

Grand Design for Global Logistics in African Region

TICAD 8 Side Event

Revisiting Impact and Future of Corridor Development Approach

- Keynote presentation -

24th August 2022

 Pacific Consultants Co., Ltd. (PCKK)

 Japan International Cooperation Agency (JICA)

Context of Corridor Development in Africa

Logistics infrastructure is fundamental to supporting economic growth, industrial development, creating jobs, and people's lives.

Economic corridor is expected to play a key role for Africa for:

- **Enhancing connectivity** covering the enormous continent;
- **Facilitating trade** amidst ongoing process of promoting African Continental Free Trade Area (AfCFTA);
- **Closing gaps** of economic challenges for landlocked countries (sometimes referred to as *land-linked* countries).

- Related indicators for Africa -

55



Member States
representing African Union

1.4 billion

Population of Africa, approx. 16%
of total world population in 2021
(United Nations estimate)

29.6 million
km²

Total land area, which is
nearly 20% world's total
land area

4.1 %

Economic growth rate in 2021 for
Sub-Saharan Africa.
(World Bank)

16 Landlocked
Countries

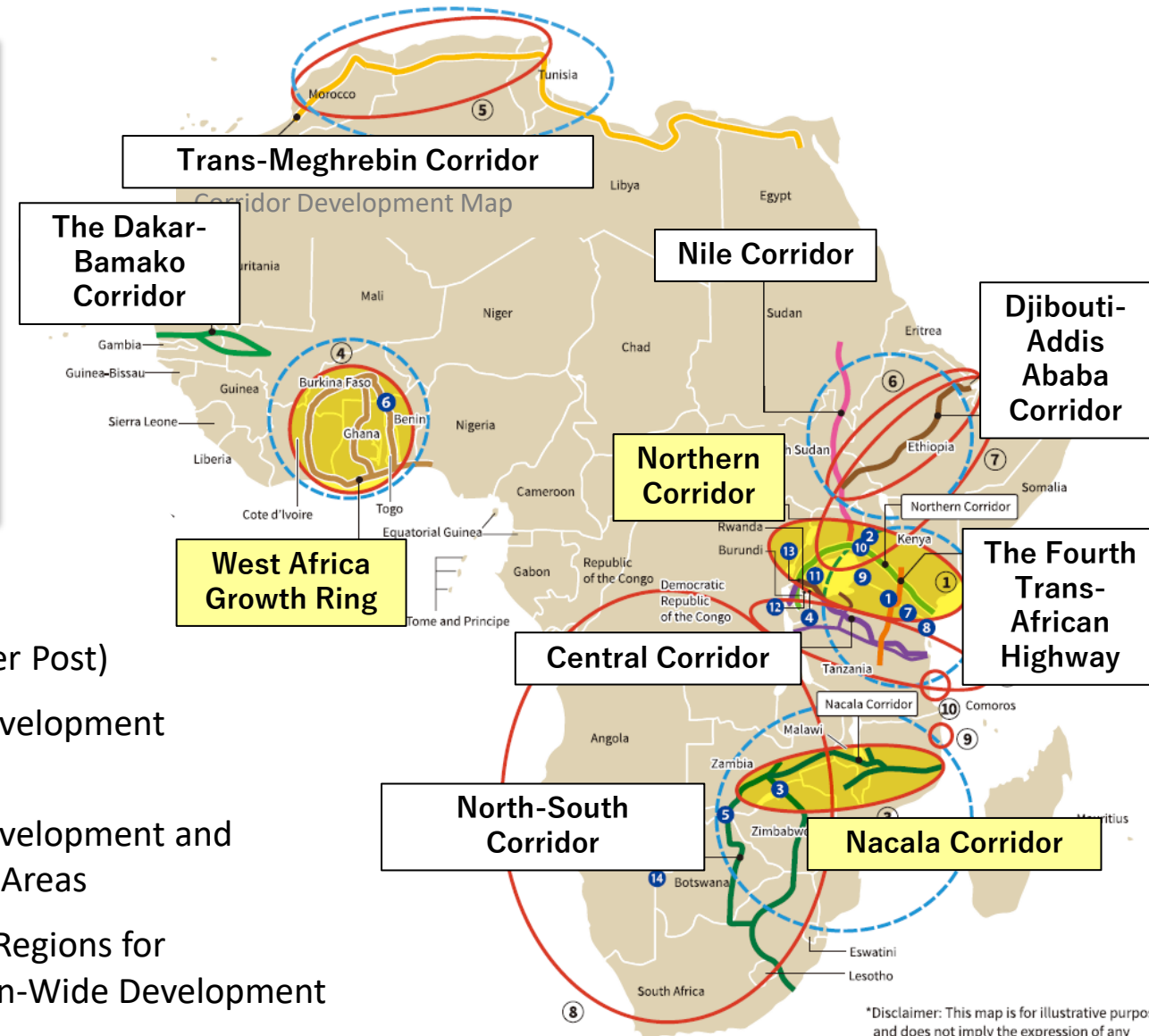
Landlocked countries in
Africa, which is the highest
among other world regions.

33 LDCs
in 2020

33 African countries fall into
the category of least
developed countries (LDCs)
out of 47 LDCs globally.

JICA's Support towards Corridor Development in Africa

JICA has been providing support for the development of "Economic Corridors" and "Ports", etc. towards achieving sustainable growth in the mid- to long-term in Africa.



*Disclaimer: This map is for illustrative purpose and does not imply the expression of any opinion on the part of JICA concerning the legal status of any country or territory or concerning the delimitation of frontiers or boundaries.

