No.

The Study on Regional Freight Corridor Development Based on Port and Rail Systems in Sub-Saharan Africa

Final Report

September 2010

Japan International Cooperation Agency

PADECO Co., Ltd.

Tonichi Engineering Consultants, Inc.

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Preface

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From this background, over a period from January to August 2010, JICA has conducted this study summarizing issues on hard infrastructure, those on operation and management, strategies for operation and maintenance, and proposed directions of ideal assistance for the port and railway sectors. Furthermore, based on the results of the field surveys in the West Africa region, regional pilot assistance programs for regional economic revitalization through the port and railway sector developments were proposed.

The Study Team led by Dr. Chiaki KURANAMI of PADECO Co., Ltd. of Japan, included consultants from PADECO Co., Ltd. and Tonichi Engineering Consultants Inc. The team performed field surveys in the relevant countries and literature research in Japan.

During the study period, three JICA internal committee meetings were conducted. The recommendations and conclusions have been reflected into the results of the study and the completed report summarizes all the results of the study.

We sincerely hope that this report will contribute to further regional transport infrastructure development in the relevant sectors in the Sub-Saharan African region and would like to express our sincere gratitude and appreciation to the individuals and organizations who have kindly supported and contributed to this study.

September 2010

Kiyofumi Konishi
Director General,
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Executive Summary

The Fourth Tokyo International Conference on African Development (TICAD IV) held in May 2008 emphasized the importance of regional infrastructural development for the acceleration of economic growth in Africa including financial and technical assistance for planning, construction, and improvement for regional transport corridors and international ports as well as assistance for capacity improvement for the maintenance of regional infrastructure. Regional economic revitalization through infrastructure development in Africa has had high expectations and interests.

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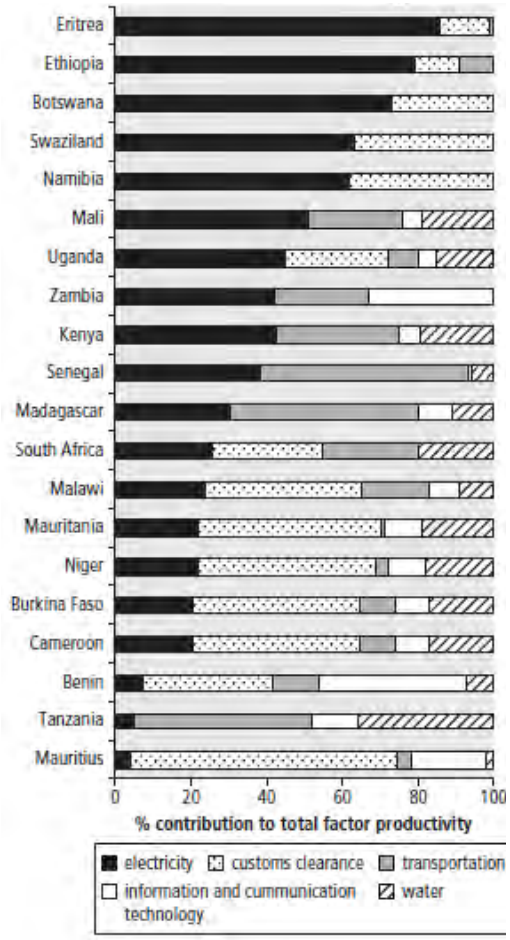
1. Constraints on Regional Transport Infrastructure in Sub-Saharan Africa

The total GDP of Sub-Saharan Africa in 2009 was US$885.2 billion (in current prices), which represents only 1.5% of world GDP. In addition, South Africa accounts for 32% of the total GDP of this region. The average GDP per capita of the region is US$1,179 (2008, current values), which is lower than that of other developing regions in the world, with only 17 countries in Sub-Saharan Africa surpassing US$1,000.

Although the level of economic growth in Sub-Saharan African countries varies by country, future growth can be anticipated in a number of these countries if individual potentials can be brought into play. The level of transport infrastructure development in the Sub-Saharan African region is low, contributing to high transport costs. The delay in improvements in transport infrastructure and inefficient customs clearance are impediments to productivity improvement of enterprises in Sub-Saharan African countries (see Figure ES-1). Business and logistics environments are poor particularly in landlocked countries as well as in low-income countries where infrastructure improvements have been delayed, standing in the way of economic growth.



Source: World Bank, Africa's Infrastructure, 2009

Figure ES-1 Impact of Infrastructure on Factor Productivity of Companies in Sub-Saharan Africa

The trend in trade and transport shows that the volume containerized cargo handled in Sub-Saharan African ports is increasing. This tendency is expected to accelerate in accordance with anticipated economic growth. However, the improvement of container ports has been delayed partly because of physical constraints arising from natural conditions. Furthermore, longer dwell times and higher costs than necessary are incurred at ports due to inefficient cargo handling and customs clearance services, as shown in Table ES-1. Improvement of physical capacity for cargo handling and enhancement of facilities to accommodate large container ships, as well as improvement of management efficiency, are cited as major issues for Sub-Saharan African ports.

Table ES-1 Comparison of Time and Cost Required for Ports and Inland Transport

	Export		Import	
	Time and cost at ports	Time and cost for inland transport	Time and cost at ports	Time and cost for inland transport
East Asia and the Pacific	6.3 days US$232.5	3.4 days US$441.3	6.5 days US$267.3	2.5 days US$462.6
Europe and Central Asia	3.7 days US$260.3	7.9 days US$983.1	3.3 days US$258.4	7.4 days US$1129.3
Latin America and Caribbean	3.6 days US$256.3	3.2 days US$525.2	4.0 days US$316.8	2.7 days US$528.4
Middle East and North Africa	3.1 days US$206.8	4.1 days US$386.2	4.2 days US$240.9	3.5 days US$451.0
South Asia	4.4 days US$256.0	8.3 days US$570.6	4.9 days US$290.4	6.1 days US$681.9
Sub-Saharan Africa	**5.2 days** **US$386.0**	**6.7 days** **US$934.5**	**6.8 days** **US$447.3**	**6.8 days** **US$1187.0**
Organization for Economic Cooperation and Development (OECD)	2.1 days **US$278.6**	2.3 days US$535.8	2.0 days US$286.9	2.3 days US$551.4

Source: World Bank, Doing Business 2010

At the same time, the capacity of land transport infrastructure should be increased for the further development of the region. In particular, there are many inland countries with significant potential for the development of mineral resources in Sub-Saharan Africa. Thus railways, which are better suited for long-distance transport and the transport of bulk cargo such as heavy mineral resources, will be important. The railways constructed during the colonial era were designed to transport inland minerals to ports. However, due to the deterioration of vehicles, rail track, and facilities on many railway lines, operating speeds have decreased and the limited transport capacity has become serious. As a result, the time and cost required to transport goods to inland countries has been increasing, and the use of roads to transport heavy mineral resources has been causing rapid deterioration of pavements.

2. Issues in Improving Infrastructure along the Regional Freight Transport Corridors Focusing on Ports and Railways

2.1 Issues in Improving Port Infrastructure

In Sub-Saharan Africa there are many ports that were developed during the colonial era, most of which have been designed to allow for easy handling of conventional cargo. Accordingly, much of the cargo handled at these ports is general cargo, and the berths are narrow with a transit shed located behind. Conventional cargo handling requires considerable unskilled labor. In contrast, container cargo is handled by automated systems requiring skilled labor and a wide open yard for cargo handling equipment. For this reason many ports have responded to an increase in containerized cargo by adding container terminals, developing container yards after removing old transit sheds, and employing different kinds of cargo handling equipment such as quay cranes for containers. While containerization has been increasing in Sub-Saharan Africa (as it has worldwide), with the exception of ports in South Africa, which have been improved to

international standards, there have been numerous problems and issues at the region's ports, as illustrated in Table ES-2.

Table ES-2 Problems and Measures for Improving Infrastructure at Ports in Sub-Saharan Africa

Issue Area	Problems in Improving Port Infrastructure	Measures in Improving Port Infrastructure
Development Plannning	• A short-sighted development of container terminals has been hastily carried out to cope with the rapid increase of container cargos as well as to meet hasty PPP implementation. As a result, the following risks exist: ✓ Risk for the investment to become inefficient to the regional development because of too many terminals and extraordinary competition among neighboring ports. ✓ Risk preventing a harmonious port development as a whole caused by negligence of other port functions than container handling.	• To program a strategy for port development in view of regional development or in view of Sub-Saharan Africa as a whole with respect to the transport corridors • Master planning of development for major ports
Cargo handling capacity	• Bottlenecks like exceeding dwell time of ships and cargos have been revealed because of limitations of capacities of the existing terminals as follows: ✓ Shortage of both open yard and cargo handling equipment to meet the capacity of waterfrontage (quay wall) preventing a port from functioning as a total system ✓ Shortage of waterfrontage itself (quay wall length and number of berths) to meet the potential demands ✓ Lack of deep navigation channel, anchorage and quay wall to meet the trend of increased ship size • Probable shortage of port capacity in the near future because of lack of planning of facility development such as the construction of sufficiently deep and long quay walls to meet the increasing demand	• Rehabilitation of existing terminals such as the expansion of the open yard, reinforcement of cargo handling equipment, improvement of operation of terminals (change of yard layout and introduction of digitalization) and traffic control in port premises • Provision of a connection system including a dedicated access road for integrated operation between ICD's and port premises • Deepening of navigation channel, anchorage and quay wall • Planning of facility development in several phases • Development of a new container terminal based on the above mentioned planning

Issue Area	Problems in Improving Port Infrastructure	Measures in Improving Port Infrastructure
Service Level (lead time, cost)	• Seamless transportation required by clients (consignees) cannot be materialized because of the lengthy lead time at ports for the reasons below: ✓ Bottlenecks in transportation because of capacity shortage (as mentioned above) ✓ Poor connection with land transport particularly with railway transport, and traffic jam and congestion due to the shortage of access road capacity ✓ Complicated and poorly coordinated procedures for customs clearance, ship entrance and cargo discharge, etc • Increase of costs such as unreasonable dues or charges incurred by complicated clearance of custom, ship entrance and cargo discharge, etc. and highly-set-out dues and charges because of lack of competition	• Rehabilitation of existing terminals (as mentioned above) • Expansion of the open yard for better connection with the railway and other access, improvement of terminal operation, development of ICD (plus reinforcement of transport capacity of railway) • Improvement and/or development of access roads and terminal gates • Digitalization of customs clearance, ship entrance and cargo discharge, etc, and by integrating them all, development of Single Window • Introduction of appropriate PPP by securing competitiveness
PPP/Privatization	• Inefficient and inflexible terminal operation practiced at service ports results in degradation of service level with respect to time and cost and consequently results in financial deficit. • The public sector is prone to conclude unilateral concession contracts favorable to the private sector. Such concession contracts may have the risks below: ✓ Risk for the public sector to be unable to monitor the service level and productivity of the terminals under concession in an appropriate manner, as their operation may be black-boxed and isolated from the total port operation, and unable to seek public fairness and welfare, particularly in the case where no competition among operators is materialized. ✓ Risk to prevent a new terminal development at a reasonable timing • Risk to raise labor disputes accompanying reduction of labor cost	• Appropriate introduction of PPP by securing competitiveness among operators • Appropriate review and change of framework and conditions of concession contract at contract renewal and other occasions

2.2 Issues in Improving Railway Infrastructure

Railways in Sub-Saharan Africa, which are operated in 32 countries, remain relatively unchanged from the colonial period. They are used to export inland mineral and agricultural resources to coastal ports, and to import petroleum products, fertilizer, and household goods into inland areas.

Decades after independence much of the region's railway infrastructure including track and rolling stock in Sub-Saharan Africa have become increasingly deteriorated leading to reduced operating speeds (exceptions include railways in South Africa and railways dedicated to minerals transport, e.g., in Mauritania, Guinea, and Liberia). There are also safety issues due to insufficient maintenance of railway facilities. Transport densities are low. Except for a few cases, these railways are not only single-track/non-electric, but also their operating speeds are low. Furthermore, there are many cases in which railways fall into a "vicious circle", where facility maintenance becomes difficult due to decreased profitability, which leads to a shortage of rolling stock, and decreased traffic due to severe competition with road transport. While there have been many PPP railway projects in Sub-Saharan Africa, many of these projects have been unable to receive development partner support for the rehabilitation of railway facilities due to the form of the concession framework. Accordingly, many railways in Sub-Saharan Africa are in stagnant operational conditions.

Problems and measures for efficient operation of Sub-Saharan railways are set out in Table ES-3.

Table ES-3 Problems and Measures for Improving Railway Infrastructure in Sub-Saharan Africa

Issue Area	Issues in Railway Infrastructure	Measures to Improvement
Safety and Stability	• It is impossible for many railways to secure safety and punctuality, which are the foundation of transport services, because of frequent derailment incidents and delayed train operations due to deteriorated facilities and rolling stock, insufficient signaling and operating system, etc., thus the trust of customers has decreased. • Consequently, these railways can not function as an attractive transport mode for the customers (shippers), falling into a "vicious circle" of decreased transport volume, no safety and no punctuality.	• Comprehensive/integrated verification and analysis of the causes of accidents in the fields including tracks, rolling stock, signaling system, telecommunication system and operating system. • Comprehensive/integrated planning and implementation of counter measures against above mentioned causes of accidents.
Transport capacity (ability)	• Transport capacity is not sufficient to accommodate the demand, resulting in a cargo queue for railway transport at the Port. There is a transport bottleneck due to the low frequency of train operation due to causes mentioned below. ➢ Restricted train speed due to weakness of track such as deteriorated rail, light weight rail, deteriorated sleepers, etc. ➢ Shortage of rolling stock (locomotives and wagons)	• Rehabilitation/improvement of track and roadbed, and improvement of capacity for maintenance. • Procurement of new and well-maintained used rolling stock. • Adequate rolling stock maintenance with procurement of spare parts, improvement of rolling stock maintenance abilities, modernization of rolling stock workshop, etc. (improvement

Issue Area	Issues in Railway Infrastructure	Measures to Improvement
	➢ Shortage of active rolling stock due to insufficient capacity to maintain rolling stock ➢ Restricted train speed due to no signaling system, out-of-order signaling system and out-of-date signaling system.	of rolling stock operating rate). • Improvement/renewal of signaling system, and adequate maintenance. • Adequate train operation schedule and system.
Service level (train traveling time, frequency, punctuality)	• Decrease in service level such as train traveling time, frequency, and punctuality,, resulting in the loss of ascendancy over road transport system, as mentioned below. ➢ Increase of train traveling time due to restricted train speed, and increase of cargo dwell time at terminals due to low frequency of train operation. ➢ It is impossible to secure punctuality, which is the foundation of transport service, due to insufficient transport capacity and frequent accidents. ➢ It is impossible to secure the adequate train diagram and frequency, which can not accommodate the potential demand due to insufficient transport capacity.	• Adequate maintenance of railway facilities such as track, roadbed, signaling system, etc., adequate maintenance of rolling stock and train operation schedule and system. (as mentioned above) • Procurement of new and well-maintained used rolling stock, and improvement of rolling stock operating rate (as mentioned above)
PPP and Privatization	• There is a risk that a railway, which has accumulated much deficit due to low performance and rigorous railway operation under government management with assistance payment, will pause or abolish its operation due to the decrease of demand because it can not maintain its sufficient service level. • On the other hand, there is a risk that a railway, in which a PPP is already introduced, will pause or abolish its railway operation due to the withdrawal of concessionaire from railway operation because of the following reasons: (i) there are problems such as unclear responsibilities between the government and concessionaire, etc.; (ii) the railway facilities such as track, etc. are deteriorated due to poor maintenance; (iii) the railway can not maintain its sufficient service level, and (iv) demand has decreased.	• Introduction of a sound and adequate PPP. • Improvement of the existing concession framework and contract conditions. (definition of the responsibility and risk between government and concessionaire, e.g., vertically separated concession) • Cooperation with port concession

Issue Area	Issues in Railway Infrastructure	Measures to Improvement
Education of staff	• Insufficient maintenance skills of staff in the fields for track and rolling stock. • Insufficient knowledge, experience and ability of staff, including governments, railway authorities and concessionaires, in the fields of railway system operation and administration, PPP and Privatization of railway,	• Education/training of staff by short-/long-term professionals in the fields of track and rolling stock. • Education/training of staff by short-/long-term professionals in the fields of railway system operation and administration. • Education/training abroad of staff with training courses.

2.3 Legal System Issues Related to Port/Railway PPP Projects

The development of "healthy" PPPs for port and railway projects in Sub-Saharan Africa is an important element for improving regional freight transport corridors. Legal system issues related to the implementation of PPP projects are summarized below.

(1) Improvements in Legal Systems at the National Level

There is a well-recognized demand for cooperation with the public sector in the implementation of PPP projects at the national level in terms of financial, technical, and human resource aspects. However, sufficient improvements have not been made in national policymaking in the legal systems governing each subsector, specifically in relation to project implementation and the formation of independent auditing organizations. However, compared with other Sub-Saharan African countries, Senegal has shown remarkable progress, already enacting BOT laws and establishing auditing organizations.

While there have been only minimal improvements in the legal systems in most countries in the region, each country has implemented PPPs for port and railway projects responding to the situation by revising its existing laws and enacting laws to establish public corporations. While a number of PPP projects have already been implemented, substantial changes in national policies such as improving specific PPP laws, creating agencies to deal solely with PPP projects, and setting up independent auditing organizations, will become increasingly important considering the limitations of existing laws (e.g., regarding monitoring procedures and compliance). Ghana has recently requested assistance from the World Bank for implementing such measures and it is envisaged that other countries will request similar assistance.

(2) Improvements in Legal Systems Related to PPP Projects

There are a number of ongoing PPP port projects in various countries in the region, most involving concessions of container terminal operations. In order to promote such concessions, it is necessary to revise public company laws, improve specific legal provisions, and create a system that allows for independent organizations to monitor how PPP projects are implemented.

Generally, in the railway subsector, there are higher risks for the private sector in dealing with existing concession train lines such as those of Transrail and Sitarail. It is necessary to improve legal systems allowing concessions to be revised to enable easy investment by the private sector, including improvement of specific legal provisions (which are linked to legal systems at the national level) and creation of a system that allows independent organizations to monitor how PPP projects are implemented. Furthermore, countries such as Ghana, where public companies have been newly established, should improve their laws as a foundation for ensuring sustainable PPP projects by reflecting the results and lessons of other PPP railway projects in the region such as those of Transrail and Sitarail.

(3) Role of Local Communities in Improving Legal Systems

As there are multiple interests of various countries involved in the implementation of PPP projects in the port/railway subsectors, coordinators play a significant role. ECOWAS has sought to fulfill this role by setting up special units and encouraging PPP project planning by private investors. Also, UEMOA has also been sponsoring meetings and conducting research on the requirements of the private sector. Both are expecting support from international organizations to strengthen/continue their activities because their funds, technology, and human resources are limited.

2.4 Trade Facilitation Issues

The major bottlenecks resulting in increased transport time and costs along regional freight corridors in Sub-Saharan Africa relate to both "hard" port and railway infrastructure as well as complementary "soft" infrastructure (e.g., policies and regulations). In particular, the introduction of single windows and GPS cargo tracking systems, and improvements in freight transport terminals (dry ports), are important in order to remove the bottlenecks. The following issues were examined in this study.

(1) Single Windows

Cumbersome port paperwork prolongs port dwell time and is an important factor causing delays in cargo transport. Currently, since there are multiple organizations involved in addition to customs and port administrations, it is critical for each country to improve network platforms by moving toward a "single window" that can transmit the information to related organizations automatically and on time, using information communication technologies (ICT). In implementing single windows, standardized information and unified contacts should be employed by related organizations, not only when dealing with port paperwork-related information, but also when dealing with all information required at ports, land borders, dry ports, and airports. Some Sub-Saharan African countries have already implemented single windows (e.g., Ghana, Mauritius), but some of these systems still require improvements.

(2) Improvements in Tracking Systems

In order to reduce/eliminate the numerous checkpoints and the requirement for escort services, which are major barriers to efficient regional road freight transport, customs administrations should employ GPS tracking systems to manage import/export cargo. Also, it is advisable that, as most of the cargo is transit cargo transported to inland countries from ports, that such systems be managed based on the ports of origin. Moreover, it will become possible to manage information on the location of transit cargo and trade-related information in real time by making efficient use of both the single window and GPS.

(3) Improvements in Inland Container Depot (ICD)

In order to reduce the congestion problem at ports caused by the shortage of land, freight terminals should be developed around ports, included bonded functions so that they can be used as Inland Container Depot (ICD), which will facilitate the transshipment of cargo between railways and ports. However, many freight terminals do not have such bonded functions. Moreover, at many freight terminals such as port terminals, inspection of transshipment cargo inspection and customs clearance takes considerable time due to a lack of cargo handling equipment (e.g., forklifts). Thus, improvements in equipment and facilities are required simultaneously with "soft" improvements

3. Directions for Port and Railway Infrastructure Improvement

3.1 Role of the Regional Freight Transport Corridors and High-Priority Improvement Measures

Considering the various issues related to infrastructure improvements along regional freight transport corridors in Sub-Saharan Africa, current status and issues have been assessed with a focus on railways and ports, and enhanced trade through infrastructure improvements. Various measures will be assessed and prioritized according to freight characteristics in order to improve transport modes and facilitate trade along the regional freight corridors. The assessment will also cover supply distribution along each corridor and the relationship to regional industries, the potential for industrial development, and consumption characteristics in the region's economic centers (e.g., large cities). This study considered trade in terms of intra-regional and inter-regional trade, for which priority transport modes and trade facilitation measures were proposed.

The definitions of intra-regional and inter-regional trade in this study were follows:

Intra-regional trade: Import(s)/export(s) between two countries in Sub-Saharan Africa, including trade between neighboring countries (not including the transit country), or trade between two countries across one or two transit countries. This trade is classified as "intra-regional import" or "intra-regional export". Normally, this trade is not through ports but **by inland transport only**.

Inter-regional trade: Import(s)/export(s) between a country in Sub-Saharan Africa and a country in another region, or trade between two countries in Sub-Saharan Africa across three or more transit countries. This trade is also classified "inter-regional import" or "inter-regional export". Normally, this trade is not by inland transport but **through (sea)ports or airports**.
Specific measures proposed for each type of trade are illustrated in Table ES-4.

Table ES-4 Transport Improvement and Trade Facilitation Measures by Trade Type

Trade Type	Cargo (Distance and Conditions of Land Transport)	Priority Transport Mode	Measures for Trade Facilitation
Intra-Regional Trade	Most types of cargo	• Road	• Integration of transport laws and regulations within the region • Introduction of third-party motor liability insurance within the region • Development of one-stop border posts • Integration of customs software (multi-language) within the region • Increase in customs-exempt commodities
	Heavy bulk (areas of production and consumption are located along railway lines)	• Rail	

Trade Type	Cargo (Distance and Conditions of Land Transport)	Priority Transport Mode	Measures for Trade Facilitation
Inter-Regional Trade	Mineral resources (e.g., copper, tin, manganese, stone, coal), timber, cement, etc.	• Rail • Port	• Introduction of single window • Development of dry port • Introduction of global positioning systems (GPS) • Implementation of a common customs bond within the region
	Agricultural products (cocoa, coffee, cotton, grain), fertilizer, container, machinery, fuel (oil, gasoline) (over 400-500 km)	• Rail • Port	
	Agriculture products (cocoa, coffee, cotton, grain), fertilizer, container, machinery, fuel (oil, gasoline) (Under 400～500 km)	• Road • Port	
	Perishable food products (e.g., fruit)	• Road • Port	

3.2 Menu of Port Infrastructure Improvement Assistance

Based on the issues in improving ports as stated previously, a menu of port infrastructure improvement assistance was proposed as shown in Table ES-5.

Table ES-5 Menu of Port Infrastructure Improvement Assistance

Assistance Measures	Description of Assistance	Type of Assistance
Assistance in the study of regional strategy and master plan related to port development	• Study on port development strategy for efficient investment to port development in view of regional corridor developments • Study on master planning for efficient and effective facilities layout and programmed facility development, and consequently the selection of priority projects	Technical cooperation and assistance
Rehabilitation of existing facilities to handle container cargos	• Assistance for the expansion of existing yards, reinforcement of cargo handling equipment and improvement of a terminal operation system to improve current container handling operation • Improvement of railway connection accompanied with the assistance above • Alteration of conventional berth to container terminal (rehabilitation of quay wall and open yard) and deepening of navigation channel, anchorage and quay wall to meet call of larger ships • Improvement of existing access road or development of new access road • Surveys required to implement each item of assistance mentioned above (development planning and feasibility study) • Technical assistance for the introduction of appropriate PPP when required	Financial cooperation, technical cooperation and assistance

Assistance Measures	Description of Assistance	Type of Assistance
Assistance for development of Inland Container Depot (ICD)	• Development of ICD including access (road) and operation system for smooth connection between ICD and terminal • Improvement of railway accompanied with the assistance above • Surveys required to implement each item of assistance mentioned above (development planning and feasibility study) • Technical assistance for the introduction of appropriate PPP when required	Financial cooperation, technical cooperation and assistance
Assistance for development of a new container terminal	• Development of a new container terminal to meet future demand • Surveys required to implement assistance above (study on facilities development, phased development and feasibility) and technical assistance for the introduction of appropriate PPP	Financial cooperation, investment and finance, technical cooperation and assistance
Assistance for digitization and system building of Single Window of customs clearance and port-related procedures	• Establishment of organization to operate and promote digitization of customs clearance and port-related procedures and integration into a Single Window system • Equipment procurement and system build-up	Technical cooperation and assistance, financial cooperation
Introduction of appropriate PPP and assistance for institutional reform	• Study or review of PPP framework accompanied by detailed demand forecast and financial and risk analyses, study on bidding requirements and contract conditions, preparation of bidding and contract documents, assistance for establishment of organization to supervise concessionaires (operators)	Technical cooperation and assistance
Capacity building to improve management and operation capabilities	• Assistance for capacity building to improve and integrate capabilities for administration, management and operation including planning capacity and PPP promotion capability (for the transformation to an appropriate landlord port)	Technical cooperation and assistance

In addition, ports in Sub-Saharan Africa were categorized according to process presented in Figure ES-2 and priority assistance measures by category were proposed as shown in Table ES-6.

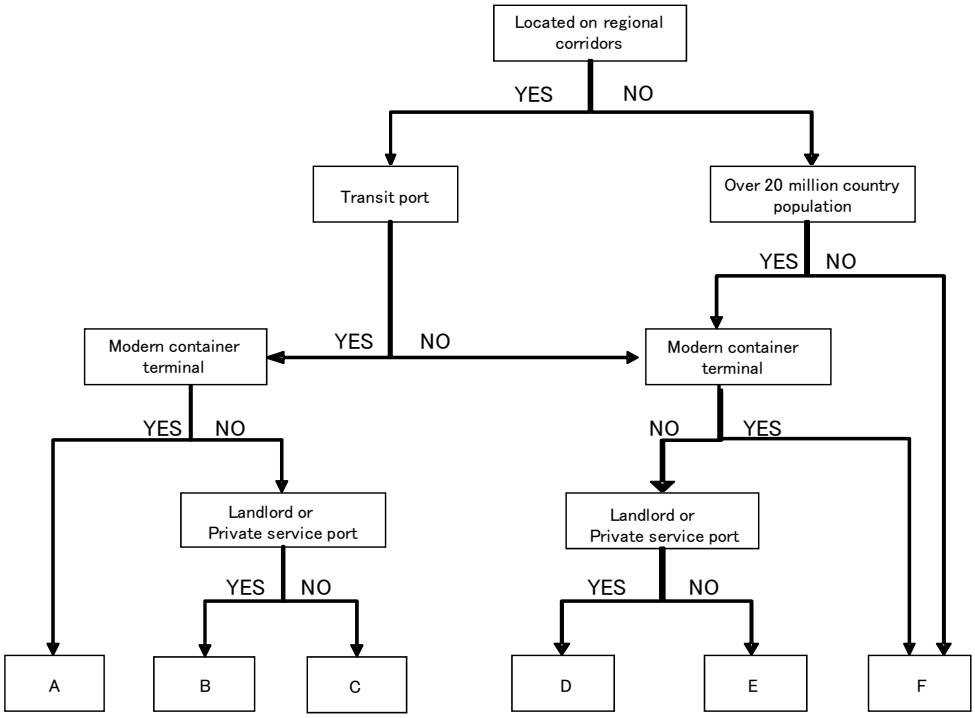


Figure ES-2 Port Grouping Flow Chart

Table ES-6 Assistance Measures by Port Type in Sub-Saharan Africa

Type	Feature	Assistance Measures	Ports
A	Transit ports that are located on a regional corridor with a modern container terminal	(i) improving efficiency of customs procedures, (ii) construction of an inland depot, and (iii) urgent facility improvement (expansion)	Djibouti, Mombasa, Dar es Salaam, Durban*
B	Transit ports that are located on a regional corridor and have a conventional container terminal of the landlord type	(i) implementation of a master plan and subsequent feasibility studies, (ii) urgent improvements and rehabilitation, and (iii) improving the efficiency of customs procedures	Maputo, Beira, Nacala, Cotonou, Lome, Tema, Abidjan, Dakar, (Conakry)[1]
C	Transit ports that are located on a regional corridor and have a conventional government-operated container terminal	(i) implementation of a master plan and subsequent feasibility studies, (ii) urgent improvement and rehabilitation, and (iii) facilitation of the introduction of a PPP	Walvis Bay, Douala, Takoradi
D	Ports for domestic demand that have a conventional container terminal of the landlord type, not located on a regional corridor, but with high demand expected	(i) improving the efficiency of customs procedures, (ii) construction of an inland depot, and (iii) construction of a new container terminal (investment/loan)	Mtwara, Tanga, Toamasina, Luanda, Pointe Noire, Apapa, Onne, Port Harcourt, Calabar, Warri, San Pedro, Conakry

[1] The Port of Conakry was classified in Group B, as it is increasing its role as a transit port.

Type	Feature	Assistance Measures	Ports
E	Ports with domestic demand that have a conventional government-operated container terminal, not located on a regional corridor, but with high demand expected	(i) Rehabilitation, (ii), and (iii) introduction of cargo handling equipment	Lobito, Matadi, Boma, Nouadhibou, East London*, Richards Bay*
F	Ports with low priority for development assistance	Low priority for assistance because these ports are not located along a regional corridor and they are in countries with small populations	Luderitz, Port Sudan, Assab, Freetown, Banjul, Cape Town*, Port Elizabeth*

3.3 Menu of Railway Infrastructure Improvement Assistance

A menu of railway infrastructure improvement assistance is proposed as Table ES-7.

Table ES-7 Menu of Railway Infrastructure Improvement Assistance

Assistance Measures	Description of Assistance	Type of Assistance
Rehabilitation of the deteriorated facilities	• Comprehensive counter measures against accidents based on the verification and analysis of the causes • Rehabilitation of the track, roadbed, bridges, etc., which are the foundation for safe and stable railway operation	Technical Cooperation Grant Aid ODA Loan
Addressing the Shortage of Rolling Stock	• Procurement of new and well-maintained used rolling stock • Repair of rolling stock that has broken down and is out of operation	Technical Cooperation Grant Aid ODA Loan
Modernization of Rolling Stock Workshops	• Modernization, renewal, and improvement of the rolling stock workshop for the inspection and maintenance of rolling stock to perform efficient rolling stock maintenance	Technical Cooperation Grant Aid ODA Loan
Track Upgrading/ Strengthening	• Upgrading/Strengthening of the tracks (a fundamental railway facility) by installing heavier rail, additional sleepers, and pre-stressed concrete sleepers, as well as by increasing ballast thickness	Technical Cooperation Grant Aid ODA Loan
Improvement of the Signaling System	• Improvement of train operational safety and efficiency by modernization, repair, and reintroduction of a signaling system	Technical Cooperation Grant Aid ODA Loan
Improvement of Container Transport	• Procurement of trains dedicated to containers • Improvement and construction of container stations/depots and container dedicated sidings • Preparedness for and procurement of container loading/unloading equipment	Technical Cooperation Grant Aid ODA Loan
Staff Training	• Education and training of staff by short and long term professionals dispatched by JICA • Education and training of staff with JICA training courses • Education and training of staff at a railway college established by JICA grant aid	Technical Cooperation Grant Aid

Assistance Measures	Description of Assistance	Type of Assistance
Improvement of Concession Frameworks	• Improvement of concession framework (a vertical separation type concession is preferred) • Definition of areas of government responsibility (e.g., rehabilitation/ improvement of the railway infrastructure, compensation for passenger train service) • Cooperation with port concession	Technical Cooperation Grant Aid

Also, railways in Sub-Saharan Africa were categorized as shown in Figure ES-3 and priority assistance measures by category were proposed as presented in Table ES-8.

