparent and trustworthy manner, to apply for the AEO status.

The AEO status provides priority access to companies for customs clearance and control processes. Although they will have to submit the same customs documents, they will be able to go through the procedures and formalities faster and without any additional fees. Businesses with this AEO status will also be able to choose to go through the customs clearance procedures in

¹² <https://www.intracen.org/layouts/2coltemplate.aspx?pageid=47244640256&id=47244681193>

their own storage facilities or in open areas. As such, time and costs of cross border procedures will be reduced.

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Module 7

Collecting Data for Designing and Monitoring Policies that Promote Transport Connectivity for the Achievement of the VPoA and SDGs

1. Key objectives of the module:

- Participants understand key transport data and indicators needed to be collected to monitor the country's progress in achieving the Vienna Programme of Action (VPoA) and Sustainable Development Goals (SDGs).
- Participants understand that regular collection of relevant transport data will inform and enable rational policy and investment decision making.

2. Introduction

Data are essential to the planning, delivery and management of transport services and infrastructure. Transport policy making process of national and local governments should be supported by a comprehensive database to ensure a sustainable and healthy development of transport systems. A sustainable data collection system also allows an effective performance measurement and policy monitoring system. In the context of transport connectivity, this is useful for assessing the effectiveness of transport operations and for identifying bottlenecks preventing the smooth movement of transit goods.

The importance of regular collection and analysis of data to monitor and report on some the specific objectives of the VPoA was stressed at the *High-level Midterm Review on the Implementation of the VPoA for LLDCs for the Decade 2014-2024*. The 2030 Agenda for Sustainable Development also calls for strengthening of national data systems.

Although there is no stand-alone Sustainable Development Goals (SDGs) on transport, transport is considered as a cross-cutting issue throughout the 17 SDGs. The transport related UN SDGs goals and targets are:

Goal 3: Ensure healthy lives and promote well-being for all at all ages

- Target 3.6: By 2020, halve the number of global deaths and injuries from road traffic accidents
- Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all

- Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix
- Target 7.3: By 2030, double the global rate of improvement in energy efficiency

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

- Target 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all
- Target 9a: Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

- Target 2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons

Goal 12: Ensure sustainable consumption and production

- Target 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment

Goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development

- Target 17.14: Enhance policy coherence for sustainable development

In the Vienna Programme of Action, transport connectivity is covered under priority areas 1, 2 and 3.

Priority Area 1: on Fundamental transit policy issues

Specific objectives are: (a) To reduce travel time along corridors, with the aim of allowing transit cargo to move a distance of 300 to 400 kilometres every 24 hours; (b) To significantly reduce the time spent at land borders; (c) To significantly improve intermodal connectivity, with the aim of ensuring efficient transfers from rail to road and vice versa and from port to rail and/or road and vice versa.

Priority Area 2: Infrastructure development and maintenance

Priority Area 2 (a) Transport infrastructure;

Specific objectives are: (a) To significantly increase the quality of roads, including increasing the share of paved roads, by nationally appropriate standards; (b) To expand and upgrade the railway infrastructure in landlocked developing countries, where applicable; (c) To complete missing links in the regional road and railway transit transport networks.

Priority Area 2 (b) Energy and information and communications technology infrastructure.

Specific objectives are: (a) To expand and upgrade, as appropriate, infrastructure for supply, transmission and distribution of modern and renewable energy services in rural and urban areas;

(b) All landlocked developing countries should make broadband policy universal; (c) To promote open and affordable access to the Internet for all; (d) Landlocked developing countries should actively engage to address the digital divide.

Priority Area 3: International trade and trade facilitation

Priority Area 3 (b) Trade facilitation.

Specific objectives are: (a) To significantly simplify and streamline border crossing procedures with the aim of reducing port and border delays; (b) To improve transit facilities and their efficiency with the aim of reducing transaction costs; (c) To ensure that all transit regulations, formalities and procedures for traffic in transit are published and updated in accordance with the Agreement on Trade Facilitation of the World Trade Organization.