Challenges towards facilitating corridor development

Challenges

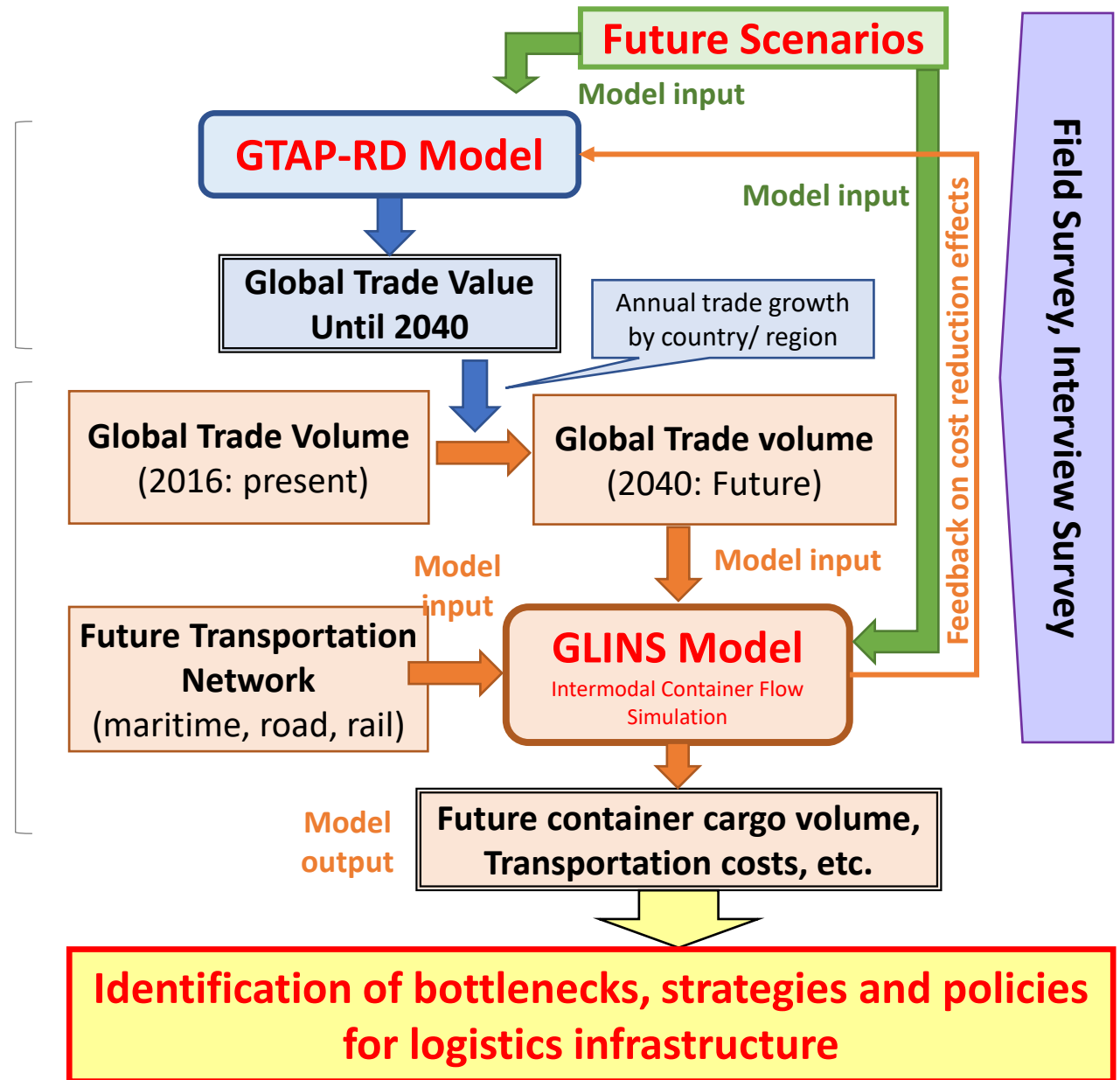
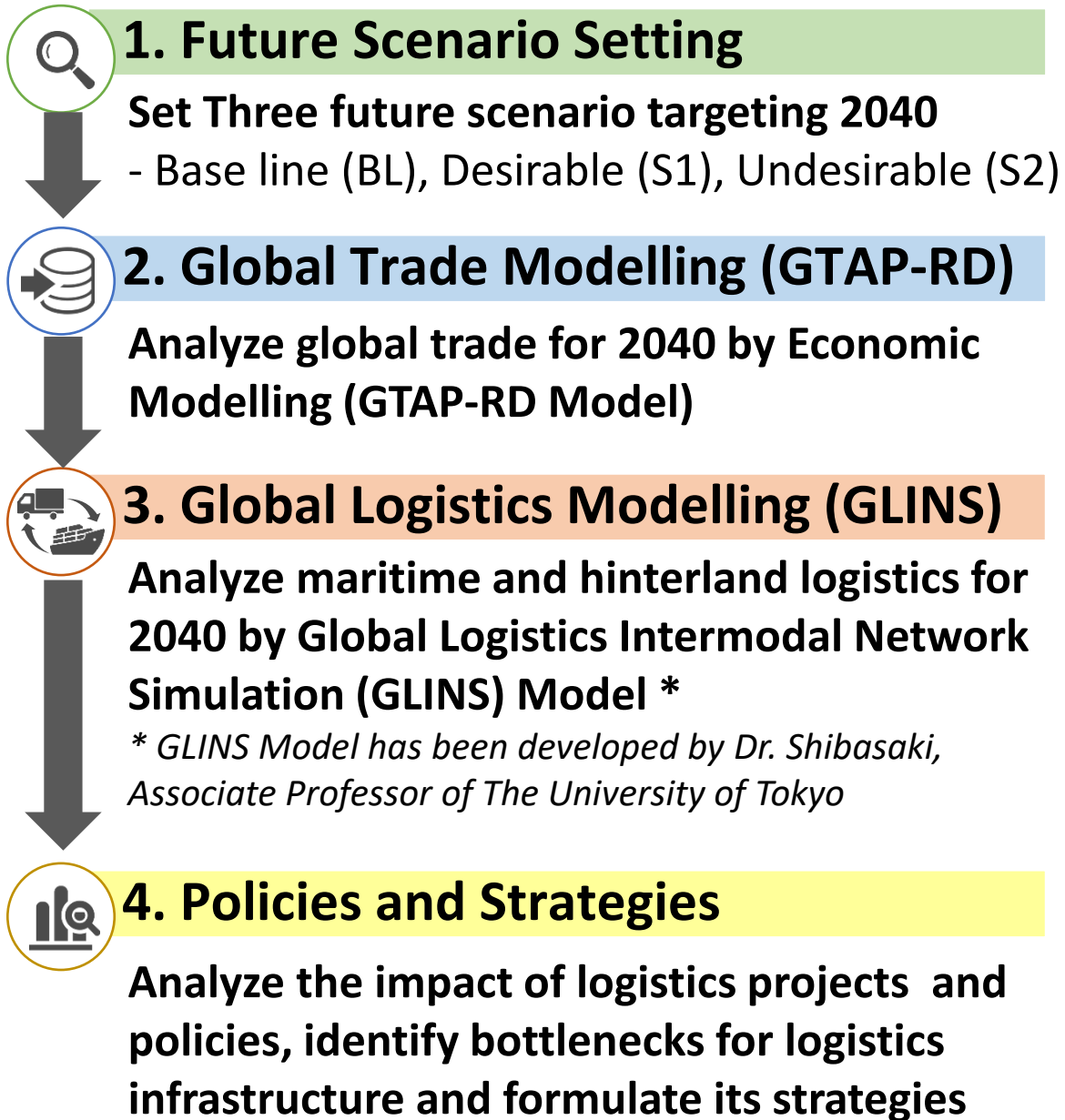
- **Necessity for long-term and comprehensive vision** that takes into account the growth potential of African countries (not just “linear growth”);
- **Strategic approach to streamline development** that prioritizes the infrastructure development timely and appropriately (when and where it is needed);
- **Maximizing impact and creating synergy** among the various projects and programs (not individual project-basis)

Objective of this study

- **Identifying the potential demand** of trade volume until 2040, considering future scenarios;
- **Formulating a strategy for infrastructure development** upon identifying the bottlenecks in logistics infrastructure in Africa;
- **Drawing policy recommendations** and direction for Japanese cooperation towards facilitating development of logistics infrastructure.