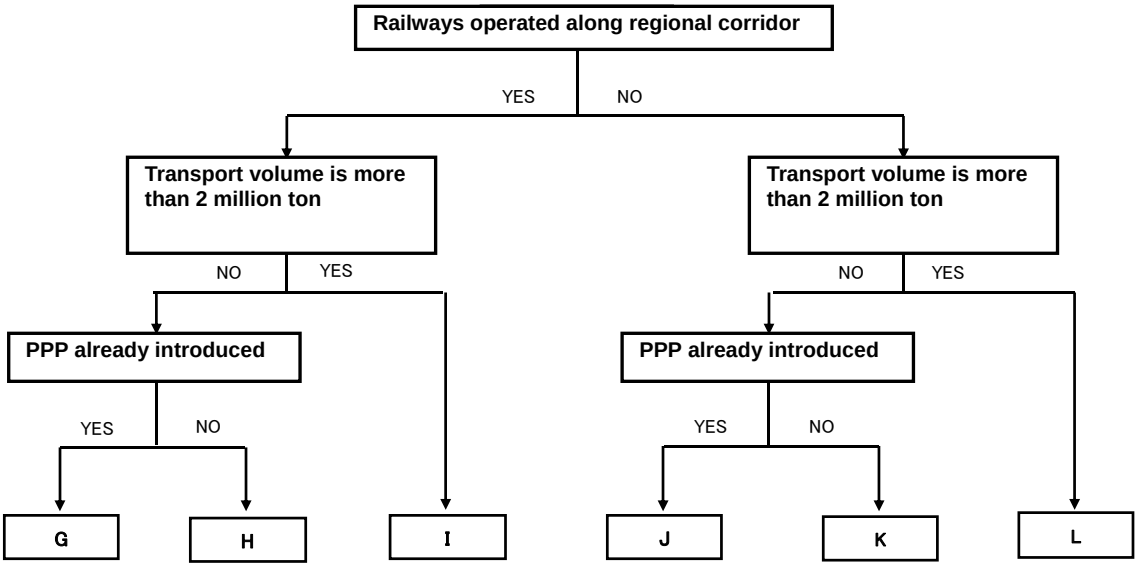


Figure ES-3 Railway Grouping Flow Chart

Table ES-8 Assistance Measures by Type of Railway in Sub-Saharan Africa

Type	Feature	Assistance Measures	Railways
G	Railway operated along a regional corridor, covering two or more countries, with a traffic volume of 2 million tons or less and a PPP already introduced	(i) moving in the direction of a vertically separated concession framework if necessary, (ii) rehabilitating aging/ deteriorated railway facilities, (iii) addressing the rolling stock shortage, and and (iv) improving container transport (depending on the level of demand)	Rift Valley Railways, Tanzania Railways Ltd, Railway Systems of Zambia Ltd, Central East African Railways Company, CDN (Corredor de Desenvolvimento do Norte), Transrail SA, Sitarail, Beitbridge–Bulawayo Railway Ltd (BOT) and Beira Railway Company
H	Railway operated along a regional corridor with a traffic volume of 2 million tons or less and a PPP not introduced	(i) introduction of concession and (ii) proceeding with maintenance/rehabilitation of aging/deteriorated facilities on the premise of receiving development partner assistance	Ethio-Djibouti Railway Company, Tanzania–Zambia Railway Authority, Mozambique Ports & Railways, SNCC in Democratic Republic of Congo, Botsuwana Railways and TransNamib Holdings Ltd, CFB in Angola (Benguela Railway)
I	Railway operated along a regional corridor with a traffic volume of more than 2 million tons	Since the high traffic volume enables a self-supporting accounting system, allow priority for assistance.	National Railways of Zimbabwe, PRASA, TFR, Swaziland Railway and GRRL (BOT) in South Africa and Swaziland
J	Railway operated within only one country with a traffic volume of 2 million tons or less and a PPP already introduced	(i) moving in the direction of a vertically separated concession framework if necessary, (ii) rehabilitating aging/ deteriorated railway facilities, (iii) addressing the rolling stock shortage and (iv) improving container transport (depending on the level of demand)	Madarail SA, Togo Rail SA, Camrail
K	Railway operated within only one country with a traffic volume of 2 million tons or less and a PPP not introduced	(i) introduction of concession and (ii) proceeding with maintenance/rehabilitation of aging/deteriorated facilities on the premise of receiving development partner assistance	ONATRA in Democratic Republic of Congo, CFCO (Chemin de Fer Congo–Ocean), Nigerian Railways Corporation, OCBN in Benin, Sudan Railways Corporation, PTB, Eritrean Railways, CFM, CFL and Ambion Railway in Angola, Ghana Railway Company Ltd
L	Railway operated within only one country with a traffic volume of more than 2 million tons	Since the high traffic volume enables a self-supporting accounting system, a low priority for assistance.	Transgabon Railway

3.4 Development Partner Assistance for PPP Projects

This study summarized how development partners can provide technical and financial assistance for the process of PPP projects. More specifically, matters to be considered and determined at each phase of port and railway PPP projects (preparation, project planning, implementation, and follow-up), as well as the assumption of key roles by government and private sector organizations, are presented. In addition, measures for development partner assistance are summarized below and in Figure ES-4 at the end of the section.

Technical Assistance

Possible technical assistance includes assistance related to: (i) policies regarding the promotion of PPP projects and related institutional design at the sector level; (ii) project planning of the PPP process of individual projects; (iii) the implementation of PPP projects; and (iv) the feedback from the implementation of PPP projects.

Examples to be considered include assistance for: (i) developing PPP legislation (e.g., by dispatching specialists); (ii) establishing a dedicated PPP unit and independent auditing organization for PPP; and (iii) developing sector reform plans and individual PPP project plans (e.g., advice regarding contractual coverage).

As a specific example, an independent auditing organization in Senegal (Conseil des Infrastructures) was established with assistance from the World Bank. To strengthen the capacity of this organization, USAID dispatched a specialist to prepare a database organizing relevant laws. In addition, IFC is providing advisory assistance for the development of the PPP port project plan for Cotonou Port (Benin). The World Bank is dispatching specialists to the Ministry of Finance of Ghana to assist with the establishment of a dedicated PPP. The Government of Ghana is now requesting the World Bank for technical assistance for railway reform. Also, the World Bank and AfDB are assisting the establishment of dedicated units in ECOWAS and UEMOA to perform PPP project planning. The EU and the Government of Spain are contributing to the initial capital.

In view of the foregoing, technical assistance must focus on countries (regions) and (sub) sectors that have a limited track record of actual performance of PPP projects, as well as PPP projects in countries in which significant problems arose during previous PPP implementation. It would be productive to investigate areas that have not been not sufficiently addressed by national resources and/or assistance from other development partners, and then provide advisory assistance.

Regarding ports, concessions involving the conversion of container terminals to land ports have been promoted in Sub-Saharan Africa. To expand private participation, advisory assistance to attract private investment, assistance regarding the planning of concession contracts attractive to the private sector, establishment of independent auditing organizations, and the development of relevant laws/regulations are required. Connections with surface transport modes (roads and railways) as well as facilitated customs procedures are also required.

Regarding railways, there are many cases in which government and private expectations of the PPP process have differed. Rights have been transferred to private firms with the infrastructure not rehabilitated, and accordingly traffic volume and revenues could not be secured as planned, resulting in poor profitability and nonpayment of concession fees.

In view of the foregoing, it is envisaged that assistance in the following fields will be effective:

1. Review and assessment of the current concession (e.g., clarifying the division of responsibility and risks between government and private sector, stipulating required contract provisions, developing a modified contract proposal);
2. Assistance regarding the establishment of an independent auditing organization and related legislation;
3. Advice on matters such as the establishment of a special fund;
4. Recommendation of incentive measures to promote the participation of private companies; and
5. Strengthening of the capacity of concerned government organizations related to the PPP process in the transport sector in general (keeping in mind private sector requirements regarding the connection with ports and competition with road transport).

Financial Assistance

It is possible to provide financial assistance (both grant and loan assistance) for infrastructure improvement, preparation of concessions, and capacity development. In PPP projects, the improvement of infrastructure (especially railways) tends to place exaggerated hopes on investment from the private sector. However, development partners can usefully provide financial assistance for infrastructure improvements that should be borne by the public sector, based on practical plans (e.g., considering required rehabilitation expenses, an earnings forecast based on a realistic demand forecast).

To date, port improvement assistance has included assistance for the expansion of facilities by direct financing from AfDB to the concessionaire, and port facility improvement using funds from various development partners. Looking forward, mainly loan assistance for the improvement and expansion of high-priority port facilities may be possible.

Regarding railway improvement, there are many cases in which the aging of existing facilities has progressed to the point that large sums are now required for rehabilitation. Railway concessionaires in Sub-Saharan Africa gain almost no profit from railway operation due to the insufficient railway facilities and limited traffic volumes. Therefore, under the present circumstances, it is difficult to apply investment from the private sector toward rehabilitation. Financial assistance, equipment provision, and the improvement of infrastructure based on railway project plans will be required. Due to the limited funds available for railway improvement in Sub-Saharan Africa from a single development partner, assistance to railways involving joint financing among development partners must also be examined. Because there are multiple recipient countries in many cases, preliminary project plans must be prepared in detail, and with cooperation among development partners and the countries concerned.

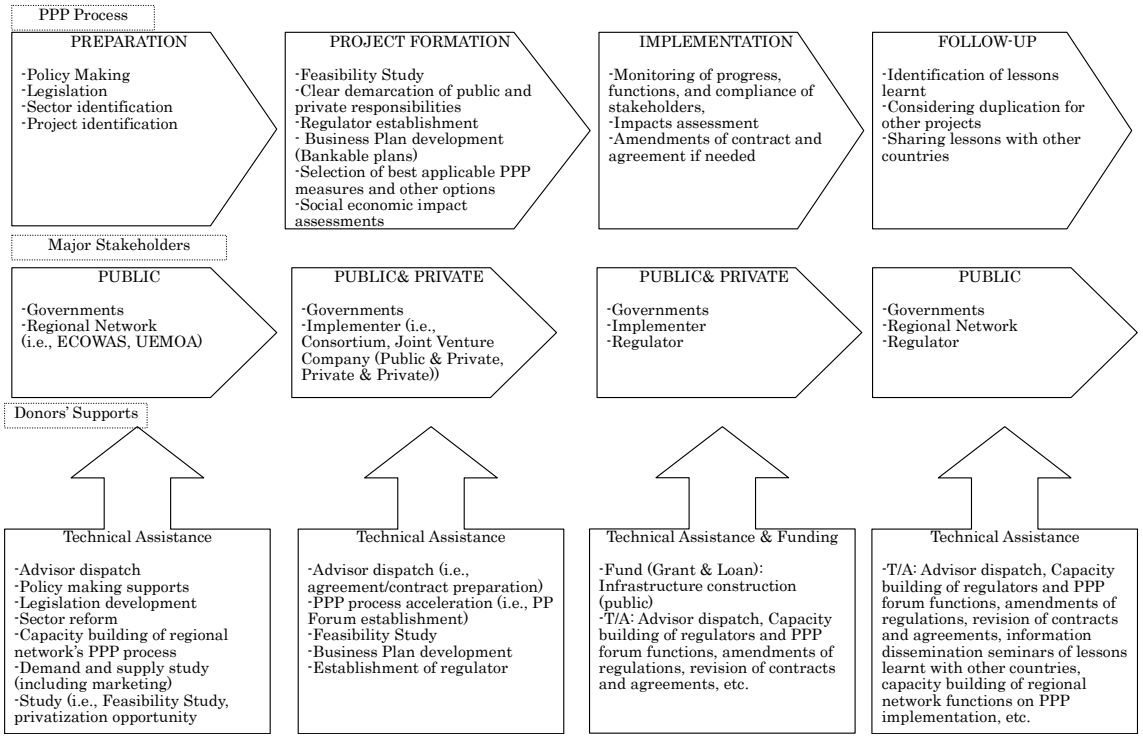


Figure ES-4 Development Partner Assistance Measures for the PPP Infrastructure Project Process

3.5 Directions of Assistance in Facilitating Trade Related to Port and Railway Infrastructure Improvements

The main issue addressed in this study has been proposed improvement policies for ports and railways in Sub-Saharan Africa. Many of the problems and issues especially in the port sector have been due to insufficient improvement of soft infrastructure related to institutions and implementation systems. The establishment of single windows, cargo tracking systems, and dry ports are considered priority measures for assistance for trade facilitation related to port and railway infrastructure. These trade facilitation measures are summarized below.

Assistance in the Establishment of Single Windows

A single window is a system that consolidates windows for the procedures of customs, port authorities, immigration offices, and other authorities, and helps reduce the time required for the handling of import and export cargo information, at borders, airports, dry ports, and (sea)ports. In the establishment of single windows, the windows for import and export cargo information are to be consolidated per country. Considering that trade procedures in Sub-Saharan Africa are cumbersome and a primary bottleneck of trade, single windows should be introduced in all countries in the region over the long term. However, port-related procedures are especially lengthy and therefore priority should be given to assistance to coastal countries in the short and medium term. It is assumed that the improvement of hard infrastructure, including the equipment and facilities required for customs cargo inspection, will be undertaken in parallel.

Assistance in Establishment of Cargo Tracking Systems

The establishment of a GPS cargo tracking system from the port to the final customs point in a landlocked country can effectively address the delays and high costs of customs escorts and checkpoints. Because the management of the transit cargo that travels between ports and

landlocked countries is the primary objective of a GPS cargo tracking system, the establishment of such a system in a corridor with the port as a starting point, and the management of cargo location information by the customs authority, is proposed. In addition, it is recommended that cargo location information and information regarding the details of the cargo be managed simultaneously, by using the system in addition to the single window. Note that it is important to eliminate customs escorts and checkpoints in parallel with the establishment of a GPS cargo tracking system.

Assistance in Establishment of Dry Ports

The establishment of dry ports near seaports will address the shortage of yard space in the seaports, as well as at connecting points between railways and roads in inland areas (landlocked countries). For the establishment of dry ports of both types, site procurement, the development of a bonding function, and improvement of cargo handling equipment and facilities are necessary. In addition, in the case of dry ports near seaports, improved access to the port by establishing access roads and/or railway sidings is required. Although there may be freight terminals at the connecting point between railways and roads, if they do not have a bonding function they cannot function as dry ports. Accordingly, the bonding function is critical.

4. Pilot Assistance Program for Regional Freight Transport Improvements Focusing on Ports and Railways

Based on the proposed assistance measures for freight corridor improvements focusing on ports and railways, specific assistance program models were studied, taking corridors in West Africa as examples. Such programs do not suppose specific development partners and should be considered as providing general directions for assistance for freight transport corridors in Sub-Saharan Africa.

Considering the impact of transport cost reductions, the interest of countries in the region, cooperation with other development partners, the combination of assistance measures, existing and planned railway networks, and the possibility of realization of the program, the following two corridors were selected for the pilot assistance program.

Pilot corridor 1: Dakar – Bamako Corridor

Pilot corridor 2: Abidjan – Ouagadougou – Niamey Corridor

The pilot assistance improvement program for the Dakar – Bamako Corridor is shown in Table ES-9 and Figure ES-5.

Table ES-9 Pilot Assistance Improvement Program for the Dakar–Bamako Corridor

Code	Project Name	Type of Assistance	Implementing Agency
Regional Development Assistance			
DB-RG-1	Feasibility Study for the Formulation of a General Regional Improvement Project for Facilitation of Export Industries along the Dakar–Bamako Corridor	Technical Cooperation	Ministries concerned (Senegal and Mali)
Port (including Trade Facilitation) Development Projects			
DB-PT-1	Study to Formulate a Dakar Port Master Plan	Technical Cooperation	Port of Dakar
DB-PT-2	Railway Container Terminal Improvement Project (including Railway Terminal(s), Handling Equipment, Peripheral Roads)	Technical Cooperation, Financial Assistance	Port of Dakar, MICATTI, Dakar Municipality
DB-PT-3	Container Terminal Expansion Project	Financial Assistance (investment and loan)	Port of Dakar, DP World
DB-PT-4	Dry Port Improvement Project in Mali	Technical Cooperation, Financial Assistance	MOC, Mali Customs
(Ongoing)	Dry Port Improvement Project in Senegal	Technical Cooperation, Financial Assistance	MICATTI, Senegal Customs
Railway Development Assistance Projects			
DB-RW-1-1	Urgent Track Improvement Project for Transrail in Senegal and Mali	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	MICATTI, MOTF, Transrail
DB-RW-1-2	Urgent Track Improvement Project for Transrail (Dakar–Thies: 70 km) in Senegal	Technical Cooperation, Financial Assistance (Loan/ Grant Aid)	MICATTI, Transrail
DB-RW-1-3	Urgent Track Improvement Project for Transrail (Tambacounda–Kidira: 175 km) in Senegal	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	MICATTI, Transrail
DB-RW-2	Urgent Bridge Rehabilitation Project for Transrail (in the vicinity of Mahina) in Mali	Technical Cooperation	MOTF, Transrail
DB-RW-3-1	Transport Capacity Expansion Project for Transrail (assistance for the procurement of rolling stock) in Senegal and Mali	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	MICATTI, MOTF, Transrail
DB-RW-3-2	Rolling Stock Operating Rate (Availability) Improvement Project for Transrail (assistance for the procurement of rolling stock spare parts) in Senegal and Mali	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	MICATTI, MOTF, Transrail
DB-RW-3-3	Modernization Rolling Stock Workshop for Transrail in Thies, Senegal	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	MICATTI, Transrail

Code	Project Name	Type of Assistance	Implementing Agency
DB-RW-4	Commuter Service Improvement Project for Petit Train de Banlieue (PTB: Dakar–Thies: 70km) in Senegal	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	MICATTI, PTB
DB-RW-5	Signaling and Telecommunication System Modernization Project for Transrail in Senegal and Mali	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	MICATTI, MOTF, Transrail
DB-RW-6	Renewal Project for Deteriorated Transrail Stations in Senegal and Mali	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	MICATTI, MOTF, Transrail
DB-RW-7	Project to Establish a Railway College at Dakar Polytechnic University in Senegal	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	MICATTI, Ministry of Education
Assistance for the Legal System Related to PPP Development			
DB-PP-1	Capacity Strengthening of Conseil des Infrastructures in Senegal	Technical Cooperation	Ministry of Finance, MICATTI
DB-PP-2	Technical Assistance Project for Improvement of the PPP Implementation Organization and Regulatory Framework in Mali	Technical Cooperation	Ministry of Finance, Ministry of Transport and Facilities
(Ongoing)	Review of the Concession Framework for Railway between Senegal and Mali	Technical Cooperation	Ministry of Finance (Senegal and Mali), MICATTI (Senegal), MOTF (Mali)
Other Trade Facilitation Projects			
DB-TF-1	Assistance for the Introduction of a Single Window in Mali	Technical Cooperation	Customs (to set up a taskforce consisting of the government organizations concerned and the private sector)
DB-TF-2	Development of a Tracking System for Transit Cargos	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	Senegal Customs as the implementing agency; a private company as the operator
(Ongoing)	Project for Axle Load Regulation in West Africa	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	UEMOA/Road Authorities in the countries concerned

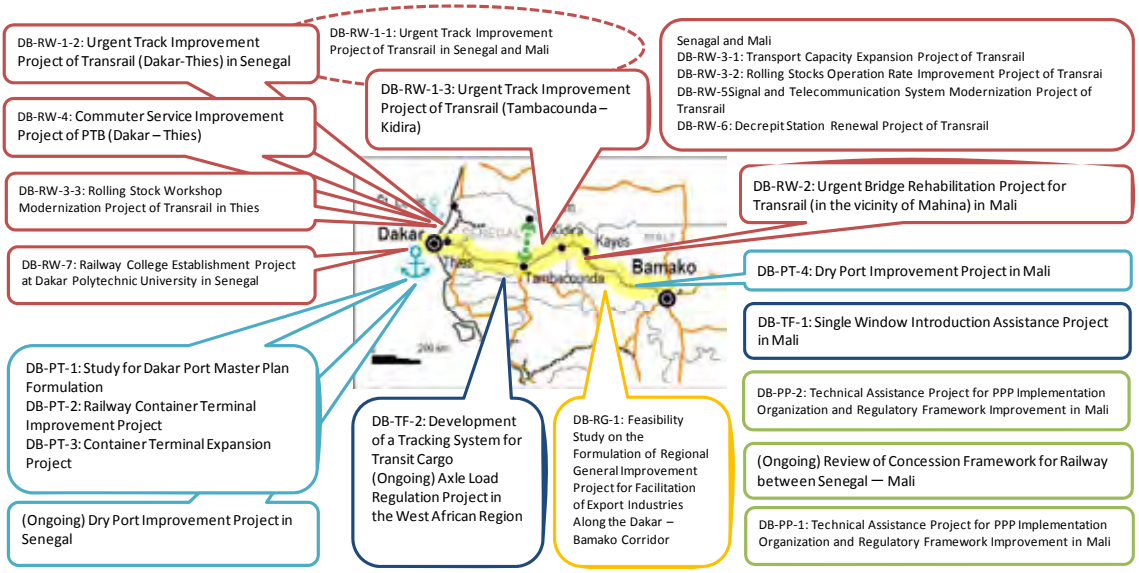


Figure ES-5 Map of Dakar – Bamako Corridor Pilot Assistance Improvement Program

The pilot assistance improvement program for the Abidjan – Ouagadougou – Niamey Corridor is shown in Table ES-10 and Figure ES-6.

Table ES-10 Pilot Assistance Improvement Program for Abidjan – Ouagadougou – Niamey Corridor

Code	Project Name	Type of Assistance	Implementing Agency
Regional Development Project			
AN-RG-1	Development of a General Regional Improvement Project for the Promotion of Export Industries along the Abidjan-Ouagadougou-Niamey Corridor and Related Feasibility Study	Technical Cooperation	Ministries concerned (Côte d'Ivoire, Burkina Faso, Niger)
Port (including Trade Facilitation) Development Projects			
AN-PT-1	Project to Improve the Port of Abidjan Container Terminal	Technical Cooperation, Financial Assistance (Loan)	Port of Abidjan and SIPF as the implementing agencies, a private company as the operator
AN-PT-2	Project to Increase the Depth of Vridi Canal	Technical Cooperation, Financial Assistance (Loan)	Port of Abidjan, General Directorate of Maritime and Port Affairs
Railway Development Projects			
AN-RW-1	Urgent Track Improvement Project for Sitarail (assistance for the procurement of rail) in Côte d'lvoire and Burkina Faso	Financial Assistance (Loan/Grant Aid)	SIPF, SOPAFER-B, Sitarail
AN-RW-2	Transport Capacity Expansion Project for Sitarail (assistance for the procurement of rolling stock) in Côte d'Ivoire and Burkina Faso	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	SIPF, SOPAFER-B, Sitarail

Code	Project Name	Type of Assistance	Implementing Agency
AN-RW-3	Modernization of Rolling Stock Workshop Project for Sitarail in Abidjan, Côte d'lvoire	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	SIPF, Sitarail
AN-RW-4	Signaling and Telecommunication System Modernization Project for Sitarail in Côte d'lvoire and Burkina Faso	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	SIPF, SOPAFER-B, Sitarail
AN-RW-5	Renewal of Deteriorated Stations of Sitarail in Côte d'lvoire and Burkina Faso	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	SIPF, SOPAFER-B, Sitarail
(Ongoing)	Feasibility Study of Railway Construction Project between Ouagadougou and Niamey	Technical Cooperation	
Assistance for the Legal System Related to PPP Development			
AN-PP-1	Technical Cooperation Project for Infrastructure Improvement Implementation Department and Regulatory Framework Improvement in Burkina Faso	Technical Cooperation	Ministry of Finance, Ministry of Transport
Other Trade Facilitation Projects			
AN-TF-1	Project for the Implementation of a Single Window in Côte d'Ivoire	Technical Cooperation	Customs (setting up a taskforce consisting of the government agencies concerned and the private sector)
AN-TF-2	Project to Introduce a Single Window in Burkina Faso	Technical Cooperation	Customs (setting up a taskforce consisting of the government agencies concerned and the private sector)
AN-TF-3	Development of a GPS Tracking System from the Port of Abidjan to Burkina Faso	Technical Cooperation, Financial Assistance	Côte d'Ivoire Customs as the implementing agency, a private company as the operator
(Ongoing)	Axle Load Regulation Project in West Africa	Technical Cooperation, Financial Assistance	UEMOA/Road Authorities in countries concerned

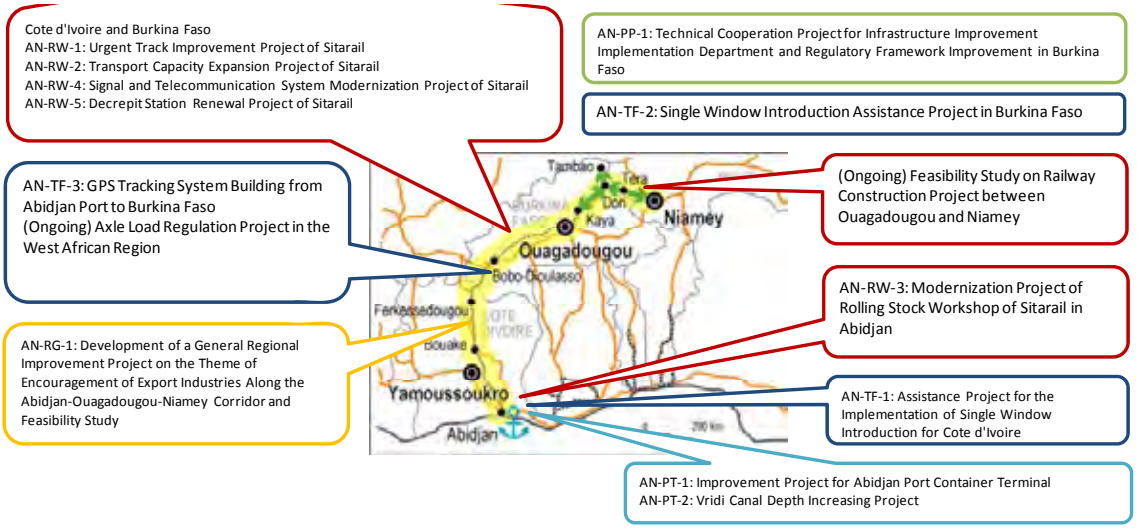


Figure ES-6 Map of Abidjan – Ouagadougou – Niamey Corridor Improvement Pilot Assistance Project

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Abbreviations

AfDB	African Development Bank
AICD	Africa Infrastructure Country Diagnostic
APIX	Agence Nationale Chargée de la Promotion de l'Investissement et des Grands Travaux
APSNet	Abidjan Port Synergy Network
ASYCUDA	Automated System for Customs Data
AU	African Union
BBR	Beitbridge Bulawayo Railway
B/D	Basic Design
BLT	Build, Lease, and Transfer
BOAD	Banque Ouest Africaine de Développement
BOO	Build, Own, and Operate
BOT	Build, Operate, and Transfer
BR	Botswana Railways
BROT	Build, Rehabilitate, Operate, and Transfer
CCFB	Companhia dos Caminhos de Ferro da Beira (Beira Railway Company)
CDN	Corredor de Desenvolvimento do Norte
CEAR	Central East African Railways
CFM	Caminhos de Ferro de Moçambique
COMESA	Common Market for Eastern and Southern African States
D/D	Detailed Design
DFID	UK Department for International Development
EAC	East African Community
EC	European Commission
ECOWAS	Economic Community Of West African States
EDI	Electric Data Interchange
EIB	European Investment Bank
EU	European Union
FDI	Foreign Direct Investment
F/S	Feasibility Study
GCMS	Ghana Customs Management System
GCNet	Ghana Community Network
GDP	Gross Domestic Product
GIS	Geographic Information System
GNI	Gross National Income
GPHA	Ghana Ports and Harbours Authority
GPS	Global Positioning System

GRC	Ghana Railway Company Ltd.
GRDA	Ghana Railway Development Authority
IBRD	International Bank for Reconstruction and Development
ICD	Inland Container Depot
ICT	Information and Communication Technology
IDA	International Development Association
IFC	International Finance Corporation
IFI	International Financial Institution
IMF	International Monetary Fund
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
JV	Joint Venture
KfW	Kreditanstalt für Wiederaufbau
LIC	Low Income Country
LPI	Logistics Performance Index
M&A	Merger and Acquisition
NEPAD	New Partnership for Africa's Development
MEPT	Ministry of Maritime Economy, Fisheries and Maritime Transport
MID	Ministry of Infrastructure Development
MIPS	Serviço Internacional de Portos de Moçambique
MLC	Management and Lease Contranct
MPDC	Maputo Port Development Company
MPS	Meridian Port Service
NLPI	New Limpopo Projects Investments (Pvt) Ltd.
M/P	Master Plan
NPA	National Port Authority
NRZ	National Railways of Zimbabwe
ODA	Official Development Assistance
OMVS	Organisation pour la Mise en Valeur du fleuve Sénégal
OPIC	Overseas Private Investment Corporation
OSBP	One Stop Border Post
PPDU	Project Preparation Development Unit
PPP	Public Private Partnership
PTB	Petit Train de Banlieue
RAHCO	Reli Assets Holding Company
RCTG	Regional Customs Transit Guarantee
RDC	Railroad Development Corporation
REC	Regional Economic Communities

RLT	Rehabilitate, Lease or rent, and Transfer
RMG	Rail-Mounted Gantry Crane
ROT	Rehabilitate, Operate, and Transfer
RSZ	Railway Systems of Zambia
RTG	Rubber-Tyred Gantry Crane
RVR	Rift Valley Railways
SADC	Southern African Development Community
SACU	Southern African Customs Union
SARA	Southern African Railways Association
SDI	Spatial Development Initiative
SDP	Spatial Development Program
SSATP	Sub-Sahara Africa Transport Policy Program
TAH	Trans African Highway
TAZARA	Tanzania Zambia Railway Authority
TEU	Twenty-Foot Equivalent Unit
TICAD	Tokyo International Conference on African Development
TPA	Tanzania Ports Authority
TPT	Transnet Port Terminals
TRC	Tanzania Railways Corporation
TRL	Tanzania Railways Limited
UEMOA	Union économique et monétaire ouest-africaine
UNECE	United Nations Economic Commission for Europe
USAID	United States Agency for International Development
USTDA	United States Trade and Development Agency
WB	World Bank
WCO	World Customs Organization
ZRL	Zambia Railways Limited

Chapter 1 Introduction

1.1 Study Background

Sub-Saharan Africa had an average GDP growth rate of 5.6% between 1999 and 2008, which is much higher than the growth rate in developed counties during the same period. For example, Ethiopia's economy grew by 11.6% in 2008. Accelerated investments in mineral resource development and associated economic activities led the growth. There are abundant identified mineral deposits and these are increasing as there are many unexplored areas in the region.

However, among the poorest 48 countries in the world, 34 are in Sub-Saharan Africa, where the poor condition of regional freight transport infrastructure has led to stagnated economic development. In May 2008, at the Fourth Tokyo International Conference on African Development (TICAD IV), Japan committed in 2012 to doubling its aid to Africa to USD 40 billion within the following five years. In addition, under the TICAD process, Japan has promised to provide funding for regional transport corridors, including assistance for port planning, construction, and improvement through technical assistance, as well as increasing regional knowledge for infrastructure maintenance and management.

Following on these commitments, JICA conducted the following studies to explore future JICA assistance strategies for transport infrastructure development in this region: (i) Study on Desirable Assistance to Transport Infrastructure in Africa (2008); and (ii) Cross-Border Transport Infrastructure Study – Phase 3 (2009). These studies, particularly the latter, showed how low cargo handling capacity and efficiency in ports and inappropriate maintenance of aging railways are major bottlenecks in regional transport corridors.