Collecting transport data to measure connectivity gives LLDCs the opportunity to report on the progress they are making towards achieving the VPoA priority areas and UN SDGs. Countries and their external partner organizations will be able to base their assessment of effectiveness and efficiency of the transport systems and the level of compliance of national administrative and legal frameworks with UN legal instruments in the field of transport and border crossing facilitation providing a domestic and a cross-border perspective and improving competitiveness, safety, energy efficiency and security in the transport sector. Furthermore, the countries will be able to measure the effectiveness of their efforts in implementing UN legal instruments in the field of transport and work towards the harmonization and standardization of rules and documentation, including through a more effective implementation of international conventions on transport and transit and regional/bilateral agreements.

3. Transport data to monitor and report on VPoA and UN SDGs progress

Having a robust and sustainable data collection mechanism is of high importance for LLDCs in their endeavors to efficiently link with the global market. Becoming more integrated into supply and value chains also require data linkages to other countries. Currently, there are several relevant databases and indicators developed by development partners that serve as benchmarking and awareness raising tools, such as:

- Logistics Performance Index (LPI) by the World Bank
- Doing Business/Trading Across Borders by the World Bank
- World Development Indicators
- Global Competitiveness Index by World Economic Forum
- Trade Cost Database by ESCAP-World Bank
- Corridor Performance Measurement and Monitoring by CAREC
- United Nations Regional Commissions Trade Facilitation and Paperless Trade Implementation Survey database
- Productive Capacities Index (PCI) by UNCTAD
- Air Connectivity Index (ACI) by the World Bank
- Liner Shipping Connectivity Index (LSCI) by UNCTAD

In order to develop these databases, development partners collect data and perform surveys on border crossing, infrastructure quality, trade, etc. Although some of these tools include indicators

related to hard infrastructure, such as density of rail lines and proportion of paved roads, they are mainly developed to measure countries' performance on trade facilitation and to monitor transport corridors' efficiency. Therefore, countries need to establish their own transport infrastructure database to measure and assess progress in the transport infrastructure development. Very few LLDCs perform transport surveys with private respondents, shippers, freight forwarders or truck drivers. As such, the data essential for building a national transport database and model are mostly not available.

3.1 Key transport data to monitor and report on VPoA

Key transport data needed to be collected by LLDCs in order to monitor and report on their progress in implementing the VPoA priority areas are elaborated in the following sections. Priority 5 (Structural economic transformation) is excluded from this module as this priority has low interfaces with transport data collection system.

For each priority area, a division is made between core and additional indicators. Core indicators relate to strategic indicators which are necessary for policy-decision making. Additional indicators are more disaggregated and can be utilized by countries to measure and monitor the performance of their transport infrastructure.

It is worth noting that several indicators are also used to monitor the achievement of SDGs as outlined in Table 29. These specific indicators are marked with '**(SDG)**'. Furthermore, qualitative data are marked with '**(Qual)**'.

3.1.1 Priority 1: Fundamental transit policy issues

This priority underlines the importance of freedom of transit and transit facilities in the overall development of LLDCs. Therefore, under this priority, LLDCs need to take actions to accede and ratify relevant conventions and legal instruments related to transit transport and trade facilitation, and to ensure their effective implementation. Furthermore, coordination and cooperation with transit countries with regard to customs controls and procedures need to be enhanced, along with simplifying and harmonizing legal and administrative regulations related to transit systems.

Table 26: Key transport data for VPoA priority 1

Indicator	How to collect/source
Core indicators	
Average road corridor speed for export and import (km/h)	Ministry of Transport
Access to all-weather road (% access within {x} km distance to road) (SDG)	
Commercial speed of international railway lines (km/h)	
Number of ratifications, accessions, signatories to transport agreements	Database of development partners
Additional indicators	
Road corridor speed with delays for export and import (km/h)	Ministry of Transport, Infrastructure Managers
Road corridor speed without delays for export and import (km/h)	

3.1.2 Priority 2: Infrastructure development and maintenance

The development and maintenance of transit transport infrastructure, information and communication technology (ICT) and energy infrastructure are crucial to reduce trading cost and

the cost of development for LLDCs. Some of the actions by LLDCs proposed under this priority include: to develop and implement comprehensive national policies for infrastructure development and maintenance, to work towards the harmonization of gauges to facilitate regional connectivity, and to develop inland transport networks including ancillary infrastructure.