Research Flow



Future Scenario Setting

What are assumptions about the future global economic outlook due to the impact of COVID-19 and the progress of DX, Carbon Neutrality, etc.?



Future scenario setting

Three future scenarios based on recent changes in the socio-economic environment

12 Common axes considered to build the 3 scenarios

Ex.) Technological Innovation / Cutting-edge technology / Free Trade Agreement / Climate Change / Green Energy / Infrastructure Development / etc.

Scenarios based on Shared Socio-economic Pathways (SSPs) and discussions with JICA Experts and Japanese researchers through several committee meetings.

Measures for COVID-19, DX, Carbon Neutrality, etc.

Economic development through promotion of international cooperation

Collapse of international cooperation due to prolonged economic stagnation and deterioration

Opportunities

Risks

Desirable Scenario (S1)
Stable and harmonious Society

Business As Usual (BAU)
Mixed Opportunities and Risks Society

Undesirable Scenario (S2)
Risk manifested Society

Global Trade in 2040

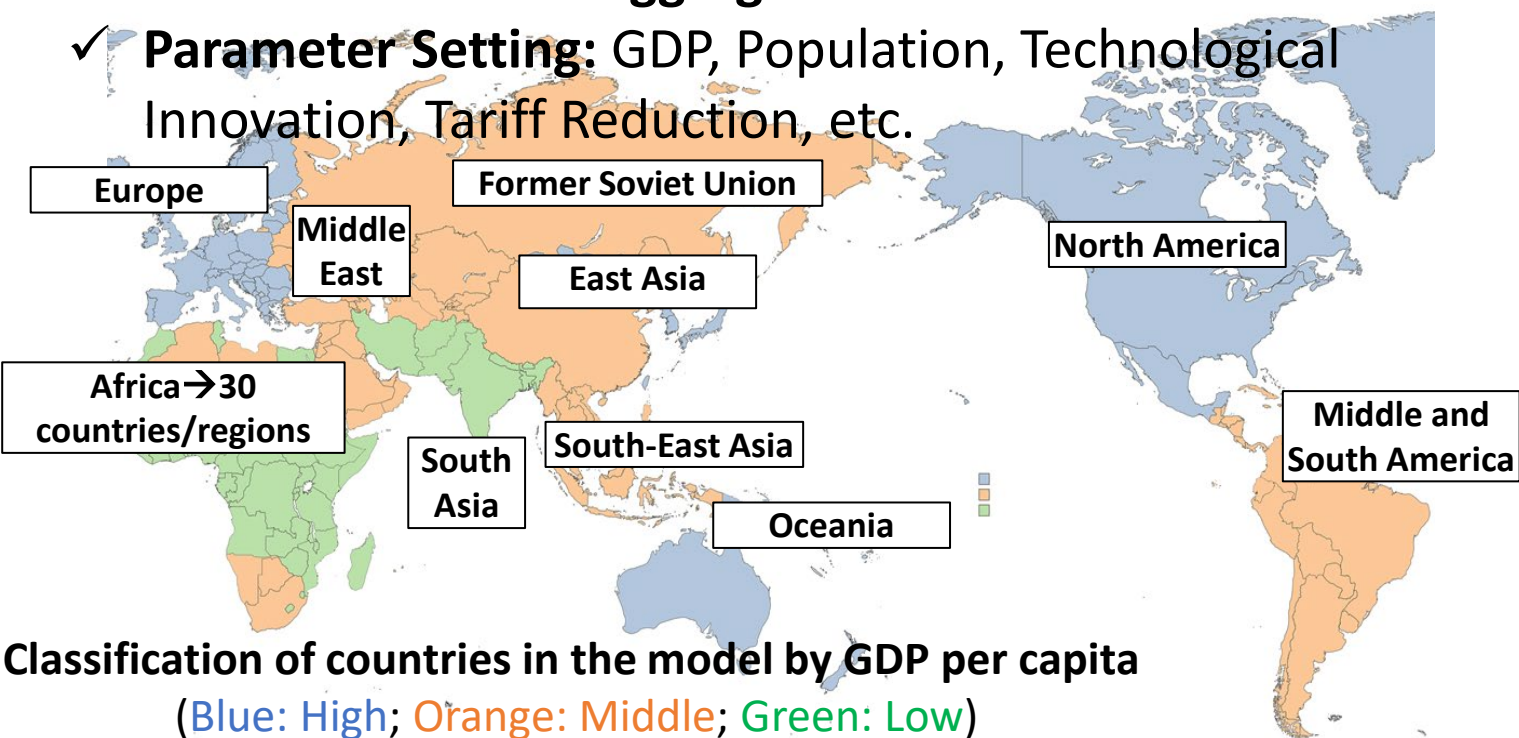
How will the impact of COVID-19 and the progress of DX, as well as the AfCFTA's enhanced trade connectivity, affect the economy and industry?



Global Trade Modelling (GTAP-RD)

Global trade simulations were conducted for three scenarios utilizing the GTAP-RD model.

- ✓ **Calculation Period: 2014 – 2040** (26 years)
- ✓ **Countries/Regions: Aggregated 43** from 141
- ✓ **Industrial Sectors: Aggregated 16** from 65
- ✓ **Parameter Setting:** GDP, Population, Technological Innovation, Tariff Reduction, etc.



Classification of sector

No.	Non-Service Sectors
1	Cereals
2	Other Edible Agriproducts
3	Fishing
4	Other Agriproducts and Forestry
5	Natural Resources
6	Household Consumer Products
7	Basic Industrial Materials
8	High GHG Emission Products
9	Processing /Assembling
No.	Service Sectors
10	Motzor Vehicles and Parts
11	Land Transportation
12	Water Transportation
13	Air Transportation
14	Communication
15	Financial Services
16	Other Services

Future Trade Value

Scenario S1 would bring the largest expansion in trade in Africa.

