

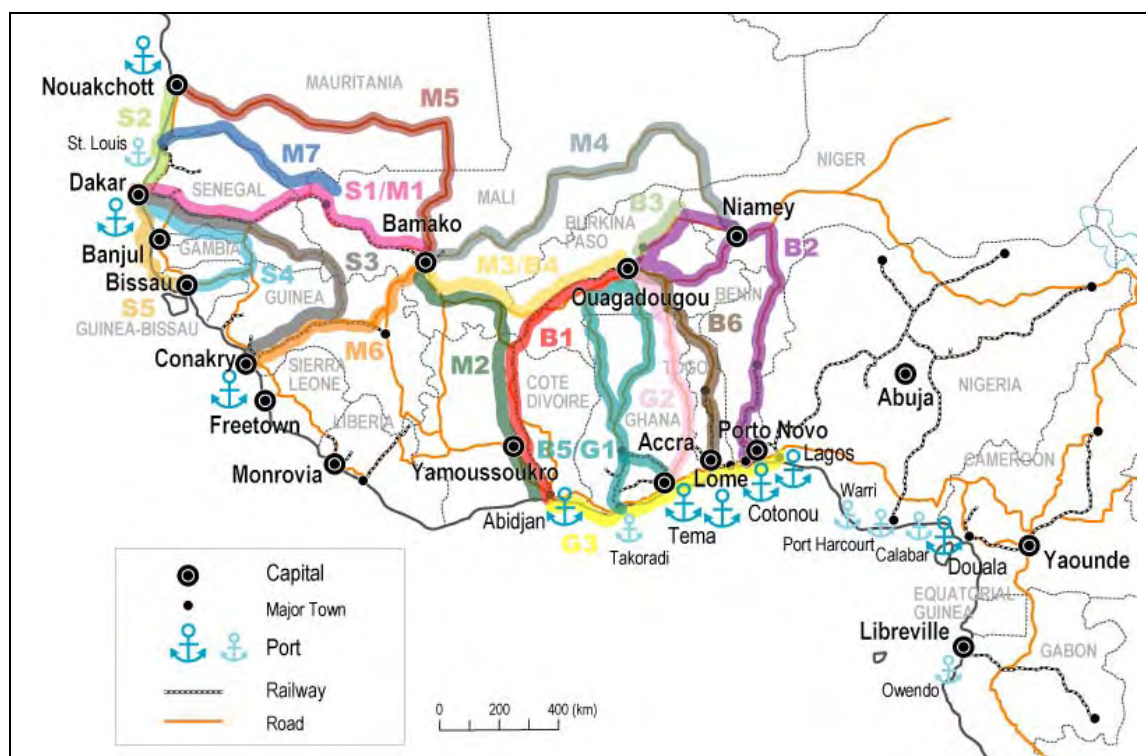
## Chapter 5 Present Situation of Interregional Freight Transport Infrastructure in West Africa

### 5.1 Introduction

Through visits from February to April 2010 to Senegal, Mali, Burkina Faso, and Ghana, the efforts of these countries and their neighbors in the development of port facilities, railway facilities, and PPP infrastructure were assessed. This chapter summarizes the present situation and problem areas for development of interregional freight transport corridors based on ports and railways, through an assessment of infrastructure and operations, efforts to improve port procedures, and an evaluation of logistics facilities.

### 5.2 Present Situation of Regional Freight Transport Corridors in the Countries Visited

Figure 5-1 illustrates regional freight corridors in West Africa with a focus on the countries visited, while Table 5-1 presents an overview of the corridors. Each corridor in the figure is coded by country.<sup>1</sup>



**Figure 5-1 Regional Freight Corridors in the Countries Visited in West Africa (Ports and Railways)**

<sup>1</sup> In Chapter 7, some of the listed corridors were selected for the design of model programs.

**Table 5-1 Overview of Transport Infrastructure of Regional Freight Transport Corridors in the Countries Visited in West Africa**

	Corridor	Port	Railway Status	Road Status
<b>S1/M1</b>	Dakar – Bamako Corridor	Dakar	There is a railway (Transrail), but it is old	The North Corridor is mainly assisted by the EU, while the South Corridor is assisted by JICA, the World Bank, and AfDB
<b>S2</b>	Dakar – Nouakchott Corridor	Dakar, Nouakchott	Between Dakar – Saint-Louis only (a section connecting to Mauritania is planned)	The EU has improved the Saint-Louis – Rosso section
<b>S3</b>	Dakar – Conakry Corridor	Dakar, Conakry	Construction from Tambacounda to Dabola has been proposed by ECOWAS	Improvement plan with AfDB assistance
<b>S4</b>	Senagal – Gambia –Guinea Bissau Corridor	Dakar, Banjul, Bissau	No existing line or plan	Transport needs to detour around inland Senegal or use waterway transport, as there is no road bridge across the Gambia River
<b>M2</b>	Bamako – Abidjan Corridor	Abidjan	An existing line linking Abidjan – Farkessédougou, and construction between Ouangolodougou – Bougouni – Bamakois has been proposed by ECOWAS	Relatively better condition than other corridors, but needs some improvement
<b>M3/B4</b>	Bamako – Ouagadougou Corridor	No port	Existing line between Ouagadougou – Bobo-Dioulasso; a feasibility study is underway by UEMOA with assistance from USTDA	Under improvement by the EU and others, but there are undeveloped sections around the border
<b>M4</b>	Bamako – Gao – Niamey Corridor	No port	No existing line or plan	Insufficient development, under improvement by the EU and others
<b>M5</b>	Bamako – Nouakchott Corridor (Road)	Nouakchott	No existing line or plan	High proportion of undeveloped sections
<b>M6</b>	Bamako – Conakry Corridor	Conakry	Between Conakry – Kouroussa – Kankan only	Improvement with the assistance of the EU
<b>M7</b>	Kayes – Saint-Louis Corridor	Saint-Louis	No existing line or plan	Development of transport network using river is planned
<b>B1</b>	Ouagadougou – Abidjan– Niamey Corridor	Abidjan	Between Abidjan – Ouagadougou only (rehabilitation is needed); a feasibility study for an extension between Ouagadougou – Niamey is underway by ECOWAS.	Relatively better condition; under improvement with EU assistance

	Corridor	Port	Railway Status	Road Status
<b>B2</b>	Ouagadougou – Niamey – Cotonou Corridor	Cotonou	A feasibility study for an extension between Ouagadougou – Niamey is underway by ECOWAS. A feasibility study for construction between Parakou – Niamey has been conducted with assistance from UEMOA	Relatively better condition in South Corridor from Ouagadougou to Niamey; under improvement in North Corridor
<b>B3</b>	Ouagadougou – Kaya – Dori – Tambao Corridor	No port	The line from Ouagadougou to Kaya needs rehabilitation; construction is needed between Kaya – Dori – Tambao.	Under improvement
<b>B5/G1</b>	Ouagadougou – Kumasi – Tema (Takoradi) Corridor	Tema, Takoradi	A feasibility study has been conducted for extension to Ouagadougou via western Ghana, but there is no clear project plan; a feasibility study for urgent rehabilitation between Takoradi – Kumasi is underway with assistance from the EU and others	Some improvement, but deterioration in some parts
<b>B6</b>	Ouagadougou – Lome Corridor	Lome	Between Lome – Blitta only (low priority)	Some improvement from Ouagadougou to the border with Togo, but conditions in Togo are relatively worse
<b>G2</b>	Tema – Yendi – Ouagadougou/ Niamey Corridor	Tema	No existing line and plan	Bridge construction and road improvement are needed (assisted by the World Bank, the EU, and ECOWAS)
<b>G3</b>	Abidjan – Accra – Lome – Cotonou – Lagos Corridor	Abidjan, Takoradi, Tema, Lome, Cotonou, Lagos	Existing line around Accra and Takoradi; the gauges are different in each country, but are to be unified to standard gauge for new construction	Some improvement (relatively better conditions near border areas)

The following sections summarize situations of the port and railway infrastructure in West Africa based on study results from the countries visited.

## 5.3 Present Situation of Port Infrastructure

### 5.3.1 Overview of Port Infrastructure

#### (1) Infrastructure Facilities

The volume of freight handled in West African ports has increased, reflecting economic growth in West Africa. In particular, the ports of Dakar, Conakry, Abidjan, Takoradi, Tema, Lome, and Cotonou have increased the volume of container cargo handled so rapidly that port congestion has become a serious issue, with long wait times for berths; therefore, the establishment of facilities to meet current and forecast demand is required. While large-scale cranes and wide yards are necessary for the handling of container cargo, the layout of existing ports has been designed for conventional cargo handling with the use of ship's gear or cranes with small lifting capacity in port terminals. Sheds and other facilities are usually located near their quays. Many of the ports in West Africa were developed during the colonial era and some of them were expanded in a makeshift manner, resulting in the need now for drastic measures.

West African port facilities were reconstructed to respond to the rapid increase in container cargo volumes, particularly at Dakar, Abidjan, Takoradi, Lome, Cotonou, and Apapa. However, many of those ports did not secure sufficient container storage space, resulting in a failure to achieve efficient yard operations. Among these ports, Abidjan and Tema have successfully improved the efficiency of their yard operations through the introduction of rubber tired gantry cranes (RTGCs) and the construction of inland container depots (ICDS).

The size of container vessels for container sea transport has become increasingly larger and ports at which such vessels can call require sufficient depth for navigation channels and quays. However, as shown in Table 5-2, the port entrances of a number of West African ports are relatively shallow. Except for the Port of Tema, which has a 16 m deep port entrance and 12.5 m deep container terminal quay, and the Port of Lome, which has a 12 m deep container terminal quay, most West African ports cannot accommodate large container vessels because they have only about 11 m deep entrance channels and 10 m deep quays for container vessels.

**Table 5-2 Overview of Major West African Port Facilities**

Port	Capacity		Depth		
	Container Cargo (1,000 TEU/year)	General Cargo (1,000 t/year)	Entrance Depth (m)	Container Berth Depth (m)	Gantry Crane
Dakar (Senegal)	400	N/A	11	11.5	–
Conakry (Guinea)	N/A	N/A	9.5	10.5	N/A
Abidjan (Côte d'Ivoire)	600	N/A	10.4	11.5–12.5	4
Takoradi (Ghana)	–	6,000	11.5	8–9.5	–
Tema (Ghana)	400	9,000	12.5	11	3
Lome (Togo)	300	N/A	16	11–12	N/A
Cotonou (Benin)	400	2,500	12	10–11	–
Durban (South Africa)	1,600	N/A	12.8	12.8	9
Djibouti (Djibouti)	350	10,000	11.5	9.5–12	4

Source: Compiled from various sources

Because of the anticipated increase in demand for container cargo, West African ports have been planning port improvement and expansion projects, with a particular focus on the construction of modern container terminals. The ports of Dakar, Conakry, Lome, and Cotonou have already incorporated the construction of new container terminals into their concession agreements. In

Côte d'Ivoire, the port authorities have commenced large-scale expansion of the port, while Nigeria plans to construct a new port to substitute for the Port of Lagos.

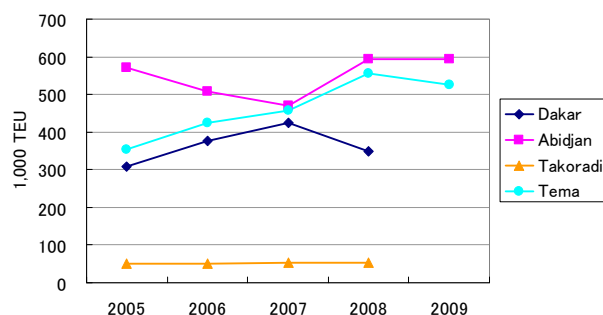
Many West African ports were developed as export ports for mineral resources, agricultural products, and other such products. These port facilities include warehouses handling mineral resources and agricultural products. Subsequently, railways were constructed for the transport of mineral materials and agricultural products to/from the inland areas. The ports of Dakar, Conakry, Abidjan, Takoradi, Lome, and Cotonou are all linked with railway networks. However, large-sized bulk carriers cannot enter the ports due to their shallow water depth, which has resulted in a gradual deterioration of the ports' competitiveness. To address this issue, navigation channels and quays need to be deepened.

The ports of Dakar, Abidjan, Lome, and Cotonou have cargo yards used exclusively by the inland countries, and the ports of Takoradi and Tema have such yards outside their port premises. The Port of Bamako in Mali and Bobo-Dioulassou and Ouagadougou in Burkina Faso have bonded terminals<sup>2</sup> for export and import cargo, which are referred to as dry ports or inland ports. These facilities aim at the smooth operation of transit cargo transport<sup>3</sup> in the region.

## (2) Volume of Cargo Handled

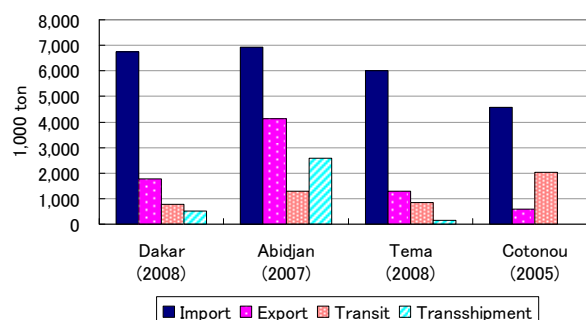
The volume of containerized freight handled in West African ports has increased, reflecting economic growth in West Africa (see Figure 5-2). While the global financial crisis that started in September 2008 reduced world trade, its impact on trading in West African countries was relatively small and container cargo volumes remained almost unchanged in many ports in the region.

As shown in Figure 5-3, major West African ports mainly handle the import of general cargo and container cargo and do not handle export cargo as much. Each port handles transit cargo for inland countries and some such as Cotonou do it at a relatively high rate. On the other hand, Abidjan handles a high volume of export and transshipment cargo, which demonstrates that the regional economy that underlies the port is relatively strong and that the port functions as a hub port feeding containers to the other ports in the region.



Source: Compiled from various sources

**Figure 5-2 Change in Container Cargo Volume in West African Major Ports**



Note: No data on transshipment cargo at Cotonou Port  
Source: Compiled from various sources

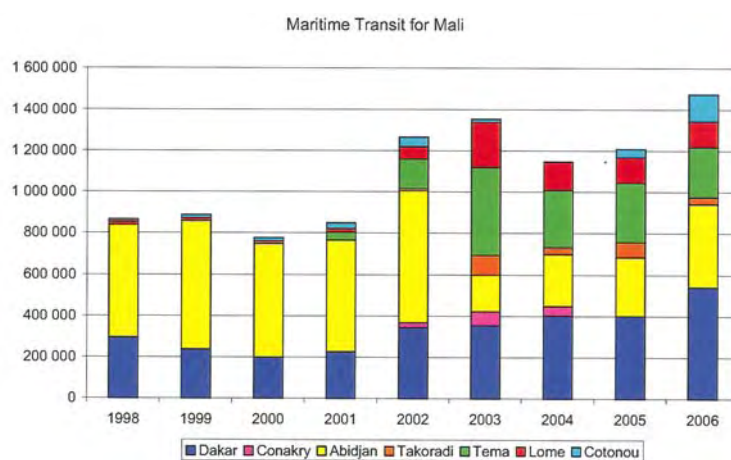
**Figure 5-3 Change in Container Cargo Volume by Cargo Type in West African Major Ports**

<sup>2</sup> The bonded system maintains the pending status of import cargo from overseas for customs duties. Areas where the bonded system is permitted are called bonded areas. Bonded terminals and bonded warehouses are facilities provided in the bonded areas.

<sup>3</sup> Transit cargo is to be transported to a third country passing through a country for cargo unloading. Transshipment cargo is to be transported to another port after transshipment in a port.