Table 27: Key transport data for VPoA priority 2

Indicator	How to collect/source
Core indicators	
Transport infrastructure	
Length of total roads network (km)	Ministry of Transport, Infrastructure Managers
Length of paved roads (% of total roads length)	
Length of total rail network (km)	
Air transport: registered carrier departures	
Length of navigable inland waterways (km)	
Recurrent spending on infrastructure (% of GDP)	Ministry of Finance
Additional indicators	
Length of international road network per class (km)	Ministry of Transport, Infrastructure Managers
Length of international road with design speed of at least 100 km/h (km)	
International Roughness Index (IRI) rating for the total length of the international roads.	
Length of main international railway lines (km)	
Length of supplementary international railway lines (km)	
Length of international railway lines with at least two tracks (km)	
Rail track gauge and loading gauge	Airport
Passenger airport terminal capacity: number of gates, number of passengers embarked and disembarked per year	
Cargo airport terminal capacity: freight and mail loaded and unloaded per year (tons)	
Length of inland waterway (IWW) with international importance (km)	Ministry of Transport, Infrastructure Managers
Cargo handling capacity of inland navigation ports (tons)	

3.1.3 Priority 3: International trade and trade facilitation

This priority aims to significantly increase the integration of LLDCs into world trade and global value chain by reducing non-physical barriers that cause high transport costs. LLDCs are encouraged, amongst others, to develop a national trade strategy and to integrate it into national development strategies, to establish and strengthen national committees on trade facilitation, to implement trade facilitation initiatives, and to effectively implement integrated border management systems.

Table 28: Key transport data for VPoA priority 3

Indicator	How to collect/source
Core indicators	
International trade	
Freight performed with road transport modes involved in international (transit) journeys (ton-kms) (SDG)	Ministry of Transport, surveys of shippers, freight forwarders and inland port operators
Freight performed with rail transport modes involved in international (transit) journeys (ton-kms) (SDG)	
Freight performed with inland water transport (ton-kms) (SDG)	
Additional indicators	

Gross weight of international (transit) cargo transported by either multi-modal, inter-modal or combined transport (tones)	Surveys of shippers, freight forwarders and truck drivers
Gross weight of containerized cargo and non-bulk cargo by each transport mode (tones)	
On-flight origin and destination (aggregate number of passengers, freight and mail tons carried between all international city-pairs on scheduled services).	Airlines

3.2 Key transport data to monitor and report on SDGs

The transport related key data indicators to monitor the progress of LLDCs in achieving the SDG targets are presented in Table 29.

Table 29: Transport-related SDGs and key data

SDG goal and target	SDG indicator	Key data	How to collect/source
Goal 3: Ensure healthy lives and promote well-being for all at all ages			
3.6: By 2020, halve the number of global deaths and injuries from road traffic accidents	3.6.1: Death rate due to road traffic injuries	<ul style="list-style-type: none"> Number of vehicles with (operational) tachograph Number of road traffic accidents per year 	Police
3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	3.9.1: Mortality rate attributed to household and ambient air pollution	<ul style="list-style-type: none"> Number of alternative fuel passenger cars, buses and trucks Average age of passenger cars, buses and trucks Number of alternative fuel filling stations along international roads and inland stations 	Ministry of Transport
Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation			
9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all	9.1.1: Proportion of the rural population who live within 2 km of an all-season road	<ul style="list-style-type: none"> Paved road length per 1000 km² territory Access to all-weather road (% access within {x} km distance to road) 	Ministry of Transport, Infrastructure Managers
	9.1.2: Passenger and freight volumes by mode of transport	<ul style="list-style-type: none"> Number of passenger-kms and freight ton-kms performed with road and rail transport modes involved in international (transit) journeys 	Surveys of shippers, freight forwarders and truck drivers

3.3 Data sources

Freight data could be classified by mode of travel, commodity type, distance covered and tonne-kilometres transported, jurisdictional and administrative units crossed, etc. The data may be obtained from direct and indirect sources. The indirect sources are often government entities that deal with trade, tax, and customs. The direct sources of information are the stakeholders involved in freight. In many countries, this information is usually quite poor due to difficulties in its collection as it would require surveys of shippers, freight forwarders and truck drivers. Such

surveys are mostly undertaken by development partners to develop their own database, such as the World Bank's LPI.