S1 Scenario:

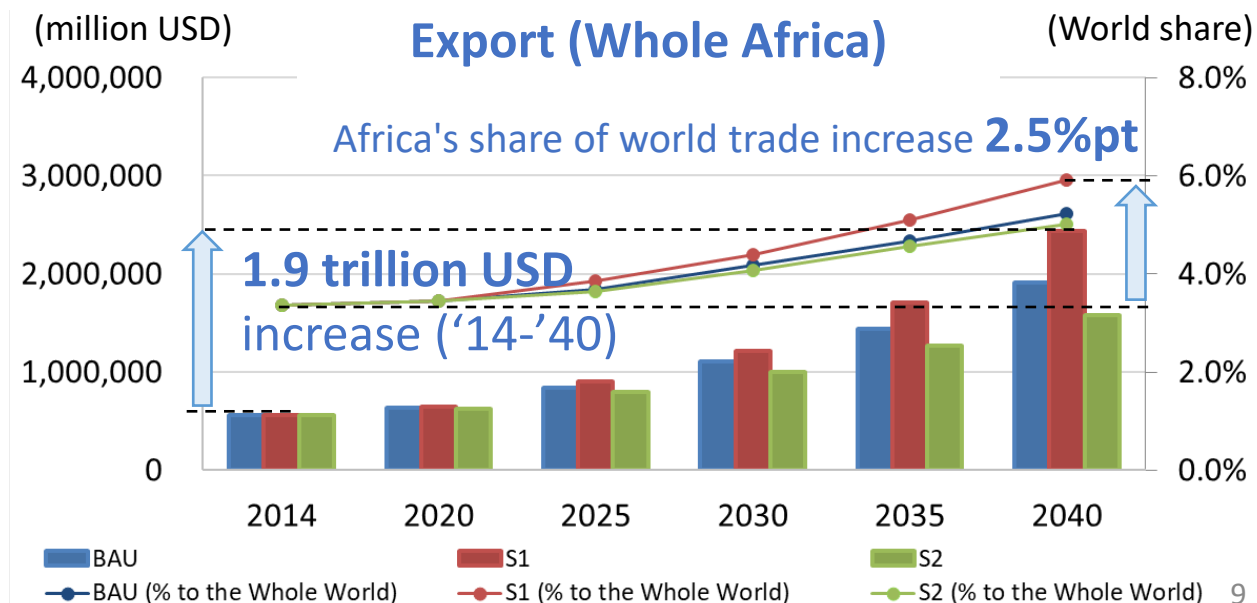
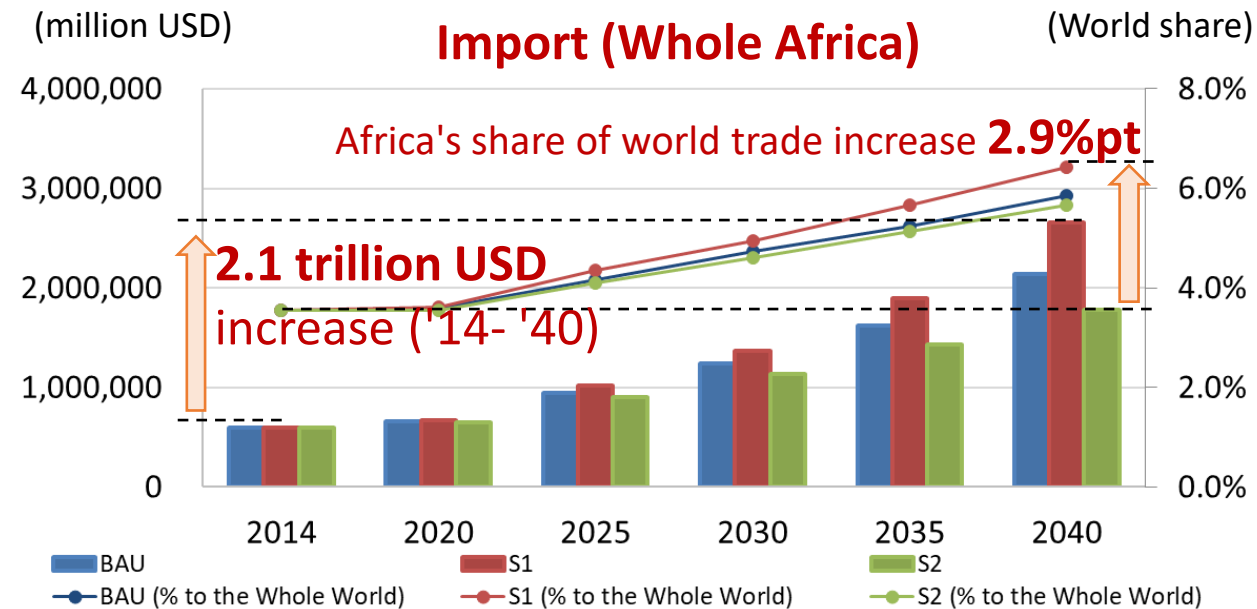
Full adoption of AfCFTA + high-tech progress in Africa

- ✓ Significant increase imports and exports compared with other scenarios.
- ✓ Africa's share of world trade increase 2.9%pt in import, 2.5%pt in export.

S2 Scenario:

Insufficient recovery from COVID-19 + low performance due to insufficient international cooperation

- ✓ Lower growth in the long-term.



Global Logistics in 2040

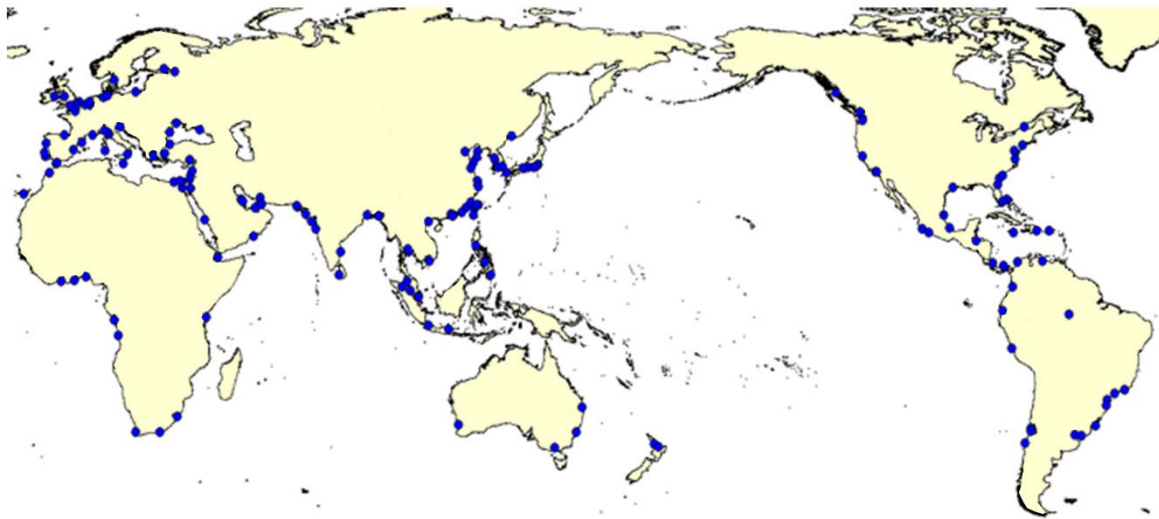
How will the development of economic corridors affect African countries?