Based on the above background, this study assessed in greater detail the status of actual port and rail facilities in the region, identified issues in operation/management/maintenance, assessed the potential contribution of port and railway improvement in the regional economy, and finally suggested potential aid projects. In particular, pilot projects for port and rail facilities were considered for the suggestion of model aid programs through field investigations in West African countries where relatively less information has been available.

The overarching objectives of this Study are as follows:

- Assessing of the status of Sub-Saharan African regional freight transport corridors focusing on port and rail and collecting basic data (through field visits in West Africa);
- Recommending strategies to improve regional freight transport corridors focusing on the port and rail sectors in the Sub-Saharan Africa Region;
- Recommending model assistance programs for improvement of regional freight transport corridors focusing on the port and rail sectors in the West Africa Region; and
- Preparing an inventory of projects relating to highways, railways, and ports in the Sub-Saharan Africa Region.

Focus regions for the basic data research, investigation of model assistance programs, and assistance strategies for this study may be defined as follows:

1. Focus region for basic research and data collection: the entire Sub-Saharan Africa region
2. Focus region for investigation of assistance strategy: the entire Sub-Saharan Africa region
3. Focus region for field investigation and model assistance programs: the West Africa region

The focus sectors for basic data research, investigation of model assistance programs, and formulation of assistance strategy are defined as follows:

1. Focus sector for basic research and data collection: Regional transport corridors, including ports, rail, and road links
2. Focus sector for investigation of assistance strategy: Port and rail
3. Focus sector for investigation of model assistance programs: Port and rail

1.2 Perspectives and Flow of This Study

(1) Research with a Regional Perspective and Identify Bottlenecks along the Transport Corridors that have a Strong Correlation with Regional Economic Activities

In undertaking a literature review for the study, analysis was undertaken based not only on regional transport infrastructure but also socio-economic characteristics that affect the demand for the infrastructure. In particular, the distribution of population, industries, and mineral deposits were visualized on maps indicating the current and future bottlenecks of regional transport infrastructure and priorities for improvement.

(2) Effective Integration of Primary and Secondary Information

A number of existing reports on transport infrastructure in East and Southern African countries prepared by various organizations are available. JICA so far has conducted studies on regional freight transport corridors in Sub-Saharan Africa including the Cross-Border Transport Infrastructure Study – Phase 3, the Preparatory Study on Southern African Growth Belt, and the Preparatory Survey on the Walvis Bay Port Container Terminal Development Project. In addition, a number of organizations and initiatives such as the Economic Community of West African States (ECOWAS), the Southern African Development Community (SADC), the Sub-Saharan Africa Transport Policy Program (SSATP), the Africa Infrastructure Country Diagnostic (AICD), and the United States Agency for International Development (USAID) have studied port and rail development in Sub-Saharan Africa. The World Bank/ECOWAS have conducted A Comparative Feasibility Study on the Development of Single Windows in the Main Ports of the Abidjan-Lagos Corridor. This study utilized existing information to the extent possible to learn lessons so as to develop assumptions on effective assistance measures in port and rail development in Sub-Saharan African countries.

(3) Verification of Hypotheses through Field Investigations

Information and implications from existing materials were verified through field interviews and investigations and reflected in assistance strategies. The study recognized the importance of including perspectives of the private sector, which utilizes regional freight transport corridors to promote regional economies, although perspectives of the public bodies are generally more emphasized. Therefore, field interviews were conducted not only with public organizations but also with private bodies that utilize transport infrastructure, e.g., forwarders, shipping companies, and trading companies, in order to understand the actual situation of transport infrastructure for industries. On the other hand, it was found that public companies and private operators do not necessarily share common perceptions of their responsibilities and their viewpoints are inconsistent in some cases. For this reason, interviewing different stakeholders is essential to obtain multi-dimensional understandings. Through analysis of the above mentioned information, infrastructure bottlenecks, and structural problems were clarified, and assistance strategies investigated for the development of a more efficient and reliable regional freight transport infrastructure.

(4) Identification of Transport Improvement Projects that Induce Transport Demand and Stimulate Local Industries

Until now, Japanese assistance for infrastructure development in other regions (e.g., the Greater Mekong Subregion in Southeast Asia) has focused on areas where freight transport improvement has been vital and indicated the impacts of infrastructure development on freight transport facilitation. On the other hand, existing transport demand in Sub-Saharan Africa is somewhat limited, and an approach to induce demand may be required. Based on the potential for future industrial development, this study aimed to identify regional transport infrastructure projects that also promote private sector investment.

(5) Case Study on Public-Private Partnership Projects for Port and Rail

A number of public-private partnership (PPP) projects have been undertaken in Sub-Saharan Africa. Although PPP projects in the port sector have been successfully implemented to some extent, PPP projects in the railway sector have experienced various problems. In addition to compiling an inventory of ports and railways, case studies of major PPP projects have been analyzed to explore the background of infrastructure and responsibility sharing between and among public organizations and private operators. Through a review of existing studies of recommended PPP projects, the validity of assistance strategies for PPP projects was assessed.

(6) Development of Assistance Strategies for Port and Railway Improvement with a High Priority and Appropriateness

In the preparation of assistance strategies, a comprehensive assessment of proposed projects in terms of their appropriateness, practicality, and urgency was conducted. Also, projects were classified based on types of private sector involvement, and appropriate assistance measures were recommended for each type.

(7) Development of Effective Model Assistance Programs for Japanese Assistance

Preparation of model assistance programs included not only project lists but also effective assistance schemes for individual project components (e.g., technical assistance, project preparation studies, grant financial assistance, loan assistance). Descriptions of each component include estimated costs, expected impacts, and the inter-relationship with similar projects by other development partners.

(8) Updating of the Corridor Map

An inventory of regional transport infrastructure (highways, port, and railways) was developed, and the Corridor Map on the JICA website was updated with the latest data of road conditions. In addition, data on ports and railways was added to the Corridor Map.

The implementation flow of this Study is shown in Figure 1-1.

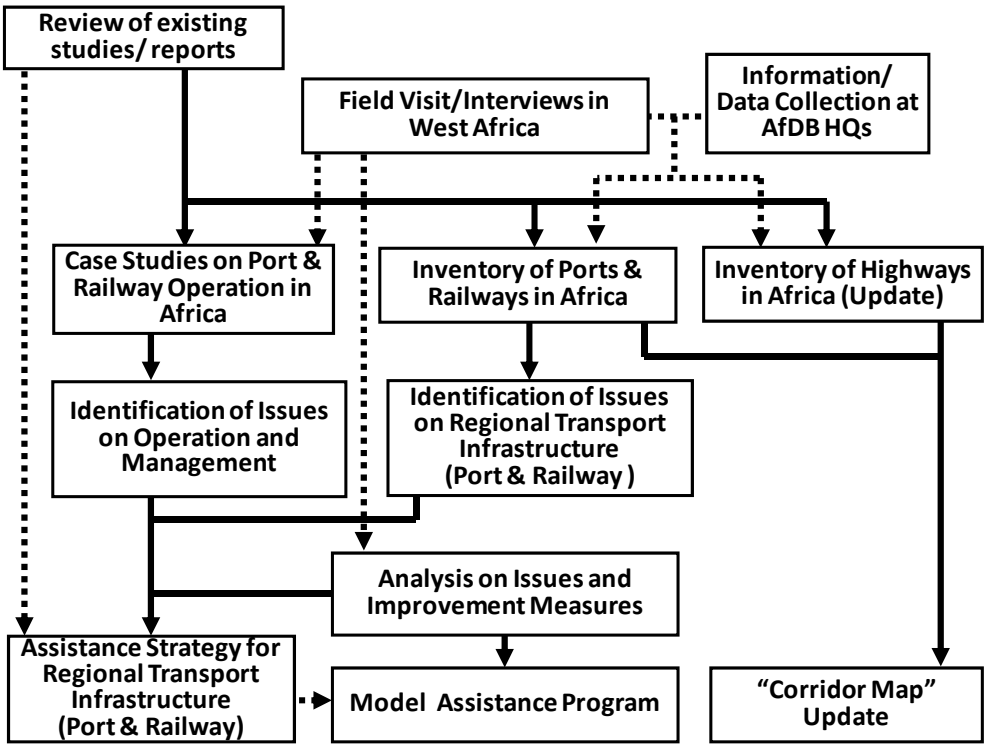


Figure 1-1 Flow of This Study

1.3 Field Investigation in West African Countries

Field investigations in West African countries were conducted between mid-February and the beginning of April 2010 in order to verify problems and strategies envisaged through data collection. The following points and features of assistance measures shown in Table 1-1 were considered in order to distinguish which countries required field visits for information collection on model assistance programs in West African countries:

- Existence of major freight transport corridors and validity of assistance;
- Availability of information on port and rail PPP projects regarded as good or bad practices; and
- Possibility of future assistance by JICA.

Table 1-1 Features of Assistance in West Africa and Selection of Countries Visited

Country	Local JICA Office	Eligibility to JICA Lending	Income Level	WB Signal System (2009)	WB Signal System (2010)	Country Selected for Field Visit
Ghana	○	○	Low	Green	Green	Visited
Gambia	×	×	Low	Red	Red	
Guinea	×	×	Low	Red	Red	
Guinea Bissau	×	×	Low	Red	Red	
Côte d'Ivoire	○	×	Medium	Red	Red	
Sierra Leone	×	×	Low	Yellow	Yellow	
Senegal	○	○	Low	Green	Green	Visited
Togo	×	×	Low	Red	Red	
Nigeria	○	○	Medium	Green	Green	Visited
Niger	○	×	Low	Yellow	Green	
Burkina Faso	○	×	Low	Yellow	Red	Visited
Benin	○	×	Low	Yellow	Yellow	
Mali	×	○	Low	Green	Green	Visited
Liberia	×	×	Low	Red	Green	

(Source: WB signal systems is based on internal information from JICA)

Countries visited included Burkina Faso Ghana, Mali, and Senegal, plus Nigeria and Tunisia for interviews with regional organizations such as ECOWAS and the African Development Bank (AfDB). Although a visit to the Côte d'Ivoire was considered, only data collection in neighboring countries was conducted due to current security concerns.

As shown in Table 1-2, field investigation interviews included governmental organizations engaging in activities related to regional freight transport infrastructure, private forwarders, trading companies, and shipping companies. Details of the organizations interviewed and meeting memoranda memos are presented in the appendixes (*Japanese version only*).

Table 1-2 Outline of Field Investigation in West Africa

Organization Type	Visited Organizations	Collected Data
Ministries and Governmental Organizations	Ministry of Transport, Ministry (Department) of Railway, Ministry (Department) of Port, Ministry (Department) of Road, Ministry of Public Works, and other organizations relating to transport infrastructure	Present status of transport infrastructure and its management, problems, existing plans, and development partner assistance
Other Donors	World Bank, African Development Bank (AfDB), European Union (EU), European Investment Bank (EIB) , and other organizations relating to transport infrastructure	Assistance activities mainly for port and railway infrastructure in the region
Regional Economic Communities (RECs)/ Regional Coordination Organizations	Economic Community of West African States (ECOWAS), Union Economique et Monetaire Ouest Africane (UEMOA, West African Monetary Union), Port Management Association of West and Central Africa (PMAWCA), etc.	Assistance activities mainly for port and railway infrastructure in the region

Organization Type	Visited Organizations	Collected Data
Private Sector	Logistic companies, trading firms, shipping companies, railway companies, port (terminal) authorities, other logistic-related associations for the region	Views and demand for regional transport infrastructure development; factors related to corridor selection
Local JICA offices	JICA offices in Burkina Faso, and Ghana, Senegal, and Tunisia	Overview for the region and activities of JICA (including report of overview for field investigation)
Transport Infrastructure Facilities (on-site inspection)	Container terminals, port facilities and equipments, congestion of access roads, railway stations, tracks, rolling stocks, maintenance factories, etc.	Current situation of operation/maintenance and conditions of port/railway facilities

1.4 Structure of This Report

The structure of this report is described below.

Chapter 2 presents an overview of socioeconomic circumstances in Sub-Saharan Africa, characteristics of regional freight corridors, and the increasing demand for development of transport infrastructure. Economic conditions in each country are assessed and the relationship between transport characteristics and infrastructure development is analyzed.

Chapter 3 explains the concept for the regional freight corridor system in Sub-Saharan Africa and analyzes characteristics of road, railway, and port infrastructure, which are recognized as inefficient and costly from a global standpoint. Current logistics procedures are also overviewed. Key issues contributing to high transport costs in the region are summarized.

Chapter 4 describes major port and railway projects including the background and history of operational organizations in order to analyze reasons for success and underlying issues.

Chapter 5 describes current actions for port and railway facilities and PPP infrastructure in the region based on information collected in the field survey for Burkina Faso, Ghana, Mali, and Senegal. The current situation of regional freight corridors based on ports and railways in West Africa is introduced with a description of operation conditions, improved port procedures, and facilities.

Issues for regional freight corridor development based on ports and railways in Sub-Saharan Africa are clarified in Chapter 6. This chapter also examines assistance programs for infrastructure development and strategies for each type of assistance. In this chapter, corridor development is redefined as logistic system improvements. The importance of logistics-related procedural improvements for ports and railways is clarified and the principles for assistance are defined.

Chapter 7 describes two selected pilot corridors in West Africa and suggests pilot assistance programs for the corridors.

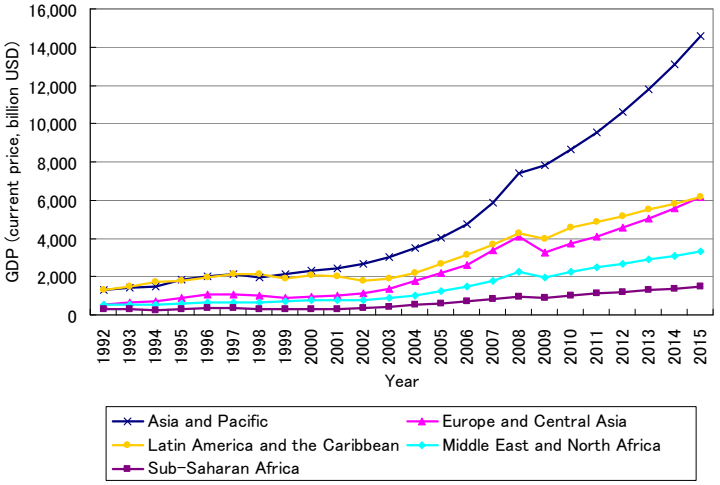
Chapter 2 Socioeconomic Circumstances in Sub-Saharan Africa

2.1 Overview of Socioeconomic Conditions

2.1.1 Economic Conditions

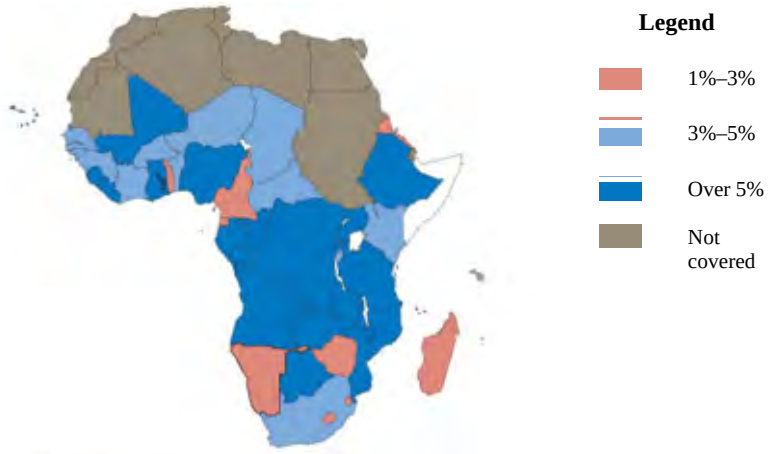
The total GDP of Sub-Saharan Africa in 2009 was USD 885.2 billion (in current prices; see Figure 2-1), which represents only 1.5% of world GDP. South Africa accounts for 32% of the total GDP of this region. The average GDP per capita of the region is USD 1,179 (2008, current prices), which is lower than that of other developing regions in the world, with only 17 countries in Sub-Saharan Africa surpassing USD 1,000.

Present economic growth in Sub-Saharan Africa is attributed mainly to the price escalation of mineral resources and fossil fuels, expansion of trade, and investments for such developments. From 2004 to 2008, Sub-Saharan Africa experienced continuous growth at a rate of over 5% per annum. However, in the wake of the global economic crisis and worldwide recession in 2009, growth declined primarily in oil-producing countries and middle-income countries, with close links to the world economy. The regional economy is showing recovery in 2010, and is expected to go back to the high growth levels experienced before the crisis (see Figure 2-2).



Note: Estimation after 2010
Source: IMF, World Economic Outlook

Figure 2-1 GDP Transition by Regions of the World



Source: International Monetary Fund (IMF), World Economic Outlook 2010

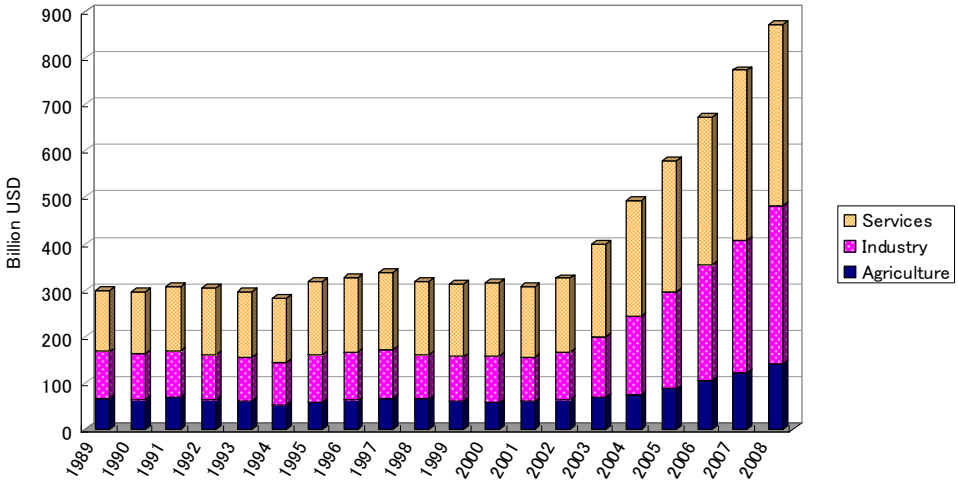
Figure 2-2 Prospect of Growth Rate of Real GDP in Sub-Saharan Africa (2010–11)

2.1.2 Industrial Structure

The industrial structure of the Sub-Saharan Africa region has undergone changes in recent years, as shown in Figure 2-3. The growth in this region during the 2000s was substantially due to an increase in the added value of the industrial and services sectors. Particularly, the ratio of the industrial sector in terms of total added value has been on an upward trend during this decade.

The major constraining factors for industrial development in this region are as follows:

1. High indirect costs (e.g., cost of transport, energy, land, communication, security);
2. Low agricultural productivity; and
3. High labor cost.



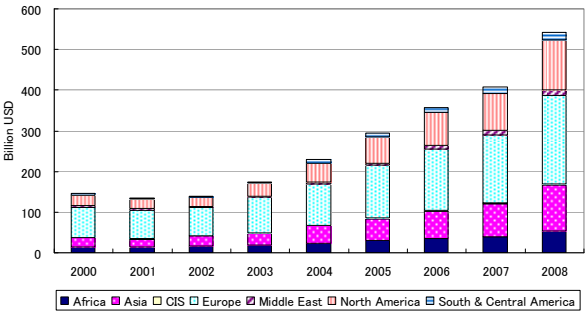
Source：JICA Study Team based on World Development Indicators

Figure 2-3 Value Added by Industries in Sub-Saharan Africa

2.1.3 Conditions of Trade and Investments

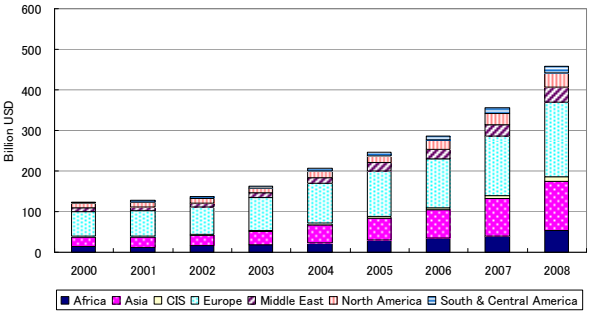
An assessment of trade in Sub-Saharan Africa shows a rapid increase in both imports and exports at the beginning of the 2000s, with European countries being the main trade partners. Trade with China and India, in addition to trade with developed countries such as Japan (and Western countries), has been increasing in this period, strengthening the relationship with Asia (see Figures 2-4 and 2-5).

A breakdown of import and export items is shown in Figure 2-6, which indicates the trade structure of importing industrial products by exporting fossil fuel and mineral resources.[1]



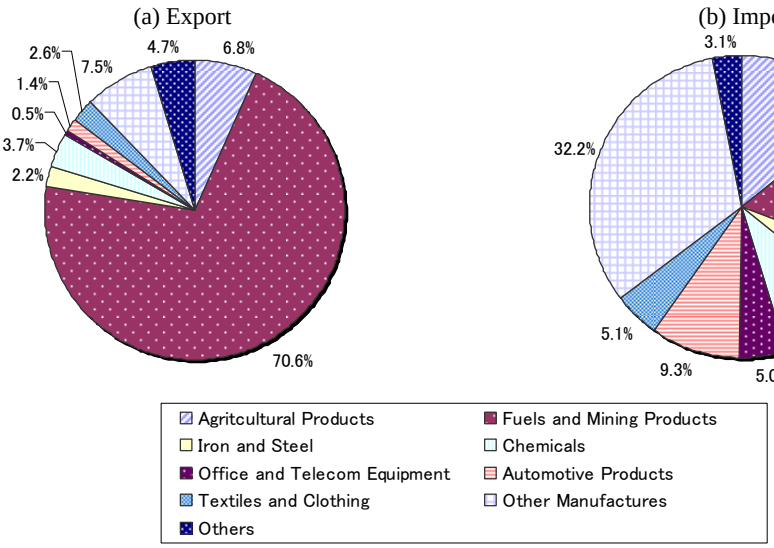
Source: World Trade Organization (WTO) database

Figure 2-4 Growth of Export Amount from African Countries to Each Region (2000–2008)



Source: WTO database

Figure 2-5 Growth of Import Amount from Each Region to African Countries (2000–2008)



Source: WTO, International Trade Statistics 2009

Figure 2-6 Breakdown of Export and Import Commodities of Africa (2008)

[1] Figures 2-4 through Figure 2-6 are based on the data from the entire African Continent including North Africa.

2.1.4 Current Status of Logistics

The Doing Business Indicators prepared by the World Bank assess the Ease of Doing Business[2] in Sub-Saharan African countries as generally low. The average ranking of Sub-Saharan African countries is 137.9th in the indicator and 136.6th in the Trading Across Borders Index, which are both significantly lower than other regions in the world (see Table 2-1).

Table 2-1 Average Evaluation Ranking of Business Environment by Region

	Overall Ranking of "Ease of Doing Business"	Ranking of "Trading across Borders"
East Asia and the Pacific	91.1	87.2
Europe and Central Asia	78.3	100.8
Latin America and Caribbean	98.5	94.2
Middle East and North Africa	123.4	92.3
South Asia	117.3	120.9
Sub-Saharan Africa	**137.9**	**136.6**
OECD	30.2	33.4

Source: World Bank, Doing Business 2010

2.2 Classification of Socioeconomic Conditions by Region

2.2.1 Regional Divisions and Regional Economic Communities in Sub-Saharan Africa

In this study, Sub-Saharan Africa is geographically divided into three regions[3]: East Africa, Southern Africa, and Central and West Africa. Since Sub-Saharan African countries have small-scale economies and markets, interregional cooperation and integration with neighboring countries has been a longstanding issue. As shown in Figure 2-7, a number of Regional Economic Communities (RECs) have been formed. These RECs have been proceeding with the establishment of customs unions, introduction of common currencies, promotion of cross-border trade, development of common markets, and improvement of regional infrastructure. To a certain extent, regional integration exists within each REC. However, the regional division of Sub-Saharan Africa is a complex issue as some countries are members of more than one REC.

[2] 183 countries are ranked by the "Ease of Doing Business" based on the aggregate of the following: starting a business, dealing with licenses (construction), hiring and firing workers, registering property, getting credit, protecting investors, Paying taxes, trading across borders, enforcing contracts, and closing a business.
[3] The regional division is based on JICA's internal organizational structure.

IGAD: Intergovernmental Authority of Development

COMESA: Common Market for Eastern and Southern African States

EAC: East African Community

SADC: Southern African Development Community

SACU: Southern African Customs Union

ECCAS: Economic Community of Central African States

CEMAC: Communauté économique et monétaire de l'Afrique centrale

ECOWAS: Economic Community of West African States

UEMOA: Union économique et monétaire ouest-africaine

Source: Cross-Border Transport Infrastructure Study – Phase 3

Figure 2-7 Major Regional Economic Communities in Sub-Saharan Africa

2.2.2 Characteristics of Each Region

Table 2-2 shows the major socioeconomic indicators of each region. Based on the indicators, the characteristics of each region are described as follows.

Table 2-2 Socioeconomic Conditions of Each Region

	East	South	Central and West	Total in Sub-Saharan Africa
Proportion of GDP (%)[a]	16.03	45.12	38.85	USD 965.8 billion
Compound Average Growth Rate (2004–08) (%)[b]	7.29	7.57	5.19	6.73
GDP per capita (USD)[a]	580	2,771	950	1,179
Proportion of Population (%)[a]	32.56	19.21	48.23	819 million
Industrial Structure (Value added as a percentage of GDP) (%)[c]				
Agriculture	33.22	6.40	28.68	19.36
Mining	5.84	22.14	29.68	22.46
Manufacturing	8.48	14.90	5.98	10.41
Services	46.54	52.88	32.76	44.05
Export as a percentage of GDP (%)[a]	18.43	43.98	38.24	37.66
FDI Inflow as a percentage of GDP (%)[a]	3.13	3.58	3.48	3.47
ODA Inflow as a percentage of GDP (%)[a]	8.38	1.83	3.94	3.70
Political Instability Index[d]	6.15	6.28	6.81	6.5
Logistics Performance Index (LPI)[e]	2.27	2.49	2.48	2.42
Road Density (km/1,000 km^2)	54.54	120.06	78.10	83.85
(Percentage of paved road)[f]	(15.39%)	(18.39%)	(9.42%)	(13.92%)
Railway Density (km/10,000 km^2)[f]	20.86	40.77	11.53	21.88

a) Calculated from World Development Indicators (2008, current prices); b) Calculated from IMF, World Economic Outlook; c) Calculated from UNdata (2008); d) EIU (2009): 0 refers to a stable situation and 10 refers to an unstable situation; e) World Bank (2010): 1 refers to the lowest performance of logistics and 5 refers to the highest; f) Calculated from World Development Indicators (The latest data, up to 2007, is used.)

(1) East Africa[4]

GDP per capita in East Africa is lower than that of the other regions in Sub-Saharan Africa. Although the region is currently undergoing economic growth at a generally high rate, it remains highly dependent on public aid. Politically, the region is relatively stable compared to the other regions, but its export ratio is low, and the evaluation of its logistics performance is relatively low.

In terms of climate, a good proportion of the area is savanna or semiarid. Ethiopia, Kenya, and the inland areas have high altitudes and can be considered as having an alpine climate, which is ideal for tea and coffee. The agricultural sector is strong in this region and several countries have high growth potential for agriculture. However, large-scale farming for exports and commerce is limited to only some products, and the majority of farmers are engaged in small-scale self-support production. Furthermore, the production of natural resources is not as significant as it is in other regions with a few exceptions. For example, Sudan has established oil production as its growth engine, and Uganda has discovered oil resources in its territory. Kenya and other countries export their industrial products to its neighboring countries. Such manufacturing industries largely contribute to the growth potential of the industrial sector.

Countries in East Africa except the Seychelles belong to Intergovernmental Authority of Development (IGAD) or the East African Community (EAC). The EAC has formed a customs union by introducing a common regional customs tariff in 2005 and aims at the formulation of political union and integration of currencies in the future. In addition, nine countries except Tanzania are members of Common Market for Eastern and Southern African States (COMESA).

(2) Southern Africa[5]

A couple of countries in Southern Africa, with South Africa at the top of the list, have relatively large-scale economies and boost the regional GDP. On the other hand, the economic scale of countries such as Zambia and Malawi is relatively small, and there is a wide gap between rich and poor countries. In terms of climate, the west coast has a desert climate. In contrast, the east coast and the inland countries, such as Zambia and Malawi, are temperate, where land is suited for the farming of rice, cotton, tea, and maize. Investments have been made in mechanized farming to take advantage of this natural condition.

Southern Africa is abundant in mineral reserves, including gold, copper, diamonds, and various rare metals. Substantial investment in resource development has flowed into this area, and exports of such resources contribute greatly to the economy. At present, ongoing growth in the industry sector can be seen in the coastal countries, while the inland countries have high growth potential. The ratio of the service industry is high in South Africa and Namibia, and South Africa is actively performing investment activities in its neighboring countries.

Countries in this region are members of the Southern African Development Community (SADC), which aims to establish a customs union and a common market with an integrated currency. In addition, South Africa, Swaziland, Lesotho, Botswana and Namibia have formed the Southern African Customs Union (SACU).

[4] Kenya, Seychelles, Eritrea, Burundi, Sudan, Rwanda, Uganda, Ethiopia, Somalia, Djibouti, and Tanzania.
[5] Angola, Comoros, Zambia, Zimbabwe, Swaziland, Namibia, Botswana, Madagascar, Malawi, Republic of South Africa, Mauritius, Mozambique, and Lesotho.

(3) Central and West Africa[6]

The southern parts of this region have a tropical climate and feature savanna, while the northern parts, which connect to the Sahara Desert, are considered to be semiarid or desert. In this region, the production of agricultural products such as cacao and coffee is high, and forestry and fishery activities are also prominent. Numerous oil and gas fields are distributed along the coast of the Gulf of Guinea. Development of these resources constitutes the core of industries in many of the countries in this region. Furthermore, the growth potential from mineral resources such as gold and rare metals in the areas other than oil-producing countries is high. Currently, with reliance on the agricultural and mining industries, the manufacturing and service industries have not evolved much.

As many of the countries in this region have a history of French colonization, the relationship with France remains strong and French is often used as the official language. As international borders divide some areas into several small countries, some of these countries are politically unstable, hindering transport through to inland countries and inhibiting growth based on regional potentials.

Most countries of this region are members of the Economic Community of Central African States (ECCAS) or Economic Community of West African States (ECOWAS). The francophone countries form Communauté économique et monétaire de l'Afrique centrale (CEMAC) and Union économique et monétaire ouest-africaine (UEMOA), which own regional central banks to circulate CFA Francs[7] as a common currency, implementing currency policies on behalf of central banks in each country.

2.3 Classification of Socioeconomic Conditions in Each Country

The previous section established an overview of the socioeconomic conditions of each region in all of Sub-Saharan Arica. However, the geographical and social features, as well as economic structures vary by country. This section classifies the countries in the region mainly from the perspective of economic scale, industrial structure, and geographical condition.[8] Four types — regional economic leader (A), oil-producing country group (B), middle-income country group (C), and low-income country group (D) — are explored in the first classification. Table 2-3 reports the relevant indicators.

In this categorization, regional economic leader (A) and oil-producing country group (B), which have large economic scales and different characteristics from the other groups, are separated at first. The remaining countries are then classified into middle-income country group (C) and low-income country group (D) according to the level of economic affluence. Particularly, the low-income country group is the largest group in terms of population, and the characteristics of the countries in the group are diverse. Therefore, analysis is performed within the group, using industrial potentials. Each group is described below in detail.

[6] Nigeria, Ghana, Sierra Leone, Liberia, Senegal, Cape Verde, the Gambia, Guinea, Guinea-Bissau, Mali, Mauritania, Niger, Burkina Faso, Benin, Côte d'Ivoire, Togo, Gabon, Cameroon, the Central African Republic, São Tomé and Príncipe, Chad, the Republic of the Congo, Equatorial Guinea, and Democratic Republic of the Congo

[7] There are two types of CFA Franc, the values of which are the same but the mutual circulation of which is impossible. Banque des États de l'Afrique Centrale (BEAC) issues one type (currency code: XAF) and Banque Centrale des États de l'Afrique de l'Ouest (BCEAO) issues the other (XOF).