Although the indirect data are relatively easy to obtain, they do not provide all the necessary information since they usually miss the domestic freight flows. Vehicle-mounted, GPS-based automatic data, automatic number-plate recognition, and other reporting systems can offer continuous information on shipments. The whole process being automated allows reducing the data collection costs in the long run. The challenge, however, is to build the trust between the government and the data generators so that an automated system of data retrieval can be implemented. Surveys of shippers, freight forwarders and drivers can complement the other sources of data, as well as additional information from waybills and other instruments that accompany consignments, if available. (OECD/ITF, 2019)

Data related to the sustainability indicators is also challenging to be systemized in LLDCs as they are either not collected or are collected irregularly, and, if collected, not always publicly available.

Air transport

Air transport is not subjected to borders and other impediments as in the case of surface transport modes, which makes air traffic data relatively easier to collect. Moreover, unlike the other modes which need to collect primary data from survey, air transport data is mostly collected using digital technology.

Air transport data are collected by a country at airport level, which are divided into landside (terminals and all the facilities used by passengers and cargo shippers) and airside (runways, taxiways and gates) zones. The data generally categorized in the following domains: (1) Passengers; (2) Freight and mail; and (3) Traffic data by airports, aircraft and airlines.

3.4 Utilizing Big Data

The importance of establishing transport infrastructure database in LLDCs to measure and assess progress in the transport infrastructure development, has been outlined in the beginning of section 3. Another advantage of having a robust database is to employ the endless possibilities of Big Data. The following paragraph is extracted from *Big Data Analytics in Government: Improving Decision Making for R&D Investment in Korean SMEs* by Kim et al (2020).

The concept of Big Data analytics (BDA) pertains to accumulating, combining, analyzing, and using large-scale data for various purposes and of various types. BDA enables organizations in both the private sector and, increasingly, the public sector to make better decisions (i.e., more quickly and efficiently) based on evidence and insights.

The establishment of data-driven policies using Big Data and BDA can help public administrators at all levels of government and in different areas reach their goals. It can also prevent the inefficient operation of the government, bad policymaking, and the selection and execution of misguided alternatives. In summary, complex policy issues affected by various variables can be handled efficiently and effectively using Big Data and BDA, and the new data-driven insights gained can aid the decision-making of the government.

However, the use of Big Data has been limited because of the lack of actual data available to the government to implement such data-driven policies. In particular, the use of Big Data has been scarce because of the limitations of the infrastructure required to (i) accumulate and generate reliable data, which is essential for utilization; and (ii) convert the accumulated and generated data into a form that can actually be used in practice.

In order to successfully utilize the advantages offered by the use of Big Data, it is not only important to have a robust transport database but also to make the data available publicly to empower the private sector to use the data and create added value as well as to use Big Data for policymaking. Data also need to be collected in a format that can be used by different government institutions and agencies.

Good practices

- Mongolia has developed statistical data collection and is the first country in the region to introduce an asset management system. The data are collected annually and data management, control and analysis are performed.
- Publicly available transport and transport-related data collected in Kazakhstan are usually aggregated. The country collects and publishes statistical data on transport showing specified shares of import, export, and transit, disaggregated by commodity type. It also has detailed data on international road freight, which include the number of permissions given to foreign companies revenues from cabotage, etc.

Source: OECD/ITF (2019)

3.5 Consolidated data by transport mode

The previous sections have elaborated on transport data needed to be collected in order to monitor the country's progress on achieving each of the relevant VPoA priorities and SDGs, and how to collect the data. This section consolidates all the previously presented data and categorizes them by transport mode.