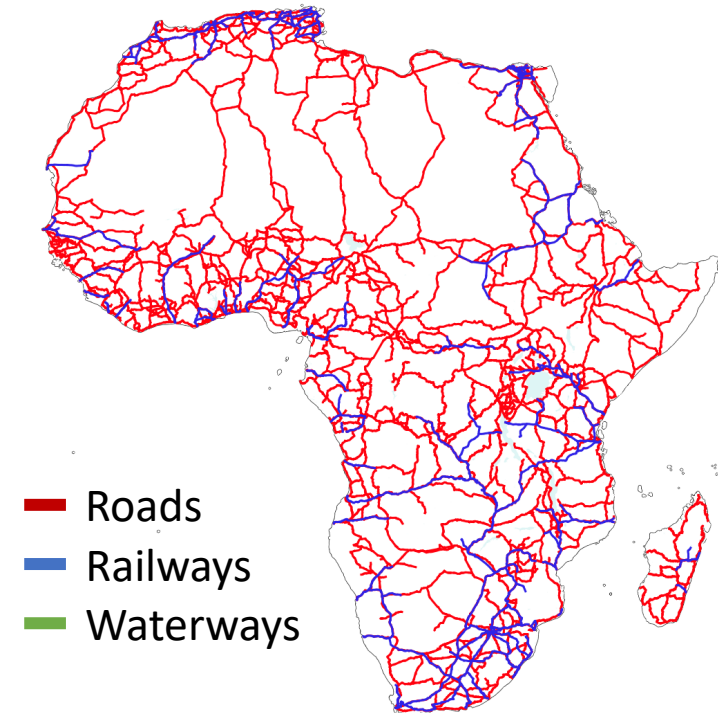
Global Logistics Modelling (GLINS)

Logistics simulations in Africa were conducted using the GLINS model.

- This GLINS model is a network assignment model for container cargos that performs carrier selection and route selection based on the actual transportation network, consisting of marine vessel, road, rail, and inland waterway.



Major Global Ports (N=249)



Land transportation network

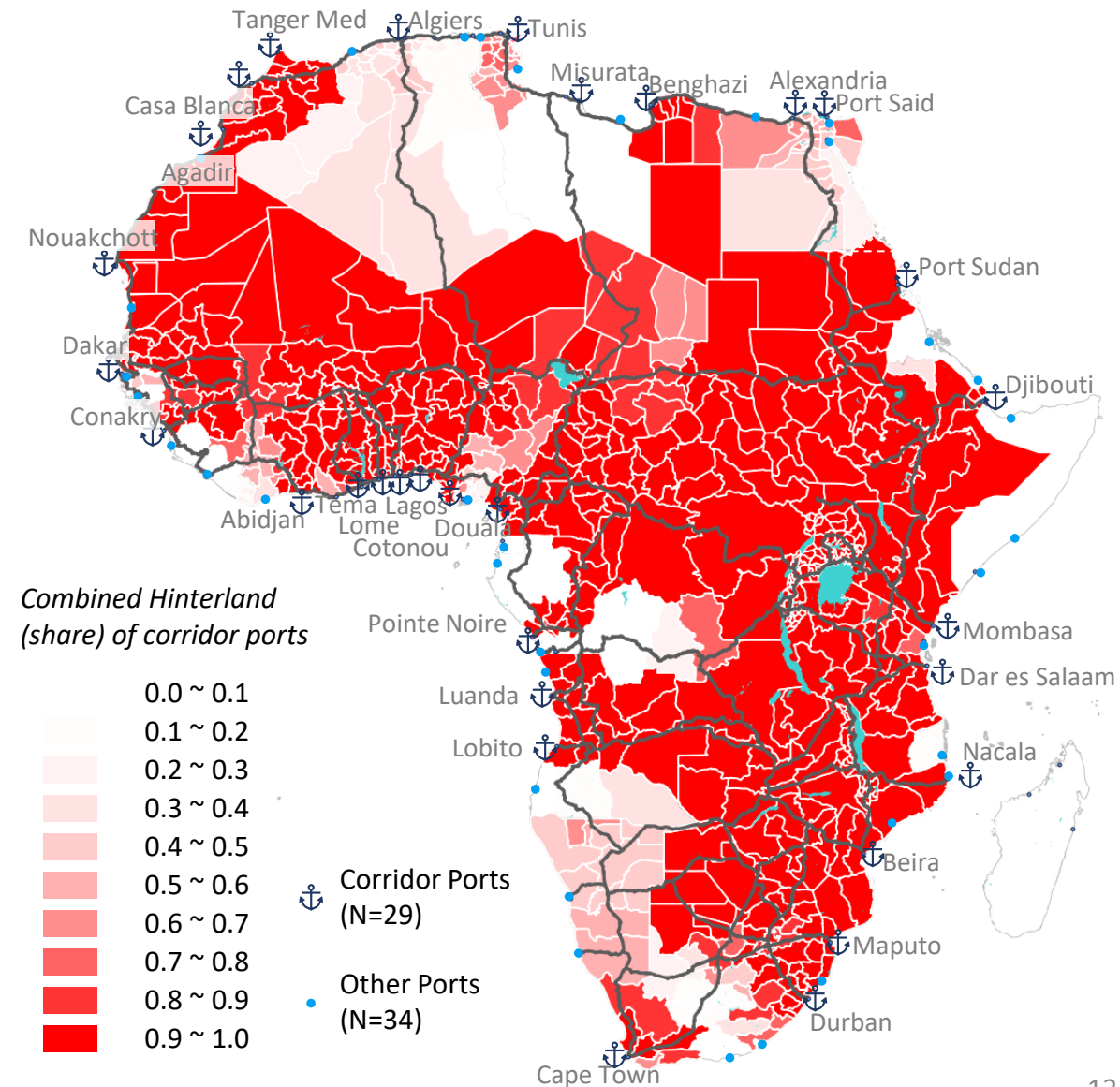
Effects of corridor development connected to the port

Ports constitute integral parts of economic corridors as gateways, contributing to transporting goods through the whole continent.

Key takeaways from model analysis

- The 29 corridor ports handle **82.3% of international container cargo** originated in or headed for the African Continent.
- The 29 corridor ports cover **78.1% of population*** in the African Continent

Combined hinterland of the 29 corridor ports



Characteristics of current transportation costs

Landlocked countries tend to have higher transportation costs.