[8] Hirano (2009) and the World Bank (2009) are used as reference for the classification.

Table 2-3 Classification by Socioeconomic Conditions

	Regional Economic Leader (A)	Oil-Producing Country Group (B)	Middle-Income Country Group (C)	Low-Income Country Group (D)	Total in Sub-Saharan Africa
Proportion of GDP (%)[a]	28.62	42.23	6.42	22.72	USD 965.8 billion
Compound Average Growth Rate (2004–08) (%)[b]	5.01	9.06	2.68	6.75	6.73
GDP per capita (USD)[a]	5,678	1,639	2,077	446	1,179
Proportion of Population (%)[a]	5.94	30.38	3.65	60.03	819 million
Industrial Structure (Value added as a percentage of GDP) (%)[c]					
Agriculture	3.33	24.39	11.16	33.49	19.36
Mining	11.82	47.06	12.27	5.23	22.46
Manufacturing	18.78	5.50	12.56	9.27	10.41
Services	62.97	32.15	45.18	47.81	44.05
Export as a percentage of GDP (%)[a]	35.37	56.79	41.15	19.95	37.66
FDI Inflow as a percentage of GDP (%)[a]	3.49	5.78	3.11	4.61	3.47
ODA Inflow as a percentage of GDP (%)[a]	0.42	2.35	2.97	12.13	3.70
Political Instability Index [d]	7.00	7.04	5.27	6.80	6.5
Logistics Performance Index (LPI)[e]	3.46	2.43	2.40	2.38	2.42
Road Density (km/1,000 km^2) (Percentage of paved road)[f]	299.83 (17.30%)	48.81 (12.47%)	90.80 (15.34%)	84.02 (13.07%)	83.85 (13.92%)
Railway Density (km/10,000 km^2)[f]	201.63	14.67	3.64	11.70	21.88

a) Calculated from World Development Indicators (2008, current prices); b) Calculated from IMF, World Economic Outlook, c) Calculated from UNdata (2008); d) EIU (2009): 0 refers to a stable situation and 10 refers to an unstable situation., e) World Bank (2010): 1 refers to the lowest performance of logistics and 5 refers to the highest; f) Calculated from World Development Indicators (The latest data, up to 2007, is used.)

Regional Economic Leader (A)

The country that falls in the category of regional economic leader is (only) South Africa, but this country alone accounts for 28.6% of the GDP of the entire Sub-Saharan Africa region. The country boasts relative affluence with a high GDP per capita. The industrial structure shows that its output of added value arising from the manufacturing and service industries is higher than in the other groups. South Africa has various mineral resources, and its economy is supported with an advanced industrial structure. In addition, it is distinct in that the country not only draws investments from foreign countries, but also actively makes investments in other countries, especially in the region.[9]

For freight transport, South Africa has large ports such as Durban, and its road and railway networks are significantly better than that of the other Sub-Saharan African countries. Accordingly, South Africa is highly praised for its logistics performance. It is important to

[9] Typical enterprises include South African Airways; an electricity public utility, Eskom; a railway public corporation, Spoornet; mobile phone carriers, Mobile Telephone Networks (MTN) and Vodacom; and a retail distributor, ShopRite. They are expanding their service networks in the region.

enhance ports to facilitate inter-regional trade, as well as to improve the surface transport environment linking with neighboring countries to promote intra-regional trade (i.e., the import of primary products and the export of processed products and services).

Oil-Producing Country Group (B)

The eight countries of Angola, Cameroon, Chad, Republic of the Congo, Gabon, Mauritania, Nigeria, and Sudan produce petroleum, and as a consequence show different economic characteristics from the other countries in Sub-Saharan Africa. In these countries, the development of petroleum constitutes a majority of their economic activities. They actively export petroleum and the amount of foreign direct investment (FDI) for its resource development is high. The group has served as the driving force for economic growth in the region as the GDP of the countries in this group accounts for 42.2% of the total GDP of entire Sub-Saharan Africa region. The group achieved a high growth rate of 9% per annum over the period from 2004 to 2008.

Most of the oil-producing countries are coastal states due to the fact that many of the oil fields in the African Continent are located along the coast of the Gulf of Guinea in West Africa. As Chad and Sudan, which have their oil fields in inland areas, need to secure a means of transport to seaports, pipelines have been laid down. However, many of the countries in this group are politically unstable.

Middle-Income Country Group (C)

Nine countries[10] of which the GNI per capita in 2008 was USD 976 to 11,905, excluding the two types, regional economic leader and oil-producing country group, fall into the middle-income country group. The GDP per capita of this group is high, and the countries have export ratios. Most countries in this group are politically stable.

This group can be further grouped into three types by its characteristics. The first group involves countries such as Côte d'Ivoire, which play a central role for its neighbors, focusing on agriculture, manufacturing, and exports. The second group includes countries such as Namibia and Botswana, which are growing with natural resource development at the core of its economy. The last are island states with small populations and land area, and inland countries surrounded by South Africa. The ratios of the services industry and FDI inflow are high for this third group. Railway network densities in this group are low and there is a need for railway line improvements in order to activate the development of mineral resources, and trade with neighboring countries.

Low-Income Country Group (D)

Countries that are not in the three above-described types are classified into the low-income country group. This group represents 60% of all the Sub-Saharan African population, and its GDP per capita is extremely low. The group shows economic growth at a rate of close to 7% per annum on average, and foreign investment can be observed. The agricultural sector is relatively more important in this group than in the other groups. Furthermore, the ratio of exports is low, while the dependence on official development assistance (ODA) is high.

The low-income country group includes both coastal and inland states. The logistics performance of these countries is evaluated as low on average, and their road and railway networks are relatively less developed, which has greatly impeded their trade with foreign countries as well as the development of domestic industries. Most inland countries are in this

[10] Botswana, Mauritius, Namibia, Seychelles, Cape Verde, Côte d'Ivoire, Lesotho, São Tomé and Príncipe, and Swaziland.

group, and the improvement of access to seaports has been a key issue to develop their economies. Generally, railway infrastructure (assuming adequate condition) is appropriate for the long-distance mass transport of agricultural products and minerals from inland areas. It is also essential to promote integrated improvements of freight transport systems, including the development of railway lines from inland areas to ports, the increased transport capability of ports, and trade facilitation.

Growth in these countries is expected with the factor(s) driving the growth varying by country. Table 2-4 compares the growth rate of the agricultural sector and that of the industrial sector, assessing the growth potential of each country in order to classify the countries according to growth levels. The table shows the classification of the low-income country group into types that have growth potential centered around agriculture with a comparably high growth rate in the agricultural sector (D1), and types that have growth potential centered on the industrial sector (D2). Furthermore, there is a mixed type that has a growth potential in both the agricultural and industrial sectors (D3). There is also a type that does not belong to any of types indicated above, including countries with political and economic instability (D4). For these countries, establishing a sound economic system is essential for industrial growth.

Table 2-4 Industrial Potential of Low-Income Countries in Sub-Saharan Africa

		Growth of value added in the agricultural sector		
		Low growth (Under 3% growth annually)	Growth (3%–5% growth annually)	High growth (Over 5% growth annually)
Growth of value added in the industrial sector	High growth (over 5% growth annually)	Democratic Republic of Congo, Gambia, Guinea, Kenya, Madagascar, Zambia	Ghana, Malawi, Tanzania [b], Togo [a]	Burkina Faso [b], Ethiopia, Mozambique, Rwanda, Uganda
	Growth (3%–5% growth annually)	Mali [c]	Benin [a], Guinea Bissau	
	Low growth (under 3% growth annually)	Burundi [a], Central Africa, Comoro, Zimbabwe [a]	Senegal	Eritrea [c]

Growth potential driven by agriculture (D1)
Growth potential driven by industry (D2)
Growth potential driven by agriculture and industry (D3)
Others (D4)

Classified by average annual growth of value added in the following periods: a) 2001–2005, b) 2002–2006, c) 2003–2007, otherwise 2004–2008
Note: No data on Liberia, Niger, Sierra Leone, and Somalia
Source: Calculated from World Bank, World Development Indicators (2008)

The types of socioeconomic conditions described above are diagramed in Figure 2-8. The figure shows where each group stands and its direction of growth using the fields of the principal industry for the horizontal axis and the volume of GDP for the vertical axis. Figure 2-9 shows the types on a map.

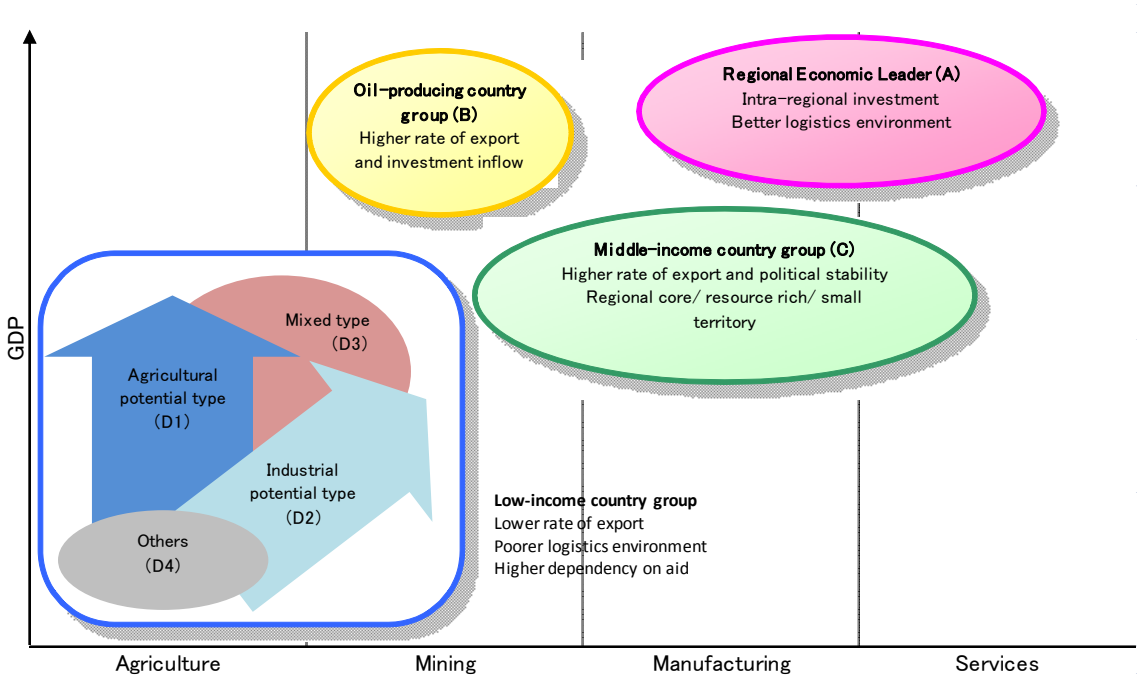


Figure 2-8 Conceptual Diagram for the Classification of Socioeconomic Conditions

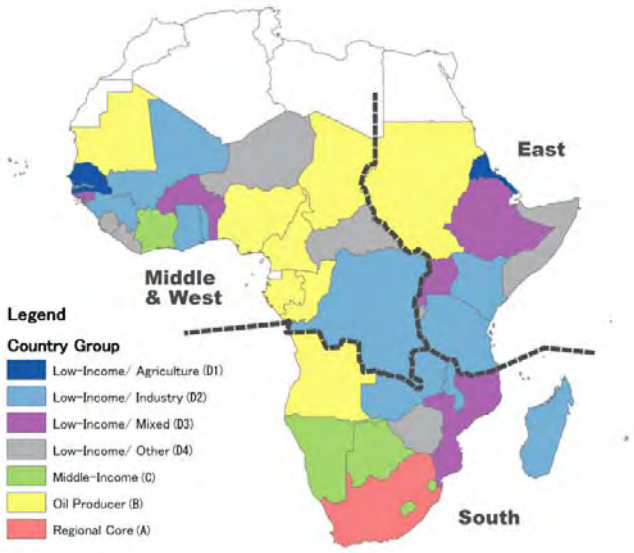


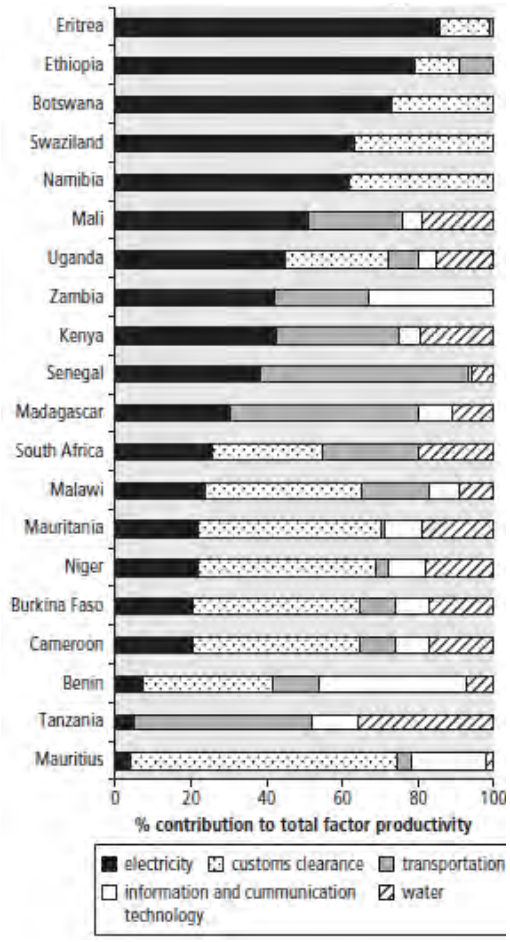
Figure 2-9 Classification of Countries in Sub-Saharan Africa

2.4 Constraints on Regional Transport Infrastructure in the Sub-Saharan African Region

2.4.1 Constraints of Economic Growth

Although the level of economic growth in Sub-Saharan African countries varies by country, future growth can be anticipated in a number of these countries if individual potentials can be brought into play. The level of transport infrastructure development in the Sub-Saharan African region is low, contributing to high transport costs. The delay in improvements in transport infrastructure and inefficient customs clearance are impediments to productivity improvement of enterprises in Sub-Saharan African countries (see Figure 2-10). Business and logistics environments are poor particularly in landlocked countries as well as in low-income countries where infrastructure improvements have been delayed, standing in the way of economic growth.

2.4.2 Constraints in Ports



Source: World Bank, Africa's Infrastructure, 2009

Figure 2-10 Impact of Infrastructure on Factor Productivity of Companies in Sub-Saharan Africa

The trend in trade and transport shows that the volume of containerized cargo handled in Sub-Saharan African ports is increasing. This tendency is expected to accelerate in accordance with anticipated economic growth. However, the improvement of container ports has been delayed partly because of physical constraints arising from natural conditions. Furthermore, longer dwell times and higher costs than necessary are incurred at ports due to inefficient cargo handling and customs clearance services, as shown in Table 2-5. Improvement of physical capacity for cargo handling and enhancement of facilities to accommodate large container ships, and improvement of management efficiency, are cited as major issues for Sub-Saharan African ports.

Table 2-5 Comparison of Time and Cost Required for Ports and Inland Transport

	Export		Import	
	Time and cost at ports	Time and cost for inland transport	Time and cost at ports	Time and cost for inland transport
East Asia and the Pacific	6.3 days USD 232.5	3.4 days USD 441.3	6.5 days USD 267.3	2.5 days USD 462.6
Europe and Central Asia	3.7 days USD 260.3	7.9 days USD 983.1	3.3 days USD 258.4	7.4 days USD 1129.3
Latin America and Caribbean	3.6 days USD 256.3	3.2 days USD 525.2	4.0 days USD 316.8	2.7 days USD 528.4
Middle East and North Africa	3.1 days USD 206.8	4.1 days USD 386.2	4.2 days USD 240.9	3.5 days USD 451.0
South Asia	4.4 days USD 256.0	8.3 days USD 570.6	4.9 days USD 290.4	6.1 days USD 681.9
Sub-Saharan Africa	**5.2 days** **USD 386.0**	**6.7 days** **USD 934.5**	**6.8 days** **USD 447.3**	**6.8 days** **USD 1187.0**
Organization for Economic Cooperation and Development (OECD)	2.1 days **USD 278.6**	2.3 days USD 535.8	2.0 days USD 286.9	2.3 days USD 551.4

Source: World Bank, Doing Business 2010

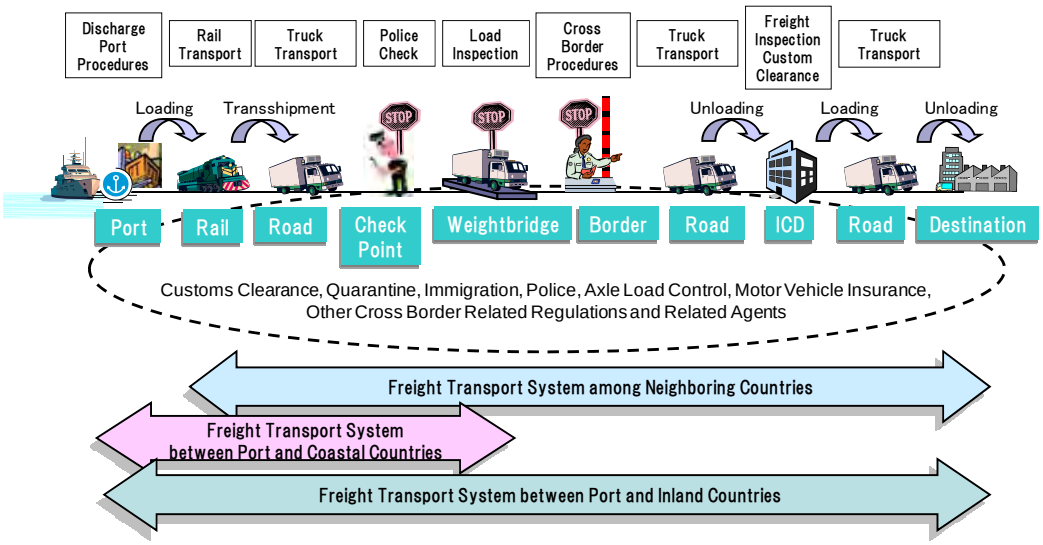
2.4.3 Constraints in Railways

At the same time, the capacity of land transport infrastructure should be increased for the further development of the region. In particular, there are many inland countries with significant potential for the development of mineral resources in Sub-Saharan Africa. Thus railways, which are better suited for long-distance transport and the transport of bulk cargo such as heavy mineral resources, will be important. The railways constructed during the colonial era were designed to transport inland minerals to ports. However, due to the deterioration of vehicles, rail track, and facilities on many railway lines, operating speeds have decreased and the limited transport capacity has become serious. As a result, the time and cost required to transport goods to inland countries has been increasing, and the use of roads to transport heavy mineral resources has been causing rapid deterioration of pavements.

Chapter 3 Overview of Regional Freight Corridors of Sub-Saharan Africa

3.1 Concept of Regional Freight Corridors

In this study, regional freight is defined as freight crossing over multiple countries. Regional freight corridors in Sub-Saharan Africa are not only comprised of surface transport infrastructure (road and rail) within neighboring countries, but also transport infrastructure (road, rail, and port) from coastal or inland countries to ports (refer to Figure 3-1). These corridors also include border facilities for completing customs procedures for cross-border freight cargo, inland depots, and a wide range of legal/regulatory systems and structures that support cross-border freight transport. As discussed in the previous chapter, much of Sub-Saharan Africa is comprised of countries that are small both in population and economic scale, and thus the development of regional freight networks and the promotion of cross-border trade is essential for industrial and economic growth.



Source: Prepared based on the concept of JICA, *The Research on the Cross-Border Transport Infrastructure: Phase 3*

Figure 3-1 Concept of Regional Freight Corridors

Development partners and RECs advocate the integrated development of these corridors, involving "soft" infrastructure such as legal institutions and systems, as well as "hard" infrastructure. In this study, this approach is called the "corridor approach." These corridor concepts not only include freight corridors, but they often also include industrial corridors as well such as corridors for electricity and sightseeing. Three of the main corridors in Africa the Trans-African Highways, the SSATP Corridors, and the Strategic Development Initiative (SDI)/Strategic Development Plan (SDP) Concept. Figure 3-2 shows the arrangement of the corridors for each concept.

Source: Prepared based on i) African Development Bank, 2003, Review of The Implementation Status of the Trans African Highways and the Missing Links; ii) SSATP Working Paper No. 86 (2007), Institutional Arrangements for Transport Corridor Management in Sub-Saharan Africa; iii) Paul Jourdan, Mintek (2006), Regional Strategies The Case for a Resource Based Spatial Development Programme, US-Africa Infrastructure Conference

Figure 3-2 Major Regional Freight Corridors in Sub-Saharan Africa

The following sections discuss the situation of road, rail, port, and freight transport procedures as well as each sub-system of related facilities found in regional freight corridors.

3.2 Current Status of the Road Sector

3.2.1 Condition of Road Infrastructure

The condition of road infrastructure in Sub-Saharan Africa is poor even when compared to low income countries (LICs) in other regions of the world. Paved road ratios of Sub-Saharan Africa on a population basis and on the basis of GDP per person are about half of those of other LICs. In addition, the low population density affects the paved road ratio per unit area, which is less than one-third of that of other LICs (Table 3-1). However, the paved road ratio and road conditions have been changing for the better since 2000. Economic growth and improvements in

governance have encouraged development partners to push for rapid improvement. The paving and improvement of major road corridors, in particular, has progressed substantially (Figure 3-3).

Table 3-1 Cross Regional Comparison of Paved Road Infrastructure

Paved roads	Sub-Saharan Africa LICs	Other LICs
Density by area (km/1,000 km^2)	10.7	37.3
Density by population (km/000 pop)	269.1	700.7
Density by GDP per capita (km/USD billion)	663.1	1,210.0

Source: AICD, 2008, The Burden of Maintenance Roads in Sub-Saharan Africa

Note: The figure shows paved and unpaved zones in major regional road corridors. However, information was not available for some parts in the major regional road corridor, and thus is shown here in black. As the data of each road differs depending on the year researched, please see the Road Inventory in "Reference Material" for details.
Source: Updated JICA Corridor Map with data from road authorities of various countries

Figure 3-3 Pavement on Major Regional Road Corridors

Source: Prepared based on "African Development Bank, 2003, Review of The Implementation Status of the Trans African Highways and the Missing Links" and data obtained from road authorities of various countries

Figure 3-4 Condition of Major Regional Road Corridors

3.2.2 Support from Development Partners

Development partners assisting improvements of regional major roads in Sub-Saharan Africa include the World Bank, African Development Bank (AfDB), and the European Union (EU)(see Figure 3-5). The World Bank is particularly involved in the development of networks connecting ports and inland countries, including SSATP Corridors. The SSATP involves the development of trans-continental roads based on the Trans-African Highway (TAH) Concept. While the World Bank and AfDB have assisted the improvement of roads mainly through loans, the EU has provided such assistance mainly through grants).

The World Bank also assisted the establishment and capacity building of Road Bureaus and Road Funds, including the implementation of road maintenance management systems such as the Highway Development and Management (HDM) model. In addition, they have been proactively supporting the implementation of weighbridges for the maintenance and management of roads.

Source: Updated JICA Corridor Map with data from road authorities of various countries

Figure 3-5 Development Partner Assistance along Major Regional Road Corridors

3.3 Current Status of Port Infrastructure

3.3.1 Outlook of Ports in Sub-Saharan Africa

Table 3-2 shows the major ports in Sub-Saharan Africa categorized by topographic conditions ("landscape"), cargo handles by major types, the condition of maritime container transport facilities, the status of maritime container transport networks, and management/operation system. Table 3-3 presents the category types and explanations.

In terms of categorization by topographic conditions ("landscape"), there are many sheltered ports on the ocean[1] in East and Southern Africa, with many of them providing naturally favorable locations for ports. On the other hand, there are many river ports[2] in the West Africa (Figure 3-6). Industrial ports, passenger ports, and fishing ports are not common in the region since these ports are typically developed as commercial ports (Figure 3-7). Maritime container transport facilities already developed as modern container terminals include Port Sudan, Djibouti Port, Mombasa Port, Dar es Salaam Port, as well as those in South Africa such as Cape Town Port, Durban Port, and Port Elizabeth. Other African ports have handled container ships

[1] A sheltered port on the ocean means a port sheltered by an island, a cape, or an indentation. This is a port that is constructed with few outlying facilities. As there is little sediment, there is little need for maintenance such as dredging.
[2] A river port is a port that is constructed at the mouth of a river. As sediment is readily deposited, there is often a requirement for maintenance such as dredging.

through reconstruction of existing facilities, or handling container cargo by utilizing some of the existing berths. However, to serve the continuing increase in container transport, the development of modern container terminals is underway at Walvis Bay Port, Luanda Port, Apapa Port, Tema Port, Dakar Port, and Abidjan Port (Figure 3-8). As for the status of maritime container transport networks, hub ports are concentrated in East Africa (Djibouti Port, Mombasa Port, and Dar es Salaam Port) and Southern Africa (Cape Town Port, Durban Port, and Walvis Bay Port), all of which have modern container terminals. In addition to these hub ports, some ports have become the transit ports for container cargo going in and out of inland countries due to geographic factors. These transit ports include Nacala Port, Beira Port, Maputo Port (all in Mozambique), Cotonou Port, Lome Port, Takoradi Port, Abidjan Port, and Dakar Port (all in West Africa)(Figure 3-9). From the maintenance/management perspective, there are many "landlord" ports where the port bureaus own the port infrastructure as regulating bodies while port services are provided by private enterprises. Other ports are service ports, where the port bureaus are mainly responsible for maintenance and management. However, the system of maintenance and management may differ depending on the terminal at the ports.

Cargo volumes are high at the hub and transit ports mentioned above. Container and general cargo throughput is also high at Apapa (Lagos) Port in Nigeria, which boasts high domestic demands, as well as Luanda port in Angola (Figures 3-10 and 3-11). As shown in Figure 3-10, container cargo throughput at Durban Port in South Africa is exceptionally high.

Table 3-2 Categorization of Major Ports in Sub-Saharan Africa

		Landscape			Freight Purpose				Container Terminal Condition			Logistics Chain Position				Operation and Management			
		Outer Sea Ports	Sheltered Ports on the Sea	River Ports	Commercial Ports	Industrial Ports	Passenger Ports	Fisheries Ports	Conventional	Improved	Modernized	Hub Ports	Feeder Ports	Maritime Container Transport Network	No Transit Container	Service Ports	Tool Ports	Landlord Ports	Private Service Ports
1	Assab	✓			✓				✓				✓			✓			
2	Port Sudan		✓		✓	✓	✓				✓				✓	✓			
3	Djibouti		✓		✓					✓	✓	✓		✓					✓
4	Mombasa		✓		✓						✓	✓		✓		✓		✓	
5	Dar es Salaam		✓		✓						✓	✓		✓		✓		✓	
6	Mtwara		✓		✓				✓				✓			✓		✓	
7	Tanga		✓		✓				✓				✓			✓		✓	
8	Maputo		✓		✓					✓				✓				✓	✓
9	Beira			✓	✓					✓				✓				✓	✓
10	Nacala		✓		✓				✓					✓				✓	✓
11	Toamasina	✓			✓					✓					✓	✓		✓	
12	Cape Town	✓			✓						✓	✓				✓			
13	Durban		✓		✓						✓	✓				✓			
14	Port Elizabeth	✓			✓						✓				✓	✓			
15	East London			✓	✓				✓						✓	✓			
16	Richards Bay		✓		✓				✓						✓	✓			
17	Walvis Bay		✓		✓			✓		✓	(✓)	✓		✓		✓			
18	Luderitz		✓		✓				✓				✓			✓			
19	Luanda		✓		✓				✓		(✓)				✓	✓		✓	
20	Lobito		✓		✓				✓				✓			✓			
21	Matadi			✓	✓				✓				✓			✓			
22	Boma			✓	✓				✓				✓			✓			
23	Pointe Noire	✓			✓					✓			✓			✓		✓	
24	Douala			✓	✓			✓		✓				✓		✓			
25	Apapa		✓		✓					✓	(✓)				✓			✓	
26	Onne			✓	✓				✓				✓					✓	
27	Port Harcourt			✓	✓				✓				✓					✓	
28	Calabar			✓	✓				✓				✓					✓	
29	Warri			✓	✓				✓				✓					✓	
30	Cotonou	✓			✓					✓				✓		✓			
31	Lome	✓			✓					✓				✓		✓			
32	Tema	✓			✓			✓		✓	(✓)			✓		✓		✓	
33	Takoradi	✓			✓				✓					✓		✓			
34	Abidjan		✓		✓			✓		✓	(✓)			✓		✓		✓	
35	San Pedro		✓		✓			✓	✓				✓			✓		✓	
36	Freetown		✓		✓					✓			✓			✓		✓	
37	Conakry	✓			✓	✓		✓	✓				✓				✓		
38	Banjul		✓		✓				✓				✓			✓			
39	Dakar	✓			✓		✓	✓		✓	✓			✓				✓	
40	Nouadhibou	✓			✓				✓				✓				✓		

Note 1: (✓) means existence of a new plan

Table 3-3 Port Categories

Item	Categories	Description
Topographic conditions ("Landscape")	Outer Sea Ports	Ports located on the shore in front of the outer sea
	Sheltered Ports on the Ocean	Natural ports without breakwater
	River Ports	Ports located along a river
Freight Purpose	Commercial Ports	Ports handling cargo for international trade or domestic transport
	Industrial Ports	Ports handling materials for large-scale industries (e.g., plant)
	Passenger Ports	Ports for passenger transport
	Fisheries Ports	Ports for fisheries industry
Container Terminal Condition	Conventional	Terminals originally designed and constructed for other cargo without specific development for improvement, and handling containers using ordinary facilities
	Improved	Terminals originally designed and constructed for other cargo but improved to handle containers later.
	Modernized	Terminals designed and constructed as container terminals with enough area to use gantry cranes, rubber-tired gantry (RTG) cranes, and other equipment
Logistics Chain Position	Hub Ports	Ports where mother container vessels call, serving as major transit points for marine transport
	Feeder Ports	Ports where containers are transported by feeder vessels after transshipped at a hub port
	Maritime Container Transport Network	Ports handling export and import cargo to and from inland countries
	No Transit Container	Ports handling export and import cargo
Management and Operation	Service Ports	Public agencies manage the port, own and build port infrastructure including cargo handling equipment, and handle cargo.
	Tool Ports	Public agencies manage the port, own and build port infrastructure including cargo handling equipment, while the private sector handles cargo.
	Landlord Ports	Public agencies manage the port and own the site and port infrastructure. The private sector obtains the business right of port operation and operates the port, which includes the building facilities, the cargo handling equipment procurement, and hiring labor through its own funds.
	Private Service Ports	The private sector owns the port, builds the infrastructure, and manages and operates the port. In the future, the private sector will also own the port.