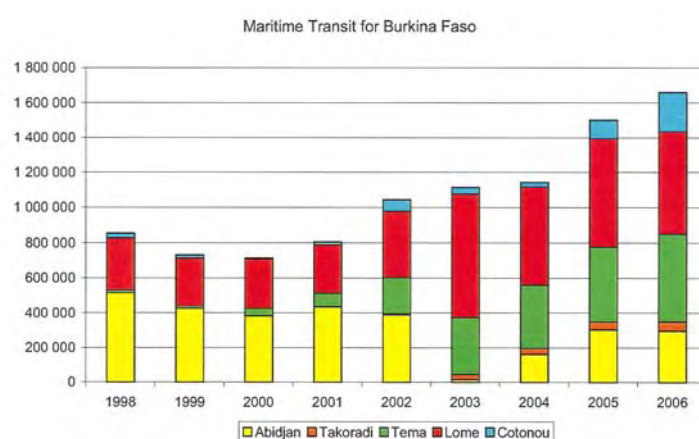
Mali, Burkina Faso, Niger, and other landlocked countries do not have seaports and therefore, they must use other countries' ports to trade with countries outside the region. Securing access to seaports is a critical issue for inland countries. Changes in cargo volume handled by Mali, Burkina Faso, and Niger by port (transit country) are shown in Figures 5-4 to 5-6. Mali and Burkina Faso once frequently used the Port of Abidjan for transit, but since 2002 the volume of cargo handled in Abidjan has decreased drastically reflecting political instability in Côte d'Ivoire. Because of the temporary closure of the major adjacent ports, Porto of Abidjan, and national borders, as of 2003, Mali and Burkina Faso began to use ports in other neighboring countries, including the ports of Tema, Lome, and Cotonou.

All seven ports reported in this chapter play important roles as gateway ports for inland countries. On the other hand, from port perspectives, transit cargo bound for inland countries is important as a source of demand and the ports have been providing preferential treatment and free trade zones to increase their use.



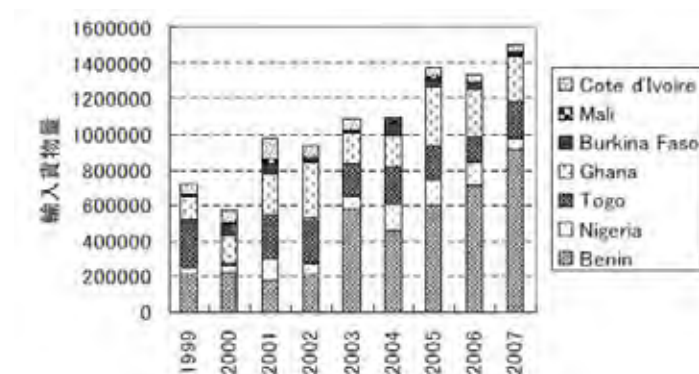
Source: ECOWAS, West African Road Transport and Transit Facilitation Strategy, 2008

**Figure 5-4 Change in Import Cargo Volume Handled by Mali by Port**



Source: ECOWAS, West African Road Transport and Transit Facilitation Strategy, 2008

**Figure 5-5 Change in Import Cargo Volume Handled by Burkina Faso by Port**



Source: Ghana Total Development of Port and Transportation  
Sectors in Western Area, Report of Research for Assistance  
Preparation, 2009, JICA [in Japanese]

**Figure 5-6 Change in Import Cargo Handled by Niger per Transit Country**

### (3) Situation of Operations

Reforms in port management and operation associated with the move from service ports to landlord ports<sup>4</sup> have been implemented in recent years. For container terminals in the ports of Conakry and Lome, Getma International, a port operator belonging to a French logistics group (or a joint venture group including Getma International) obtained the concession. Bolloré, the French logistics group, obtained the concession for container handling and the construction of a new container terminal in the Port of Cotonou. As a result, most West African major ports have been transformed to landlord ports.<sup>5</sup> All landlord port concessions in West Africa include the management and operations of container terminals in their scope and some promote the introduction of private sector funds for facility improvements (new investment). For example, the ports of Dakar, Conakry, Lome, and Cotonou have included the construction of new container terminals and the extension of existing container terminals in the scope of concession. The focus of PPP port projects is likely to shift to new large-scale investments such as the construction of new container terminals or new ports.

Ghana has already built and operated an information technology platform known as GCNet for the facilitation of smooth import and export freight procedures. Following this successful development, Côte d'Ivoire built the Abidjan Port Synergy (APSNet) in a collaborative project undertaken by the Port of Abidjan, related government agencies, and private companies; operations commenced in August 2009. This has allowed Côte d'Ivoire to have the capability to exchange and process a variety of information among ports, freight shippers, customs, container terminals, and the port gate. A combination of GCNet and APSNet has allowed the customs offices in the two countries to exchange and process information on cargo transported to/from the countries. APSNet provides information on transit cargo handled by Mali, Burkina Faso, and Niger for exporters and importers in these countries in order to reduce the time and cost required for cross-border trade. In Ghana, the introduction of a similar system is under consideration. In both Ghana and Côte d'Ivoire, a cargo tracking system for transit containers has already been in operation. Therefore, the information infrastructure relating to the land transport of transit cargo in West Africa is being established.

<sup>4</sup> For the definition of these types, see Chapter 4 (Section 4.2.1).

<sup>5</sup> A port managed by a public institution but in which the private sector invests in improvement of facilities, procurement of cargo handling equipment, and the management of workers, and is engaged in cargo handling (see Chapter 4).



As shown in Table 5-3, West African port dues are higher than those in ports in other African countries. For example, the fee for handling cargo imports in the Port of Durban, a port in South Africa, is USD 121 per TEU (20-foot container) while the fee in major West African major ports is USD 160–220 per TEU. In addition, as for days required for handling and storing the cargo, the dwell time in the Port of Durban is about four days while in most West African ports it exceeds 10 days. Details of the time required for port operations in West Africa are presented in Table 5-4.

**Table 5-3 Fees for Use of Major West African Ports**

Port	Import of Container (USD/TEU)	Export of Container (USD/TEU)	General Cargo (USD/t)	Dry Bulk (USD/t)	Liquid Bulk (USD/t)
<b>Major Ports in West Africa</b>					
Dakar	160	160	15	5	4
Conakry	N/A	N/A	N/A	N/A	N/A
Abidjan	220	220	8.5	5	N/A
Takoradi	168	168	7	2-3	1.5
Tema	168	168	10	3	1.5
Lome	220	220	9	5	N/A
Cotonou	180	180	8.5	5	N/A
<b>Major Ports in South and East Africa</b>					
Durban			11.50 (export)	5 (export)	5 (export)
	121	243	14.50 (import)	6.50 (import)	6.50 (import)
Djibouti	138	135	7–8	4	1–1.5

Source: AICD (2009)

**Table 5-4 Time for Operation in Major West African Ports**

Port	Container			General Cargo	Dry Bulk	Liquid Bulk
	Dwell Time (days)	Ship Waiting Time (days)	Berth Productivity (moves/hr)	Ship Waiting Time (days)	Ship Waiting Time (days)	Ship Waiting Time (days)
<b>Major Ports in West Africa</b>						
Dakar	7	0.5–1	10	1	0	0
Conakry	15	2–3	N/A	1.5	N/A	N/A
Abidjan	12+	1	35+	2.9	1	1.5
Takoradi	N/A	N/A	N/A	2 hours	2 hours	3 hours
Tema	25	0.45–0.6	36–42	0.4	0.25	3.5 hours
Lome	13+	1	14	1	1	1
Cotonou	12	1	N/A	2	2	N/A
<b>Major Ports in South and East Africa</b>						
Durban	4+	0.2	45	2+ hours	0	0
Djibouti	8	1	68	1.5	0.5	N/A

Source: AICD (2009)

The details of each major West African major port are described in the following sections.

### 5.3.2 Port of Dakar

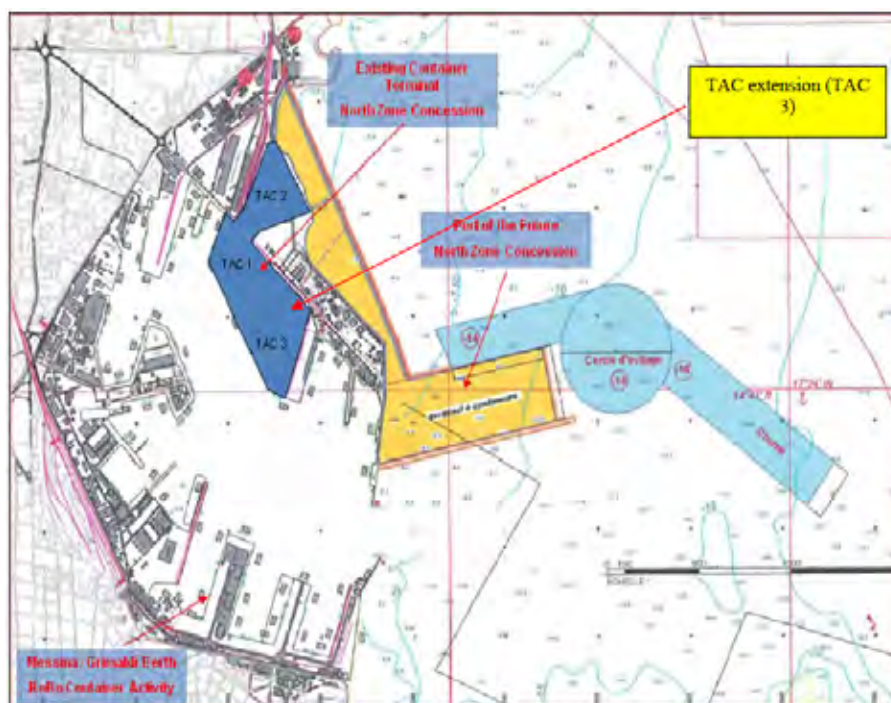
#### (1) Overview of Facilities

The Port of Dakar is surrounded by two breakwaters. The anchorage, with a water depth of 15 m is located near the port entrance. The port's major commercial functions are concentrated in the southern and northern zones.



Between the 1<sup>st</sup> and 3<sup>rd</sup> jetties, the water depth is 8.5–10 m. In the southern zone, there is a total of 15 berths, which handle transit cargo for Mali, general cargo, and ro-ro<sup>6</sup> cargo for Mali. Dakar-Ziguinchor domestic passenger ships also use the southern zone. Modification and extension work for the 2<sup>nd</sup> jetty is almost complete, which will allow for a 22.9 ha expansion of the yard. Operation of the jetty is to be outsourced to one or more private companies. About 20% of container cargo in the Port of Dakar is handled in the southern zone.

In the northern zone, the quay for cargo handling is comprised of a breakwater (alternatively called the 10<sup>th</sup> jetty) and the 4<sup>th</sup>, 5<sup>th</sup>, and 8<sup>th</sup> Jetties; there are a total of 23 berths. The area of the northern region is 75.8 ha. The 4<sup>th</sup> jetty is the container terminal. DP World concluded a concession agreement with the Dakar Port Authority in 2008 and is to extend the container terminals (see Table 5-7). The existing terminals (TAC 1 and TAC 2) with an area of 14 ha will be extended to 20 ha due to reclamation of the water area. The 8<sup>th</sup> jetty is used as an oil berth and has a water depth of 9–12 m. The jetty was constructed with steel sheet pile and needs to be reconstructed or repaired as it has been corroding.



Source: African Development Bank (2010)

**Figure 5-7 Facility Layout and Expansion Plan for Dakar Port**

Facility issues faced by the Port of Dakar include a limitation on the entry of large container ships into the port due to its shallow (11 m) water depth. In addition, since the quay of the container terminals has a depth of 11 m, it is difficult for large, fully loaded container ships to moor in the port. Therefore, a water depth of 13 m was provided for the quay that was newly constructed between the 4<sup>th</sup> and 11<sup>th</sup> jetties. Because of these factors, the container terminal quay to be constructed by DP World in the area to be reclaimed on the northern breakwater offshore in accordance with the concession agreement is planned to have a depth of 14 m.

<sup>6</sup> Abbreviation of roll-on/roll-off, a cargo handling system for loading/unloading cargo in vehicles onto/off a vessel ramp together with the vehicles.

In addition to the facilities on the waterfront, a project to construct a dry port in the hinterland near the Port of Dakar, which was commenced in 2006, has almost been completed and is now at the stage of selection of a private sector operator in accordance with the concession agreement. In the dry port, cargo warehouses<sup>7</sup> and buildings that house offices for wholesale agents, freight forwarders, and the customs administration were constructed and various other facilities were established (e.g., a platform for waste collection vehicles, parking, workshops, a gas station).

Cargo for Mali, an inland country, transported to/from the Port of Dakar is hauled by Transrail as well as by road transport. However, the design of the lead-in track is not effective, resulting in inefficient loading/unloading of containers.<sup>8</sup> Freight trains depart from Dakar as soon as they complete preparation for cargo transport, and 3–4 train services with a capacity of about 50 TEU per train are operated per week. On the other hand, from the viewpoint of road transport, traffic from the city center and the Port of Dakar is frequently congested. In order to alleviate this road congestion and ease the passage of trucks, plans for a road network to link the port and expressways are now under consideration.

## (2) Cargo to be Handled

The total volume of cargo handled in the Port of Dakar in 2008 was about 10 million tons. Cargo items handled included sulfur, wheat, and coal. For transit cargo, Mali's transport demand accounted for about 85% of the total transit cargo volume in the port (nearly 7% of entire cargo volume). From Mali's perspective, the Port of Dakar has about a 40% share of the country's total transit cargo volume (see Table 5-4). This trend is the result of an increase in cargo transport within Mali due to social instability in the Côte d'Ivoire. Table 5-5 shows cargo volume handled and import and export cargo including transshipment and transit cargo from 2006 to 2008.

**Table 5-5 Cargo Handling in Dakar Port**

	2005	2006	2007	2008
Import	6,423,522	5,628,347	7,070,643	6,752,731
Export	1,619,986	1,185,975	1,301,022	1,787,444
Transit	525,498	639,150	699,918	765,654
(to Mali)	(402,229)	(543,527)	(586,580)	(663,694)
Transshipment	1,110,868	903,082	779,460	520,094
<b>Total (ton)</b>	<b>9,679,874</b>	<b>8,356,554</b>	<b>9,851,043</b>	<b>9,825,923</b>
<b>Container Traffic (TEU)</b>	<b>309,404</b>	<b>375,876</b>	<b>424,457</b>	<b>347,483</b>
Traffic of Ship	2,411	2,374	2,406	2,165

Source: Annual Report of Port Autonome de Dakar, 2008

The Port of Dakar provides a 50% discount on the port usage fee along with free 30-day warehouse storage for container transport bound for Mali (the average dwell time is about 20 days). About 200 trucks provide transport services every day.<sup>9</sup> Container transport by truck is carried out in convoy, accompanied by customs officer(s). There are some cases where trucks and/or trains are not available for the transport of cargo discharged in the port.

<sup>7</sup> Cargo to be stored includes that controlled by the customs administration and tax authority.

<sup>8</sup> At present, a curved single-track line enters into the edge of the container storage yard from the train marshalling yard that lies to the north of the container storage yard. Containers are loaded/unloaded to/from a train on the single line, which requires a long time as working space is not separated from the storage yard and work is extremely restricted, and as a result, a change of trains takes time causing difficulty in achieving on-time performance.

<sup>9</sup> Some of these trucks are also used for transport of Mali's cotton to the Port of Abidjan in Côte d'Ivoire. For this reason, the arrival of trucks for picking up cargo at the Port of Dakar is sometimes delayed causing extension of the dwell time for cargo for Mali from 20 to 30 days.

Transport in convoy is carried out to ensure that the transit cargo is effectively transported to the neighboring country (thereby avoiding “leakage” into the national economy while evading customs duties). However, this increases transport time and cost. In addition, trucks need to pass through a number of checkpoints along the corridor, resulting in lower transport speeds and higher transport costs. Hence, a system for tracking the movement of containers is required and assistance in this field is expected.