Key takeaways from model analysis

- **Countries with a high share of intra-regional trade:** Intra-regional transportation costs are **relatively lower** than regional average. (ex. South Sudan, Botswana)
- **Geographically isolated countries:** Depend more on extra-regional trade and their intra-regional transportation costs are **relatively higher** than regional average. (ex. Ethiopia, Madagascar)

Standardized variate of transportation cost by region

Standardized variate of transportation cost
 $(Z_i = (x_i - \bar{x}) / \sigma)$

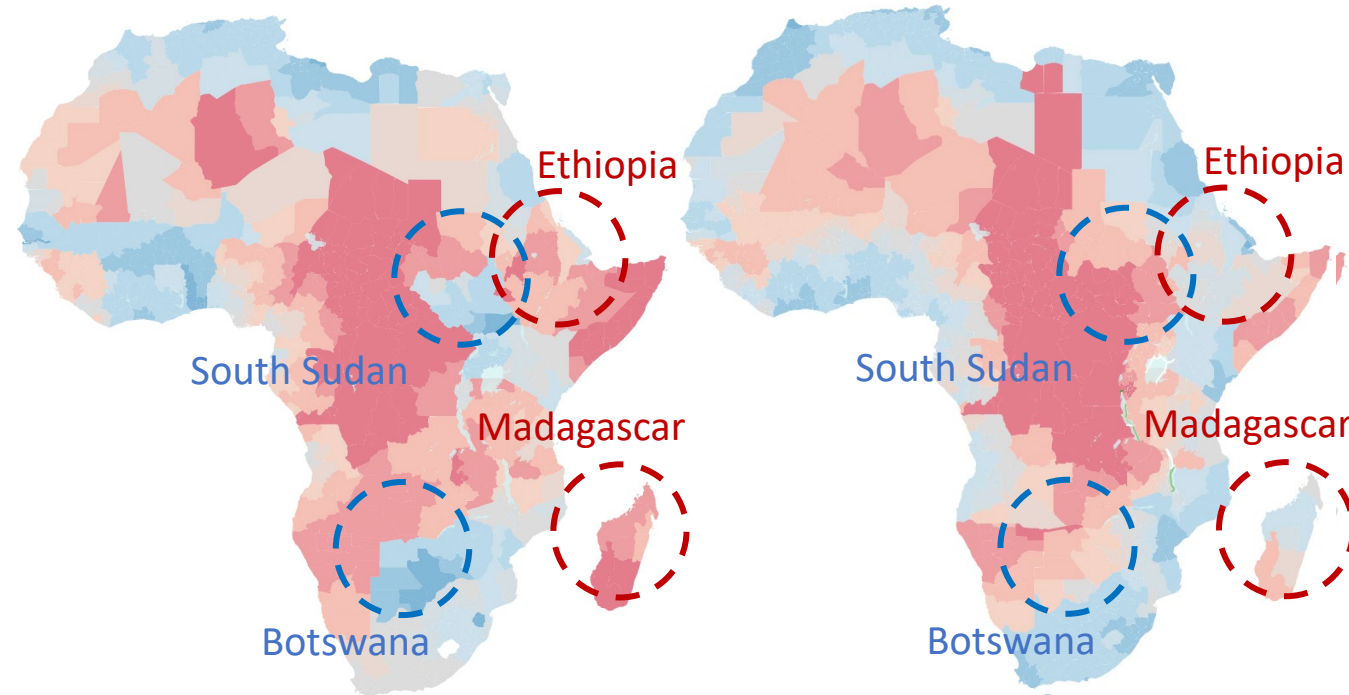
Lower than Average

Regional Average

Higher than Average

Intra-regional

Extra-regional



Bottlenecks in roads and railways

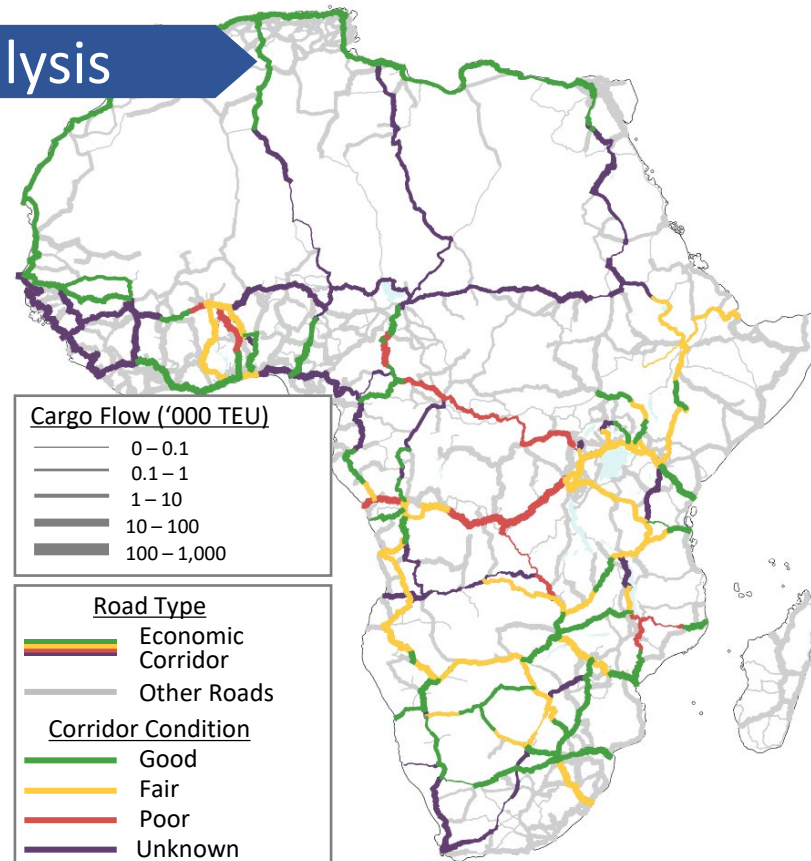
Infrastructure gaps need to be sufficiently addressed to accommodate future cargo transportation demand and facilitate regional trade.

 Cargo flow on roads (2040 / S1)