General

Number of ratifications, accessions, signatories to transport agreements
Recurrent spending on infrastructure (% of GDP)

Road transport

Transit
Average road corridor speed for export and import (km/h)
– Road corridor speed with delays for export and import (km/h)
– Road corridor speed without delays for export and import (km/h)
Access to all-weather road (% access within {x} km distance to road)
Infrastructure
Length of total roads network (km)
Length of paved roads (% of total roads length)
Paved road length per 1000 km ² territory
Length of international road network per class (km)

Length of international road with design speed of at least 100 km/h (km)
Passenger and Freight
Passenger volume transported by road in international journeys per year (passenger-kms)
Freight performed with road transport modes involved in international (transit) journeys (ton-kms)
Gross weight of international (transit) cargo transported by either multi-modal, inter-modal or combined transport (tones)
Gross weight of road containerized cargo and non-bulk cargo (tones)
Road safety
Number of vehicles with (operational) tachograph
Number of road traffic accidents per year
IRI rating for the total length of the international roads.
Sustainability
Number of alternative fuel passenger cars, buses and trucks
Average age of passenger cars, buses and trucks
Number of alternative fuel filling stations along international roads and inland stations

Rail transport

Transit
Commercial speed of international railway lines (km) <i>(The average commercial speed of the majority of the international railway lines along the national segment, which is equal to the distance divided by the journey time)</i>
Infrastructure
Length of total rail network (km) <ul style="list-style-type: none"> – Length of main international railway lines (km) – Length of supplementary international railway lines (km) – Length of international railway lines with at least two tracks (km)
Rail track gauge and loading gauge
Freight
Freight performed with rail transport modes involved in international (transit) journeys (ton-kms)
Gross weight of rail containerized cargo and non-bulk cargo (tones)

Air transport

Infrastructure
Passenger airport terminal capacity: number of gates, number of passengers embarked and disembarked per year
Cargo airport terminal capacity: freight and mail loaded and unloaded per year (tons)
Others
Registered carrier departures
On-flight origin and destination (aggregate number of passengers, freight and mail tons carried between all international city-pairs on scheduled services).

Inland water transport

Infrastructure
Length of navigable inland waterways (km)
Cargo handling capacity of inland navigation ports (tons)
Freight
Freight performed with inland water transport (ton-kms)
Gross weight of IWW containerized cargo and non-bulk cargo (tones)

4. Recommendations

Reliable data on the transport sector would allow for a better assessment of transport infrastructure and related policies. It might be useful for LLDCs to develop a statistical center for (freight) transport that could play a role in data collection and analysis for policy support and for promoting dialogue among relevant stakeholders that ultimately could result in coordinated decision-making process and actions to increase transport connectivity.

5. References

ICAO. 2009. "Collection of Data on Airport and Airspace Capacity, Investment and Funding". https://www.icao.int/Meetings/STA10/Documents/Sta10_Wp015_en.pdf.

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OECD/ITF. 2019. "Enhancing Connectivity and Freight in Central Asia: Case-Specific Policy Analysis". <https://www.itf-oecd.org/sites/default/files/docs/connectivity-freight-central-asia.pdf>.

Annex 1. List of Landlocked Developing Countries

1. Afghanistan
2. Armenia
3. Azerbaijan
4. Bhutan
5. Bolivia (Plurinational State of)
6. Botswana
7. Burkina Faso
8. Burundi
9. Central African Republic
10. Chad
11. Eswatini
12. Ethiopia
13. Kazakhstan
14. Kyrgyz Republic
15. Lao People's Democratic Republic ('Lao PDR')
16. Lesotho
17. Malawi
18. Mali
19. Mongolia
20. Nepal
21. Niger
22. North Macedonia
23. Paraguay
24. Republic of Moldova
25. Rwanda
26. South Sudan
27. Tajikistan
28. Turkmenistan
29. Uganda
30. Uzbekistan
31. Zambia
32. Zimbabwe

Annex 2. List of Transit Developing Countries

1. Algeria
2. Angola
3. Argentina
4. Bangladesh
5. Benin
6. Brazil
7. Cambodia
8. Cameroon
9. Chile
10. China
11. Democratic Republic of Congo
12. Djibouti
13. Eritrea
14. Ghana
15. Guinea
16. India
17. Iran
18. Cote d'Ivoire/Ivory Coast
19. Kenya
20. Mozambique
21. Myanmar
22. Namibia
23. Nigeria
24. Pakistan
25. Peru
26. Senegal
27. Somalia
28. South Africa
29. Tanzania
30. Thailand
31. Togo
32. Turkey
33. Uruguay
34. Vietnam