### **(3) Organization for Operation**

The Dakar port authority is under the Ministry of Maritime Economy, Fisheries and Maritime Transport (MEPT), which manages the port of Dakar. Its top decision-making body is its executive board, which consists of representatives from government agencies and private sector groups. The President appoints the board chairperson. The board members include representatives from Mali. The port has been operated as a national enterprise conducting commercial operations with the management system of a private company since 1987. In addition, taking advantage of a 25-year extension of the period for the leasing of port facilities in 1992, the port has been promoting the PPP process. An increase of its capital from CFA 5 billion to CFA 20 billion has allowed the Port of Dakar to have a modern organizational structure with capacity for integrated management. In March 2010, DP World and AfDB signed an agreement to provide EUR 47.5 million for the project, including modification, repair, and extension of the terminals, the total project cost is about EUR 210 million.

### **5.3.3 Abidjan Port**

The Port of Abidjan handles 90% of all incoming and outgoing cargo in Côte d’Ivoire and serves as a gateway port to the inland countries of Burkina Faso and Mali. It is the largest and most advanced port in West Africa. Abidjan, where the port is located, is the largest city in Côte d’Ivoire and virtually functions as the national capital, while being the center of trade and finance in Francophone West Africa. The port faces the Ébrié Lagoon, which is cut off from the Atlantic Ocean and the Gulf of Guinea by the Vridi Plage sandbar. The Vridi Canal, constructed in 1950, connects the lagoon to the open sea (see Figure 5-8). Located nearly in the center of West Africa, Abidjan is reached relatively easily from any West African country by land transport. The city boasts advanced road and railway networks that make full use of its favorable location and acts as one of the major transit points to West and Central African countries.

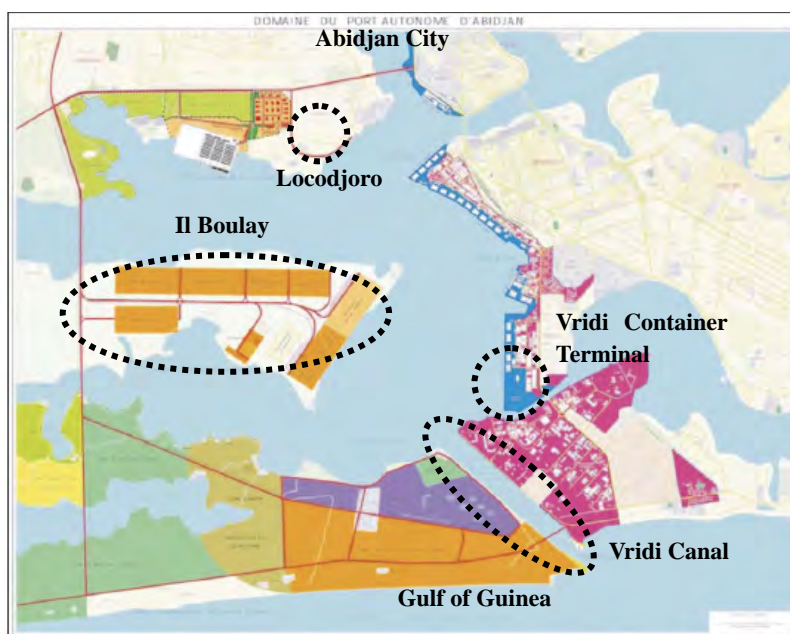
#### **(1) Outline of Facilities**

The Port of Abidjan has a 20 ha of land and about 100 ha of water, the latter of which is divided into an anchorage and a section for mooring ships to buoys used for lumber loading. The port also consists of other special facilities such as warehouses, berths for banana exports, lumber depots, and an offshore oil berth that supplies crude oil to a refinery through a 1,700-foot pipeline (using anchored tankers as the loading platform.) The port has a total of 34 berths including those for handling containers, lumber, fruit, ore, cereal, and oil.

The container terminal has an area of 27 ha and a container stowing capacity of 1 million TEU. In the terminal, eight RTGs are in operation, along with three 40-ton and one 60-ton gantry crane and two 100-ton mobile cranes. Utilizing the cargo handling equipment and GPS attached to mobile cargo handling equipment, the Vridi Container Terminal has a loading and unloading performance of 30 boxes per hour, which is on par with the cargo handling efficiency of a major European port.

Although the Port of Abidjan is relatively well-equipped for a West African port, the volume of cargo handling at the existing container terminal is approaching the limit. Considering the

difficulty for 2,500 TEU or larger container ships to enter any port in West Africa at the moment, the Port Authority of Abidjan decided to build a new port on Boulay Island (Île Boulay) in Ébrié Lagoon so that large container ships can be serviced. The groundbreaking ceremony was held in June 2008. As for the first stage of the new port construction plan, a container terminal with a water depth of 15 m and a 600-m long quay is to be built by 2012. It is expected to function as a gateway port for transit cargo to inland countries as well as a hub port for maritime container transport. It is planned to be developed into a container terminal with a 3-km long quay and a capacity to handle 3 million TEUs per year in the future.



Source: Modified from UNEP (2009)

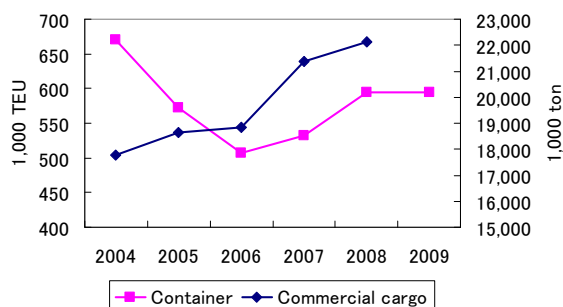
**Figure 5-8 Layout of Facilities at Abidjan Port**

Abidjan is the starting point of the Sitarail Line linked to Burkina Faso. Cargo handled at the port is transported between Côte d'Ivoire and Burkina Faso on this railway line. A marshalling yard attached to the port is located in a hinterland of West Quay and ends there. There are no branch lines to South Quay, where the container terminal is located. Thus, containers need to be transported by truck for about 3 km before they are loaded on trains, which increases the transport cost. Freight trains are to make at least four round trips a day, but the goal is not achieved because there are not enough (freight) wagons. As a result, considerable volumes of freight at the port await railway transport.

## **(2) Cargo Handled at the Port**

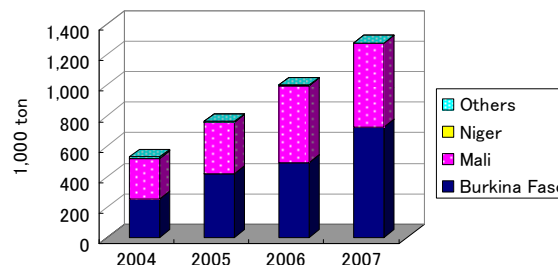
Use of the Port of Abidjan has declined due to the conflict in 2002, but recently there are signs of recovery and growth. Handling volumes of both containers and general freight have been increasing (see Figure 5-9). The main items handled at the port include lumber and manganese ore, in addition to various crops such as cacao, coffee beans, and cotton. The port is geographically important for transit to inland countries, but since the outbreak of the conflict, transit cargo has been sent to the Tema or Lome instead. The volume of transit cargo handled at the Port of Abidjan has been increasing since 2004. In particular, the volume of cargo to Burkina Faso has increased significantly as shown in Figure 5-10. In Burkina Faso and Mali, cargo transported via the Port of Abidjan account for a large proportion of the total. Niger also uses

the port for cargo transport via Burkina Faso (see Figures 5-4 to 5-6). Cargo transshipped via the port account for 30% of total imports and exports, respectively.



Source: Port Autonome d'Abidjan, Containerization International Yearbook

**Figure 5-9 Trends in Cargo Handling Volume at the Abidjan Port**



Source: Port Autonome d'Abidjan

**Figure 5-10 Breakdown of Transit Cargo at Abidjan Port**

### (3) Management Organizations

The Port Authority of Abidjan is under the supervision of the General Directorate of Maritime and Port Affairs. As to technical and financial issues, the authority is also supervised by the general directorates of infrastructure and finance. Collaboration with private companies is gradually being promoted. For example, Société d'Exploitation du Terminal de Vridi (SETV), jointly funded by the Bolloré Group and APM Terminals, signed a concession contract (in October 2003) to operate the Vridi Container Terminal. An Anglo-Dutch consortium led by P&O Nedlloyd signed a 30-year BOT contract for the construction of a new terminal (in 2000).

Owing to the excellent facilities and the improved efficiency achieved through the participation of the private sector, cargo handling efficiency at the Port of Abidjan is relatively high among West African ports. However, the handling cost is also comparatively high. In addition, the port also faces an operational risk arising from a situation where multiple labor unions coexist. When one of the unions goes on strike, it affects the work of other operators. As a result, the entire port becomes less efficient.

To facilitate procedures and enhance efficiency, a single window project is now underway at the port. The project is led by the Abidjan Port Synergy Network (APS Net), a semi-governmental entity. Other members are the port authority, customs administration, banks, logistics-related unions, commerce and industry associations, exporters of agricultural products, and delegates from Mali and Burkina Faso. A platform for facilitating information exchange among these organizations was established in July 2009.

#### 5.3.4 Summary of Port Infrastructure Conditions in West Africa

The following summarizes port infrastructure conditions in West Africa, particularly in the countries visited.

##### (1) Container Terminals

The countries in West Africa tend to lack container terminals, but their capacity for handling containers is improving, as shown in the case studies.

The shortage of container terminals has been gradually alleviated at the Port of Dakar since 2007, when DP World obtained a concession to operate, maintain, and expand the terminals. Specifically, the company acquired a quay with a depth of 13 m (single berth) constructed by the port authority and is planning to build another container terminal outside the northern breakwater. In addition, the company is building a yard at a neighboring site and has installed two Panamax-size container cranes. Furthermore, the installation of six post-Panamax-size cranes and the adoption of RTGs are currently underway. Moreover, the company introduced NAVIS (container terminal operation system) to enhance the efficiency of existing terminals. Therefore, measures have been taken or are planned to be implemented to address all expected tasks at the Port of Dakar.

As for the Port of Tema in Ghana, Meridian Port Services (MPS) was jointly established in 2007 by the Ghana Ports and Harbours Authority (GPHA), AP Moller, and the Bolloré Group; in addition, a PPP was initiated for the operation of container terminals. At present, problems arising from the shortage of terminals have been resolved. Relatively few containers are transported by feeder ship to the Port of Takoradi in Ghana and the port has an ample storage yard, so no problems have been reported. JICA assisted formulation of a development master plan for the Port of Tema in 2002. Further, GPHA is formulating a development master plan and an urgent development plan for the Port of Takoradi.<sup>10</sup>

The PPP process for the operation of container terminals at the Port of Lagos in Nigeria has been finalized. Containers no longer need to wait for berths at the APM and Tin-Can Island container terminals at Apapa because they are sent to an ICD outside the port. Congestion in the container yard has also been reduced. However, it still takes 3–4 weeks for consignees to receive their cargo after unloading due to cumbersome customs procedures. There is heavy congestion around the gate because the only transport available between the terminals and the ICD is by truck. In light of economic growth in Nigeria, there has been discussion about constructing a new port. Thus, all the expected tasks have been met or are planned to be addressed.

## **(2) Customs Procedures**

Despite efforts to improve customs procedures, some major problems remain, as shown in the case studies.

Customs procedures at Dakar Port in Senegal have improved, and the congestion problem arising from the procedures has been resolved.<sup>11</sup> A plan is underway to build an ICD at a location 20 km from the port. Meanwhile, problems relating to customs procedures at the land borders were not reported, although there is still considerable traffic congestion.

Customs clearance at the Port of Tema in Ghana takes a long time (about 16 days on average) due to the complicated procedures involved, but this does not cause congestion at container terminals because containers are transferred to an ICD within two days of unloading. Border crossing at Paga takes a relatively short time (about 1 hour) at Paga on the Ghana/Burkina Faso frontier. The problem is that one has to visit all offices concerned and obtain approvals for the documents required for customs clearance. No major problems have been reported at the Port of Takoradi in Ghana, where only a few containers are handled. However, again, a period of about 16 days is required to complete customs procedures despite the introduction of an electronic payment system for customs duties. Forwarders and other associated operators have expressed strong dissatisfaction, so it is necessary to simplify customs procedures and approval procedures relating to imports/exports.

<sup>10</sup> The urgent development plan is for the construction of a support base for oil drilling in the Gulf of Guinea.

<sup>11</sup> A problem of detained containers may arise if a consignee will not pick up the cargo and an auction cannot be held.

In Nigeria, it takes as long as 3–4 weeks for clearance, including customs procedures, for container imports. However, congestion at container terminals is relieved by transferring containers to an ICD outside the port. Problems concerning cross-border transport are not present because there is virtually no transit cargo. However, considerable containerized freight is imported across the Benin border because the situation at the border is convenient for importing prohibited goods. Consequently, measures to tackle the expected tasks have not been implemented, with the exception of ICD construction.

### **(3) Linkage with Land Transport**

West African countries have yet to find a solution to the problem of insufficient linkages with land transport, as shown in the case studies.

This problem still exists at the Port of Dakar in Senegal due to heavy traffic congestion in and around Dakar. In terms of connection with the railway, serious track deterioration and a shortage of wagons due to the unfavorable business performance of Transrail has led to an accumulation of port cargo, which has prevented an optimal rail connection.

In Ghana, railways only operate between Accra and Tema, where commuter trains run, and between Takoradi and bauxite and manganese fields. In other cases, cargo transport is reliant on trucks. The Ports of Tema and Takoradi are both far from the nearest big city (Accra) and the traffic around these ports is not so heavy. There are plans to build an inland port in a suburb of Kumasi, and railway transport from the Port of Tema has also been considered.

In Nigeria, ICDs were constructed to relieve congestion at the Port of Lagos. However, there is still a problem of insufficient linkages with land transport, resulting in heavy traffic congestion in the city. An existing railway line stretching from the Port of Apapa is not used for cargo transportation. There is a privately funded plan to build an ICD 60 km from the Port of Apapa Port and subsequently connect the ICD and the port by railway.

### **(4) Labor Issues**

Labor issues at the ports in the countries visited have been substantially addressed, as summarized below.

DP World obtained a concession to operate, maintain, and expand container terminals at the Port of Dakar in Senegal. The company, although in a selective manner, took over the employment of skilled workers and provided them with its unique training and vocational education programs. There are presently no labor disputes.

There are also no labor disputes in Ghana, although GPHA is gradually outsourcing cargo handling work.<sup>12</sup> MPS is in charge of managing the container terminals, procuring cargo handling equipment and providing the employees with vocational education and training. Regarding cargo handling work outside the terminals, the proportion of direct management is decreasing. Job cuts are unnecessary at the Port of Takoradi because the port mainly exports bulk cargo.

At the Port of Lagos in Nigeria, most handling work, including cargo handling at container terminals, is already conducted on a PPP basis. Therefore, the number of directly employed workers is small.

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<sup>12</sup> At present, about 25% of all cargo is handled directly by GPHA.



## **5.4 Present Condition of Railway Infrastructure**

### **5.4.1 Railway Infrastructure Overview**

#### **(1) Infrastructure Facilities**

The field investigation in West Africa visited the following railway operators: (i) Transrail, which operates railway service between Dakar and Bamako; (ii) Sitarail, which operates railway service between Abidjan and Ouagadougou, and (iii) the Ghana Railway. These railway systems have long route lengths and low transport densities for both passenger and freight. Most sections are operated without signals due to aging/deteriorated tracks and signaling system; also, the systems are single track and non-electrified. The railway facilities including the tracks and rolling stock have become increasingly deteriorated due to insufficient maintenance. These railway companies have been caught in a “vicious circle” in which traffic volume decreases because of competition with road transport as well as because of low transport capacity due to a decrease in operating speeds, a shortage of rolling stock, and a shortage of government funds; the consequent reduction in profits will lead to a further lowering of the maintenance level.