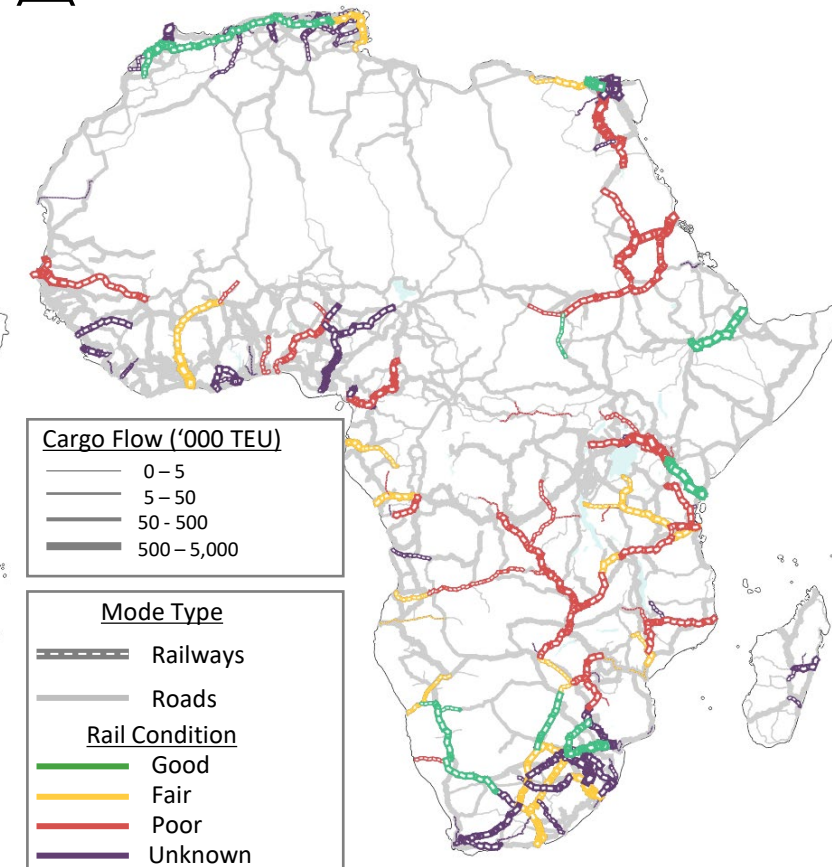
 Cargo flow on rail (2040 / S1)

Key takeaways from model analysis

- Roads with high transportation demand but in **poor condition exist** especially in sections connecting inland regions.
- **Railway infrastructures are largely under-invested** despite their advantage over road transport for cost and efficiency.



*Road conditions are determined based on PIDA evaluation report and Study Team Survey



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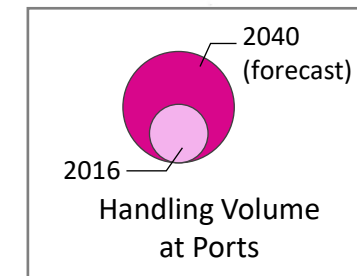
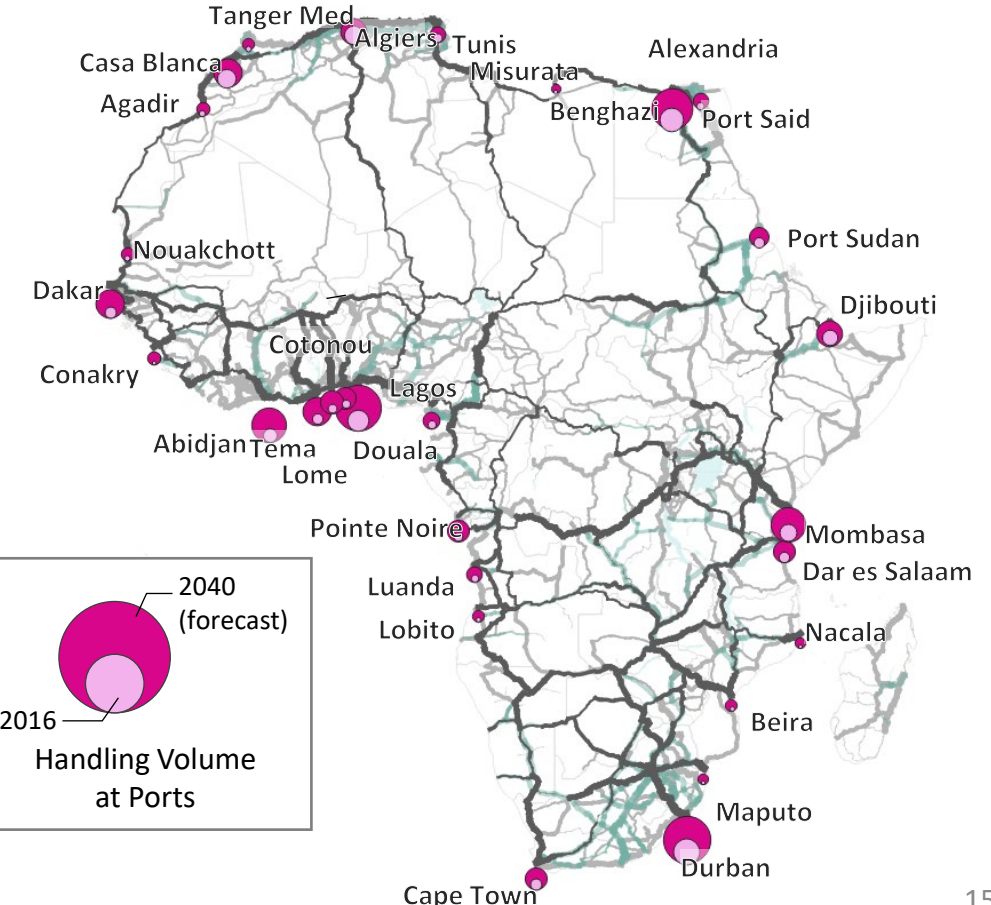
Bottlenecks in ports

Cargo handling demand at port is expected to become on average **4.2 times larger** in 2040 under S1 Scenario than that in 2016.

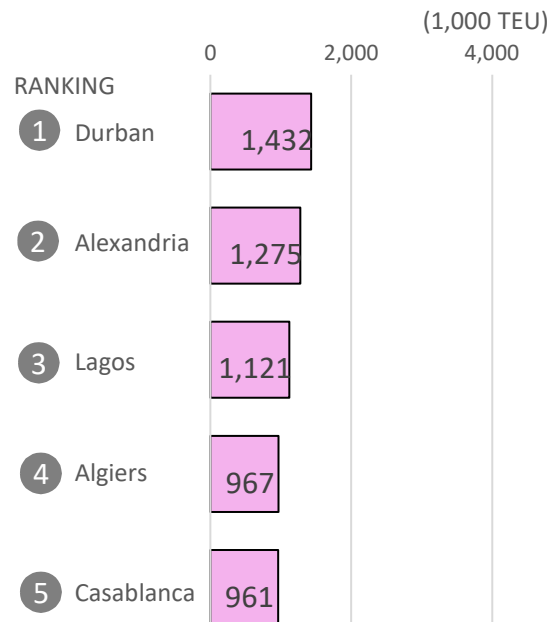
* Cargo volume is based on import and export of containers (excluding transshipment)

- Growth is expected to be larger especially for the western African ports, such as Abidjan and Lagos.