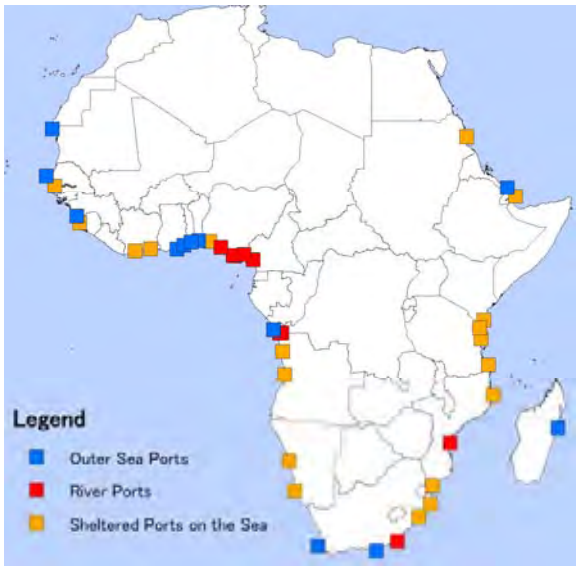


Figure 3-6 Port Topographic Conditions by Category

Figure 3-7 Freight Purpose by Category

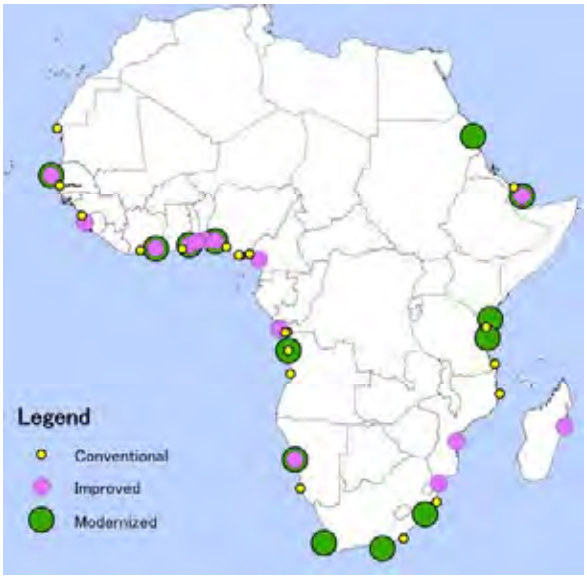


Figure 3-8 Container Terminal Condition by Category

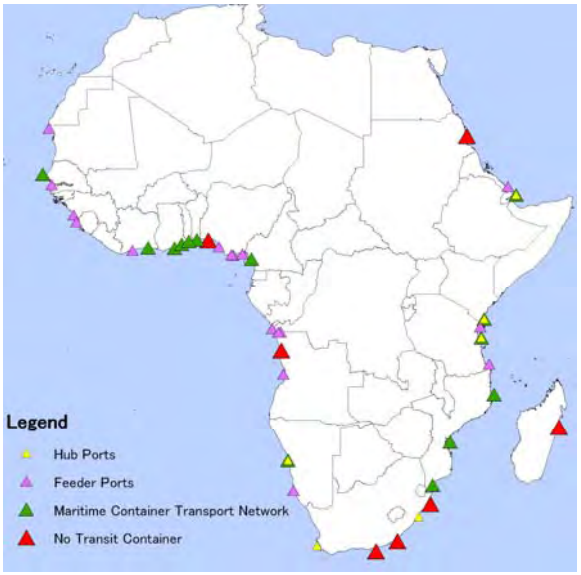


Figure 3-9 Logistics Chain Position by Category

Figure 3-10 Container Cargo Handling Volume (TEUs)

Figure 3-11 General Cargo Handling Volume (tons)

3.3.2 Change in Cargo Handled

The volume of cargo handled from 2001 to 2008 in Sub-Saharan Africa increased by an annual rate of 13.2% in the east, 10.9% in the south, and 9.9% in the west. While general cargo increased at an annual rate of 3.1% in East Africa and 12.1% in West Africa, it decreased in Southern Africa (by an annual rate of 11.6%).

Most of the container and general cargo of the Southern African region is handled at South African ports such as Durban. These ports are relatively advanced with upgraded port facilities and services to accommodate large container ships, which contributes to the increase in the volume of container cargo while suppressing the handling of general cargo in the Southern African region. In East and West Africa the volume of both container and general cargo handled is on the rise; this trend is especially notable in West Africa.

Concerning dry and liquid bulk cargo, it is difficult to obtain accurate information on trends handled as these items are mainly handled by privately owned terminals. However, the volumes are likely steadily increasing in Sub-Saharan Africa due to the growing trade of natural resources.[3] Based on data from the ports that disclose traffic data, it appears that the volume of dry bulk cargo is decreasing in Southern Africa while it is increasing in East and West Africa. Trends in the volume of dry bulk cargo are similar to those for general cargo, since containerization is possible for some dry bulk cargo such as copperplate. As for liquid bulk, there is not a significant difference in a shift of volumes handled between regions. Table 3-4 presents growth rates in cargo handling by sub region.

[3] Africa Infrastructure Country Diagnostic (AICD), 2009, Beyond the Bottlenecks Ports in Africa.

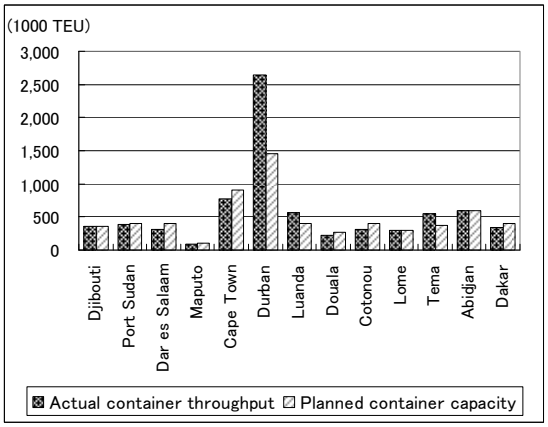
Table 3-4 Growth Rate of Annual Cargo Handling Volume of Major Ports in Sub-Saharan Africa[4]

	Container Cargo (%)	General Cargo (%)
Eastern	13.2	3.1
Southern	10.9	−11.6
Western	9.9	12.1
Total	11.0	−5.0

Source: Calculated with data from Shipping Statistics (annual)

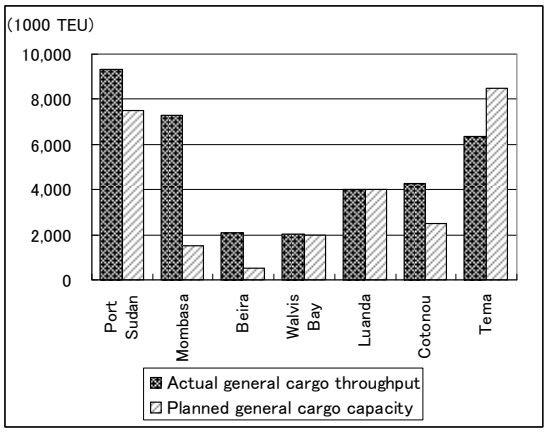
3.3.3 Current Status of Port Infrastructure

As previously discussed, the volume of both container and general cargo traffic has substantially increased. This is causing a growing capacity shortage at container terminals and general cargo terminals at major ports in Sub-Saharan Africa. Figure 3-12 shows a comparison between the planned capacity[5] and the actual volume of cargo handled at ports needing additional capacity (container terminal capacity in particular). At many of these major ports, the volume of cargo handled surpasses the planned capacity. Figure 3-13 shows the same comparison done with general cargo. It is evident that there are many ports where the handling volume of general cargo surpasses capacity, or comes close to the capacity limitation.



Source: prepared based on i) AICD, 2009; ii) Shipping Statistics

Figure 3-12 Container Cargo Handling Volume and Planned Terminal Capacity



Source: same as the left

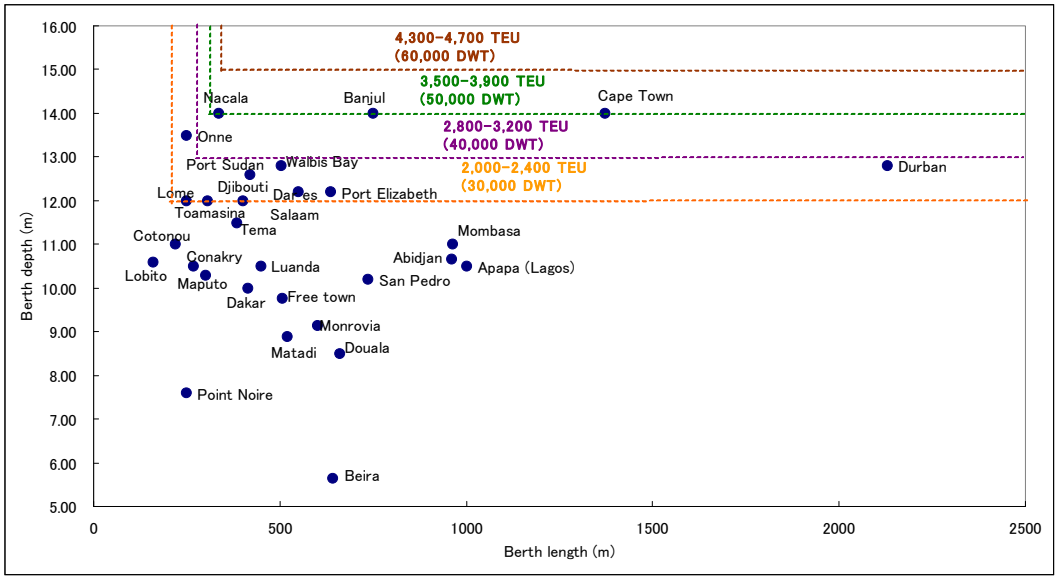
Figure 3-13 General Cargo Handling Volume and Planned Terminal Capacity

[4] Due to data constrains, this study used the total volume of cargo handled at certain ports in calculating the growth in the volume of cargo handled. To be specific, total handling volume of two ports in East Africa (Djibouti and Mombasa), five ports in Southern Africa (Beira, Port Louis, Cape Town, Durban, and Port Elizabeth), and five ports in West Africa (Cotonou, Lome, Takoradi, Tema, and Abidjan) were used. To calculate the handling volume of general cargo, the total handling volume of two ports in East Africa (Djibouti and Mombasa), eight ports in Southern Africa (Beira, Port Louis, Cape Town, Durban, East London, Port Elizabeth, Richards Bay, and Saldanha Bay), and three ports in West Africa (Cotonou, Takoradi, and Tema) was used.

[5] Planned capacity refers to the maximum handling volume of cargo planned at the time of development of a port terminal. If prerequisites (e.g., the efficiency of cargo handling equipment) change, it is possible to handle cargo larger than the planned capacity. However, handling cargo surpassing the planned capacity generally brings negative economic effects, as the waiting time offshore and time spent at the port increases.

Cargo handling capacity is largely affected by port facilities and services, the efficiency of operation, and various procedures related to importing/exporting cargo.

The water depth of many of ports in Sub-Saharan Africa is less than 10 meters. An over-Panamax container ship (4,000 TEU class), used for the long-distance route connecting Asia and Europe, requires water depth greater than 15 meters, yet there is no port that fulfills this requirement in Sub-Saharan Africa. There are also only a few ports in the region that meet the 12 meter requirement for a Panamax container ship (2,000 TEU class): Cape Town Port, Durban Port, Banjul Port, Nacala Port, Onne Port, Walvis Bay Port, Port Sudan, Port Elizabeth, Dar es Salaam Port, Djibouti Port, Tomasina Port, and Lome Port. Although large container ships offer high unloading efficiency, one of the reasons for the shortage of port capacity is the limited number of ports that can accommodate large container ships in Sub-Saharan Africa. Figure 3-22 presents a comparison between the berth depth/berth extension by the scale of container ship, and the berth depth/berth extension of existing major ports in Sub-Saharan Africa.



Source: Prepare based on various sources (e.g., regarding standards of berth depth/berth extension by the scale of container ships, this table is based on values published in Technical Standards and Commentaries for Port and Harbour Facilities in Japan and Technical Standards and Commentaries for Port Facilities)

Figure 3-14 Berth Depth and Length, and Feasible Container Vessel Size for Entry

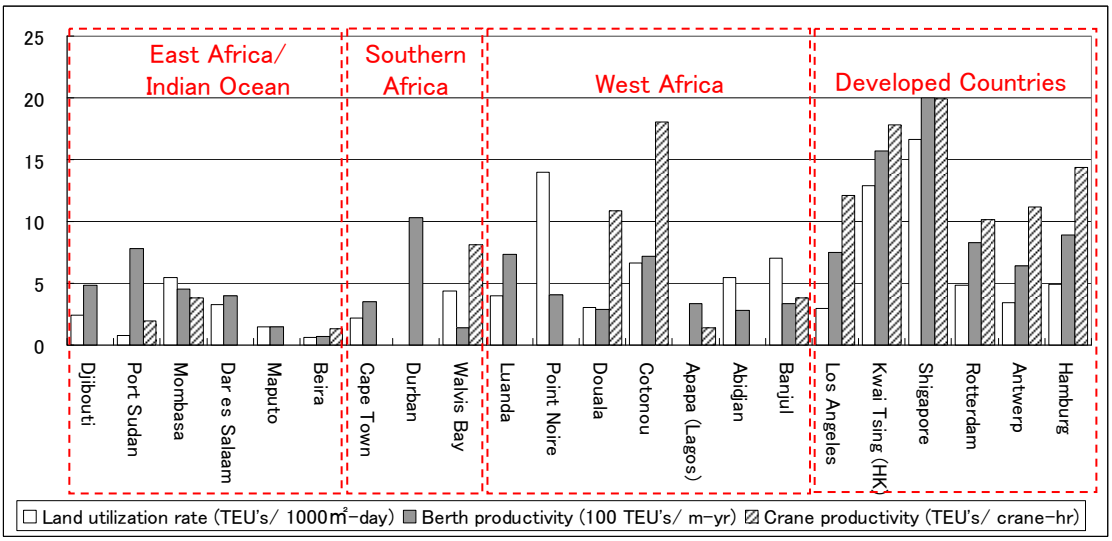
There is an extremely limited number of ports in the region that use gantry cranes for uploading container cargo. A gantry crane is substantially more efficient compared to a mobile crane or ship gear, and most of the major ports in developed countries upload container cargo by gantry cranes. Inadequacy in cargo handling equipment is another factor explaining the shortage of port capacity.

3.3.4 Current Status of Port Operation

In order to assess port operational efficiency, factors such as the ground utilization rate, quay utilization rate, and crane utilization rate at major ports in Sub-Saharan Africa and other regions of the world were also compared (Figure 3-15). However, only the crane utilization rates of ports that have implemented gantry cranes were calculated. Figure 3-15 shows that these indices of work efficiency greatly differ depending on the port, even within Sub-Saharan Africa. On the

whole, there is not a large difference between the indices for Sub-Saharan African ports and major European ports such as Hamburg, Antwerp, and Rotterdam. However, there is room for improvement when compared to the efficiency of some ports such as Singapore and Hong Kong.

In recent years, backed by support from the World Bank and other development partners, port container terminals in Sub-Saharan Africa have become increasingly privatized. There are many cases where the world's mega operators have operated on a concession basis, and operational efficiency has subsequently improved.[6] However, the procedures of government authorities such as the customs administration conducted at the port are still largely cumbersome.



Source: Prepared based on data from Containerisation International, AICD, and other sources

Figure 3-15 Efficiency Comparison of Container Terminal Facilities and Equipments – Ports in Sub-Saharan Africa and Other Regions

3.3.5 Status of Support by Major Development Partners

Major development partners, including include JICA, the European Investment Bank (EIB), and the World Bank, are assisting the development of container terminals at major ports. As mentioned, the World Bank supports both the privatization of container terminals and the facilitation of customs procedures at ports. Table 3-5 presents example port facility development projects assisted by these development partners.

[6] Chapter 4 discusses examples and lessons concerning operational methods of port businesses.

Table 3-5 Major Port Facility Development Assistance Projects by Development Partners in Recent Years

Ports (Countries)	Development Partner(s)	Project Names/Summary	Start	End	Status
Douala (Cameroon)	World Bank (IBRD)	*Douala Port Project* Terminal (container berth and multi-purpose berth) expansion	1983	1991	Complete
	JICA	*Douala Port Container Terminal Modernization Project* Rehabilitation of the container terminal	1987	NA	Complete
Point Noire (Congo Republic)	EIB	Rehabilitation of the container terminal	— (Signed in 2009)		Under preparation
Djibouti (Djibouti)	AfDB	*Bulk Terminal Project in Djibouti* Development of the bulk terminal	—	—	On-going
Conakry (Guinea)	EIB	Rehabilitation and expansion of the container terminal	— (Signed in 2003)		Under preparation
Mombasa (Kenya)	JICA	*Mombasa Port Development Project* New container terminal construction	2007	—	Ongoing
Mombasa (Kenya)	World Bank	*East Africa Trade Transport Facilitation Project* Improvement of the port procedure and security	2006	2011	Ongoing
Monrovia (Liberia)	World Bank	*Liberia Infrastructure Rehabilitation Project* Rehabilitation of the entrance channel and oil jetty	2006	2010	Ongoing
	World Bank	*Emergency Infrastructure Rehabilitation Project - Additional Financing* Rehabilitation project of the container terminal yard	2009	NA	Ongoing
Beira (Mozambique)	JICA	*Beira Port Dredger Enhancement Project* Provision of a dredger	2007	2009	Completed
	EIB, Netherlands	*Beira Corridor Project* Entrance channel dredging (dredging to recover the entrance channel depth to its original design)	2010	—	Under preparation
	DANIDA	Provision of a dredger	2011	—	Under preparation
Maputo (Mozambique)	WB (IDA)	*Railways and Ports Restructuring Project* Rehabilitation of the Maputo Port Jetty Terminal (one of the components of the project involves Maputo Port)	1999	2009	Completed
Dakar (Senegal)	World Bank (IDA)	*Dakar Container Port Project* Rehabilitation of the container terminal	1984	1992	Completed
	World Bank (IDA)	*Second Transport Sector Project* Expansion of the container terminal	1999	2007	Completed
	EIB	*Liaison Maritime Dakar –Ziquinchor* Construction of a Ro-Ro terminal	—	—	Under preparation

Ports (Countries)	Development Partner(s)	Project Names/Summary	Start	End	Status
Freetown (Sierra Leone)	WB (IDA)	*SL Infrastructure Development Project* Rehabilitation and expansion of the container terminal	2005	2011	Ongoing
Durban (South Africa)	JBIC and others	*Port Expansion Project in Southern Africa* Loan contract for Port expansion (co-financed with private Japanese banks)	2009	—	Ongoing
Dar es Salaam (Tanzania)	World Bank	*East Africa Trade Transport Facilitation Project* Improvement of port procedures and security	2006	2011	Ongoing

Source: Based on development partners websites

3.4 Current Status of Railway Infrastructure

3.4.1 Overview of Railways in Sub-Saharan Africa

Almost all railways in Sub-Saharan Africa operate long-distance freight services. Some are to urban railways while others do not carry passengers at all. In addition, among the railways which transport freight, most carry various kind including natural resources. Railways dedicated to one freight type are quite limited. Figure 3-6 summarizes the railways of Sub-Saharan Africa, categorized by type of freight transport, type of passenger transport, area of service, and form of management.

With respect to the area of service, only a few railways cover three countries; most operate only within one or two countries. Regarding the form of management, some railways have been privatized but most are still managed by the government. Of the privatized railways, most are combined-structure PPPs in which both the maintenance of railway infrastructure and the management of railway operation are the responsibility of the private sector. On the other hand, separated-structure PPPs, in which the public sector is responsible for the maintenance of railway infrastructure, are found only in the cases of Tanzania Railways, Mandarail in Madagascar, and Sitarail in Côte d'Ivoire and Burkina Faso.

Table 3-6 Categorization of Major Railways in Sub-Saharan Africa

		Operating Agency	PPP Process Phase (Management)						Freight Transport				Passenger Transport			Service Area			Remarks
			National (Public)	Private	Partly PPP	BOT	Combined-structure PPP	Separated-structure PPP	Freight	General Freight Transport	Semi-industrial Railway	Industrial Railway	Passenger	General Passenger Transport	Urban Railway	Domestic	Regional (2 countries)	Long-distance regional (more than 3	
1	Sudan	SRC: National	✓						✓	✓			✓	✓		✓			
2	Eritrea	Eritrean Railways: National	✓						✓	✓			✓	✓		✓			Like a light railway.
3	Ethiopia (Dibouti)	CDE: National	✓						✓	✓			✓	✓			✓		
4	Uganda/ Kenya	Rift Valley Railways: PPP			✓		✓		✓	✓			✓	✓	✓		✓		
5	Kenya	Magadi Rail: Private		✓					✓			✓				✓			
6	Tanzania	Tanzania Railways Ltd: PPP						✓	✓	✓			✓	✓			✓		
7	Tanzania	TAZARA: Public	✓						✓	✓			✓	✓			✓		
8	Zambia	RSZ: PPP					✓		✓	✓			✓	✓				✓	
9	Zambia	TAZARA: Public	✓						✓	✓			✓	✓			✓		
10	Malawi	CEAR: PPP					✓		✓	✓			✓	✓			✓		
11	Mozambique	CDN: PPP			✓		✓		✓	✓			✓	✓			✓		
12	Mozambique	CCFB: PPP			✓		✓		✓		✓		✓	✓			✓		
13	Mozambique	CFM: National	✓						✓	✓			✓	✓			✓		
14	Zimbabwe	NRZ: National	✓						✓	✓			✓	✓	✓		✓		
15	Zimbabwe	BBR: PPP: BOT			✓	✓	✓		✓	✓								✓	
16	Madagascar	Madarail SA: PPP			✓			✓	✓	✓			✓	✓		✓			
17	South Africa (Swaziland)	PRASA: National	✓										✓	✓	✓		✓		RSA is a country with a developed railway system.
18	South Africa (Swaziland)	TFR: National	✓						✓	✓								✓	Categorized as long-distance regional railway by means of freight transport.
19	South Africa (Swaziland)	Swaziland Railway: National	✓						✓	✓			✓	✓				✓	Operated integrally with railways of RSA
20	South Africa (Swaziland)	GRRL: PPP: BOT			✓	✓	✓						✓	✓	✓	✓			Aims enhancement of the passenger railway network.
21	Botswana	Botswana Railways: National	✓						✓	✓			✓	✓				✓	
22	Namibia	TNHL: National	✓						✓	✓			✓	✓			✓		
23	Angola	CFM: National	✓						✓	✓			✓	✓		✓			Damaged by the civil war. Rehabilitation is planned to be completed in 2010.
24	Angola	CFL: National	✓						✓	✓			✓	✓		✓			Damaged by the civil war. Under rehabilitation.
25	Angola	CFB: National	✓						✓	✓			✓	✓				✓	Damaged by the civil war. Under rehabilitation.
26	Angola	Ambion Railway: National	✓						✓	✓						✓			Damaged by the civil war. Under rehabilitation.
27	DRC	SNCC: National	✓						✓	✓			✓	✓				✓	
28	DRC	ONATRA: National	✓						✓	✓			✓	✓	✓	✓			
29	Congo	CFCO: National	✓						✓	✓			✓	✓		✓			
30	Gabon	Transgabon Railway: PPP					✓		✓		✓		✓	✓		✓			
31	Cameroon	Camrail: PPP					✓		✓	✓			✓	✓		✓			
32	Nigeria	NRC: National	✓						✓	✓			✓		✓	✓			
33	Benin	OCBN: National	✓						✓	✓			✓	✓		✓			
34	Togo	Togo Rail SA: PPP			✓		✓		✓	✓						✓			
35	Togo	SNPT: National	✓						✓			✓				✓			
36	Ghana	GRC: National	✓						✓	✓			✓	✓		✓			Hardly functioning caused by damaged railway tracks and rolling stocks.
37	Ivory Coast, Burkina Faso	Sitarail: PPP						✓	✓	✓			✓	✓			✓		
38	Liberia	NIOC: National	✓						✓			✓				✓			
39	Liberia	Bong Mining Company: Private		✓					✓			✓				✓			
40	Guinea	ONCFG: National	✓						✓			✓	✓	✓		✓			Operation stoped in 2008 caused by damaged railway track
41	Guinea	Kindia Bauxite Railway: Private		✓					✓			✓				✓			
42	Guinea	Boke Railway: Private		✓					✓			✓	✓	✓		✓			
43	Guinea	Conakry-Fria Railway: Private		✓					✓			✓				✓			
44	Guinea	Dabola-Tougue Railway: Private		✓					✓			✓				✓			Branch of ONCFG.
45	Senegal, Mali	Transrail SA: PPP			✓		✓		✓	✓			✓	✓			✓		
46	Senegal	PTB: Public	✓										✓		✓	✓			
47	Senegal	Sefics: National		✓					✓			✓				✓			
48	Mauritania	SNIM: National	✓						✓			✓	✓	✓		✓			

SRC (Sudan Railway Corporation), Eritrean Railways, CDE (Ethio-Djibouti Railway Company), RVR (Rift Valley Railways), Magadi Rail, TRL (Tanzania Railways Ltd), TAZARA (Tanzania-Zambia Railway Authority), RSZ (Railway Systems of Zambia Ltd), CEAR (Central East African Railways Company), CDN (Corredor de Desenvolvimento do Norte), CCFB (Beira Railway Company), CFM (Mozambique Ports & Railways), NRZ (National Railways of Zimbabwe), BBR (Beitbridge-Bulawayo Railway (Private) Ltd. Madarail SA, PRASA (Passenger Rail Agency of South Africa), TFR (Transnet Freight Rail), SR (Swaziland Railway), GRRL (Gautrain Rapid Rail Link), BR (Botswana Railways), TNHL (TransNamib Holdings Ltd), CFM (Mocamedes Railways), CFL (Luanda Railways), CFB (Benguela Railway), Ambion Railway, SNCC (Societe Nationale des Chemins de Fer du Congo), ONATRA (National Office of Transport), CFCO (Chemin de Fer Congo-Ocean), Transgabonais (Transgabon Railway), Camrail (Cameroon Railways), NRC (Nigerian Railways Corporation), OCBN (Organisation Commune Benin-Niger des Chemins de Fer et des Transports), Togo Rail SA, SNPT (Societe nouvelle des phosphates du Togo), GRC (Ghana Railway Company Ltd), Sitarail, NIOC (National Iron ore Company Ltd), Bong Mining Company, ONCFG (Office National du Chemin de fer de la Guinee), Kindia Bauxite Railway, Boke Railway, Conakry-Fria Railway, Dabola-Tougue Railway, Transrail SA, PTB (Le Petit Train de Banlieue-SA), Sefics 社, SHIM (Mauritanian National Railways)

Source: Jane's World Railways (2009, HIS Jane's), Railways Databases (Update 2007 and Private Concessions Database, World Bank), DDPQQ Database (World Bank Group), World Railways (2005, JARTS, Japanese)

3.4.2 Traffic

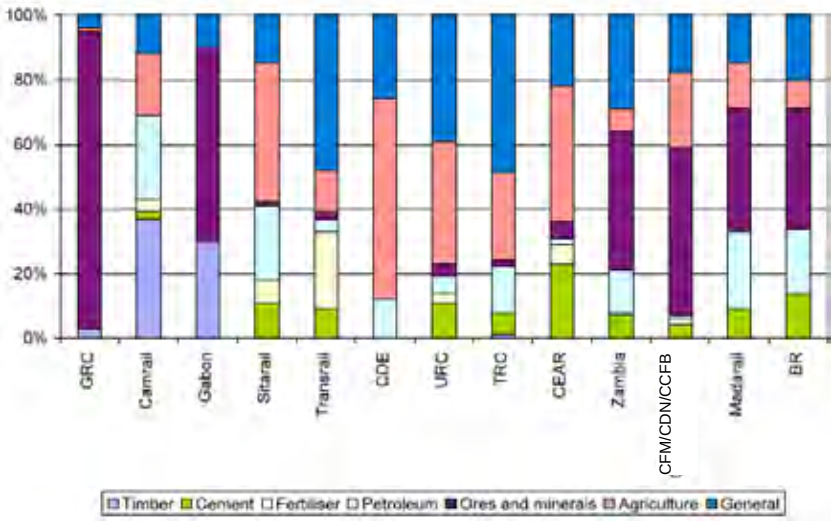
Table 3-7 presents a comparison by region of passenger transport volume (in person-km) and the freight transport volume (in ton-km) of railways in Africa. It is evident that railways in Africa mainly transport freight.[7] However, railways in North and Southern Africa transport comparatively more passengers than railways in other parts of Africa. Passenger transport has become more significant compared to freight transport on railways of North Africa.

Table 3-7 Freight and Passenger Transport Volumes of African Railways

Region	Route-km (000) operated	Passenger-km (billion)	Net tonne-km (billion)	Density (million traffic unites per route-km)
North Africa	13	45	13	4.7
West Africa	9	1	12	1.4
Central Africa	6	1	4	0.9
East Africa	9	1	5	0.6
Southern Africa	33	13	114	3.9
Total	69	61	148	3.0

Source: AICD, 2009

Moreover, the types of freight carried by railway are greatly variable depending on the route. On a number of regional rail carriers (e.g., in Gabon, Zambia, Madagascar), the transport of mineral resources accounts for a relatively high proportion of freight transported. On other railways, agricultural products, timber, cement, fertilizer, and fuel, account for a comparatively large percentage of the freight traffic. In a study of railway development plans, it is important that the relation between the industrial structure and the goods transported in the areas along the railway be well understood (refer to Figure 3-16).



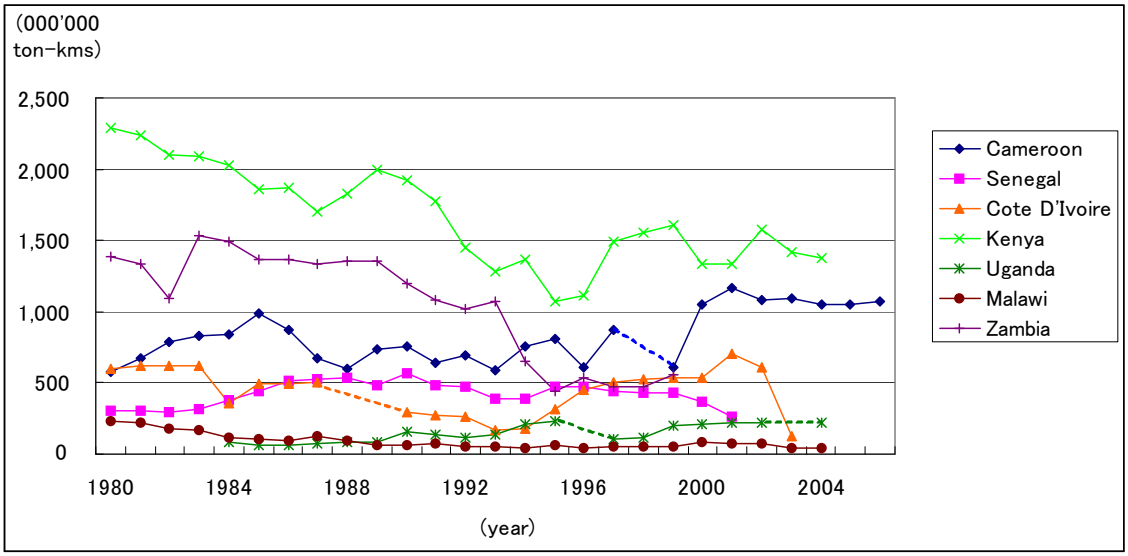
Source: AICD, 2009

Figure 3-16 Commodities Carried on Selected Sub-Saharan Railways

[7] The sum of person-km and ton-km is called "traffic units", which is often used to compare when the overall transport performance between/among different railways.

On the other hand, although the railways of Sub-Saharan Africa were developed and maintained in former colonial times, after independence, the majority of the railways rapidly deteriorated and, due to a lack of maintenance, overall transport capacity has also declined. Figure 3-17 shows the transition of the railway traffic in each country after 1980. From this figure it can be seen that total railway traffic has been decreasing along each route. Although the total freight transport volume has been increasing along with economic growth, because of a decrease in the transport capacity of most rail lines, there has been an increased reliance on road transport. In Sub-Saharan Africa it is not rare for freight transport distances to exceed 1,000 km because of the need to haul goods from ports to inland destinations. However, in general, road transport currently accounts for a majority of the modal share and this is expected to continue increase.

Even in situations where railway transport capacity is insufficient, demand for railway transport exceeds its capacity due to its lower cost. Due to an imbalance between demand and transport capacity, much cargo is kept for 2–3 months before it is transported by railway. In addition, in some situations, the railway capacity is insufficient to transport heavy freight such as copper, iron ore, and coal from inland countries. In this situation, this bulky cargo is often transported by road. Many cases have been observed across the continent in which repeated road maintenance is required due to pavement deterioration pavement caused by excessive transport loads some years after a road has been completed.



Source: World Bank, Railway Database 2007

Figure 3-17 Railway Freight Traffic by Selected Sub-Saharan African Railways (1980–2006)

3.4.3 Current Status of Railway Infrastructure

Figure 3-18 shows the operating status of Sub-Saharan Africa's main railway corridors. As can be seen from the figure, there are railway corridor sections that are run down or on which service has been suspended.

Many of these are routes where the railway infrastructure facilities have deteriorated and railway operations were shutdown due to the limited maintenance investments and repair expenses. On other routes, railway operations have become difficult because of an insufficient railway rolling stock as railway operations are generally limited to rail sections with particularly

high demand. As shown in Figure 3-19, most railway lines in Sub-Saharan Africa are single track lines with limited capacity.