Transrail has not yet secured a transportation capacity commensurate with the demand as it is unable to rehabilitate its railway facilities due to a shortage of funds, a poor line equipment, a shortage of rolling stock, and frequent derailment incidents. On the other hand, Sitarail has a relatively favorable financial standing and undertakes rehabilitation to some extent partly because of cooperation with relevant organizations including the government. The rails linking Ouagadougou, Bobo-Dioulasso, and the border are light rails of 30 kg/m that were laid more than 55 years ago and thus are in need of strengthening. All of these railway enterprises have rolling stock workshop facilities that are too old to enable efficient maintenance work.

#### **(2) Operational Status**

Transrail, Sitarail, and Ghana Railway operate railway systems that were constructed during the colonial era. Since independence of the respective countries, their railway systems have transported inland mineral resources such as manganese, bauxite, and zinc, and agricultural/forestry products such as raw cotton, livestock, cacao, and timber, to coastal outports for export, and transported imported goods such as petroleum, petroleum products, fertilizer, cement, clinker, and daily commodities and sundry goods, to inland areas as national railway companies. These railway systems serve as one of the important international transport routes for Mali and Burkina Faso, which are landlocked countries, handling rapidly increasing container cargo handling volumes. Since the 1980s, the railway systems have been forced to engage in a struggle with increasingly developing road transport systems, resulting in a decrease in traffic volume and reduced profitability. Against the backdrop of this situation, with the introduction of PPP schemes, Sitarail and Transrail began railway operations as concessionaires in 1995 and 2003, respectively. However, neither railway enterprise has yet achieved its target traffic volume due to track deterioration and a shortage of operational rolling stock. Ghana Railway has been examining the introduction of a PPP scheme since 2002, but it took them a long time to select a contractor and contract negotiations were eventually unsuccessful. Their railway facilities deteriorated during this prolonged process.

The railway infrastructure of Transrail is owned by the Governments of Senegal and Mali. However, the governments do not guarantee the maintenance of the infrastructure. Accordingly, Transrail faced a period of prolonged financial weakness without being able to receive support from development partners. Transrail has been struggling to improve its concession framework with of the World Bank and other development partners in recent years. Sitarail, on the other hand, has undertaken rehabilitation systematically using a fund established for railway facilities improvement. This fund is financed by concession fees and government funds. The Ivorian crisis from 2002 to 2003 resulted in a significant decrease in traffic on Sitarail, but traffic has

rebounded in recent years partly due to the cooperation of the government, relevant organizations, as well as its own management efforts.

In recent years, the railway system of Ghana has undergone rapid deterioration of its railway infrastructure, resulting in a significant decrease in traffic. The Government of Ghana decided to improve railway systems (e.g., operation, maintenance, management) through a PPP with a vertical separation system as a solution for infrastructure deterioration with the aim of improving the efficiency of the railway system. The Ghana Railway Development Authority (GRDA) was established in 2008 pursuant to the Railway Act of 2008 (Act 779), by which GRDA is to assume the rehabilitation of existing routes and the development of new routes, and GRC is to engage in only the operations/maintenance of existing routes.

Tables 5-6 and 5-7 show the volume of passenger and freight transport (respectively) by year for Transrail, Sitarail, and Ghana Railways.

**Table 5-6 Changes in Volume of Passenger Transport by Railways  
(Million Persons)**

Item	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Transrail	0.600	0.836	0.732	0.700	0.607	–	–	0.112	0.114	–	–	–
Sitarail	0.379	0.269	0.243	0.300	0.400	0.321	0.088	0.178	0.100	-	-	0.500
GRC*	2.105	2.208	1.469	0.844	0.546	1.543	2.335	2.564	2.134	1.458	0.985	0.956

Note 1: \*: Ghana Railway Company Ltd.

Note 2: – : no data

Source: Jane's World Railways (2009, HIS Jane's), Railways Databases (Update 2007 and Private Concessions Database, World Bank), DDPQQ Database (World Bank Group), Ghana Total Development of Port and Transportation Sectors in Western Region, Report of Research for Assistance Preparation, 2009, JICA

**Table 5-7 Changes in Volume of Freight Transport by Railways  
(Million Tons)**

Item	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Transrail	–	0.437	0.386	0.373	0.274	–	0.100	0.479	0.515	0.373	0.388	0.379
Sitarail	0.596	0.643	0.806	0.876	1.016	0.870	0.180	0.569	0.760	0.812	0.907	0.830
GRC*	0.847	0.816	0.973	1.157	1.554	1.682	1.876	1.764	1.827	1.654	1.121	0.306

Note 1: \*: Ghana Railway Company Ltd.

Note 2: – : no data

Source: Jane's World Railways (2009, HIS Jane's), Railways Databases (Update 2007 and Private Concessions Database, World Bank ), DDPQQ Database (World Bank Group), Ghana Total Development of Port and Transportation Sectors in Western Region, Report of Research for Assistance Preparation, 2009, JICA

### 5.4.2 Transrail

The railway lines extending across Senegal and Mali are 1,236 km in length (Dakar-Bamako) and are operated by Transrail (freight and passenger). In Senegal, there are railway routes of 906 km in total that are comprised of about 643 km of trunk lines, which connect Dakar, Thies, Tambacounda, and Kidira, and about 263 km<sup>13</sup> of three branch lines, which connect Thies and Saint Louis, Diourbel and Touba, and Guinguineo and Lydiance, respectively. The railway lines in Mali are comprised of about 593 km of trunk lines that connect Bamako, Kayes, and Kidira, and an about 60 km of branch lines that connects Bamako and Koulikoro.<sup>14</sup> A photographic inventory of an inspection of these lines is presented in Figures 5-12 to 5-15 at the end of this subsection (5.4.2).



Source: Prepared by the study team based on data from Transrail

#### (1) Railway Facilities (Line Equipment)

The railway lines consist of mainly single, non-electrified track with 1,000 mm gauge. The railway line extending about 70 km between Dakar and Thies is double-tracked with each track shared with Petit Train de Banlieue (PTB, to be discussed later). The railway tracks are generally flat with mild slopes and are in good alignment. The tracks are mostly laid on a low height embankment provided on the flatland, with some track laid on an embankment of 10 m or higher. There are also cutting sections that are short in total length. There are no tunnels between Dakar and Bamako. In many sections, embankment shoulders have collapsed or filled ballast has overflowed on the slope. At some points within the precincts of stations, sleepers have been buried into soil with no ballast. Ballast has also flown out from the shoulder at many points between stations, and the ballast shoulder needs to be backfilled with ballast. The maintenance condition of tracks (alignment, cross level, longitudinal level) is far from acceptable.

There are 21 bridges of more than about 20 m in length between Bamako and Mahina (about 400 km) on the Malian side, three of which are moderate-sized bridges of about 100 m to 300 m in length. In addition, there are more than 120 box culverts likely to be crossings with roads or small-scale cross drains. This quantity, is however, extremely small for the distance.

The rails are light in weight at 36 kg/m, 30 kg/m, and 26 kg/m, respectively. The 36 kg/m rails were laid between 1966 and 1992 while the 30 kg/m rails (600 km in total length) and 26 kg/m rails (150 km in total length) have recently become deteriorated after being in use for more than 70 years. The 36 kg/m rails between Guinguineo and Tambacounda have been continuously welded between stations but the welding condition is poor. The 26 kg/m rails near the section between Tambacounda and Bala are joined with fish plates and bolts, which are missing in some parts. In terms of the sleepers laid between Guinguineo and Tambacounda, steel sleepers, twin-block concrete sleepers, and wooden sleepers are mixed depending on the place. The fastenings include the latest Pandrol fastening for only a small portion but are mostly old. Many fastenings lack fastening bolts.

<sup>13</sup> The trains are currently out of service except for the section between Diourbel to Touba.

<sup>14</sup> The trains are currently out of service for the section between Bamako to Koulikoro.

There are numerous derailment incidents mainly due to the poor track condition. The tracks between Bamako, Kayes, and Kidira consist of light rails of 30 kg/m that have deteriorated after being use for over 70 years. The sleepers consist of steel sleepers only. The faulty track between Bala and Kidira (about 130 km) mainly consists of light rails of 26 kg/m that have become deteriorated after being in use for more than 70 years. As shown in Table 5-8, the number of derailment incidents between Bala and Kidira in 2009 was 39, which represents 27.1% of the total number of derailment incidents (144). The worst section is between Dakar and Thies (about 70 km), with 56 derailment incidents in 2009, representing 38.9% of the total number of derailment incidents (144). Immediate rehabilitation of railway facilities on all routes is required.

**Table 5-8 Number of Derailment Incidents of Transrail by Section**

Year	Dakar–Thies (70 km)	Thies–Bala (443 km)	Bala–Kidira (130 km)	Kidira–Bamako (593 km)	Total
2008	75 (34.7%)	42 (19.5%)	45 (20.8%)	54 (25.0%)	216 (100%)
2009	56 (38.9%)	11 (7.6%)	39 (27.1%)	38 (26.4%)	144 (100%)

Source: Prepared by the study team based on the data from Transrail

## **(2) Signaling System and Safety Installations**

The Transrail railway system is mainly single rail and non-electrified throughout with no interlocking system between traffic lights and turnouts. The turnouts are operated manually by operators dispatched to them. Thus, the safety of railway system is questionable. With no interlocking system between traffic lights and turnouts, the departure of trains is permitted by exchange of information between station masters in the blocked section. The starting signals are likely operated with wires and may be invisible during nighttime. The level crossings are provided without crossing gates or warning systems throughout and cautions are given exclusively with a whistle.

## **(3) Travel Condition**

In the sections where travel condition inspections were conducted, strong lateral motions, vertical motions, and rolling caused by poor track maintenance were strongly felt. Track irregularities may be beyond the allowable maintenance standard limits in the longitudinal level, alignment, and cross level. Such motions are attributable to the track itself, which is inappropriate for operating passenger trains, as well as the capacity of shock-absorbing springs. In addition, the poor maintenance condition of the rolling stock (the excessive wear of wheel flanges in particular) may also be the cause of the frequent derailment incidents.

The maximum operating speed of Transrail between Guinguineo and Thies is 50–60 kph along relatively well-maintained track and 40–50 kph along relatively poorly maintained track. The average operating speed in this section was about 37.8 km (except for stoppage time at stations). The maximum operating speed between Bamako and Kayes in Mali side was about 60 kph under normal conditions and reached 70 kph along some sections. While speed limit signs were rarely observed, the operating speed was limited to 20–40 kph in some sections. Most bridges were passed at a speed of below 40 kph with a few bridges passed at a speed of 60 kph. There was a medium-sized bridge on which operating speed was limited to 10 kph. Partly because the railway system is single track entailing waiting time at stations for another train to pass in the opposite direction, the trains traveled between Dakar and Bamako (a distance of about 1,236 km) in about three and a half days (85 hours)<sup>15</sup> at an average speed (schedule speed) of about 14.5 kph.

<sup>15</sup> Based on an interview with Transrail (Senegal Office).

#### **(4) Rolling Stock Condition**

There are 20 locomotives, of which 14 are operable, but the number in fact operable is 10, considering that some are unavailable for various reasons. Transrail has 700 wagons, of which 450 wagons are operable and only 80% of them are active. At the Port of Dakar, the transport capacity does not meet the demand as much cargo is kept waiting for rail transport. In the section between Bamako and Kayes, wagons that were left unattended after having derailed and been wrecked, were observed at more than five points. As there is only one on-track crane available in the section between Bamako and Kidira, the derailed rolling stock has not been recovered.

Transrail has major rolling stock workshops at Thies, Dakar, Guineo, and Tambacound in Senegal, and at Bamako and Kayes in Mali. The workshop facilities are poor and are far from what is necessary for efficient maintenance of rolling stock. These workshops can repair and overhaul locomotives, wagons, and coaches. However, the repair parts are imported from Canada, the United States, India, and elsewhere, and a shortage of spare parts has resulted in a reduction in rolling stock operating rates.

The tread profile of wheels under repair has worn away, indicating a corrective maintenance system far from the preventive maintenance supported by a modern periodic inspection system. This is likely attributable to the operation of trains prioritized without regard to a certain amount of failure, with the need to operate with a limited number of rolling stock. The worn flange is repaired by welding the worn part with metal lining and grinding it with a wheel lathe, but the finish is far from adequate.

#### **(5) Infrastructure Investment by Transrail**

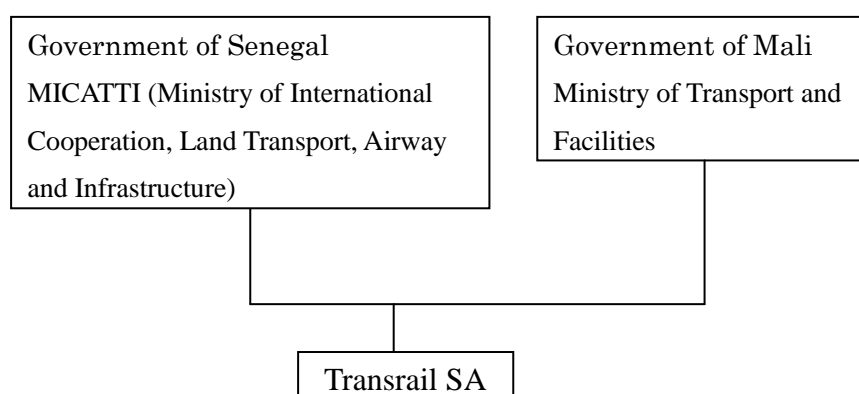
The railway infrastructure of Transrail is owned by the Governments of Senegal and Mali. The Ministry of International Cooperation, Land Transport, Airway and Infrastructure (MICATTI) of Senegal and the Ministry of Transportation and Facilities (MTF) of Mali are in charge of the infrastructure in the respective countries. Transrail has not been able to receive support from international development partners (e.g., the World Bank, AfDB, EU) because the governments have not guaranteed the cost of maintenance/rehabilitation of the railway infrastructure. Transrail committed to making infrastructure investments of CFA 31 billion in the concession concluded in 2003. Transrail raised the above funds by obtaining a CFA 25 billion loan from the World Bank and other development partners through a government guarantee and has covered the remaining CFA 6 billion with its own funds. The usage of the funds has consisted of: (i) CFA 6 billion for equity capital, (ii) CFA 20 billion for improvement of infrastructure, (iii) CFA 5 billion for improvement of rolling stock and communications equipment. The infrastructure investment remains short even if Transrail makes investments as provided in the concession agreement. A trial calculation made several years before the concession indicates that both Senegal and Mali each need to make infrastructure investments of CFA 100 billion, or CFA 200 billion in total.<sup>16</sup>

#### **(6) Organization of Operation and Management**

Figure 5-11 shows the operation and management organizations of Senegal and Mali in charge of Transrail.

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<sup>16</sup> In the new concession, which is under discussion at present, a loan of CFA 170 billion is to be granted with the guarantee of the two nations. The funds will be allocated as follow: (i) CFA 130 billion for improvement of infrastructure (mainly for 600 km of track), (ii) CFA 40 billion for rolling stock improvement and communications equipment. Item (i) will be undertaken by the governments of the two nations as borrowers, while item (ii) is to be repaid by Transrail under its responsibility.



**Figure 5-11 Railway Operation and Management Organizations of Senegal and Mali**

The railway track across Senegal and Mali extends for 1,236 km. The railways on the Senegalese side have been operated as the Senegal National Railways (SNCS) since the independence of the country and the railways on the Malian side as the Mali Railway (RCFM) since the independence of the country respectively. The railway route linking Bamako, Kidira, and Dakar, which is an important international transport route for a landlocked country, Mali, has been operated by Transrail based on a 25-year concession (Rehabilitate-Operate-Transfer: ROT) since 2003. The railway infrastructure is owned by the Governments of Senegal and Mali, but the two governments do not guarantee its maintenance/rehabilitation. Accordingly, faced with a period of prolonged financial weakness, Transrail has been unable to receive support from international development partners (e.g., the World Bank, AfDB, EU), but has attempted to improve the concession.