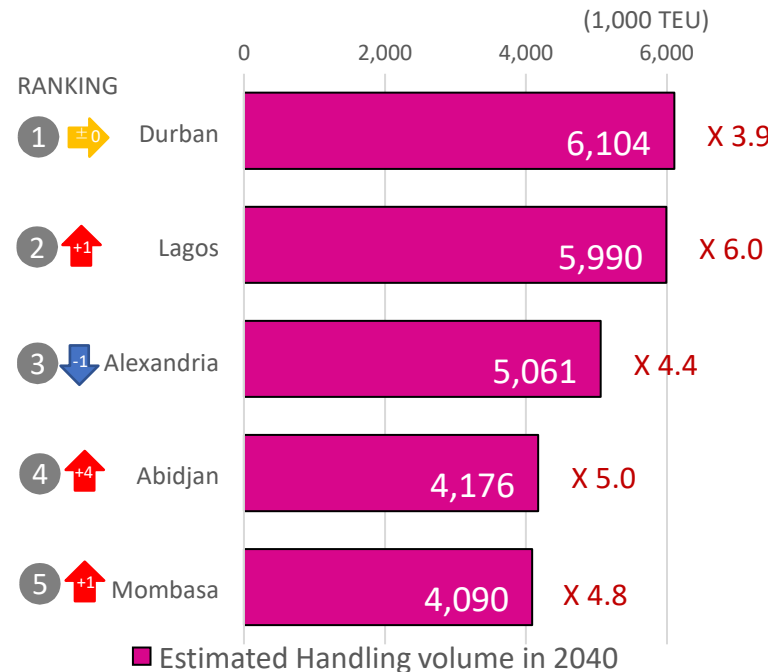
Future Transportation Demand at Major 29 Ports



Top 5 ports for cargo handling in 2016



Top 5 ports for cargo handling in 2040



Estimated Handling volume in 2016

Estimated Handling volume in 2040

Contribution to transportation cost reduction

Developing economic corridors and facilitating cross-border trade contribute to reducing transportation cost, especially for landlocked countries.

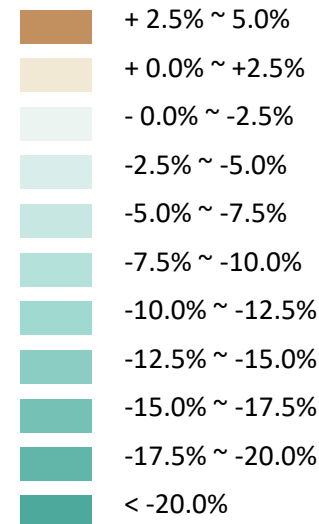
Key takeaways from model analysis

- The benefit could be enjoyed by all countries, once economic corridors are fully developed across the continent, with some small exception for coastal areas
- The benefit would be **bigger for landlocked countries** than for coastal countries.

* The figure shows impact of corridor development on transportation cost reduction. Impact is determined by comparing cost between WITH and WITHOUT corridor setting.

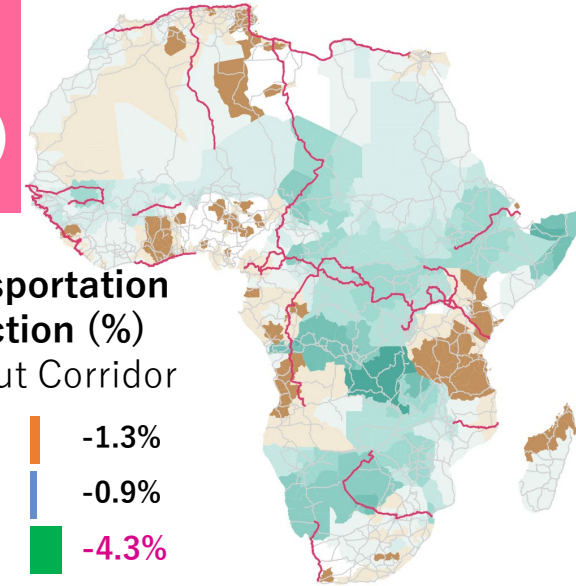
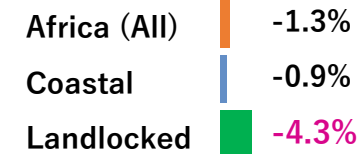
— Economic Corridor
— Other roads

Transportation cost reduction rate (%)



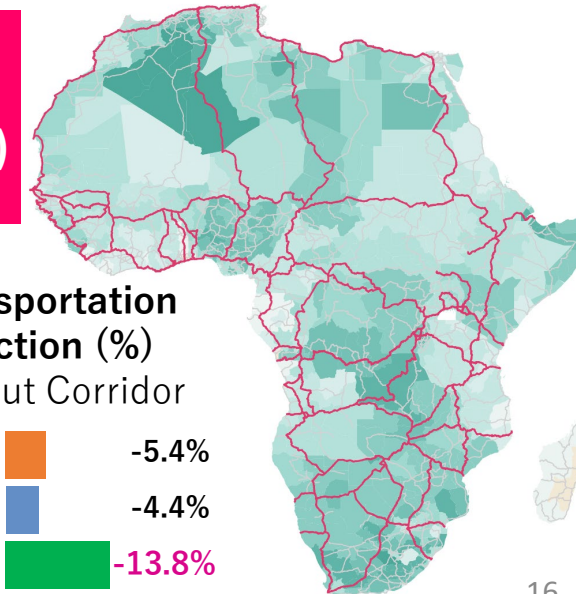
2030 Model (S1 Scenario)

Total Transportation Cost Reduction (%)
With-Without Corridor



2040 Model (S1 Scenario)

Total Transportation Cost Reduction (%)
With-Without Corridor



JICA's Recommendations

How should inclusive/integrated corridor development be promoted in the post-COVID19 and DX era?

What is the importance of green infrastructure in Africa and how can this be achieved?



JICA's Recommendations

1. Preparing for the significant increase in the transportation demand

- **The desirable future scenario (S1) would significantly increase Africa's imports and exports.**
- It also increases intra-African trade in agricultural products. Thus, improving the supply-demand imbalance for agricultural products, and consequently contributes to improving food self-sufficiency in Africa as a whole.
- **Also, to respond to the global agenda on climate change, it is necessary to promote green transition by upgrading infrastructure, facilitating the shift from road to rail, while also taking measures to improve the efficiency of trucks, ships and other means of transportations.**

2. prioritizing support for bottleneck infrastructure

- Some infrastructures may become logistical bottlenecks due to future demand growth.
- **It is important to provide priority support to these infrastructures in order to eliminate impediments to economic growth.**

3. Reducing disparities through integrated corridor development

- **Integrated economic corridor development (including border facilities such as OSBPs and port development) is expected to improve the accessibility of cargo transport and economic activities, benefiting many regions and people in Africa.** It will also reduce transportation costs for landlocked countries and contribute to reducing disparities.
- In response to the rapidly growing demand for cargo transport in and out of Africa, it is necessary to promote infrastructure development while taking into account future demand forecasts and investment effects from a long-term perspective.

Thank you for your kind attention

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Contact: AfGL@tk.pacific.co.jp