Source: Jane's World Railways

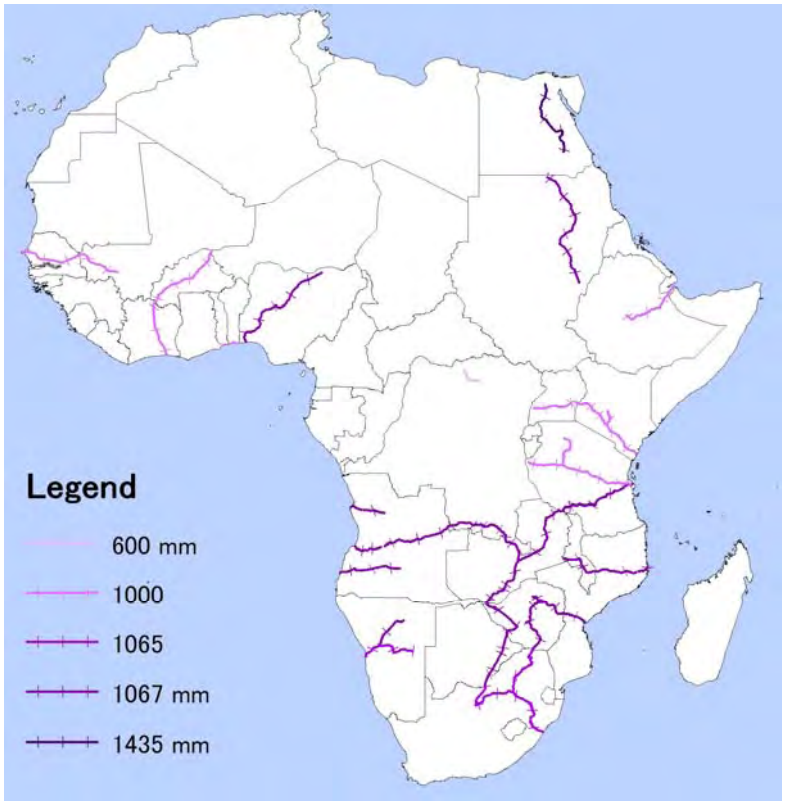
Figure 3-18 Operation Status of Railway Corridors

Source: Jane's World Railways

Figure 3-19 Number of Tracks of Railway Corridors

Figure 3-20 shows the distribution of standard gauge railway in Sub-Saharan Africa. As can be seen from the figure, railways that connect East Africa including Kenya, Tanzania, and Uganda, are 1,000 mm gauge[8]. On the other hand, in Southern Africa the railway track is 1,067 mm gauge,[9] and in North Africa there is some track with standard gauge (1,435 mm gauge).[10] This situation originated during colonial times, when the railways were constructed and developed by each colonial power using the railway standards of each particular country. Significant extensions and further development have not been undertaken until recently. In recent years, there has been a growing momentum to extend railway lines and develop a broad-area railway network. All African countries have agreed to unify the railway lines of each country to standard gauge. On the other hand, because improvement requires large costs, it has been proposed that it would be more economical to strengthen transport capacity by improving and repairing tracks through a focus on improved speed rather than through optimizing railway "trajectories".[11]

[8] This is called standard meter gauge and is used in mainland Southeast Asia, Europe, Africa, and parts of South America.
[9] This is one of the standard gauges, which is used in Taiwan, the Philippines, Indonesia, and New Zealand, as well as in Central and Southern Africa. In addition, a number of subways and private railways, as well as the JR conventional lines, among others, are designed using this standard. This is also called "Cape gauge" because it was first used in Cape Town.
[10] This is called "standard gauge", which is the standard for the railways of Europe and North America. About 60% of the railway lines in the world are designed with this standard.
[11] In the East African Community (EAC) Railway Master Plan completed in 2008-2009, it was scheduled at first to prepare a long-term railway maintenance plan with the idea of unifying the rail gauge to standard gauge. The consultant that executed this study finally proposed a maintenance plan without unifying track gauge, but their recommendation was not accepted by the EAC countries and unification of the rail gauge is being considered.

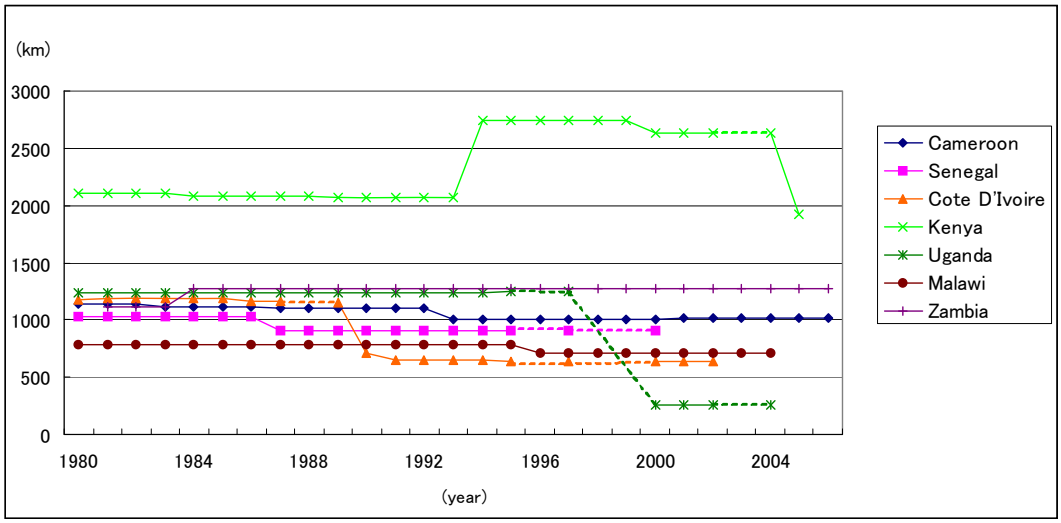


Source: Prepared based on: (i) Jane's World Railways; and (ii) World Bank, Railway Database

Figure 3-20 Gauge of Railway Corridors

Thus, railways in Sub-Saharan Africa have a number of issues due to their reliance on the original rail infrastructure, e.g., different track gauges, and in many cases, a single-track route. However, a bigger problem is that sufficient maintenance and rehabilitation of the original railway infrastructure has not been conducted until recently.

Figure 3-21 shows the change in length of each of the main railway lines in Sub-Saharan Africa. Since 1980, the length of railways in operation has decreased. As mentioned, these lines include those that have not been operated due to a lack of repair and maintenance as well as others that due to a shortage of railway rolling stock have closed some segments in order to concentrate on routes with relatively high demand. In addition, the train operating speeds have shown a tendency to decrease due to a lack of repair and maintenance; the average travel speed on most operating routes falls below 20 kph at present. Transport capacity along the route is remarkably low for a number of reasons, e.g., long transit times caused by derailment accidents. There are some railways where the railway infrastructure (e.g., the roadbed, bridges, rail track) has deteriorated to the extent that it is impossible to increase train operating frequencies even if additional rolling stock is added.

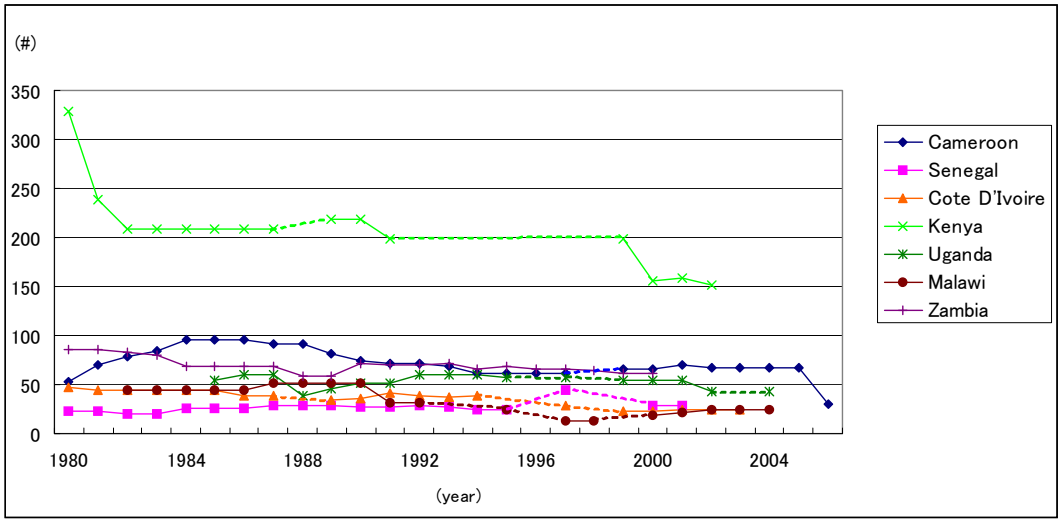


Source: World Bank, Railway Database 2007

Figure 3-21 Railway Route Length of Selected Sub-Saharan African Railway (1980–2006)

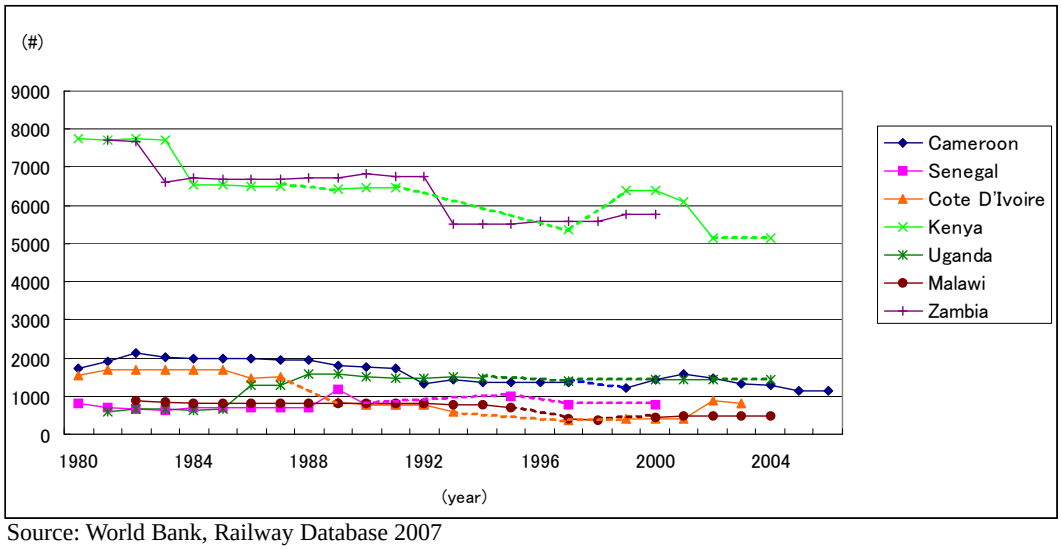
Figures 3-22 and 3-23 show the year-on-year change in the number of locomotives and railway wagons since 1980. Both have been decreasing. In addition, non-operational rolling stock is often counted in the total count although it cannot be repaired due to a lack of spare parts. Consequently, the amount of rolling stock that can be used effectively is lower than appears from these figures. Reasons why there is so much unusable rolling stock include a lack of funding for repairs and maintenance; the fact that most rolling stock and spare parts are not produced in the country and therefore must be imported; and a lack of engineers capable of making adequate repairs. As a result, capacity is significantly constrained by the limitation of rolling stock.

Thus, the railway infrastructure of Sub-Saharan Africa has steadily declined and has become degraded, both in terms of the railway lines and rolling stock. This situation makes it difficult to cope with the increasing demand for economic growth.



Source: World Bank, Railway Database 2007

Figure 3-22 Number of Freight Locomotives (1980–2006)



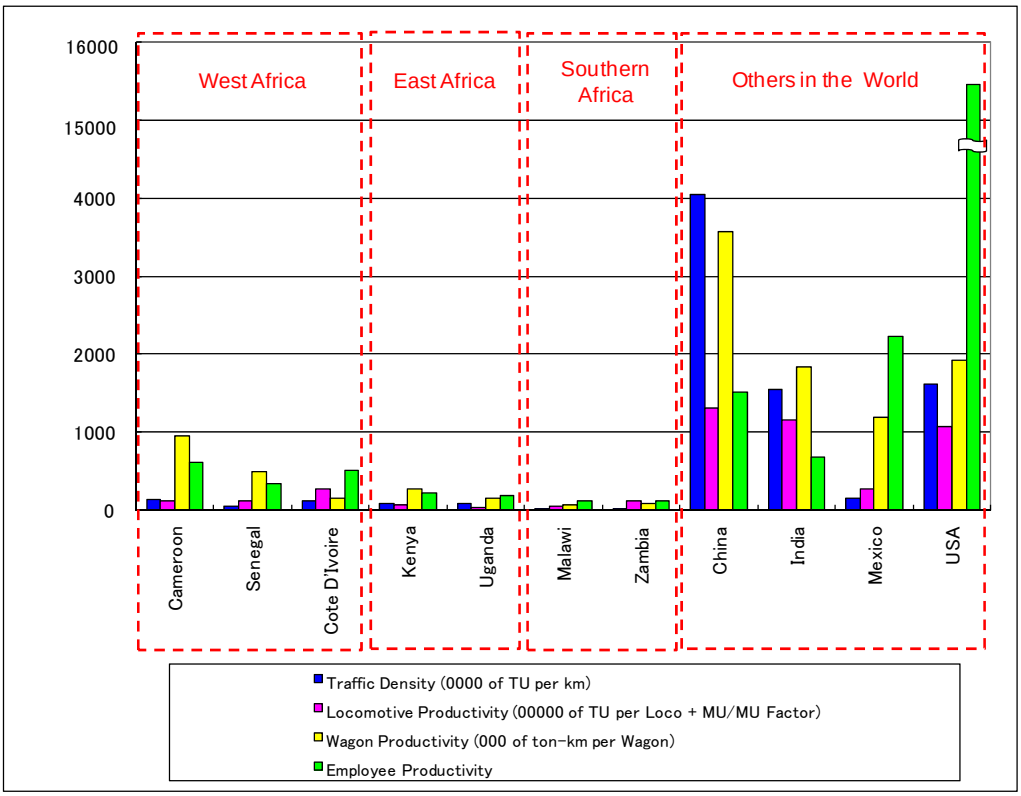
Source: World Bank, Railway Database 2007

Figure 3-23 Number of Freight Wagons (1980–2006)

3.4.4 Current Status of Railway Management

Figure 3-24 compares railways of Sub-Saharan Africa with those of other parts of the world. Indicators of railway management efficiency include: (i) annual traffic volume per unit length of line, (ii) annual freight traffic volume per freight wagon, (iii) annual freight traffic volume per locomotive, and (iv) annual traffic volume per staff. In each efficiency indicator, the scores of Sub-Saharan Africa's railways are relatively low compared with those of the railways of China, India, Mexico, and the United States.[12] The reasons why the efficiency per unit length of line of Sub-Saharan Africa's railways is relatively low are include: (i) constraints on the number of train operations per unit length of line due to single track on most of the routes; (ii) constraints on train operations due to low speed limits stemming from the severe deterioration of railway infrastructure, particularly of the track and rolling stock; and (iii) the shortage of rolling stock, which prevents railways from taking full advantage of operational capacity. Because most routes are single tracks, there are restrictions along the route length on the number of trains that can be operated, a problem that is exacerbated by old, deteriorating rail facilities and rolling stock, resulting in low speed limits. Efficiency per unit of rolling stock is also low since the number of units actually available is much less than the total owned by a railway due to the shortage of spare parts and the lack of repair knowhow in the region. In addition, the management efficiency of the region's railways is low due to a shortage in staff capacity and low productivity per person.

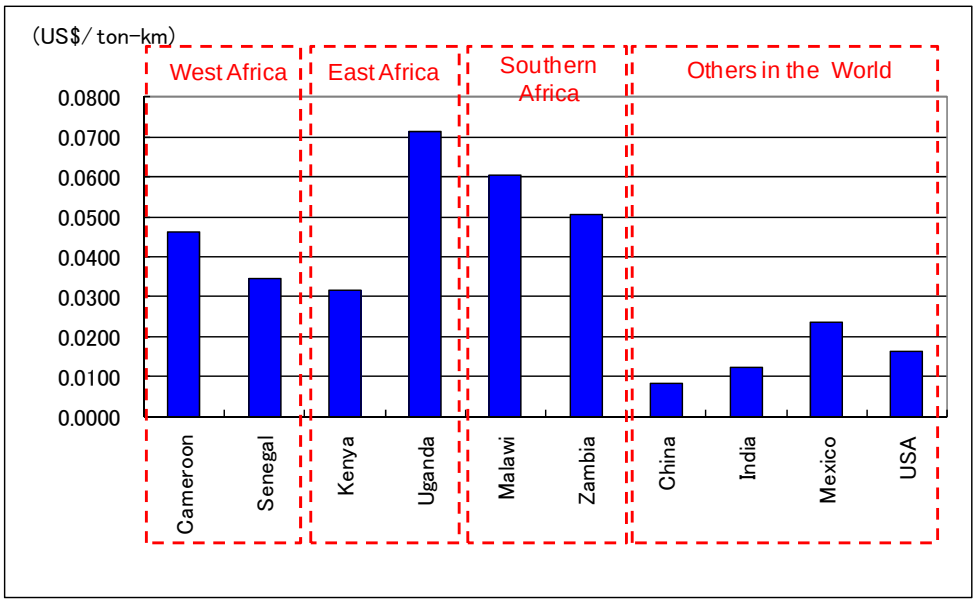
[12] Freight transport is a main area of specialization of railways in the United States, and operation of large unit trains called mile trains is undertaken. The transport efficiency of such operations is extremely high.



Source: World Bank, Railway Database

Figure 3-24 Operational Efficiency Comparison – Railways in Sub-Saharan Africa and Other Regions in the World

In addition, in a comparison of railway transport rates, it was found that rates in Sub-Saharan Africa are relatively higher than other regions (Figure 3-25). In general, the railways of Sub-Saharan Africa have a shortage of funds, and there are many that cannot afford the necessary costs for repairs and maintenance of railway infrastructure and rolling stock. However, they cannot financially invest in repair and maintenance because of low management efficiency, even if railway transport rates are higher than those in other regions in the world.



Source: World Bank, Railway Database

Figure 3-25 Railway Rate Comparison – Railways in Sub-Saharan Africa and Other Regions in the World

In recent years, the railway and port subsectors have increasingly been operated as concessions. But in most cases, after the concession is granted, the business management is taken over by the team of the former operator,[13] although with replacement of some key individuals. The holdover staff members continue to work on railway operations, making use of the railway track and rolling stock. In most concession contracts, additional investment in rolling stock and the repair of railway track is agreed. However, due to financial problems, investment in the railway infrastructure on a large scale does not usually occur. Before the shift to concessions, there were many problems with track, rolling stock, and staff. Therefore, new managements have not succeeded because of the problems that they have inherited.

3.4.5 Status of Development Partner Support

Figure 3-26 shows support of the railway sector, which has been led by the World Bank to date, and has included route rehabilitation, rolling stock purchases, and technical assistance including support for privatization. In particular, maintenance of the Sena Line Railway Line along the Beira Corridor was assisted with USD 500 million from the World Bank and EIB. The EU has focused on road maintenance in Sub-Saharan Africa. Because many roads are currently in poor condition due to heavy freight road transport, the EU has recently begun assist the enforcement of axle load controls and railway transport capacity improvement.

[13] In many of the railways of Sub-Saharan Africa, surplus workforce reduction is undertaken after the concession is contracted. However, because the majority of the staff members of the railway enterprise after the concession are staff members of the former operator, there is generally no substantial change in the management skills and technology of the staff.

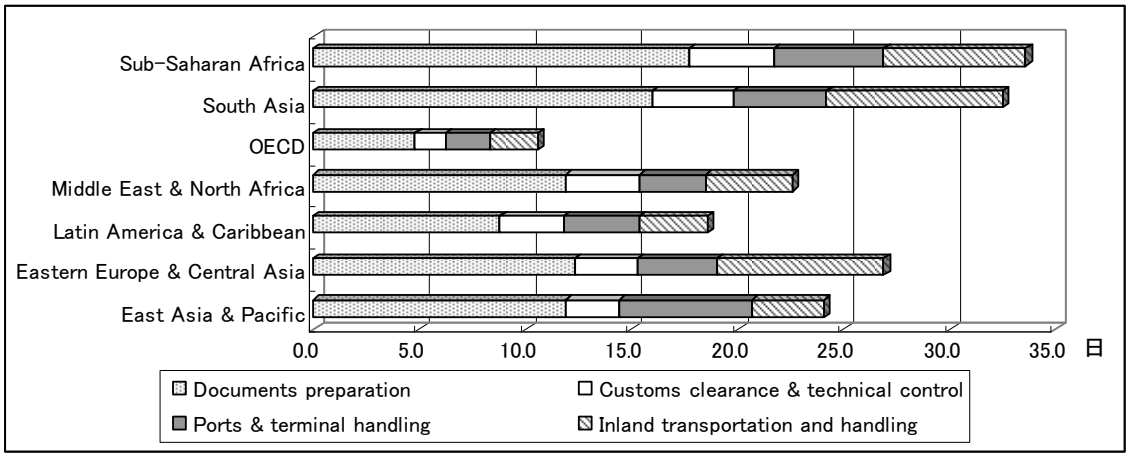
Source: Prepared with information from the websites of various development partners

Figure 3-26 Railway Corridor Development Assistance Projects of Development Partners

3.5 Various Procedures and Facilities Related to Regional Freight Transport

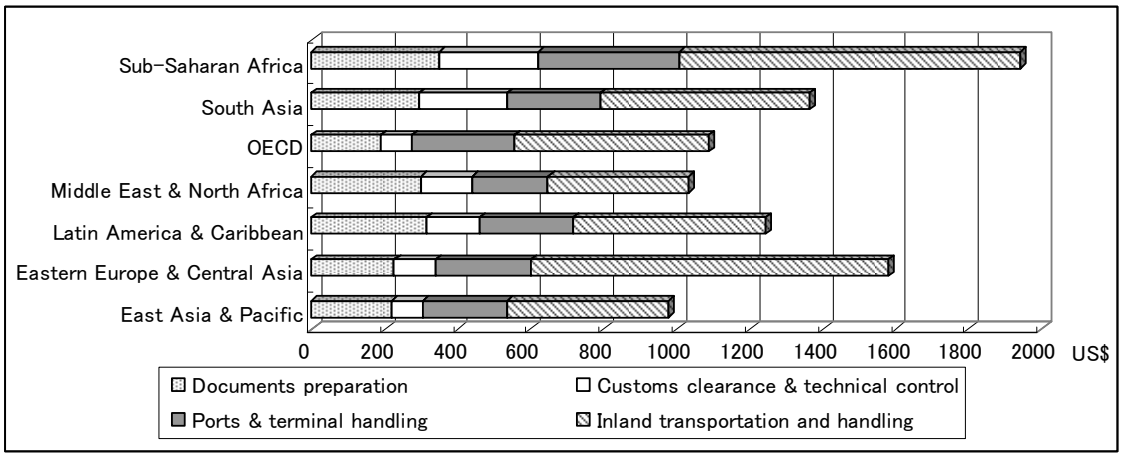
As stated in the previous subsection, the problems with regional freight transport in Sub-Saharan Africa are long transit times and high transport costs, which increase the costs of imports/exports and costs of production. Figures 3-27 and 3-28[14] present the results of a comparison between the time required for procedures and costs in Sub-Saharan Africa and other regions of the world from the perspective of exporters and importers. The results indicate that the time required for procedures in Sub-Saharan Africa are substantially longer, particularly for document preparation. Typically, several organizations related to freight trade and transport, such as Customs and Quarantine authorities, the Port Authority, the Police, and Immigration office, have not yet developed an accessible and standardized information platform; each related organization demands a separate filing; and the procedures have not yet been computerized, or if they have, the procedures are too complicated. The cost comparisons in Figure 3-28 show that inland freight transport charges in Sub-Saharan Africa are higher than those in other regions. Transport charges per unit time and distance (e.g., including charges on import and export trade) are comparatively high; costs per unit time are higher than in other regions in the world, even comparing to the situation of inland transport.

[14] The figures show the view of local traders of import and export costs and prices.



Source: World Bank, Doing Business

Figure 3-27 Breakdown of the Procedure Time for Export



Source: World Bank, Doing Business

Figure 3-28 Breakdown of the Procedure Cost for Export

In addition, according to World Bank research, if the number of days it takes to export goods increases by a day, the trading volume decreases by 1%; that one day delay in importing and exporting is similar to an increase of 70 km between trading partners.[15] Hence, it is necessary to develop and maintain standard procedures and related freight facilities related to regional transport.

3.6 Key Issues of Regional Freight Transport in Sub-Saharan Africa

In Sections 3.2 to 3.5, the current status of and issues in each sector along regional freight transport corridors are summarized. This section analyzes transport time and costs along entire corridors, ands identifies specific sectors causing bottlenecks along the corridors. In addition, major issues related to regional freight transport corridors are discussed. The analysis in this section reflects the study result of 'The Research on the Cross-Border Transport Infrastructure: Phase 3 (JICA, 2008).'

[15] Djankov, Freund, and Pham (2008), *Trading on Time.*

3.6.1 Time and Cost Analysis of Regional Freight Transport Corridors

Taking as an example, the Northern Corridor (between Mombasa Port in Kenya and Kampala in Uganda), one of the leading regional freight transport corridors in Sub-Saharan Africa, the factors leading to bottlenecks along a regional corridor are clarified, and the substantial transport costs in the region are analyzed.

Figure 3-29 presents a graph of the transport time required from the harbor to final destination along the Northern Corridor. Figure 3-30 similarly shows the total required cost for freight transport. Figures 3-31 and 3-33, respectively, show the breakdown of required time, cost, and generalized cost necessary for freight transport along the corridor.[16] The total required cost indicates the necessary expenditure when transport operators haul the freight. The required total cost consists of vehicle running cost and the cost for procedures in the port/ICD. However, here, in case the volume of freight on the homeward trip is smaller compared to the volume on the outward trip,[17] the freight transport costs are defined to assign the additional cost of the homeward trip on the cost of the outward trip. In contrast, the transport price is defined as the price that the shipper pays the transport operator when the transport operation. Moreover, the generalized cost includes the time required to move the freight (i.e., the time value of the freight).

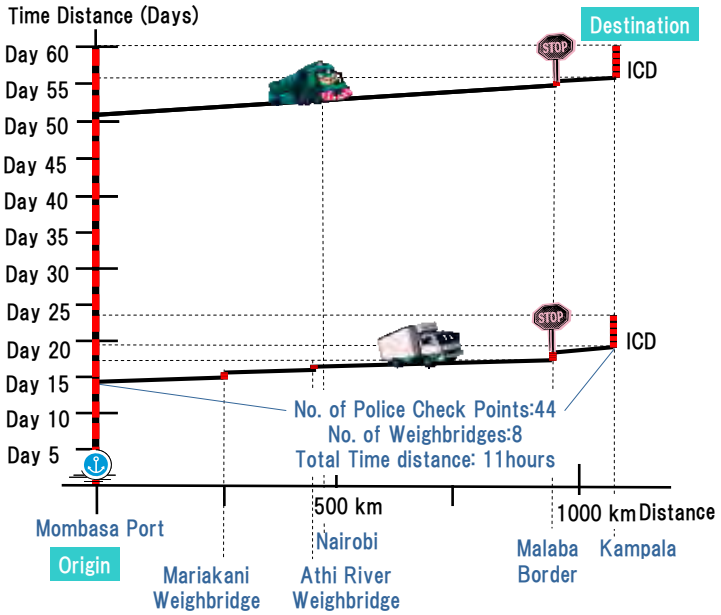


Figure 3-29 Transport Time between Mombasa–Kampala for a 40 ft Container

[16] For the computation formulas and the data used to calculate the total required cost and the generalized cost, refer to the Feasibility Study for Cross-Boarder Traffic Infrastructure Adjustment Research Phase 3 Final Report (JICA, 2009).

[17] The route from port to inland is defined to correspond to the outward trip and the route from the inland to harbors to correspond to the homeward trip.

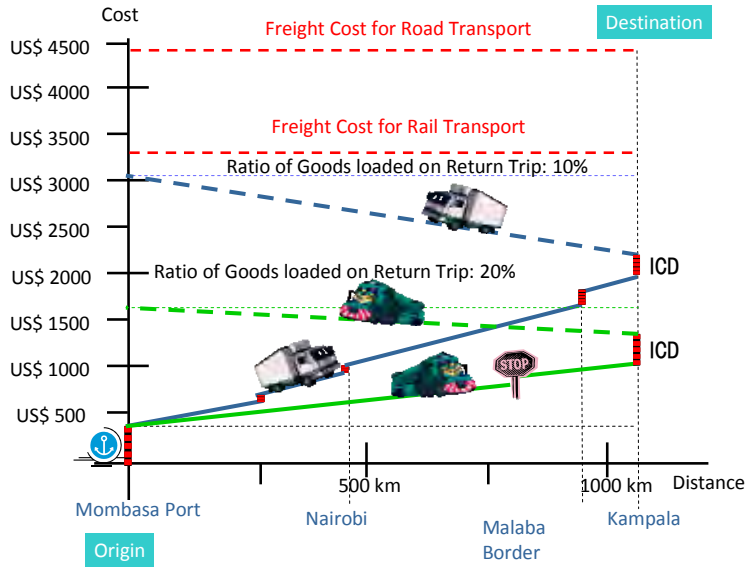


Figure 3-30 Transport Cost between Mombasa–Kampala for a 40 ft Container

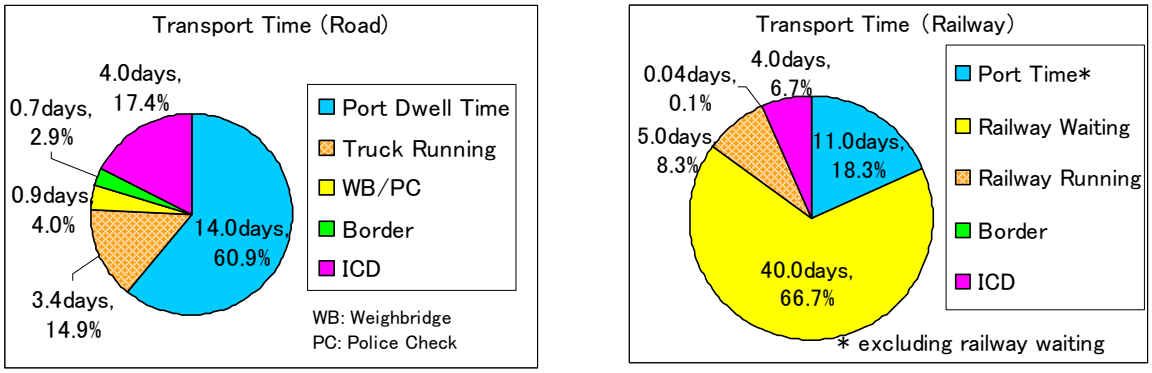


Figure 3-31 Breakdown of Time and Distance between Mombasa–Kampala

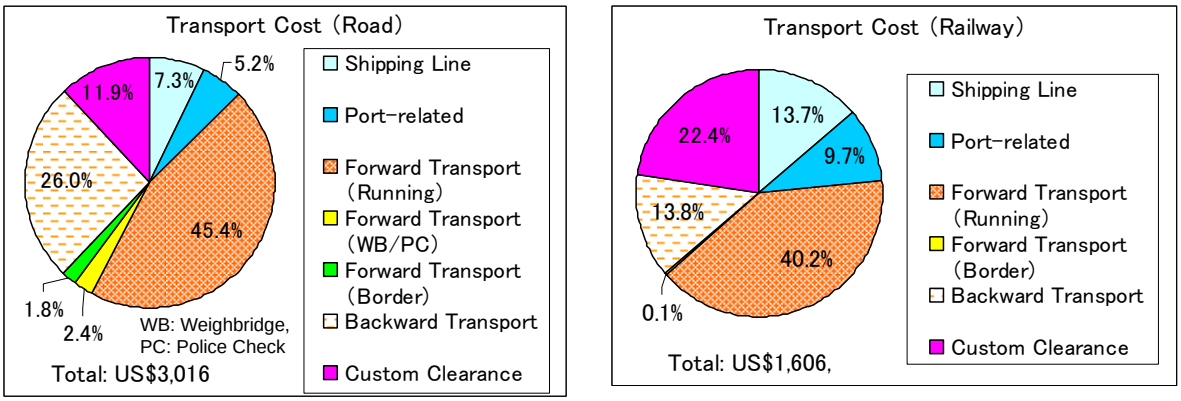


Figure 3-32 Breakdown of Required Cost between Mombasa–Kampala for Transport of a 40 ft Container

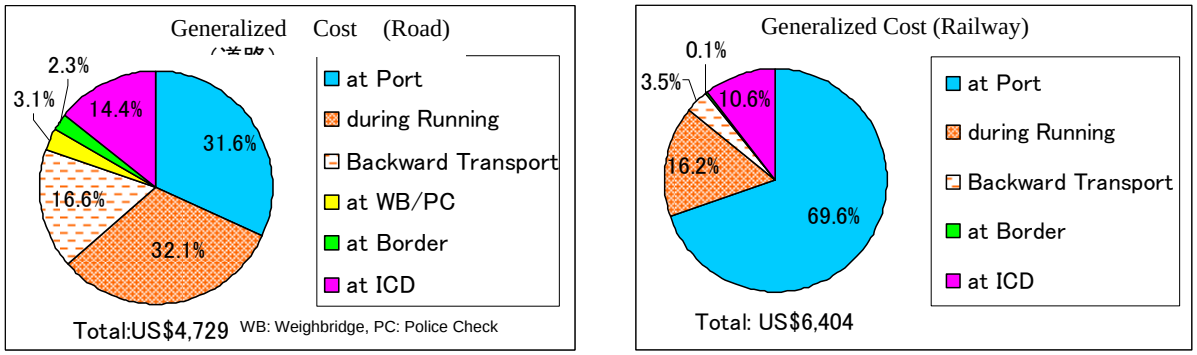


Figure 3-33 Breakdown of Generalized Cost between Mombasa–Kampala for Transport of a 40 ft Container

Figure 3-31 shows that a very large portion of the entire transport time is spent by the time for procedures at the port and the waiting time for a train. As stated in Section 3.3, the reason for the time-consuming procedures at the port is the congestion of the port container terminal and the complexity of the procedures related to customs clearance. Also, as implied in Section 3.4, late railway arrivals are a consequence of insufficient railway transport capacity as compared to the actual demand for railway transport. Transit times by both road and railway are also long. In road transport vehicles do not usually operate at night due to security concerns; in the case of rail transport, operating speeds are low due to poor track conditions.