### **(7) Items Transported**

During the colonial era the railways on the Senegalese side transported agricultural products such as peanuts and raw cotton as well as passengers, while the railways on the Malian side transported agricultural products such as peanuts and livestock as well as passengers. Major freight items hauled by these railways now include petroleum, fertilizer, chemical products, and aggregate materials. In recent years, the volume of general cargo transported in containers has been increasing.

### **(8) Scheduled Rail Transport**

The scheduled transport services currently provided in Senegal and Mali are only the following: (i) a railway freight transport service between Dakar and Bamako and a passenger transport service between Bamako and Kayes provided by Transrail; (ii) a commuter service between Thies–Dakar (about 70 km) provided by Petit Train de Banlieue (PTB); and (iii) a phosphate transport service linking Thies, Tivaouane, and the Port of Darou (22 km + 22 km, 44 km in total) provided by Sefics. Freight and passengers are transported between Diourbel and Touba on a nonscheduled basis.

### **(9) Rail Transport by Transrail**

The passenger transport provided by Transrail between Dakar and Bamako has been suspended since October 2009 partly due to safety issues. Transrail operates three return passenger trains per week between Bamako and Kayes.

Transrail aims to operate one return container train and one return freight train service per day between Dakar and Bamako. The goal has not been achieved yet due to a shortage of locomotives and wagons, and the frequently occurring derailment incidents (13 incidents per month on average). The annual traffic volume has been far below the target of 2 million tons, with 373,000 tons in 2006, 388,000 tons in 2007, and 379,000 tons in 2008.

The time required to cross national borders is considered acceptable at about 2 hours.

Container cargo handling at the Port of Dakar is undertaken by DP World. The time required for container handling is 6–7 hours. Container dwell time at the port is prolonged by the railway transport capacity constraint. The container transport capacity of Transrail is 200 TEUs/week and the railway waiting time at the port is 2–3 weeks on average and a maximum of 6 weeks. The limited number of operable rolling stock for container transport, however, does not permit Transrail to increase its train services. Transrail operates 3–4 services per week of a train made up of 25 wagons<sup>17</sup> to transport 50 TEUs of freight. The services are not scheduled but operated as soon as prepared.

### **(10) Passenger Transport by PTB**

PTB operates two passenger train services from Thies to Dakar (about 70 km) and 21 services (1,000 seats/train) from Rufisque (about 40 km from Thies) to Dakar (about 30 km) in the morning for commuters to Dakar, 10 services from Dakar to Rufisque, and one service from Dakar to Thies in the evening for the return trip home. There are significantly fewer services for the return trip than services for commuting because while more commuters use railways for commuting in the morning, to arrive at their workplaces or schools punctually, more commuters use buses (with higher fares), which provide the passengers with more flexibility. The 70 km section between Dakar and Thies is double-tracked, with each track shared with Transrail.

With the fares set low (the discount rate is also high with a one-month commuter pass priced at CFA 4,500 and a one-month student commuter pass at CFA 3,500 for a section of about 30 km, while the normal ticket is CFA 150), CFA 1.3 billion (about 60%) of the annual revenue of CFA 2.2 billion is covered by governmental compensation for restrictions imposed on public services<sup>18</sup> (2008). While the balance before depreciation shows a profit, there is a loss after depreciation.

The number of trains operated in the 2008 fiscal year was to be 7,670, of which 277 went out of service due to failures. A total of 163 of these failures were caused by derailment and track failure. The passenger capacity in the 2008 fiscal year was 4.5 million. While the maximum daily passenger capacity is about 25,000 at present, PTB expects to increase it to 75,000 in the future. To that end, PTB is considering replacing the existing track between Dakar and Thies with a three-rail track with a gauge of 1,000 mm + 1,435 mm with financial assistance from China and India. In addition, extending the standard gauge track branched out from halfway as far as the new airport is currently under consideration.<sup>19</sup>

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<sup>17</sup> This is the maximum number of wagons allowed to be combined for reasons brakes and couplers.

<sup>18</sup> The payment has been delayed due to government financial constraints.

<sup>19</sup> Activities Report 2008 (PTB).





Track in the Guinguineo station



Track in the vicinity of Birkelane station



Level crossing in the vicinity of Kaffine station



Track between Kotiari and Bala (26 kg/m rail)

**Figure 5-12 Condition along the Track of Transrail  
(Guinguineo Station, near Birkelane, near Tambacounda, and near Bala)**



Damaged rail and fishplate without bolts



Longitudinal crack of rail

**Figure 5-13 Faulty Points of Track in the Section between Bala and Kidira  
(about 130 km) Reported by Transrail**

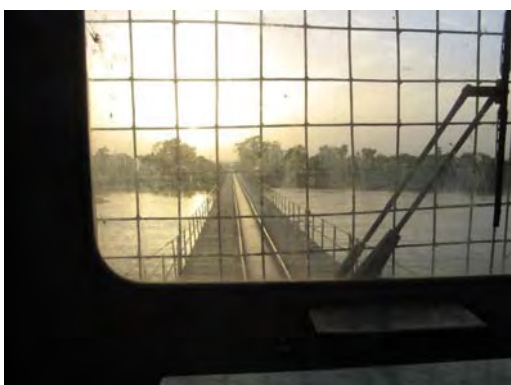


Damaged sleeper and fishplate without bolts



Damaged sleeper and excessive joint gap

**Figure 5 13 Faulty Points of Track in the Section between Bala and Kidira  
(about 130 km) Reported by Transrail (continued)**



Bridge restricted to a speed of 10 kph



Wagons derailed and left along the railway line



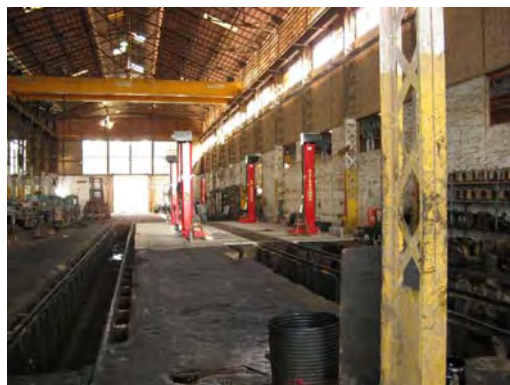
Ballast overflowed onto the slope due  
damaged embankment shoulder



Damaged track due to ballast deficiency

**Figure 5-14 Additional Inspection Photos  
(Guinguineo–Thies, Bamako–Kayes, Kayas–Kidira: Motor Car)**





Inspection and repair shed for locomotives



Excessively worn locomotive wheel



Wagons under repair

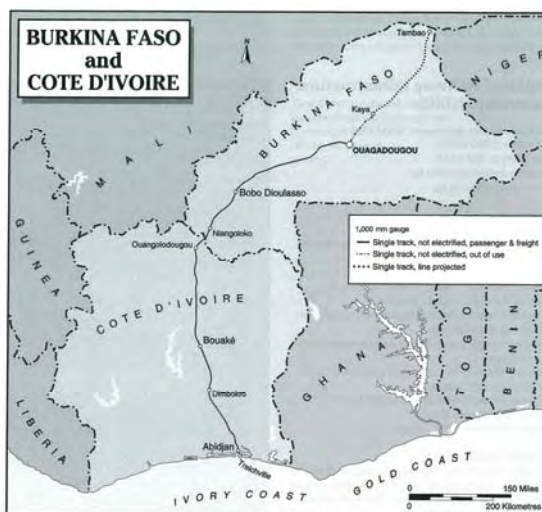


Welded frange to be cut by wheel lathe

**Figure 5-15 Photos Taken in the Inspection of Transrail's Rolling Stock Workshops (Thies, Bamako)**

### 5.4.3 Sitarail

There is a freight and passenger railway route operated by Sitarail that extends 1,145 km between Abidjan in the Côte d'Ivoire and Ouagadougou in Burkina Faso. The route extends about 660 km between Abidjan, Ouangolodougou, and the border on the Côte d'Ivoire side, extends about 485 km between Ouagadougou, Niangoloko, and the border, and about 103 km between Ouagadougou and Kaya (out of service since 2003) on the Burkina Faso side. Photos illustrating this subsection (5.4.3) are presented in Figures 5-17 to 5-19 at the end of the subsection.



Source: Jane's World Railways (2009, HIS Jane's)

### **(1) Railway Facilities (Line Equipment)**

The railway lines consist of non-electrified single track with 1,000 mm gauge. The track is aged and deteriorated but is in relatively good maintenance condition. The railway tracks are generally flat with mild slopes and are in good alignment. The tracks are mostly laid on a low height embankment provided on the flatland, with some track laid on an embankment of 10 m or higher. There are also cutting sections that are short in total length. An earth gutter is provided in the cutting sections. Sitarail explained that there are several small to medium sized bridges in relatively good conditions. There are no tunnels between Abidjan and Ouagadougou.

The rails linking Ouagadougou, Bobo-Dioulasso, and the border are light rails of 30 kg/m that were been laid more than 55 years ago. The section between Abidjan and the border is mainly made of 36–37 kg/m or 30 kg/m rails. The 30 kg/m rails laid between Ouagadougou and Bobo-Dioulasso have been continuously welded between stations but the welding condition is poor. Steel sleepers, monoblock concrete sleepers, twin-block concrete sleepers, and wooden sleepers are mixed depending on the place. Ballast has flown out from the shoulder at some points between stations, and the ballast shoulder needs to be backfilled with ballast. At some points within the precincts of stations, sleepers have been buried into soil with no ballast.

On the Bobo-Dioulasso side of Koudougou station, maintenance works are provided for railway facilities such as ballast improvement work and repair work for sections with a damaged slope or earth gutter. There was a European-made multiple tie tamper in operation at Bobo-Dioulasso station.<sup>20</sup> The track maintenance condition (alignment, cross level, longitudinal level) is mostly acceptable but was poor in parts.

In spite of their insufficient funds, Sitarail is keen on the maintenance/rehabilitation of railway facilities. However, the railway facilities are gradually deteriorating and requires rehabilitation in the near future.

### **(2) Signaling System and Safety Installations**

The Sitarail railway system is single track and non-electrified throughout the entire section with no interlocking system between traffic lights and turnouts. The turnouts are operated manually by operators dispatched to them. Thus, the safety of railway system is questionable. With no interlocking system between traffic lights and turnouts, the departure of trains is permitted by exchange of information between stationmasters in the blocked section. The level crossings near the Bobo-Dioulasso station adopt either a horizontal (normally vertical) gate arm or moving barrier for the road blocking system. Both systems are manually operated.

### **(3) Travel Condition**

Because the railway system is single track, there is some waiting time for trains at stations to allow for trains in the opposite direction to pass. Due to the unfavorable condition of tracks and rolling stock, the trains take 36 hours on average to travel between Abidjan and Ouagadougou (about 1,145 km) at an average speed (schedule speed) of about 31.8 kph. According to Sitarail, the trains travel at a maximum speed of 80 kph and an average speed of about 60 kph in sections with favorable track conditions. The trains of Sitarail thus travel at an average speed (schedule speed) more than double the average speed of Transrail trains traveling between Dakar and Bamako at about 14.5 kph, but there is significant scope for improvement.

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<sup>20</sup> A multiple tie tamper is a large vehicle used to tamp the ballast for track maintenance.

#### **(4) Rolling Stock Condition**

Sitarail operates more than 20 locomotives (they own 30) and 874 wagons (they own 949)<sup>21</sup> but is still short of rolling stock to meet its transport needs. As a result, a considerable amount of cargo is kept waiting at the Port of Abidjan for railway transport.

The rolling stock workshop at Bobo-Dioulasso is Sitarail's second largest rolling stock workshop and is capable of overhauling or manufacturing new wagons and coaches. As for locomotives, the rolling stock workshop can perform small repair services or maintenance of bogies (motored) and engines, but cannot overhaul them. Sitarail has its largest rolling stock workshop at Abidjan and equipped with facilities for overhauling locomotives. It is slightly better than that of Transrail. The facilities are, however, poor and far from what is necessary to efficiently maintain the rolling stock. Sitarail also faces issues of excessive wear of wheels and flanges required to be welded with metal lining. Sitarail may need to periodically grind the wheels with a lathe to maintain the wheel tread profile. However, they do not perform this procedure because of a shortage of wheel lathes and the high cost. For repairs beyond the technical capacity of its staff, Sitarail request European engineers to provide on-site service.<sup>22</sup>

#### **(5) Infrastructure Investment by Sitarail**

In the 1995 concession it was agreed that an Investment Fund would be established (with CFA 800 million as capital) to provide funds for the upgrading of infrastructure and equipment and that Sitarail would contribute 1% of its profit to this fund in addition to the concession fee. By 1995 the railway condition had deteriorated in terms of infrastructure and equipment and the consequent degradation in service was considerable, with the freight transport capacity having decreased to 500 tons or less per train. Conditions were restored by the governments with funding assistance from international development partners including the World Bank, the EIB, and the Government of France, as well as Belgian companies. The concession fee from Sitarail was appropriated for repayment.

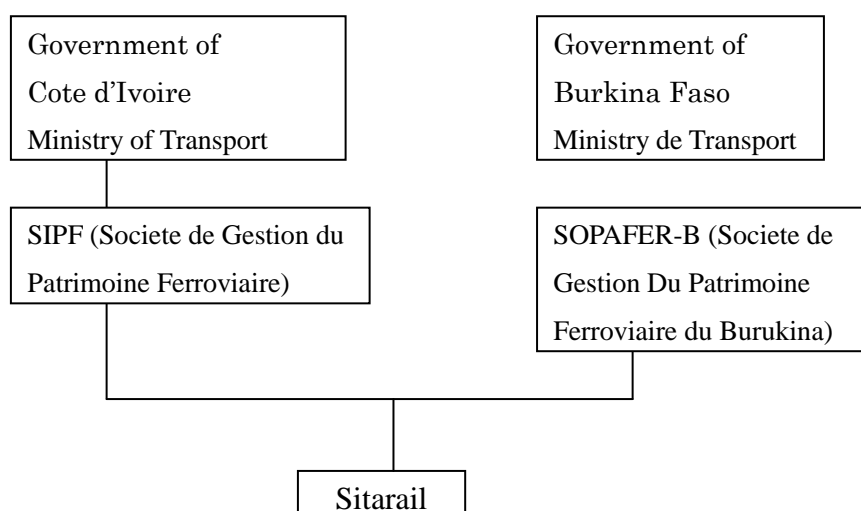
From 2001 to 2002, a second contract amendment was implemented. This amendment included the revision of the concession fee for the existing contract, the renaming of the Investment Fund to the Railway Investment Fund, and additional funding by the governments. This fund is to be operated and managed by a "roundtable" group comprised of the Ministries of Finance and Transport of the two countries with technical advice received from the two state-owned companies, SOPAFER-B and SIPF. Regarding fund management, Sitarail is to include the cost of upgrading of infrastructure and equipment in its annual budget and the roundtable group (with regular meetings four times per year) to prepare the budget, with budget execution left to Sitarail, including procurement through competitive bidding. Thus, Sitarail has been able to access the infrastructure upgrading fund but its profit ratio remains low. To address this situation, the upgrading of infrastructure and replacement of equipment with public funds is desired. It is expected that an agreement will be reached by the countries on a Common Vision clearly specifying the sharing of responsibility between the governments. However, securing funds is likely to be difficult (as several billion CFA is likely to be required for the infrastructure upgrading).

#### **(6) Organization of Operation and Management**

Figure 5-16 shows the operation and management organizations of Côte d'Ivoire and Burkina Faso in charge of Sitarail.