Border crossing times tend to be short while clearance times at ICDs tend to be long. In the example corridor, customs checks consist only of the inspection of documents at the border, while other procedures (e.g., document presentation, inspection of the goods, import tax collection) are undertaken in an ICD close to the destination. In addition, the time for clearance at weighbridges and road checkpoint passages can be greater than border crossing times in the focus corridor.

Figures 3-30 to 3-32 indicate that a high percentage of half-loaded homeward trips contribute to a large increase in the total transport cost. This increased cost is because many exported goods such as cut flowers and scarce resources such as rare metals are transported via airplane, while imported goods such as machines, instruments, and consumables are transported by ship.
However, these figures show that the difference between the total cost of freight transport and the transport rates is large. In particular, the high rates for truck transport are related to policies to protect the road transport industry. In the case of rail transport, capacity is lower than the demand for railway transport. As each of the rail corridors is dominated by one company, it is presumed that the cost of rail transport would be set at a level slightly lower than the road transport cost.

Finally, the generalized cost, as shown in Figure 3-33, is thought to have the most significant impact on user behavior. Particularly in the rail transport sector, a large portion of costs is accounted for by costs at port due to the long time required for procedures and railway waiting time. It is clear that the port and the railway are the main bottlenecks on the network, although the bottlenecks relate to procedural issues (e.g., customs clearance) and information technology infrastructure. Accordingly, a more detailed analysis of the current status/problems and maintenance policies for ports, railways, and related trade facilitation measures in Sub-Saharan Africa will be presented in the following chapter.

Chapter 4 Management and Operation Systems of Port/ Railway Projects

4.1 Introduction

In this chapter the management and operation systems of port and railway projects in Sub-Saharan Africa are assessed and the reasons for their successes and failures are analyzed.

In section 4.2, the types and characteristics of the management and operation system of port and railway projects in Sub-Saharan Africa are considered. In section 4.3, the backgrounds of 10 port and railway projects and the development of their management and operation systems are described. Further, the factors behind their success as well as their internal problems are analyzed. In section 4.4, lessons from the analyses conclude the chapter.

4.2 Overview of Port and Railway Projects in Sub-Saharan Africa

4.2.1 Port Projects

(1) Types of Port Management

Port management can generally be categorized into four typologies.[1] The responsibility distribution between and among the public and private sector for each type are shown in Table 4-1.

Public service ports: In this category, public agencies manage the port, own and builds port infrastructure including cargo handling equipments, and handle cargo (pilotage and tug services are sometimes outsourced to the private sector).

Tool port: Public agencies manage the port and own and build port infrastructure including cargo handling equipment, while the private sector handles cargo (cargo handling equipment is leased).

Landlord port: Public agencies manage the port and own the site and port infrastructure. The private sector obtains the right to operate the port, which includes the building facilities, the purchasing and management of cargo handling equipment procurement, and the hiring of labor through its own funds. A typical case of this port management type is the concession system).

Private service port: In this category, the private sector owns the port, builds the infrastructure, and manages and operates the port. In the future, the private sector will also own the port in future.

In Europe, North America, and Asia, the main port management system is the landlord port in which the private sector takes on all roles aside from port development and management including port master planning and linkage with urban plans (generally limited to minimum land use permission based on land ownership).[2] African countries, though still relatively inexperienced, have been attempting to modernize and streamline their ports.[3] The concession model,[4] such as found in the case of a typical landlord port, has been adopted most frequently.

[1] "PPPs in Transport – Roads, Ports & Airports", presented on 22–24 September 2009, World Bank International Finance Corporation PowerPoint presentation.
[2] A vertical separation system in which the port manager owns the site was studied and adopted by the Port of Tokyo in 2008.
[3] Beyond the Bottlenecks: Ports in Africa, Ocean Shipping Consultants, Ltd., 2009.
[4] There is no international standard for the term of a concession, which varies between/among countries and agencies.

In this system, the public agency withdraws from operation and delegates operations and management of the container terminal to the private sector. This model enables, e.g., the introduction of advanced technologies acquired by international terminal operators; hence, efficient terminal operation becomes possible and public agencies such as the port authority can concentrate on port development planning and operations management.

Table 4-1 Port Activities and Responsible Officials

Operational Model	Public Service Port	Tool Port	Landlord Port	Private Service Port
General Management	Public	Public	Public	Private
Management of Navigation Channel	Public	Public	Public	Private
Navigation Aids	Public	Public	Public	Private
Major Port Facilities (Breakwater, Quay, Yard, Road, etc)	Public	Public	Public/Private	Private
Cargo Handling Equipment	Public	Public/Private	Private	Private
Warehouse/Transit Shed	Public	Public	Public/Private	Private
Cargo Handling	Public	Private	Private	Private
Pilotage	Public/Private	Public/Private	Public/Private	Public/Private
Tugboats	Public/Private	Public/Private	Public/Private	Private
Mooring	Public/Private	Public/Private	Public/Private	Private
Dredging	Public/Private	Public/Private	Public/Private	Public/Private
Others	Public/Private	Public/Private	Public/Private	Public/Private

Note: "Public・Private" in the table means that public organizations or private companies are in charge of the activity.

Figure 4-1 presents the types of management and operation of the main ports in Sub-Saharan Africa. Recently, the PPP process has been promoted for its particularly efficient operation of container terminals. An example of an entirely private service port is Djibouti; most other ports are public service ports, tool ports, or landlord ports. There are two sorts of operations privatization systems: one outsources only the operation of the terminal facility, while the other outsources both facility improvements (construction and installation) and operation.

Regardless of the length of concession term, the difference from privatization is that there is a contract term. The project type of concession in the World Bank database is limited to those for the repair of the existing facility (e.g., rehabilitate-operate-transfer) and does not include a build-operate-transfer concession for a new facility. However, in the definitions of the Asian Development Bank and the United Nations Economic and Social Commission for Asia and the Pacific include both new facilities and repair of existing facilities, and BOT is recognized as a concession project type of concession. This report follows the World Bank definition.

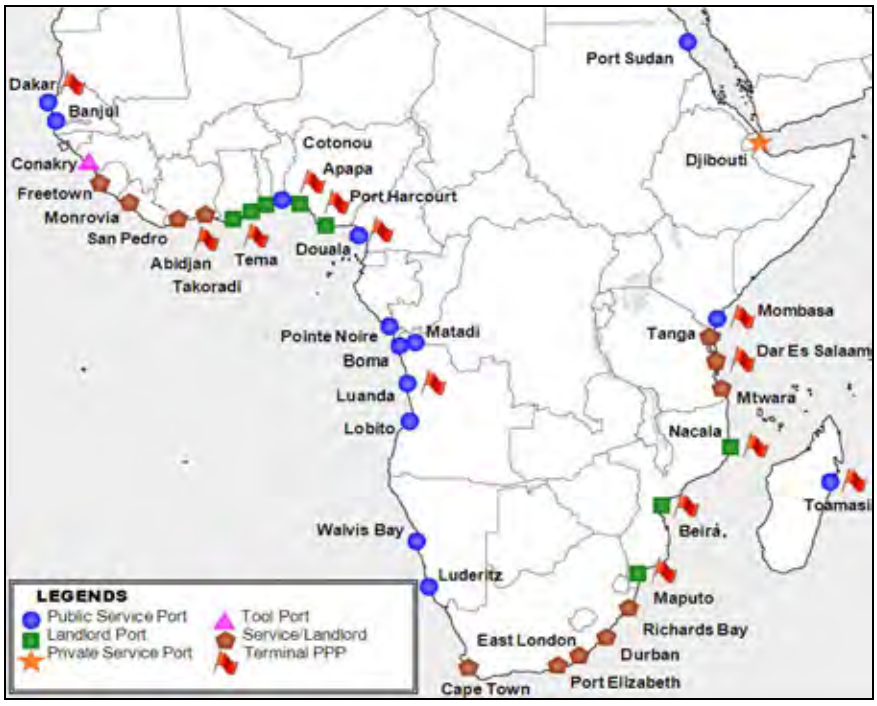


Figure 4-1 Operation Systems of Ports in Sub-Saharan Africa

(2) Success Factors for PPP Projects

Various factors affect the success of PPP projects in the port sector. In particular, there are three necessary conditions: (i) sufficient demands; (ii) a concession fee set based on rational demand estimation and market research; and (ii) competitive physical infrastructure and institutional framework compared with that of other ports.

(3) The Current Situation of PPP Ports

The modality of PPP projects differs depending on the degree of involvement of the private sector in terms of project responsibility and fund injection. PPP projects range from simple outsourcing contracts with low involvement to complete privatization through sales to the private sector. The main types of PPP projects are as follows:[5]

Management/lease contract: The operations of a national facility are outsourced to a private company for a certain period. Both management contract and lease contract are the same in terms of the ownership and the right to make investment decisions, which rest with the government during this period. In a management contract, the government reimburses the private company for operating expenses and takes the operating risk. In a lease contract, the private company pays lease fees to the government for the operation of the facilities and assumes the operating risk.

Concession contract: The operations of a national facility are outsourced to a private company for a certain period. The private company takes a significant investing risk during this period. Models such as Rehabilitate-Operate-Transfer (ROT), Rehabilitate-Lease or Rent Transfer (RLT), Build- Rehabilitate- Operate-Transfer (BROT) are included in this sort of contract.

[5] Based on the World Bank's Private Participation in Infrastructure (PPI data) definition: http://ppi.worldbank.org/resources/ppi_glossary.aspx#management.

Greenfield project: Only private companies or public-private joint ventures carry out the construction and operations of a new facility within the contract time frame. The built facility is sometimes given back to the government after the expiration of the contract. Build-Lease-Transfer (BLT), Build-Operate-Transfer (BOT), and Build-Own-Operate (BOO) are included in this sort of contract.

Of the 26 ports across 19 countries in Sub-Saharan Africa, 42 PPP projects have been carried out. A description of the PPP projects and their investment situations is presented in Table 4-2.

Table 4-2 Private Investment in Port Projects in Sub-Saharan Africa

Type of PPP Project	Countries (Ports)	No. of Transactions	No. of Cancelled Transactions	Royalty Payments to Government (USD m)	Investment in Facilities (USD m)
Management or lease contract	Cameroon (Douala), Kenya (Mombasa)	4	1	0	0
Concession	Algeria, Angola (Luanda), Comoro (Mutsamudu), Egypt (Alexandria), Equatorial Guinea (Luba), Gabon (Owendo), Ghana (Tema), Madagascar (Toamasina), Mozambique (Beira, Maputo, Quelimane), Nigeria (Apapa, Calabar, Harcourt, Lilypond, Onne, Warri, Tin Can), Sudan (Juba), Tanzania, Seychelles (Berjaya)	34	0	1,366	1,155
Greenfield Projects	Côte d'Ivoire (Abidjan), Egypt (Sokhna, Suez Canal), Equatorial Guinea (Luba), Ghana (Tema), Kenya (Mombasa), Mauritious, Morocco (Tangier)	11	0	316	1,866
Total		42	1	1,683	1,288

Source: Beyond the Bottlenecks: Ports in Africa, Ocean Shipping Consultants, Ltd., 2009 (citing the World Bank's Private Participation in Infrastructure Database, 2008)

A concession contract is a main type of PPP project and in Sub-Saharan Africa Nigeria has the most concession contracts of this type. Defaults in concession contracts for PPP port projects have been less than with PPP railway projects.[6] Only one contract (in Mombasa, Kenya) was cancelled between 1995 and 2005.[7]

[6] Port enterprises can expect quite stable profits, which is an advantage of conducting PPP projects in the port sector.
[7] Beyond the Bottlenecks: Ports in Africa, Ocean Shipping Consultants, Ltd. 2009.

Through these PPP projects, a total of USD 1.28 billion of private funds have been invested in facility construction. Investments in container handling facilities account for 95% of this amount, with container terminals accounting for 62% and multipurpose terminal facilities for 32% (most cargo is containerized). Of the countries in the database, Nigeria accounts for 55% of the entire investment, with investments in the Port of Apapa particularly high at USD 300 million. The total concession fee paid to governments was USD 1.68 billion; USD 1 billion of this total was paid to the Port of Apapa. As a *Greenfield* project, the Port of Abidjan carried out the expansion of its facilities with an investment of USD 0.14 billion in 2000 and the Port of Tema carried out expansion of its container terminal with an investment of USD 10 million.[8]

Table 4-3 shows the implementation of concession contracts in East Africa, Indian Ocean, and West Africa countries. Many concession contracts have been concluded because they enable introduction of the know-how of international operations, while suiting to the needs of private sector investors. On the other hand, governmental agencies sometimes resist the complete privatization of container terminal operations and a cooperation contract is concluded (e.g., as the case of all ports in Mozambique and the Port of Tema in Ghana).

Since some concession projects have been delayed by corruption and other issues (e.g., at the Ports of Luanda and Dakar), it is necessary to implement transparent procurement procedures and conduct them properly. In Nigeria, neutral consultants have conducted concession procedures and practice project monitoring. However, in other Sub-Saharan African countries, such practices have not been adopted. Therefore, donor support for the selection of concessionaire is required to secure the transparency of PPP procedures. Another issue is that concessions may have prevented the participation of small and medium sized domestic enterprises that cannot compete with global mega terminal operations. Therefore, Sub-Saharan African countries may suffer because of the infancy of their domestic industries and the remittance of operating profits to foreign countries. Attention should be given to the issue of maximizing socio-economic impacts and lessening public fiscal burdens.

Table 4-3 Implementation of PPP Port Projects by Country

Country Name	Port	Year	Description	Duration	Contractor
East Africa/Indian Ocean					
Djibouti	Djibouti	2000	Concession of entire port activities and *Greenfield* development for mega container terminal	20 years	DP World
Tanzania	Dar es Salaam	2000	Concession of container terminal		Hutchison
Mozambique	Beira	1999	Concession of all port activities	25 years	Cornelder (67%)/ CFM (33%)
	Maputo/ Matola	2003	Concession of all port activities	15 years (Extension of 10 years available)	DP World (transferred from MD&HC)
	MIPS, Maputo	1996	Concession of container terminal	15 years (can be extended to 2013)	DP World

[8] Private Sector Participation in Infrastructure in Africa, Afeikhena Jerome, African Peer Review Mechanism Secretariat (APRM), August 2008, p. 27, Table 7.

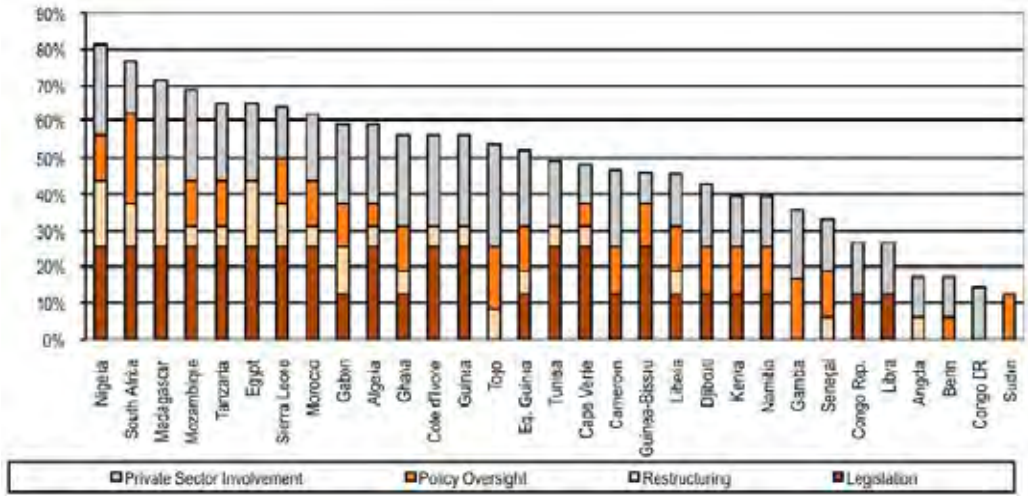
Country Name	Port	Year	Description	Duration	Contractor
	Nacala	2005	Concession of all port activities	15 years	CDN
	Quelimane	2005	Concession of all port activities	25 years	
Madagascar	Toamasina	2005	Concession of container terminal	20 years	ICTSI
East Africa					
Angola	Luanda	2007	Concession of container terminal	20 years	APM Terminals
Gabon	Owendo	2007	Concession of multiple terminal	25 years	Gabon Port Management (Portek)
	Gentil	2007	Concession of multiple terminal	25 years	Gabon Port Management (Portek)
Togo	Lome	Plan	Concession of new container terminal	25 years	MSC (51%)/ Lome (49%)
Cameroon	Douala	2004	Concession of container terminal	15 years	Consortium including APM Terminals
Nigeria	Multiple ports	2007	Concession of container terminal and others		Various investors (the Apapa/Lagos container terminal contractor is APM Terminals)
Ghana	Tema	2003	Concession of container terminal	25 years	Consortium including APM Terminals
Côte d'Ivoire	Abidjan	2005	Concession of container terminal		Consortium including APM Terminals
Liberia	Monrovia	Plan	Concession of multipurpose facilities		Bidding
Sierra Leone	Freetown	Plan	Concession of multipurpose facilities		Bidding
Guinea	Conakry	On-going	Concession of container terminal	25 years	GETMA International
	Kamsar	Plan	Concession of Guinea Aluminum Project		
Guinea-Bissau	Bissau	Plan	Concession of handling facility		
Senegal	Dakar	2006	Concession of container terminal		DP World
Cabo Verde	Mindelo	Plan	Concession of handling facility		

Source: Beyond the Bottlenecks: Ports in Africa, Ocean Shipping Consultants, Ltd., 2009

While some countries have been pursuing the construction of landlord ports to worldwide standards, some countries still have not even introduced the concept of PPP. However, recently about 30 countries in the region have been preparing master port plans and the advancement of port development policies including organizational reform is expected.

Although concession projects have been promoted in Sub-Saharan African countries, independent auditing organizations have audited the concession projects in a few cases. Laws and regulations on price have been established in many countries. However, only South Africa has established an independent regulatory or auditing organization (and Nigeria is now developing the concept). In many countries, central government agencies such as the Ministry of Transport administer the concession projects. An independent regulatory function contributes to the avoidance of monopolies, the introduction of free competition, compliance monitoring of public and private organizations, and the security/safety of operations. However, the establishment of such organizations is challenging because it requires major administrative reform(s).

The World Bank has assessed port reforms through PPP implementation in several countries and quantified the results with four indices[9] (Legislation, Restructuring, Policy Oversight, Private Sector Involvement).[10] The indices were assessed based on a questionnaire sent to 24 countries (including 21 with ports) using Infrastructure Institutional Scorecards. As shown in Figure 4-2, there is a large variation in progress among the countries, with a 10% score in Sudan and 80% in Nigeria.



Source: Beyond the Bottlenecks: Ports in Africa, Ocean Shipping Consultants, Ltd., 2009
(Original Source: Vagliasindi, Governance Arrangements for State Owned Enterprises, The World Bank Sustainable Development Network, Policy Research Working Paper 4542 March 2008)

Figure 4-2 Situation of Port Reform in Africa

(4) Effect of PPP Port Projects

Table 4-4 presents a comparison of the operation efficiency of ports (cargo handling efficiency: averaged handling amount of containers per hour) with different project types. The table shows that PPP projects (especially concession projects) are operated relatively more efficiently than public ports. The ports operated by global mega terminal operators such as APM and DP World are increasing, and streamlining using international standards is currently being promoted.

[9] See the reference in note 7, Figure 4-2. Also see World Bank, Africa's Infrastructure: A Time for Transformation, 2009, Chapter 4.
[10] Based on the 4 indices of port reform, described in the reference in note 7.

Table 4-4 Operation System of Ports with a High Cargo Handling Efficiency and Development Partner Assistance

Port/Country	Average Volume of Container handling (Moves/hour)	Operation Types (PPP)/ Operator	Facility	Development Partner
Abidjan/Côte d'Ivoire	20	PPP (Concession)/APM	gantries	
Dar es Salaam/Tanzania	20	PPP (Concession ROT)	gantries	
Douala/Cameroon	20	PPP (Management Contract/APM)	gantries	
Toamasina/Madagascar	18	PPP	mobile crane	
Djibouti/Djibouti	17	PPP (Management Contract/DPW)	gantries	
Durban/South Africa	15	Public	gantries	
Tema/Ghana	14	PPP (Concession ROT)/APM	gantries	
Elizabeth/South Africa	13	Public	gantries	
Apapa (Lagos)/Nigeria	12	Recent PPP (Concession ROT/RLT)/APM	gantries	
Cape Town/South Africa	12	Public	gantries	
Mombasa/Kenya	10	Public	gantries	
Dakar/Senegal	10	Recent PPP (Concession BROT)/DPW	mobile crane	AfDB
Maputo/Mozambique	10	PPP/DPW	gantries	
Beira/Mozambique	9	PPP	gantries	
Port Sudan/Sudan	8	PPP	gantries	
Walvis Bay/Namibia	8	Public	ship's gear	
East London/South Africa	8	Public	ship's gear	
Luanda/Angola	8	Recent PPP/APM	ship's gear	
Matadi/Congo	7	Public	ship's gear	
Pointe Noire/Congo	7	Public	ship's gear	

Source: World Bank Private Participation in Infrastructure (PPI) database, 2008

(5) Development Partner Assistance

Development partner assistance for PPP port projects includes technical cooperation for the concession framework of the Port of Cotonou (Benin) carried out by IFC in 2009 and the review of the PPP project for the Port of Toamasina (Madagascar) in 2003.

AfDB concluded a facility building finance contract (EUR 47.5 million) with a concessionaire (DP World) for the container terminal of the Port of Dakar Port (Senegal) in March 2010. Introducing PPP (concession) to the Port of Dakar is expected to improve efficiency, strengthen operations, enhance competitiveness, transfer technology, create employment, and reduce the public fiscal burden.[11]

[11] AfDB – Senior Loan of Euros 47.5 Million to Dakar Container Terminal, Senegal, http://allafrica.com/stories/.

4.2.2 Railway Projects

(1) Framework of PPP Railway Projects

The modalities of PPP projects differ depending on the degree of involvement from the private sector in terms of project responsibility and fund injection. There are various types: "operation consigning contracts" with low involvement, "management consigning contracts", "lease contracts", "operation and maintenance concession contracts", "BOT contracts", and complete privatization by "disposal" [refer to subsection 4.2.1(2)]. Various modalities have been applied to the PPP railway projects. Although initial investments (e.g., construction costs) are huge in railway projects, profit is low except for high-profit lines with high transport demand. Therefore, a concession contract without new construction has been the main modality especially in Sub-Saharan Africa.

There are two frameworks of the concession: (i) concession of the entire railway project (vertical integration type), and (ii) concession of a vertical separation system (i.e., the public agency takes responsibility for asset management and the financing of track construction/rehabilitation, rail yards, and electric/communication systems, while the concessionaire takes charge of rolling stock maintenance and railway operations).

There are some variations among the concession contracts,[12] with ROT the main modality in Sub-Saharan Africa (refer to Table 4-5). In standard concession contracts in the region, the concessionaire obtains the right to operate the existing line(s) for a period of 15–30 years and conducts both rehabilitation and operation. The concessionaire pays a concession fee to the government, the outsourcer, for the right to use the facilities. While the concessionaire manages the project by obtaining revenues from line operation, the concessionaire assumes operating risks caused by the reduction of traffic and the aging or inadequate maintenance of the assets (e.g., track, rolling stock). In many cases, the equity of the concessionaire is managed by an investment from the project members and a loan is obtained from the government (including relending a sub-loan to the concessionaire based on financing from an international development partner) or the private sector. Residual funds are covered by the cash flow obtained from the operation.

(2) Success Factors of PPP Projects

Many issues must be addressed in order to have a successful railway PPP project. To successfully implement a concession contract, the following conditions should be met.

Demand forecast: Since transport demand varies widely depending on factors that enterprises cannot control, demand forecasting itself is difficult. In many cases, PPP railway projects are built based on an excessive demand forecast that subsequently leads to the collapse of the project. Accurate demand forecasting based on accurate assessment of regional government transport policies and competing lines and alternative transport modes such as road transport is necessary. Considering the uncertainty of demand forecasting, reasonable financial assistance from the government including revenue compensation is essential.

Accurate evaluation of investment and clarification of responsibility for the investment: At the conclusion of a concession contract, the public agency (the railway) should properly evaluate the asset value and conditions of the existing assets (track, rolling stock) the rights of which are transferred to the business. Further, the investment required for rehabilitation during long concession periods should be estimated properly and reflected in contract conditions. In addition,

[12] In this report, maintaining consistency with World Bank terminology, a concession contract includes ROT, BROT, and RLT contracts that do not include new buildings.

whether the public agency or concessionaire bears responsibility for investment in rehabilitation should be stipulated in the concession contract.

Financing by the private sector: Reducing the public fiscal burden through the use of private funds is a significant part of a PPP project. Business funds are capital raised from business investors and loans from financial institutions. From the moment the demand risk is transferred to the business, the business bears high risks. Since obtaining a loan from a financial institution is difficult, the business must increase investment amount.[13] The cost of track rehabilitation is a large part of the total operation costs of ROT projects and is managed by the invested fund. Therefore, when the cash flow from a project is insufficient, more capital investment is required.

(3) Development and Current Situation of Railway Projects in Sub-Saharan Africa

Traditionally, railways in Sub-Saharan Africa have played a critical role in transport because competing road transport was sufficiently established until the 1980s and the utilization of railway was politically encouraged.[14] However, with the liberalization of the transport sector and road construction, the amount of cargo hauled by railway transport has gradually decreased. In addition, due to aging infrastructure and the delay in investment for rehabilitation, the role played by railway has declined except for that railways linked to mineral resources development.

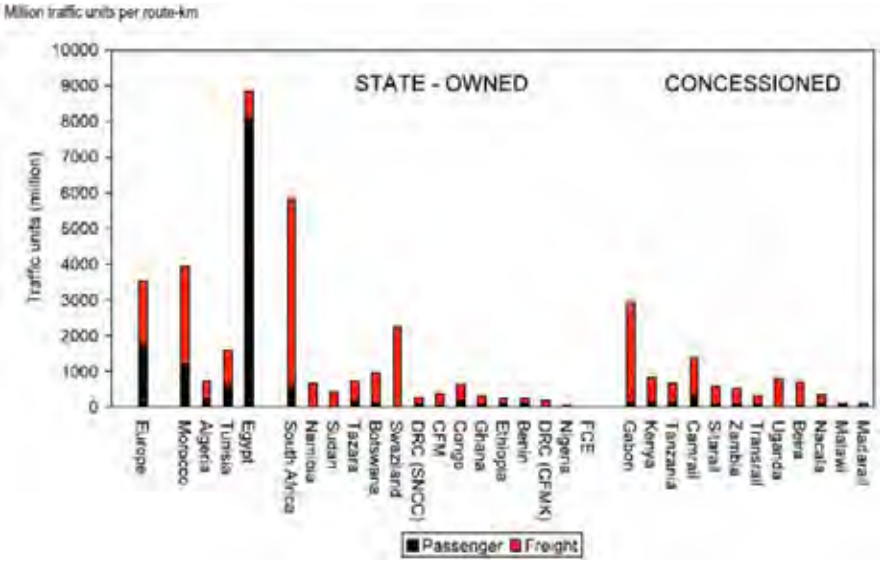
Many railways in Sub-Saharan Africa have been constructed and operated to connect ports, inland trading bases, and resource producing-areas dating back to the colonial era. Although there have been a number of visions to integrate several railways, many railways only connect domestic cities, freight transport nodes such as ports, and cities in inland countries, so a wide-area network has not been actualized. There are two exceptions: (i) the North Africa route connecting South Africa to Malawi, Congo, Tanzania, and the Maghreb; and (ii) the East Africa route connecting South Africa, Kenya, Uganda, and Tanzania. Historically, these routes were established trade as routes to serve the Southern African region.

As of the end of 2008, 51 routes in 36 countries were operational in Africa. The fact that the existing South and Central routes traverse both English- and French-speaking countries as well as different track gauges in North Africa are two primary reasons why the development of wide-area railway networks has been difficult. In addition, since many existing railways in Sub-Saharan Africa have deteriorated after independences due to insufficient maintenance, significant investment is required to improve them. According to the AICD report in 2009, for investments in rehabilitation and new equipment, USD 500 million per year for an initial period of ten years and USD 200 million per year would be required. It is impossible for railway companies and public agencies themselves should raise such funds without grant or loan financing from international organizations or the utilization of private funds from PPP projects.

Although new railway construction projects have been planned in each country, profitable operation is difficult unless a minimum of 2–4 million tons of traffic volume is ensured, and this threshold amount is not currently met by Sub-Saharan African railways (see Figures 4-3 and 4-4). About 80% of railway transport in terms of traffic units (i.e., the sum of ton-km and passenger-km) in Sub-Saharan Africa is accounted for by freight transport; passenger transport is not very prevalent. Since profit from passenger transport is not expected, securing investment funds from the private sector is difficult because the investment required for infrastructure/facility rehabilitation is huge, and freight transport rates are controlled because of

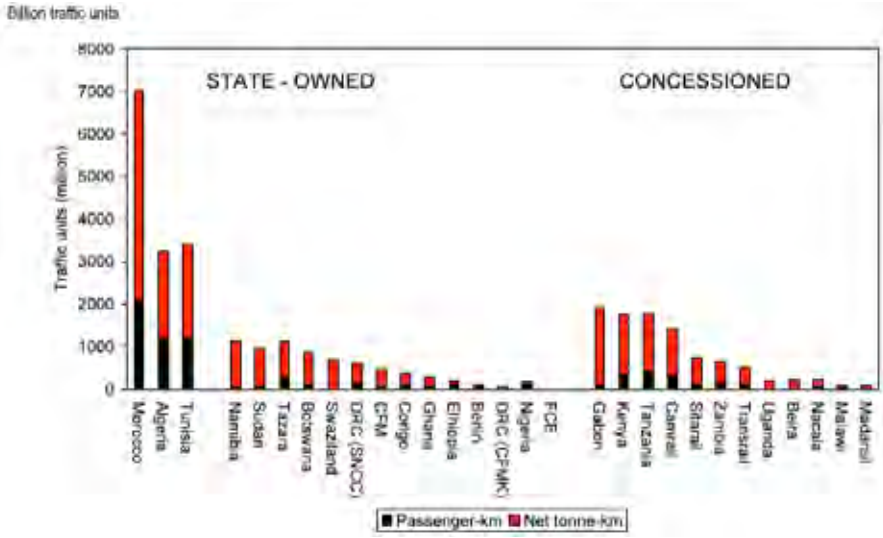
[13] Conversely, when the demand risk is not transferred to the business, the project risk becomes low and the financing from commercial banks and general investors becomes easy. In such a case, the rate of investment by the business in the project decreases.
[14] AICD Background Paper 17 (Phase II), Richard Bullock, *Off Track: Railways in Sub-Saharan Africa,* July 2009.

competition with road transport. Therefore, the government cannot provide sufficient incentives for such private investment.



Source: AICD Background Paper 17 (Phase II), Richard Bullock, *Off Track: Railways in Sub-Saharan Africa*, July 2009

Figure 4-3 Average Railway Transport Density (2001–05)



Source: AICD Background Paper 17 (Phase II), Richard Bullock, *Off Track: Railways in Sub-Saharan Africa*, July 2009

Figure 4-4 Average Railway Transport (2001–05)

(4) Current Situation of PPP Railway Projects

Almost all railways in Africa were managed by the nation or a national company until the 1980s. Thereafter, the participation of the private sector increased and the introduction of PPP projects began in the 1990s. In many PPP projects, the public agencies own the track infrastructure assets and outsource the procurement and maintenance of cars and the maintenance and management of tracks to the concessionaires.

In many countries in Central, East, and West Africa, the concept of PPP projects was introduced in the 1990s. As international and bilateral development partners began to increasingly require the integration of PPP strategies into projects, more railway PPP projects were developed. With assistance from international financial organizations, railways in Sub-Saharan Africa reviewed their business systems and realized the benefits of outsourcing PPP project operations to private businesses. As shown in Table 4-5, 21 railways have introduced PPP concepts into their projects. The breakdown is: 7 routes with complete privatization,[15] 10 routes with concession contracts, 2 routes with management contracts, and 2 routes with *Greenfield* projects.[16]

Among 10 concession contract routes, eight are vertical integrated ROT and three are vertical separated type routes. In the vertical integration contract, the public agency only has ownership of the infrastructure and transfers the operating rights to the concessionaire. However, many such businesses are unprofitable because the operations are carried out with uncertainty as to fund security and the responsibility for the rehabilitation and the infrastructure improvement at the beginning of the concession. (Details are described in case studies presented later.). Many current concessionaires are holding companies that consist of private companies that transport cargo by rail. The contract period is 15–30 years. In the vertical separation contract, as the public agency takes responsibility to own and improve the infrastructure, the concessionaire does not need to bear the huge track rehabilitation costs and can concentrate on operation. As the public agency (government) conducts the operation of the infrastructure, financing from international organizations is relatively easy.

Table 4-5 Types of PPP Railway Project in Sub-Saharan Africa and Development Partner Assistance

Country	Operator	PPP Types	Vertical Integration	Vertical Separation	Development Partners
Kenya	Magadi Soda Company	Privatized	–	–	
Liberia	Bong Mining Company	Privatized	–	–	
Guinea	Kindia Bauxite Railway	Privatized	–	–	
Guinea	Boke Railway	Privatized	–	–	
Guinea	Conakry–Fria Railway	Privatized	–	–	
Guinea	Dabola–Tougue Railway	Privatized	–	–	
Senegal	Sefics	Privatized	–	–	
Uganda, Kenya	RVR	Concession (ROT)	✓	–	DFID (rehabilitation of bridge caused by natural disaster only)
Mozambique	CDN	Concession (RLT)	✓	–	
Mozambique	CCFB	Concession (RLT)	✓	–	IDA (loan)
Zimbabwe	BBR	Greenfield Project (BOT)	✓	–	
Madagascar	Madrail SA	Concession	–	✓	EIB

[15] The seven routes were established by a private company for transporting mineral resources.
[16] As to type of PPP, refer to subsection 4.2.1(2).

Country	Operator	PPP Types	Vertical Integration	Vertical Separation	Development Partners
		(ROT)			
South Africa、Swaziland	GRRL	Greenfield Project (BOT)	✓	–	
Togo	Togo Rail SA	Management Contract	✓	–	
Senegal, Mali	Transrail SA	Concession (ROT)	✓	–	
Tanzania	TRL	Concession (ROT)	–	✓	IFC (loan partially)
Zambia	RSZ	Concession (ROT)	✓	–	
Malawi	CEAR	Management Contract	✓	–	
Gabon	Transgabon Railway	Concession (ROT)	✓	–	
Cameroon	Camrail	Concession (ROT)	✓	–	WB, IDA, EIB (loan)
Côte d'Ivoire, Burkina Faso	Sitarail	Concession (RLT)	–	✓	WB, EIB (loan)

Source: JICA Study Team based on AICD and World Bank documents

(5) Effect of PPP Railways

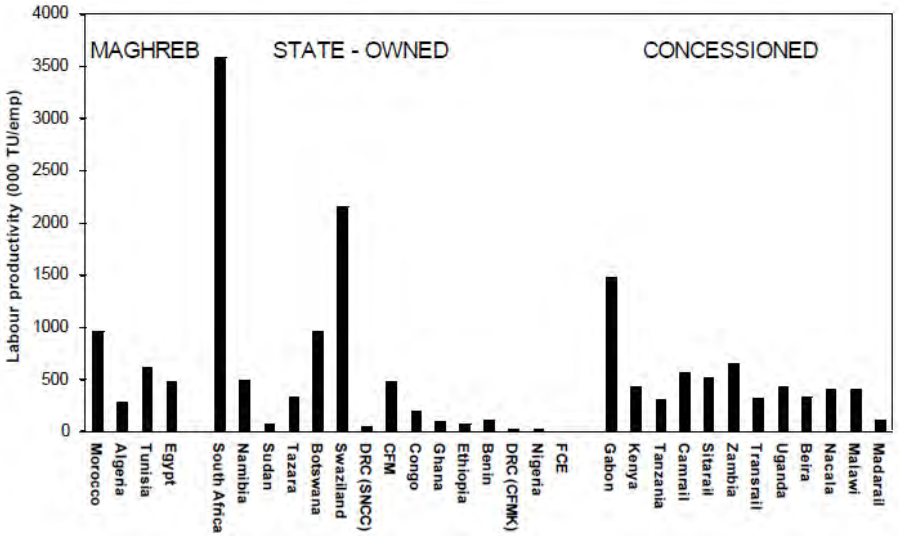
Evaluating the effect of PPP projects over the past 12 years,[17] both freight and passenger traffic along four routes have increased, and among those routes, only two were concession routes. Although freight traffic on concession railways has generally been increasing, passenger transport has stagnated or decreased and the effect of PPP projects on passenger transport is not recognized. This is due not only to conflicts and natural disasters, but also to the small demand for passenger transport and limited capacity volume due to deteriorated infrastructure and rolling stock (including locomotives).[18]

The concessionaire can set freight transport rates depending on demand and supply, but in many cases, the government controls the passenger transport fares. When the government sets fares, it is desirable that it provide a subsidy (such as a revenue guarantee) in the concession contract so as to avoid huge profit risks to be borne by the concessionaire. In some concession contracts, government support is included but the subsidies are not actually paid and therefore the concessionaire cannot avoid profit risks (the risk of bearing the deficit of passenger transport).[19] Improved operational efficiency and asset utilization through the improvement of transport efficiency, staff reductions, the disposal of old rolling stock are expected through the participation of foreign railway companies. However, many foreign companies and major stockholders of the consortium participating in railway operations in Sub-Saharan Africa intend to control the supply chain in the area using the railways; thus, they do not depend on only profits from railway operations. Since the railway business market in Africa is not especially large and the business risks are high, the participation of the pure railway operation play companies that exist in developed countries cannot be expected at present.

[17] Since 2000, concession contracts have increased mainly in West Africa. However, it takes 3–5 years from contract to operation and many projects are still in the initial stage several years after concluding the contract.
[18] AICD Background Paper 17 (Phase II), Richard Bullock, *Off Track: Railways in Sub-Saharan Africa*, July 2009.
[19] World Bank, Review of Selected Railway Concessions in Sub-Saharan Africa, 2006, p. 33.

Railway sector downsizing has been carried out over the last 10–15 years as part of sector reforms to decrease the public railway business scale. This policy follows the framework of structural reforms in Sub-Saharan Africa by the World Bank including the International Monetary Fund, and in many cases, the restructuring of public railway companies (decentralizing of the organization and downsizing) was undertaken. Accordingly, a number of public railway companies were downsized before the concession. The World Bank supported the restructuring by providing funds for severance pay, outplacement, and job training. Some public railway companies acquired capital from the concessionaires and transferred the discharged employees to the concessionaires.

Despite these downsizing efforts, labor efficiencies in the countries have remained low even at concession railways. As shown in Figure 4-5, labor efficiencies in Sub-Saharan Africa have not reached international average levels of 500,000 traffic units per staff member. Wages are generally low and downsizing has led to a reduction in worker morale and a lowering of labor efficiency. In addition, low asset productivity and incomplete maintenance due to a lack of parts have been barriers to efficient operation.



Source: AICD Background paper 17 (Phase II), Richard Bullock, *Off Track: Railways in Sub-Saharan Africa*, July 2009

Figure 4-5 Comparison of Railway Labor Efficiency by Country

Railway transport is safer than road transport. However, the safety of the railways in Sub-Saharan Africa is lower than in other regions due to deteriorating tracks, insufficient maintenance of rolling stock, and poor safety practices. Concessions are addressing these issues but it is too early to evaluate the results.

In railway sector investment in rehabilitation and maintenance of the existing infrastructure is the most significant task. The existing infrastructure has been deteriorating and its rehabilitation and maintenance require substantial investment. However, the private sector cannot raise the funds. Since the demand for railway transport is not especially high, the profits from the business cash flow do not reach the required level. In many cases, infrastructure rehabilitation with financing from international development partners has been available but has not been actualized. Due to a lack of funds from private operation companies, the rehabilitation of track infrastructure tends to have been even further delayed. In many cases there has been a “vicious circle” with the lack of funds leading to further deterioration of the facilities/infrastructure and the degradation of operations.

4.3 Analysis of Port and Railway PPP Projects

4.3.1 Port Case Studies

Case studies of PPP port projects in Sub-Saharan Africa were undertaken focusing on 10 ports as shown in Table 4-6. The table shows the contents of the projects, success factors, and future implications.[20]

The advantages of PPP projects not only for the port sector but also for the general transport sector include: (i) the raising of funds for infrastructure improvement, (ii) efficiency improvements in project implementation and operation, (iii) and access to advanced technologies and the sustainability of infrastructure improvement and services. On the other hand, an issue is that the success of PPP depends on auditing and regulatory activities.[21] The transfer of ownership to the private sector does not always lead to efficiency improvements, and the application of PPP to all sectors is not always proper due to social, political, and legal issues. The case studies were carried out taking these factors into account.

Table 4-6 Port Case Studies

Country	Port	Features
Djibouti	Djibouti	• Only port where the management concession was applied • New investment by concessionaire is permitted and strategic port improvement is possible • Cargo handling efficiency was improved by the PPP project
Tanzania	Dar es Salaam	• Container and general freight traffic is rapidly increasing • When the public sector bears the responsibility of facility investment, if the facility improvement is delayed, the improvement of cargo handling efficiency decreases. • Contract period for concessions to attract private investments has to be longer than a certain period (about 20 years) • In transitional stage from service port to landlord port • Entrance port of inland countries (Burundi, Rwanda, Tanzania, Zambia)
Mozambique	Maputo	• Consensus building of the concession contract took a long time and a confidential relationship between the public and private sectors was not built • Connection with railway transport was established (Maputo Development Corridor to the Gauteng metropolitan area of South Africa) • Entrance port of inland countries (Malawi, Zambia, South Africa, Zimbabwe, Swaziland)

[20]The case studies were developed based on interviews by the JICA study team and a number of references (e.g., Review of the Effectiveness of Port and Port Terminal Concessions, AECOM, 2009, Beyond the Bottlenecks: Ports in Africa, Country Annex (AICD); Ocean Shipping Consultants, Ltd., August 2009, Africa's Infrastructure, A Time for Transformation, World Bank, 2009; Economist Intelligence Units Country Profiles, 2008; Containerisation International Yearbook 2010; Transnet Port Terminals, Ports Authority of the Republic of South Africa; JICA, Preparatory Survey on the Walvis Bay Port Container Terminal Development Project; Transnet (http://www.transnet.co.za/), Tanzania Ports Master Plan Final Report, Royal Haskoning/Tanzania Ports Authority, February 2009; DP World Website; Sub-Saharan Africa Transport Policy Program SSATP Working Paper No. 84, "Port and Maritime Transport Challenges in West and Central Africa", SSATP, 2007; Project Evaluation of the Modernization of the Container Terminal of Douala Port, 2005; Port and Maritime Transport Challenges in West and Central Africa, Working Paper No. 84, 2007; World Bank, Ghana: Development of Port and Transportation Sectors in Western Region; JICA, Report on Port Autonome d'Abidjan (http://www.paa-ci.org/).

[21] Jean Kizito Kabangunka, SSATP Regional Coordinator E &S Africa, World Bank, Multi-Year Expert Meeting on Transport and Trade Facilitation: Public and Private Partnerships for the Development of Infrastructure to Facilitate Trade and Transport, 8–10 December 2009.

Country	Port	Features
South Africa	Durban	• As the port of the national company and railway are operated by the same business (Transnet), the project is efficient and effective • Transport to Gauteng (South Africa) was made smooth by improvements to the railway container terminal • Durban is the largest port in Sub-Saharan Africa • There is a container terminal expansion plan
Angola	Luanda	• Under the general freight terminal contract, the concessionaire is required to provide some investment • As the concessionaire needed to conclude some contracts related to the container terminal operation, problems about the validity of the task and contract period arose • With a rapid increase in container and general freight traffic, a number of issues needed to be addressed immediately. • There is a new port construction plan
Cameroon	Douala	• Cargo handling efficiency was greatly improved by the PPP • There is room for system reform because single business operates the project and monopolizes it • There is possibility of Douala becoming a transit port to Burkina Faso, the Central African Republic, Chad, Mali, and Niger • A new container terminal is under construction
Nigeria	Lagos	• Cargo handling efficiency was greatly improved by implementing the PPP • The PPP project was strongly promoted as government policy • Problems include lengthy dwell times, limited port capacity, the need to reform the tariff system, and the need for better links to surface transport • Problem caused by rapidly increasing container and general freight traffic must be solved
Ghana	Tema	• The PPP project improved facilities and cargo handling efficiency • Legal establishment of the PPP project such as detailed regulations is desirable • Possibility to serve as entrance port of inland countries such as Burkina Faso, Mali, and Niger after the Côte d'Ivoire conflict (transition from Abidjan) • There are expansion plans for Tema and Takoradi ports
Côte d'Ivoire	Abidjan	• Cargo handling efficiency was greatly improved by the PPP • Possibility to serve as the main entrance port of inland countries such as Burkina Faso, Mali, and Niger before the Côte d'Ivoire conflict (political stability is required) • Policy to restore the role as entrance port is required • There is a container terminal construction plan
Senegal	Dakar	• PPP project improved cargo handling efficiency, facilities, and personnel training • A good case study of a smooth transition from service port to landlord port • There is a port expansion plan

4.3.2 Railway Case Studies

As mentioned, in the railway business in Sub-Saharan Africa, operations based on concession contracts have been promoted since 2000, and utilization of the private sector for finance and technology through PPP projects is recognized as essential. However, as PPP projects at the initial stage of operation and have not progressed on the public side due to the difficulty of obtaining the considerable financing required for track rehabilitation as a precondition of railway project operation, the effect of PPP operations cannot be evaluated at this time.

Therefore, it is more difficult to identify success factors for the railway projects compared to the port projects. Nevertheless, the 10 railway case studies identify factors that have both helped and hindered PPP projects, as well as lesson learned (Table 4-7).[22]

Table 4-7 Railway Case Studies

Countries	Railways	Features
Uganda/Kenya	Rift Valley Railways (RVR)	• Concession contract (vertical integration type, ROT), 25-year contract period (contract signed in October 2005) • Freight and passenger transport (only in Kenya) transport conducted • There are some problems (facility rehabilitation was not conducted, riots, the financial sustainability consortium is questionable) • The consortium consists of multinational companies
Tanzania	Tanzania Railways Ltd. (except TAZARA)	• Concession contract (vertical separation type, ROT), 25-year contract period (signed in September 2007) • It took a long time from planning to the conclusion of the concession contract (about 10 years), during which the infrastructure deteriorated and staff morale suffered • A good case study of auditing the organization, finance, downsizing, and budget security • Connected to railways of foreign countries through the Southern African Railway Association (SARA)
Zambia	Railway System of Zambia (except TAZARA)	• Concession contract (vertical integration type, ROT), 20-year contract period (signed in December 2003) • Long-distance railway route was established and efficiency of operation, facility improvement, and downsizing conducted according to plan • Establishment of an independent auditing organization and infrastructure improvement fund are required (concession fee, fuel cost arrangement) • Connected to railways of foreign countries through SARA

[22] The contents of the case studies were created based on the interview result by the JICA research team and the references below: Jane's World Railways (2009, HIS Jane's), Railways Databases (Update 2007 and Private Concessions Database, World Bank), PPI Database (World Bank Group), Review of the Effectiveness of Rail Concessions in the SADC Region (March 2009, USAID/Southern Africa), Result of Railway Privatization in Africa (2005, IBRD/The World Bank), Latest World Railways (6/2005, Japan Railway Technical Service: JARTS), Feasibility Study on Corresponding to Cross-Border Traffic Infrastructure Phase 3 (Project study, 3/2009, JICA), Way of Supporting to Transportation and Traffic Infrastructure in Africa (Project Study, 3/2008, JICA)

Countries	Railways	Features
Malawi	Central East African Railways Company (CEAR)	• Concession contract (vertical integration type, MLC: Management and Lease Contract), 20-year contract period (signed in November 1999) • There are the following problems: uncertainty as to the content of the concession contract, conflict with the concessionaire due to an absence of an auditing organization, confrontation with the Government of Mozambique aiming at railway-port integration operation, a lack of laws and regulations due to a premature introduction of the concession (negotiation was started leaving the system unestablished), a lack of a consensus on contract issues • Damage to the infrastructure through natural disasters arose (and there was a lack of a contract provision to address this unforeseen situation) • CEAR (shareholder composition is the same as Mozambique CDN) is the contractor
Mozambique	Corredor de Desenvolvimento do Norte (CDN)	• Concession contract (vertical integration type, RLT), 1-year contract period (signed in July 2000) • Although aiming at integrated operation with Malawi, problems arose due to uncertainty regarding contract content and the lack of an auditing organization. A consensus on contract issues was lacking. • Connected to railways of foreign countries as a member of SARA • CDN (shareholder composition is the same as Malawi CEAR) is the contractor
Mozambique	Beira Railway Company (CCFB)	• Concession contract (vertical integration type, RLT), 25-year contract period (signed in August 2004) • The railway is operated for transport of coal associated with mine (coal) development (using the Central Corridor) • The contract stipulates that in case of conflicts associated with the coal mine, an international organization should be involved for dispute settlement. • Because of the particular circumstances of mine development and the short transitional period, the effect of the project cannot be evaluated at this time
Zimbabwe	Beitbridge–Bulawayo Railway (BBR)	• BOT contract (including new route construction and existing route rehabilitation), 25-year contract period (concluded in 1999) • Effect of private operation is obvious (supply of higher quality services, improved efficiency and investment) • There have been negative effects due to an exclusive provision of the contract to other railways and region (this shows the difficulty of regional railway operation) • Connected to railways of foreign countries through SARA • Stockholding by foreign capital is 85%

Countries	Railways	Features
Cameroon	Camrail	• Concession contract (vertical integration type, ROT), 20-year contract period (signed in April 1994) • A good case study of infrastructure improvement using a low-interest loan from a development partner; traffic volumes is relatively large • Provisions for compensation for passenger transport have still not been implemented • Stockholding by foreign capital is 77%
Burkina Faso/ Côte d'Ivoire	Sitarail	• Concession contract (vertical separation type, RLT), 15-year contract period at first (signed in December 1994), 35 years after revision • National companies of both countries administer and coordinate the project, with proper operation and flexible response to unforeseen situations • The government has raised investment funds for renewal of infrastructure and equipment with development partner (World Bank, EIB) assistance and the concessionaire repays the debt service (principal and interest) • A special fund allocated by concession fee was established for infrastructure improvement • Contract with single concessionaire
Mali/Senegal	Transrail	• Concession contract (vertical integration type, ROT), 25-year contract period (concluded in 2000) • Responsibility for infrastructure improvement is uncertain between the public side and the concessionaire • An administrative and coordinating organization is absent and confidence between the parties involved is lacking

4.4 Lessons from the Case Studies

4.4.1 Lessons from the Port Case Studies

As shown in the cases presented in Section 4.3, as for the port sector, know-how has been accumulated for the landlord port type PPP project, resulting in improved performance. The general application has been a concession of container terminal a private operation. In this section, the lessons of the PPP port operations are summarized based on the cases.

(1) PPPs are Effective for Streamlining Existing Container Terminal Operations

Private sector know-how and the introduction of international technology are valuable for existing container terminals. For example, in the Ports of Lagos, Dakar, Djibouti, and Abidjan, achievements have included improvement of cargo handling efficiency, reduction of congestion, and reduction in ship dwell times. In PPP port projects, the responsibility of the public and private sector and the sharing of roles for facility improvement are relatively clear because of the functional and physical characteristics of port facilities. In many cases, PPP projects advance in the following process: starting from concession of operation of the container terminal, advancing to concession of operation of the entire facilities, and then investment in facilities and equipment to improve the operation efficiency. As the cargo handling efficiency is improved by the PPP, the port operation makes good private business sense. This in turn provides further encouragement for the private sector to invest in facilities and equipment.

(2) The Effect of Private Investment in PPP Projects of Appropriate Scale Container Terminals is High

When there are existing facilities of a certain scale and these facilities can be utilized as a container terminal of an appropriate scale, a large effect from a rather modest investment can be expected (as in the case of the Port of Lagos). In addition, if the concessionaire is permitted by contract to reform the facilities, it can make its private investment using funds from AfDB and undertake strategic facility improvements as in the case of the Ports of Dakar and Djibouti. In the Port of Abidjan, investment from private companies has totaled USD 500 million since the operation fund moved from public subsidy to private finance.

(3) Operational Efficiency is Improved by a Concessionaire Who Has International Know-How

If international terminal operators (e.g., DP World, APM Terminals) are concessionaires, the transfer of the latest terminal operation technologies is possible (as in the case of the Ports of Lagos, Dakar, Djibouti, Abidjan, Luanda, and Tema). In the Port of Dakar, cargo handling times were introduced with the introduction of operation software.

Since international operators have significant know-how about port facilities and services, they can make strategic investments and improvements. In the Port of Dakar, a human resources development system (involving education and the training of skilled workers) provided by the private sector has have contributed to more efficient port operation and improved services. In addition, competition between/among multiple operators has reduced tolls at the Ro-Ro terminal. In the Port of Djibouti, DP World has invested in port facilities and services, which is expected to increase port capacity and strengthen international competitiveness. In the Port of Abidjan, the safety of the port was improved, and illegal charges and corruption stopped.

(4) Coordination of Facility Improvements and Operation Outsourcing Is Required in PPP Programs

When the public sector is responsible for facilities improvement and outsources container terminal operation, infrastructure improvements by the public sector such as the rehabilitation/expansion of facilities and improved land transport is sometimes delayed. This delay renders efficient operation more difficult and makes it less likely to achieve positive effects such a reduced congestion, lowered tolls, and increased competitiveness relative to other ports. It is necessary to implement PPP projects by best exploiting the cooperation between the public and private sectors, e.g., in demarcating the facilities investment to be made by the private sector.

(5) Port Development Planning with a Broad-Based Vision Required to Increase International Competitiveness

Ports in Sub-Saharan Africa need to reduce tariffs (rates) to increase their competitiveness. As the PPP framework evolves from simple outsourcing of the operation of container terminals to the facilities and management concessions to the private sector, free competition among private companies and management improvement are expected.

To reduce the high transport costs in Sub-Saharan Africa, better links between ports and land transport modes (railways and roads) are essential. To achieve this aim, political action by the countries and political decisions by regional communities are necessary. To improve the cargo handling efficiency of ports, the customs procedures system must be streamlined. Single window processing, as well as the development of one-stop border posts, should be pursued.

Also, more generally, transparency and compliance of PPP project implementation should be increased. Through concession contracts, the establishment of independent third-party auditing organizations, enhancement of the function of organizations for coordinating and auditing public corporations, and enactment of related laws and regulations are required.

4.4.2 Lessons from Railway Case Studies

As shown in the case studies in Section 4.4, many PPP railway projects have had problems. Therefore, the cases where railway operations/performance has been relatively efficient were found to be only Camrail in Cameroon and Sitarail in Côte d'Ivoire and Burkina Faso; the other cases are difficult to evaluate at present. The lessons derived from the case studies mentioned previously are described below.

(1) A Realistic Vision and Detailed Contract Stipulations Are Important in Planning Railway Concessions

In railway projects in Sub-Saharan Africa, public expectations of the private sector entering into concession contracts have been excessive and gaps between project vision and the reality of implementation often arise. While the existing infrastructure is deteriorating due to long periods of poor maintenance and transport capacity is low due to low operating speeds, many governments demand private sector operators to carry out both freight and passenger transport (e.g., Transrail, Camrail).

In some PPP contracts, the government owns the infrastructure, but operations are outsourced without defined responsibility sharing for infrastructure improvement and rehabilitation and finance; private companies cannot operate railways according to plan and become unprofitable (e.g., Transrail, RSZ, CDN). Many contracts do not make provision for political instability and unforeseen circumstances such as natural disasters (e.g., RVR, CEAR). These situations make railway operations difficult. Therefore, when planning a concession contract, defining the sharing of responsibility between the public and private sectors, and establishment of an independent organization to audit planning and operation are essential. Sitarail provides an example of such a successful case. While mine development PPPs are special cases, the CCFB contract is notable for intervention by an international organization in response to a conflict.

In view of past experience, companies now bidding for railway concessions in Sub-Saharan Africa do not depend on profit from railway operations. Unless the public sector can present preconditions and concession models in which the private sector can gain a reasonable profit, this trend will continue.

(2) Evaluation of Investment Funds Required for Infrastructure Rehabilitation Rolling Stock

In many railway enterprises, the existing assets (e.g., track, rolling stock) of national railway companies have become remarkably deteriorated but investment funds required for rehabilitation of the assets are budgeted only for a short period (initially about 5 years). Required long-term investment funds are generally not budgeted at all or are budgeted in small amounts. As a result, the funds required for rehabilitation often exceed the expectations of both the public sector and the concessionaire. The business cannot meet the fund requirement from the cash flow generated and the use of deteriorated assets seriously decreases the efficiency of the railway operations. When planning a concession project, an accurate assessment of the capital investment funds required for infrastructure rehabilitation and rolling stock is essential.

(3) Passenger Transport Based on an Appropriate Demand Forecast Is Difficult Without Public Compensation

In railway enterprises in Sub-Saharan Africa, demand forecasts for freight transport[23] have been excessive; this negatively affects financial stability. Railway enterprises are expected to pay the concession fee set in concession contracts with operating revenues, but these generally do not reach an appropriate level to enable investment in the rehabilitation of the deteriorated infrastructure and rolling stock. Excessively high demand forecasts arise from underestimation of the possibility of use of alternative transport (usually road transport) and the absence of governmental policies for allocation of regional traffic between railway and road.

In a number of concession contracts, both freight and passenger transport operations have been outsourced to the concessionaire (e.g., Sitarail, Camrail), but passenger transport is generally still unprofitable. The demand for passenger transport along many regional railway routes is low and fare revenues cannot finance the required maintenance and rehabilitation of the railway infrastructures. Passenger transport makes business sense only with government subsidies. At the same time, the financial aspects of PPP projects are complicated by expectations of government, business, and the public (users).

Passenger transport is sometimes included in a concession for political reasons and in view of the perceived effect on regional economies, improvements in the life of local communities (poverty alleviation) and environmental improvement. In such cases, policies emphasizing passenger transport should be established. Contract contents should incorporate a detailed agreement on governmental support including compensation from governmental funds to private companies and passenger service levels. Service improvements should be required of private companies.

(4) Public-Led Finance and Establishment of Special Funds are Desirable for Infrastructure Improvement

Many debts of concessionaires are financed by public loans (onward lending following a loan from an international development partner to the government) and equity from investment by the private sector typically accounts for less than 20% of the total investment. As a result, investment only in rehabilitation is implemented by the private sector. There is a limit on cashing in of businesses operators' equity as a current asset and it is difficult to apply businesses equity to infrastructure rehabilitation and reinvestment.

In many cases demand is relatively low and revenue insufficient to meet rehabilitation requirements and it is unrealistic to expect investment from private funds (except in the case of railway enterprises tied to resource development). Therefore, it is desirable that the public sector takes responsibility for financing, sometimes through loans from international development partners. Environments in which the public sector conducts infrastructure improvements and private firms can safely carry out railway operations utilizing their management know-how should be established. Assurances of funds for facility improvement through special funds such as the one in the case of Sitarail are important to ensure the sustainability of railway projects.

When the public sector borrows from international development partners for the continued operation of low-profit routes with low demand, external debts increase. Therefore, careful judgments must be made looking at the priority of the route in the national development plan.

[23] Since railway operating speeds are low (40-60 kph) in Sub-Saharan Africa, railway enterprises target freight rather than passenger markets.

(5) When Traffic Is Low, A Vertical Separation Concession Is Desirable

Railway concessions can be vertically integrated or vertically separated. On routes in which traffic is high (and there is stable demand), the revenue risk of the concessionaire is reduced, and a vertical integration concession including infrastructure improvement and operation can generally work out financially, as in the case of Camrail.[24] For railways with low traffic[25], vertical separation concessions in which the public sector takes charge of infrastructure improvements are more desirable and can enable the private sector to concentrate on operations.

(6) Increasing Competitiveness by Other Means Utilizing the Comparative Advantage of Railway Transport Is Required

Generally, freight transport longer than about 500 km is thought to be favorable from a cost standpoint[26]and the expectation of the role played by railway in the transport systems of Sub-Saharan Africa, with its many inland countries, is still high. Freight transport is the main railway market. Improved service levels are necessary to enhance the railway transport function. Increasing transport frequency, reliability, and safety, and reducing rates are essential to strengthen rail's competitiveness with other modes. PPPs are important because PPP projects are expected to improve the efficiency of railway operation including the above issues.

(7) A Railway Improvement Plan Considering Regional Viewpoints and Long-Term Local Benefits Is Required

Railway improvements can be effective investments in serving long-distance freight transport demand between countries in Sub-Saharan Africa. Railway improvements can help prevent road deterioration caused by overuse; further, they can reduce traffic congestion, accidents, and air pollution. In railway improvement planning it is necessary to assess all policies[27] related to transport to avoid unreasonable competition with road transport. As mentioned in the case of BBR, exclusive stipulations can sometimes negatively affect transport systems in neighboring regions and along other railways, not only in terms of efficiency and profitability, but also regarding future visions and the impact of the entire railway network on regional development. There are some cases (e.g., CDN, BBR, RSZ) where the existing guidelines of regional networks were not applied when concession contracts were concluded. Therefore, reaching a consensus on the improvement of regional transport infrastructure is an important requirement for transparency and compliance.

[24] While not a subject for the case studies, Transgabon (Gabon) is a successful example of a vertical integration type concession linked with minerals transport and Madrail (Madagascar) is a successful example of a vertical separation type concession.
[25] As already mentioned in Chapter 6.5.3, the study adopted 2million traffic tons as a minimum profitable transport volume based on WB, AICD reports and case studies.
[26] World Bank, Review of Selected Railway Concessions in Sub-Saharan Africa, 2006.
[27] Strengthening of enforcement against vehicle overloading, political intervention to reduce oligopoly situations in the road transport industry, and reforming the port system are policies that should be assessed. This will enable a reduction in transport costs in Sub-Saharan Africa and strengthen the region's international competitiveness.