<sup>21</sup> Based on interviews at the Bobo-Dioulasso rolling stock workshop.

<sup>22</sup> The dispatch of an engineer for one week costs about JPY 2 million.



**Figure 5-16 Operation and Management Organizations  
in Côte d'Ivoire and Burkina Faso**

In 1993 the governments of Côte d'Ivoire and Burkina Faso agreed to operate the two railways over a total length of 1,145 km as a unified railway operator and to introduce a PPP scheme in their railways. As a result of open bidding for the railway operation right, the first concession was concluded in December 1994. The agreement was concluded between SOPAFER-B (a railway asset management company established by the government of Burkina Faso) and SIPF (a railway asset management company established by the government of Côte d'Ivoire) with Sitarail as the concessionaire, and the operation of the railway commenced based on an agreement effective for 15 years from 1995 to 2010. The agreement at that time was an operational agreement where both the railway infrastructure and the rolling stock were owned by the governments of the two countries and only operation was entrusted to Sitarail. The agreement has been already revised to an agreement called RLT (Rehabilitate-Lease or Rent-Transfer) with the term extended 35 years until 2030.

The railways in Côte d'Ivoire and Burkina Faso were first constructed in 1904 as the Abidjan–Niger railway and started service in 1954 for the section to Ouagadougou. Since independence in 1960, the two nations have operated the railways in cooperation with each other. In 1989, however, with conflicting views between the two countries over the construction and extension of new lines between Ouagadougou and Tambao, they established national railway companies (SICF and SCFB, respectively) to operate their railways on their own. This policy has reduced efficiency, and led to the replacement of rail freight by truck freight, and exacerbated the financial situation of the railways. Under these circumstances, the governments decided to operate the railways again as a unified utility and to introduce a PPP scheme in their railways after discussion in 1992-93.

## **(7) Items Transported**

The railway route from Abidjan to Ouagadougou is an important international transport route for landlocked Burkina Faso. The major import items transported by railway include petroleum products, fertilizer, clinker, and containers (general cargo). The major export items transported by railway include raw cotton, agricultural products, livestock, manganese ore, and zinc. In recent years, the volume of general cargo transported by containers has been increasing.

## **(8) Scheduled Rail Transport**

At present, railway passenger and freight transport services are provided by Sitarail on a scheduled basis between Abidjan and Ouagadougou in Côte d'Ivoire and Burkina Faso.

## **(9) Rail Transport by Sitarail**

Sitarail operates three passenger train return services per week between Abidjan and Ouagadougou with ridership of 500,000 in 2008. Sitarail aims to operate at least four return freight train services per day between Abidjan and Ouagadougou. This goal has not yet been achieved due to the shortage of locomotives and wagons. Traffic in recent years is far below the 1.01 million tons achieved in 2001, 812,000 tons in 2006, 907,000 tons in 2007, and 830,000 tons in 2008. Sitarail currently operates freight trains by hauling 21 wagons (18 m/vehicle) of 62 tons (tare + payload) on average by locomotive sometimes with containers mixed with wagons.

The customs procedure at the national borders is simple with an international transit document shared by the two countries. Random customs inspections are conducted but are finished in about two hours.

The traffic volume, which was 510,000 tons in 1996 immediately after the start of the concession, increased to 880,000 tons in 2008, and to 1.01 million tons in 2001. Sitarail recorded its highest profit in 2000 at CFA 2 billion. However, the Ivorian crisis starting in 2002 resulted in decreased distribution activities and decreased customer churn (i.e., the selection of other routes or other means of transport), and traffic in 2002 and 2003 decreased to 870,000 tons and 180,000 tons, respectively. During the recession, Sitarail reduced employee working hours by about half to 15 days/month and permitted employees to work outside of the company to cut personnel expenses. Most employees have returned to full-time employment (few people were unemployed). Sitarail, the Port of Abidjan, and the Bolloré Group (a large shareholder of Sitarail), which were adversely affected by the Ivorian crisis, made collective efforts to acquire new customers for management recovery by emphasizing attractive pricing and the safety of railway transport. Traffic volume was on the rise in 2006 (810,000 tons) and 2007 (910,000) but decreased again due to the global economic crisis in 2008. However, the volume has started to rise again and is expected to recover to 1.01 million tons in 2010.



Koudougou station and passenger platforms



Ballast cleaning and slope stabilization works in the Bobo-Dioulasso direction of Koudougou station

**Figure 5-17 Inspection along Sitarail Railways  
(near Koudougou Station, near Siby Station, and near Bobo-Dioulasso Station)**





Level crossing in the vicinity of Bobo-Dioulasso station



Manual gate closing

**Figure 5 17 Inspection along Sitarail Railways  
(near Koudougou Station, near Siby Station, and near Bobo-Dioulasso Station)  
(continued)**



Slope stabilization work



Slope after stabilization work



Cutting section in good condition



Embankment section in good condition

**Figure 5-18 Inspection along Sitarail Railways  
(Inspection on a Motor Car along the Railways between Banfora Station and the  
Border via Niancoloko Station)**



Spare wagon wheels



A wagon under manufacturing works



A Locomotive under repair



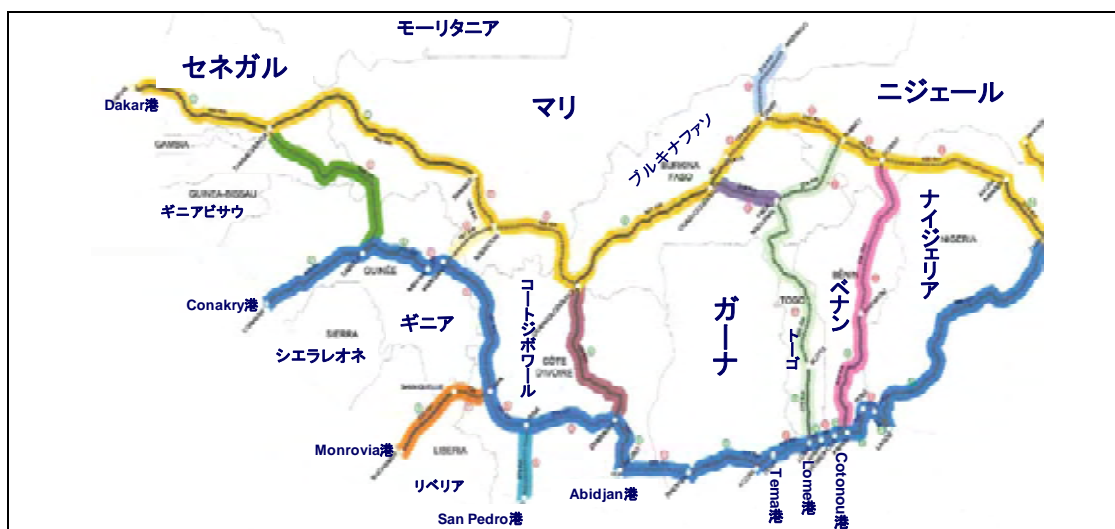
Wheels after repair

Figure 5-19 Bobo-Dioulasso Rolling Stock Workshop of Sitarail (Field Inspection)

#### 5.4.4 Railway Improvement Projects in West Africa

##### (1) ECOWAS Railway Improvement Project

ECOWAS began studying railway improvement policy in West Africa in the late 1990s and developed a master plan in 2000 (see Figure 5-20).



Source: After CIMA International, et al. (2008), Feasibility Study for the Interconnection of Railway Networks in the Economic Community of West African States (ECOWAS), Final Report, March 2008

Figure 5-20 ECOWAS Railway Master Plan

From 2006 to 2008, ECOWAS and UEMOA conducted follow-on prefeasibility studies of the 17 priority railway links in the master plan (Table 5-9). All of these sections are to be newly constructed. The prefeasibility study examined route selection, environmental impacts, financial aspects, introduction of PPP, and implementation system.

**Table 5-9 Priority Railway Links Proposed in the ECOWAS Railway Master Plan**

No.	Section	Crossing countries	km
A1	Ilaro–Pobè	Nigeria–Benin	23
A2	Segboroué–Aneho	Benin–Togo	49
A3	Lomé–Téma	Togo–Ghana	147
A4	Prestea–Abobo	Ghana–Côte d’Ivoire	222
A5	Dimbokro–Man–Sanniquelli	Côte d’Ivoire –Liberia	535
B1	Ouangolodougou–Bougouni–Bamako	Côte d’Ivoire –Mali	569
B2	Kaya–Dori–Niamey	Burkina Faso–Niger	397
B3	Niamey–Dosso–Kaura Namoda	Niger–Nigeria	45
C1	Niamey–Dosso–Parakou	Niger–Benin	625
C2	Kaya–Dori–Ansongo	Burkina Faso–Mali	363
C3	Kano–Maradi	Nigeria–Niger	241
C4	San Pedro–Man	Côte d’Ivoire	399
C5	Blitta–Fada Ngourma–Niamey	Benin–Burkina Faso–Niger	–
C5 (1)	Blitta–Fada Ngourma –Ouagadougou	Benin–Burkina Faso	–
C6	Bougouni–Mandiana–Kankan	Mali–Guinea	261
C7	Man–Mandiana–Kankan	Côte d’Ivoire –Guinea	571
C8	Niamey–Fada Ngourma–Ouagadougou	Niger–Burkina Faso	492
C9	Dabola–Tambacounda	Guinea–Mali–Senegal	646

Source: CIMA International, et al. (2008), Feasibility Study for the Interconnection of Railway Networks in the Economic Community of West African States (ECOWAS), Final Report, March 2008

The following subsections (2) to (5) summarize the development of priority railway links mainly in the countries visited.

## **(2) Railway Construction Project between Bamako and Ouagadougou**

The section between Bamako and Ouagadougou, which is one of the priority railway links proposed by the ECOWAS, will be linked to the Abidjan–Ouagadougou corridor railway (Sitarail) at Ouangolodougou (a city near the border in Côte d’Ivoire) located south of Bamako (see Figure 5-21).<sup>23</sup> The section between Bamako and Ouangolodougou (569 km) is expected to be newly constructed. The completion of this section will link Bamako with the Ports of Abidjan and Dakar Port, thereby expanding railway transport options for these ports. In addition, completion of this section will link Mali and Burkina Faso, which will facilitate economic exchange between the two countries. UEMOA plans to conduct a detailed feasibility study of this section in the near future with assistance from the United States Trade and Development Agency (USTDA). The study also includes the rehabilitation of the existing lines between Dakar and Bamako.

<sup>23</sup> Some in Burkina Faso who seek a railway link with Bobo-Dioulasso.



Source: CIMA International, et al. (2008), Feasibility Study for the Interconnection of Railway Networks in the Economic Community of West African States (ECOWAS), Final Report, March 2008.

**Figure 5-21 Bamako–Ouagadougou Railway Corridor Development Project**

### **(3) Ouagadougou–Niamey Railway Improvement Project**

The railway corridor between Ouagadougou and Niamey via Kaya and Dori is included in the 17 priority railway links. Mining of uranium has commenced in the suburbs of Niamey, and the development of a manganese mine<sup>24</sup> at Tambao near Dori is being studied. This railway will link Niamey with the Port of Abidjan Port. Since there are no railway links to the outports, the development of this railway corridor will provide rail with a share of the freight transported between Burkina Faso and Niger, which is dominated by road transport at present. Sitarail, the operator of railways between Abidjan and Ouagadougou, is interested in extending its track to Niamey. The EU has accorded this section as a top priority railway link and is preparing a technical study (between a feasibility study and a detailed design study) to be conducted by ECOWAS. The study also includes the rehabilitation of existing sections between Abidjan and Ouagadougou, and Ouagadougou and Kaya.



Source: CIMA International, et al. (2008), Feasibility Study for the Interconnection of Railway Networks in the Economic Community of West African States (ECOWAS); Final Report, March 2008.

**Figure 5-22 Ouagadougou–Niamey Railway Corridor Development Project**

<sup>24</sup> While a Japanese trading company is reportedly engaged in activities toward the acquisition of mining rights, market entry by an Indian company is also reported. The future development remains uncertain.



#### (4) Dori–Tambao Railway Improvement Project

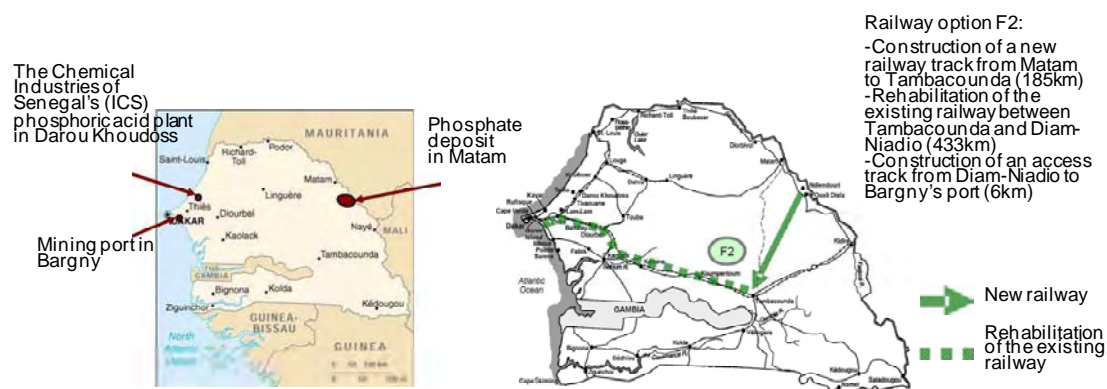
The section between Dori and Tambao (about 90–100 km) was not included in the priority railway links proposed by the ECOWAS but has drawn considerable interest in local communities. The distance between Ouagadougou and Dori is about 273 km, of which there is an existing route as far as Kaya (although it requires rehabilitation because it has been out of service for several years). The distance between Kaya and Tambao via Dori is about 260–270 km (of which the distance between Kaya and Dori is about 170 km). The construction cost is estimated at about JPY 40–50 billion. The project is only at the conceptual stage with no concrete plans for a feasibility study. If constructed, this section is to be operated under a PPP but there are many issues to be assessed including the details of the route, implementation system, demand forecast, and the securing of access to the outports.

Sitarail finds the development of new railway routes between Burkina Faso and Niger as having high potential because the region has abundant mineral resources including the Tambao Mine and finds the railway improvement between Burkina Faso and Mali as effective as a means of transporting agricultural products from Mali.

#### (5) Tambacounda–Matam Railway Improvement Project

Since the transport of the phosphate in Matam Province, Senegal, with potential reserves of 40 million tons, has been limited to road, there has been incentive to progress with a Senegalese plan to construct a new railway line between Tambacounda and Matam (185 km; see Figure 5-23). This plan, however, requires the rehabilitation of the conventional lines of Transrail to the port. Accordingly, it is also planned to upgrade the conventional Tambacounda–Diam–Niadio (near Thies) (433 km) line or to construct a new line linking Diam, Niadio, and the Port of Port (6 km).<sup>25</sup>

In addition, there is a concept to construct a new line leading from Tambacounda to an iron ore vein with probable reserves of 750 million tons in Faleme District in East Senegal.



Source: Etude de faisabilité pour le projet de transport des phosphates de Matam; Report Final, EESD, LLC, December 2007.

**Figure 5-23 Map of Matam Phosphate Deposit and Transport Route**

<sup>25</sup> Employment of standard 1,435 mm gauge is under consideration for this project.

#### **5.4.5 Summary of the Condition of Railway Infrastructure in West Africa**

This subsection summarizes the condition of railway infrastructure mainly with respect to Transrail in Senegal and Mali and Sitarail in Côte d'Ivoire and Burkina Faso.

With regard to Ghana, a study of the feasibility of rehabilitation of the East and Central Lines may be required after reviewing the result of the feasibility study of the West Line, which is currently with EU assistance (covering sections out of service and in operation). This ongoing study is necessary given the large-scale damage to the railway infrastructure (e.g., track, rolling stock, station facilities), and with the operation of the rail routes limited to 300.9 km (32.4%) of its total length of 929.4 km.

##### **(1) Railway Improvement Master Plan**

A railway improvement master plan has been prepared to some extent. The Ministry of Transport and Infrastructure of Senegal has prepared a master plan for its railways. If the concession currently under negotiation is revised, Transrail is expected to execute the revision according to its management plan. SOPAFER-B of Burkina Faso and SIPF of Côte d'Ivoire have concluded a concession with Sitarail under the same conditions as a state-owned management company for railway infrastructure and rolling stock workshops, with the required investment. Since implementation has been confirmed, it will not be included here as a requirement for railway infrastructure upgrading.

##### **(2) Deteriorated Railway Facilities (Line Equipment)**

Transrail and Sitarail need to rehabilitate their deteriorated railway facilities (line equipment). Transrail has stopped operation of passenger trains along the section between Dakar and Bamako due to train accidents. At present, it provides passenger transport only along the section between Bamako and Kayes. However, PTB (a public corporation) provides a small-scale commuter transportation service between Dakar and Thies. Sitarail operates three returns per week of passenger trains between Abidjan and Ouagadougou. Station facilities have deteriorated at some intermediate stations.

The poor condition of Transrail's track causes a decrease in train speed (the schedule speed for the section between Dakar and Bamako is abnormally low at about 14.5 kph) and leads to frequent derailment incidents. The faulty track between Bala and Kidira (about 130 km) mainly consists of 26 kg/m light rails. In this section, 39 derailment incidents occurred in 2009, which represents 27.1% of the 144 derailment incidents in total. The worst section is between Dakar and Thies (about 70 km), where 56 derailment incidents occurred in 2009, representing 38.9% of the total number of derailment incidents. Poor conditions were observed in some areas for Sitarail as well.

The rehabilitation of deteriorated facilities, which form the foundation for safe and stable railway transport, such as tracks, railway roadbeds, and bridges is a priority issue. In addition, deteriorated station facilities require rehabilitation when resuming passenger transport.

##### **(3) Shortage of Rolling Stock**

The traffic capacity of Transrail and Sitarail falls short of the demand due to a shortage of operational (available) rolling stock. Eliminating this shortage is an urgent requirement. While procurement of new and well-maintained used rolling stock as well as sufficient spare parts is required, improvement of rolling stock availability by improving maintenance efficiency is a priority.

#### **(4) Rolling Stock Workshops**

The rolling stock workshops owned by railway companies are capable of repairing and overhauling locomotives, wagons, and coaches, but they require modernization to enable efficient rolling stock maintenance. Issues include: (i) the lack of repair parts, (ii) the need to modernize workshops for the inspection and repair of rolling stock, and (iii) the education/training of personnel to upgrade skills for rolling stock maintenance.

#### **(5) Upgrading of Track**

The track of Transrail and Sitarail is fragile and need upgrading. Use of heavier rails, replacement of current sleepers with pre-stressed concrete sleepers, installation of additional sleepers, and an increase in ballast thickness are priority measures.

The rails of Transrail railways between Dakar and Bamako are light in weight (36 kg/m, 30 kg/m, or 26 kg/m). The 36 kg/m rails (mainly between Dakar and Tambacounda) were laid from 1966 to 1992, while the 30 kg/m rails (600 km in total length) and 26 kg/m rails (150 km in total length) have become deteriorated after use for more than 70 years. The railway facilities require immediate rehabilitation along the entire line.

The Sitarail railway section between Abidjan and Ouagadougou is mainly made of 36–37 kg/m or 30 kg/m rails and has become deteriorated after use for more than 55 years. The track of Sitarail are in better condition than that of Transrail, but rehabilitation or replacement is required in the near future since the rails are excessively worn in parts and is reaching the end of its useful life.

#### **(6) Signaling System**

The railways of Transrail and Sitarail are operated virtually without a signaling system at present since the system is non-functioning. Thus, an interlocking system between signal equipment and turnouts needs to be introduced.

#### **(7) Response to Increased Container Transport**

There has been a rapid increase in the ratio of container transport to total freight transport in recent years. Transrail and Sitarail have responded by operating special container trains. However, they require upgraded transport capacity by increasing the number of vehicles for container transport, upgrading container handling facilities, and establishing/expanding container depots.

#### **(8) International Transportation System**

There has been progress in the development of the international transport system by railway. Customs clearance at the Port of Dakar takes about 6–7 hours and the border crossing to Mali is completed in about two hours. At the Port of Abidjan, freight is handled by SDV of the Bolloré Group. Customs clearance is facilitated with an International Transit Document shared by Côte d'Ivoire and Burkina Faso. Improvements in the border crossing procedure for railway cargo (e.g., introduction of a railway one-stop border post, as at Malaba between Uganda and Kenya) are considered unnecessary at present.

Thus, international transport by railway is relatively smooth with no particular problems. Accordingly, it will not be included in the railway infrastructure upgrading issues presented in this study. However, procedural improvement may be necessary as rail freight transport volumes increase.



## **(9) Personnel Skills**

Railway personnel are unskilled and require education/training in various fields such as management, track maintenance, maintenance of railway facilities such as roadbeds and bridges, rolling stock maintenance, maintenance of the signaling system, and the handling of containers. Track condition is poor. The upgrading of track maintenance capability is a priority issue. Since the railways request on-site service by European engineers for repairs beyond the technical capability of the staff, the upgrading of rolling stock maintenance skills is a priority.<sup>26</sup>

## **(10) Concession Form**

Both well-functioning and nonfunctioning concessions were both observed in the countries visited. The concession framework of Transrail needs improvement and is under review mainly by the World Bank. The concession of Sitarail was assessed as mostly favorable.

Transrail is making efforts toward the rehabilitation of their deteriorated assets with assistance from development partners with the concession revised through the establishment of an asset holding company so that the government may assume responsibility for infrastructure maintenance. Consensus building is underway among the two governments, development partners, and the concessionaire through a joint study of the new concession framework.

SOPAFER-B of Burkina Faso is a 100% state-owned railway asset management/railway management company responsible for rehabilitation as owner of railway infrastructure and rolling stock workshops. It receives assistance from the World Bank, the EIB, the government of France, and Belgian companies. While the concession fee from Sitarail will be appropriated for the repayment, SOPAFER-B will be responsible for final payment if Sitarail defaults on the concession fee. SOPAFER-B has invested CFA 15 billion in bridges, civil engineering facilities, construction machinery, optical fiber, and rolling stock workshops over the last 15 years.

The railway asset management/railway management company of Côte d'Ivoire is a 100% state-owned company called SIFP. It concluded a concession contract with Sitarail under same conditions as the concession with SOPAFER-B. The Railway Investment Fund was established with funding from the government. This fund will be operated and managed by the roundtable group described above.

## **5.5 Development of Regional Freight Transport Corridors**

### **5.5.1 Importance of Securing Multiple Corridor Options**

Since the Ivorian Crisis in 2003 it has been important for cargo owners in neighboring landlocked countries to secure multiple freight transport corridors. Due to the crisis the Port of Abidjan was paralyzed and the national borders between Côte d'Ivoire and Burkina Faso were closed for periods of time. Freight transported from the Port of Abidjan Port to inland areas was required to pass through disputed area territory. Figures 5-4 and 5-5 show changes in ports used for transport of freight destined to Burkina Faso and Mali from 1998 to 2006. With the Ivorian Crisis in 2003, most of the freight destined for Burkina Faso shifted from the Port of Abidjan to the Ports of Tema and Lome. In recent years, the volume of freight shipped via the Port of Cotonou has been increasing. Similarly, the figures show that freight destined for Mali has shifted from the Port of Abidjan Port to the Ports of Tema, Takoradi, Conakry, and Lome. Interestingly, in terms of the freight destined for Mali only, the freight shipped via Dakar has not increased as much as generally thought. One reason is likely that while there has been progress in improving the roads between Senegal and Mali, the railway has not been able to provide sufficient traffic capacity to meet the demand.

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<sup>26</sup> The dispatch of an engineer for one week costs about JPY 2 million.

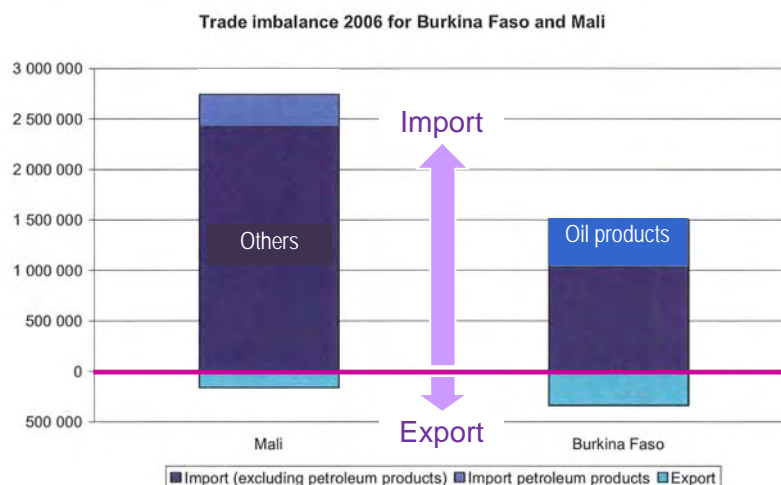
### 5.5.2 Expectations of Landlocked and Coastal Countries

The significance of the development of regional freight transport corridors between landlocked and coastal countries. The volumes of freight from landlocked countries handled at major ports in Sub-Saharan Africa are less than the volumes of domestic freight. Accordingly, while the landlocked countries place a high priority on the development of regional corridors from the perspective of securing access to ports, the coastal countries consider the development of regional corridors mainly in terms of their significance for developing inland regions within their own countries and promoting resource development. As a result, the priority for developing regional transport corridors for coastal countries may be lower than the priority for landlocked countries.

The priority of the development of regional transport corridors for the coastal countries needs to be increased by specifying the benefits of the development of the corridors for the coastal countries (e.g., regional development, resource development).

### 5.5.3 Adjustment of the Difference between the Volumes of Import and Export Freight

The freight of landlocked countries in West Africa such as Mali and Burkina Faso predominantly consists of imported goods (see Figure 5-24). Accordingly, while rolling stock and containers are mainly used for transport in the direction of inland areas, relatively few are used in the direction of ports. As a result, railways, trucks, and containers are generally used in one direction and return with empty loads. A better balanced freight transport system would allow for more effective use of the transport infrastructure.



**Figure 5-24 Graphical Depiction of Trade Imbalances of Landlocked Burkina Faso and Mali**

### 5.5.4 Items Transported

Table 3-10 presented a regional comparison of the volume of passengers and freight transported by railway in Africa. This table showed that railways in Africa mainly haul freight. However, railways in North Africa and South Africa transport relatively more passengers, and railways in North Africa mainly transport passengers rather than freight.

The items transported by railways differ greatly among routes. For example, mineral resources account for a large portion of the traffic hauled by the GRC, Gabon, Zambia, CFM/CDN/CFBB, Madrail, and BR railways. On other railways, agricultural products, timber, cement, fertilizer,

and fuels account for a relatively large portion of the traffic. Understanding the relationship between industrial structure and the items transported and future potentials in the regions along the railways is important in considering future railway development.

### **5.5.5 Vehicle Overloading and Axle Load Control**

In West Africa pavement damage created by vehicle overloading is a major issue. Overloading reduces road life by half and increases the cost of road improvement and vehicle operation, the latter because of the decrease in vehicle speed. The conventional countermeasures against overloading have been taken by countries or regions. However, the application of different axle load standards makes it difficult to apply broad-based controls, and as a consequence freight must be transhipped at national borders. To address this issue, ECOWAS and the UEMOA have adopted the following resolutions/decisions:

- Resolution C/RES.1/12/88: Enforcement of 11.5 ton limit
- Written Decision D/DEC.7/7/91: Decision of road regulations and axle load control
- Resolution C/RES.5/5/90: Placement of weighbridges
- Written Decision C/DEC.7/7/91: Road regulations in individual member countries compliance of the 11.5 ton axle load control
- Regulation 14/2005/CM/UEMOA: Vehicle dimension, decision of 12 ton axle load control, regulation control/enforcement methods

Table 5-10 shows the axle load limits specified by the ECOWAS.

**Table 5-10 Axle Load Control by ECOWAS**

Type of Vehicle	Axle Load Limit (tons)
1. 1 axle in front	6
2. 1 axle in middle/back	12
3. 2 axles in middle/back	Type 2: 21 Type 4: 20
4. 3 axles (including tandem)	25
5. Container wagon (type 4): tandem with 3 axles or 2 axles in back	24

Source: Decision C/DEC.7/7/91 Relating to the Road Traffic Regulations Based on the 11.5 Tons Axle Load to Protect Road Infrastructures and Road Transport Vehicles

Other RECs in Sub-Saharan Africa have undertaken similar actions. Table 5-11 shows the axle load limits specified by CEMAC/ECCAS and COMESA.

**Table 5-11 Axle Load Control by CEMAC/ECCAS and the COMESA**

REC	Axle Load Control (tons)		
	1 Axle	2 Axles	3 Axles
CEMAC	13	21	27
COMESA	10	16	24

Source: United Nations Economic Commission for Africa (UNECA)

Reasons for the overloading (a typical example of which is shown in Figure 5-25) despite the efforts underway since the latter half of 1980s include:

- a lack of enforcement;
- only partial enforcement of restrictions, with overloaded vehicles traveling along other corridors; and
- a lack of sanctions or fines against drivers due to bribery and corruption.



**Figure 5-25**  
**Truck Transport in West Africa**  
**(Dakar–Bamako Corridor)**

The enforcement of restrictions requires the cooperation of transport companies as well as the placement of weighbridges by road administrators, and the enforcement of axle load regulations by the police. It is also under consideration to seek voluntary control from transport companies with vehicles above a certain size subject to license cancellation in the event of violation(s). It is necessary to make it mandatory for port authorities to confine overloaded vehicles within the port under jurisdiction.

Overloading restrictions were implemented in 2009 along major corridors in Ghana, Nigeria, and Togo. However, the enforcement of these restrictions has encouraged transport companies to use corridors and ports in neighboring countries without such enforcement in order to reduce their transport costs. Another consideration is that load controls are important to ensure a “level playing field” (i.e., fair competition) with other modes of transport (especially railways).

### **5.5.6 Response to a Truckers’ Cartel**

While expensive transport costs in Africa are attributed to poorly developed infrastructure and bribes, the World Bank reported a survey showing the significant influence of a cartel formed by truckers.<sup>27</sup> USAID conducted a similar survey and pointed out that free competition is inhibited by the adjustment of prices by trade associations. Table 5-12 shows a tariff manifested by a trucker's association in Burkina Faso, ONTRAF. This tariff is also used by truckers and the actual transport invoice is allegedly based on this tariff with little change.<sup>28</sup>

**Table 5-12 ONTRAF’s Tariff for Truck Charges for Transportation  
from Tema to Ouagadougou (2007)**

Cargo Type	CFA	USD
20 foot container (less than 15t)	900,000	2,142
Two 20 foot containers or one 40 foot container (less than 30t)	1,300,000	3,094
Tariff per 1t of cargo exceeding the limit weight	30,000	71
Tariff per 1t of bulk cargo	30,000	71

Source: USAID, Transport and Logistics Costs on the Tema–Ouagadougou Corridor, 2010

Some truckers’ cartels regulate the number of vehicles assigned for transport to inland areas to inhibit cargo owners or freight forwarders from selecting specific truckers for the transport of their cargo. In addition, since cargo and trucks must wait in long queues, the allocation of

<sup>27</sup> World Bank, Transport Prices and Costs in Africa: A Review of International Corridors, 2009.

<sup>28</sup> USAID, Transport and Logistics Costs on the Tema–Ouagadougou Corridor, 2010.

vehicles is lengthy and cargo and forwarders are inevitably must rely on truckers for the quality of the driver and vehicle condition. Anecdotal evidence indicates that trucks are predominantly owned by individuals with involvement with politicians and government officials, and thus the industry is less deregulated than it would be otherwise.

In addition, without competition between and among truckers, although public investment in roads will contribute to an increase in vehicle travel speeds and to a reduction in operation costs, these benefits will be absorbed as profit by truckers and will not result in a reduction in freight transport cost for cargo owners. From this perspective, stable and low-cost transport through railway improvement may more effectively reduce transport prices, which are currently dependent on road transport cartels.

### **5.5.7 Cooperation with Other Development Partners and Regional Economic Communities**

The development of regional freight transport corridors entails multifaceted assistance including large-scale capital investment. In West Africa, development partners (e.g., the World Bank, JICA, AfDB, the EU, USAID) and regional economic communities (e.g., ECOWAS, UEMOA, OMVS/ Senegal River Basin Development Authority) can provide assistance. Table 5-13 shows examples of their activities. What is notable is the increasing interest in broad-based efforts and support for railway development in West Africa among such development partners as the World Bank, AfDB, and the EU. This is a response to the more costly transport cost in West Africa compared to other parts of Africa and developed countries, as described in Chapters 2 and 3, a consequence of the overdependence on road transport in West Africa. The increase in road improvement costs due to vehicle overloading is also a relevant factor contributing to the need to assist railway improvement in order to assure the sustainability of the regional freight transport infrastructure.

**Table 5-13 Examples of Assistance in the Transport Sector by Development Partners and Regional Economic Communities in West Africa**

Donor	Assistance
AfDB	<ul style="list-style-type: none"> <li>• Financing for ECOWAS railway master plan (implemented by ECOWAS)</li> </ul>
World Bank	<ul style="list-style-type: none"> <li>• Assistance for the development of arterial and rural roads, and technical assistance for PPP railway projects</li> <li>• Assistance for port development (e.g., loan for expansion of the Port of Dakar container terminal; a loan for facilities development in the Port of Monrovia; a loan for container terminal rehabilitation and expansion in the Port of Freetown)</li> <li>• Implementation of the West Africa Transport and Transit Facilitation Project (construction of rest areas for truck drivers; one-stop border post development along the Abidjan-Lagos Corridor; establishment of single windows; a feasibility study on customs information sharing systems along the Abidjan-Lagos Corridor)</li> <li>• Assistance for dry port development</li> </ul>
EIB	<ul style="list-style-type: none"> <li>• Assistance for port development (e.g., a loan for construction of a Ro-Ro terminal at the Port of Dakar; a loan for rehabilitation and expansion of the Port of Conarky)</li> </ul>
EU	<ul style="list-style-type: none"> <li>• Assistance for development of arterial roads; financing for one-stop border posts (implemented by UEMOA)</li> <li>• Financing for a feasibility study of construction of a railway between Ouagadougou and Niamey</li> <li>• Assistance for institutional building in UEMOA countries</li> </ul>

Donor	Assistance
JICA	<ul style="list-style-type: none"> <li>• Arterial road development</li> <li>• Port development</li> <li>• Assistance for building bridges</li> <li>• Studies (e.g., a one-stop border post study in West Africa, a study of cross-border transport infrastructure)</li> </ul>
USAID	<ul style="list-style-type: none"> <li>• Study of trade facilitation</li> </ul>
BOAD	<ul style="list-style-type: none"> <li>• Assistance for development of arterial roads</li> </ul>
ECOWAS	<ul style="list-style-type: none"> <li>• Implementation of a railway master plan and a (pre)feasibility study (financed by AfDB)</li> <li>• Study on introduction of single window in West African ports</li> <li>• Feasibility study on construction of a railway between Ouagadougou and Niamey (financed by the EU)</li> <li>• Study on one-stop border post development along the Abidjan-Lagos Corridor</li> <li>• Feasibility study on customs information sharing systems along the Abidjan-Lagos Corridor;</li> </ul>
UEMOA	<ul style="list-style-type: none"> <li>• Technical advice for feasibility study on construction of a railway between Ouagadougou and Niamey (financed by the EU)</li> <li>• One-stop border post development (financed by the EU)</li> </ul>
OMVS	<ul style="list-style-type: none"> <li>• Study on introduction of a transport system using the Senegal River</li> </ul>



## **Chapter 6     Future Directions of Infrastructure Improvements along Regional Freight Corridors Focusing on Ports/Railways**

### **6.1        Preface**

In each chapter so far, the current state of infrastructure along regional freight corridors in Sub-Saharan Africa, focusing on ports and railways, has been analyzed based on field investigations conducted in West Africa. Through such analyses, it has been observed that in order to revitalize the economy of Sub-Saharan Africa, it is necessary to effect large reductions in transit time and costs by improving infrastructure along regional freight corridors and by improving operational efficiency. Moreover, it has become clear that in order to maximize the efficiency of improvements, it is critical to improve each component, such as procedures related to ports, railways, roads, and connections between regional freight transport modes, to comprehensively create single regional freight corridor transport systems. In addition, it has been pointed out that while road transport has been the dominant component in regional freight corridor improvements, there is an increasing demand for infrastructure improvements focusing on ports and railways in order to achieve sustainable medium- and long-term improvements of regional freight corridors in areas with high potential for industrial and resources development.

In the integration of corridor improvements, the creation of a healthy competitive environment including the railway industry is crucial. Improvements of road systems in the vicinity of ports, cooperation between regional development and resource development as well as strict regulations on overloaded road transport vehicles should be implemented through comprehensive efforts including not only infrastructure improvements but also measures to facilitate trade, human resource development, legal system improvements, deregulation of the trucking industry, and measures to secure funding for improvements.

First, this chapter will assess problems and issues related to existing infrastructure along the regional freight corridors in Sub-Saharan Africa, in order to suggest a menu of assistance measures for improvements based on participation of and cooperation by multiple development partners. In addition, assistance measures of high priority for each type will be reviewed in an attempt to categorize ports and railways in Sub-Saharan Africa.

### **6.2        Role of the Regional Freight 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).

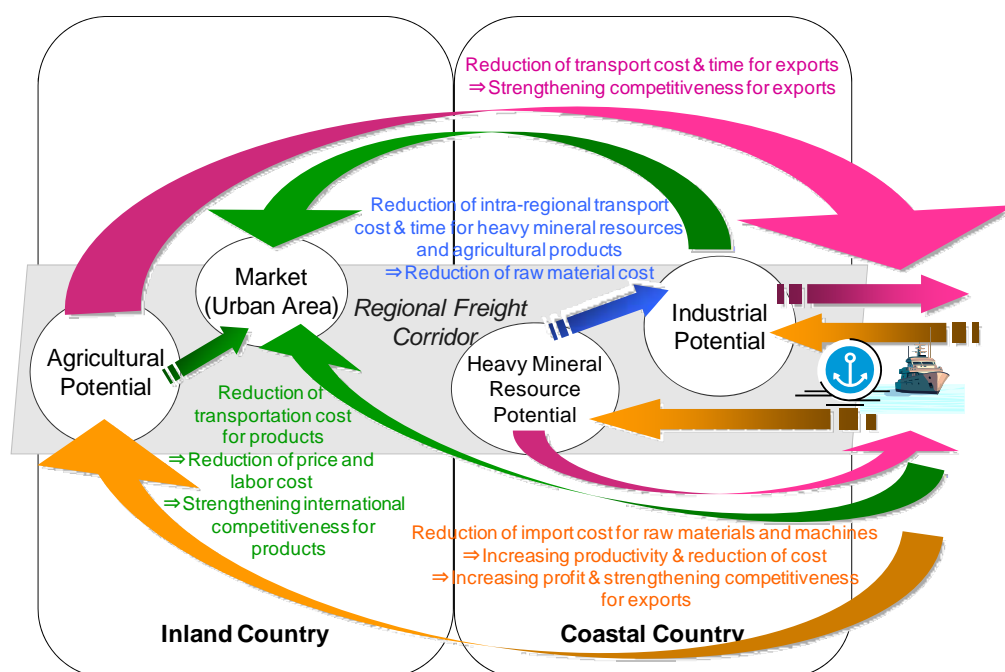
This section will also assess roles of the regional freight corridors. In addition, according to industrial potential and consumption characteristics along the corridors, this section will examine high priority transport improvements and measures to facilitate trade along the regional freight corridors, all of which are required for economic growth of Sub-Saharan Africa

## 6.2.1 Role of Regional Freight Corridors and Maintenance Issues

### (1) Role of the Regional Freight Corridors

Regional freight corridors play a vital role in vitalizing regional economies by reducing freight transport costs and time. The reduction in transport costs and time facilitates the movement of raw materials and equipment for production, thereby increasing productivity and reducing indirect costs. Furthermore, competitiveness in terms of cost and quality is strengthened, resulting in increased profits.

For example, in the agricultural sector, productivity and the quality of harvests are improved by a reduction in import costs for fertilizers and agricultural equipment. In addition, transport costs between the farms and markets are reduced. As a result, profits are increased and the competitiveness of exports is strengthened. Reductions in transport costs for products decrease market prices, consumer prices, and labor costs. The decrease (i.e., improvement) in consumer prices and labor costs reduces production costs and helps achieve competitiveness at the international level. This scenario of vitalization of regional economies is depicted in Figure 6-1.



**Figure 6-1 Scenario for Vitalizing Regional Economies with Corridor Improvements**

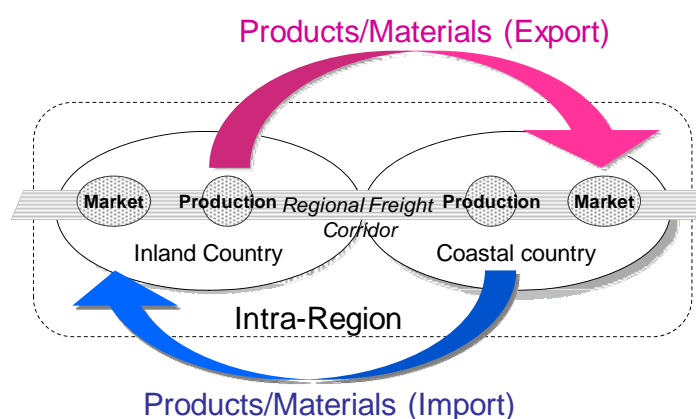
### (2) Intra-Regional Trade and Inter-Regional Trade

It is useful to first define the technical terms used in this chapter. Trade utilizing regional freight corridors in the Sub-Saharan Africa region is defined as “intra-regional trade” or “inter-regional trade”. The transport mode and trade facilitation policies differ considerably depending on whether imports and exports of countries are intra-regional or inter-regional.

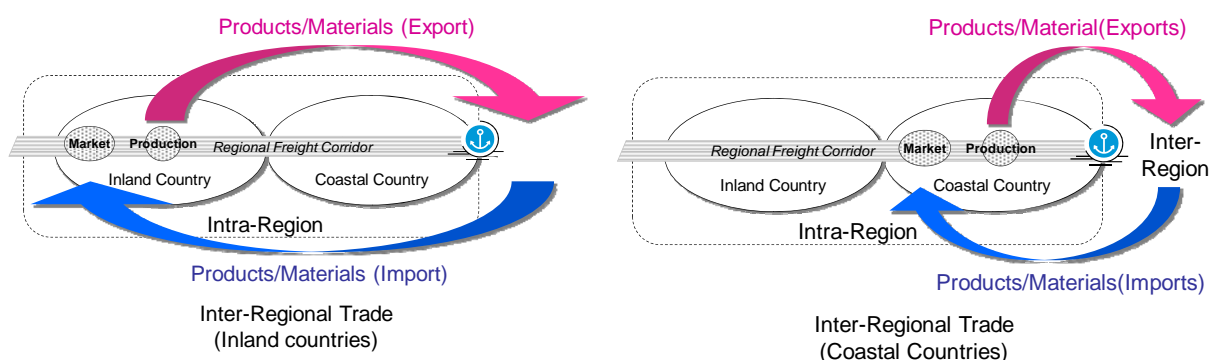
In this study, “intra-regional trade” and “inter-regional trade” are defined as follows, and graphically represented in Figure 6-2 and 6-3.

**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**.



**Figure 6-2 “Image” of Intra-regional Trade (by inland transport)**



**Figure 6-3 “Image” of Inter-Regional Trade (through ports)**

### (3) Importance of a Multi-Sectoral Approach

In order to address issues related to regional freight transport corridors and promote regional revitalization, consideration of not only hard infrastructure but also related soft infrastructure and industrial developments along corridors is required. The main themes of this type of multi-sectoral approach, is aimed at achieving revitalization of local areas through regional freight transport corridor development, are listed below in the following box.

### **Main Themes of Multi-Sectoral Approach for Regional Freight Transport Corridor Development**

#### ***(1) Multi-sectoral measures for improving the entire logistics system***

These measures includes not only infrastructure improvement but also facilitation of trade procedures, human resource development, legal systems development, relaxation of regulations governing truck transport, and comprehensive actions to secure revenue for infrastructure maintenance.

#### ***(2) Coordination with industrial development along corridors***

These measures include coordination with local development initiatives, mineral resource developments, agricultural developments, and industrial developments. (A combination of various schemes including technical and financial assistance, will be required.)

#### ***(3) Clarification of role sharing for ports, roads, and railways***

Role sharing is to be clarified according to the trade characteristics of the corridor.

#### ***(4) Securing a sound competitive environment***

A sound competitive environment between road transport and railway will be realized by enforcement of regulations against truck overloading.

#### ***(5) Strengthening collaboration with development partners and/or RECs***

Coordination with development partners and/or RECs will be necessary because regional freight transport corridor development requires multilateral assistance involving significant funds.

### **6.2.2 Priority for Improvement of Transport Modes**

Transport modes required for local revitalization will vary according to the trade characteristics and industrial potential for each region. Prioritization for the improvement of the transport modes studied as follows.

#### **(1) Characteristics of Railway Freight Transport and Inland Transport Measures in Sub-Saharan Africa**

Characteristics of railway freight transport in Sub-Saharan Africa include the following:<sup>1</sup>

- Most freight hauled is bulk, of which is inter-regional trade. The ports are origins/destinations.<sup>2</sup>
- The main exports from inland areas to ports are mineral resources (e.g., copper, tin, manganese, stone, coal), lumber, and agricultural products (e.g., cocoa, coffee, cotton, grain).
- Most imports from ports to inland areas are industrial products (e.g., cement, petroleum products, general cargo). General cargo is containerized in some cases, especially for high-priced products (e.g., Ugandan coffee), which are transported to ports beyond national borders.

<sup>1</sup> Source: AICD, 2009, Off Track: Railways in Sub-Saharan Africa.

<sup>2</sup> There are some exceptions. In Botswana, there is a large share of railway transport freight in which ports do not serve as an origin or destination. The main freight items transported by railway are raw materials towards South Africa and other products (e.g., cement, petroleum) from South Africa.

Thus, while there are some exceptions, railway transport has an advantage for inter-regional trade, and road transport has an advantage for intra-regional trade. The main reasons for this finding are as follows:

- Existing railways were constructed during the colonial era in order to export the mineral resources of Sub-Saharan Africa and import industrial products from imperial countries. Therefore, inter-regional transport networks connecting ports and mining areas and/or networks connecting ports and major markets have been developed.
- If railways were used for intra-regional trade, road transport would be used from production area to station and from station to market. Transshipment would be required twice and the transport distance would be short in most cases. Therefore, road transport is more appropriate for intra-regional trade.

However, road transport has an advantage for inter-regional trade in some cases. Examples include transport over relatively short distances (400-500 km), excluding cases where the weight of the freight is extremely heavy for its price, and the transport of perishable food products. Railway transport would take precedence in some special cases, e.g., where freight is heavy bulk and its main production area and market are along the railway network.

## **(2) Prioritization of for Transport Improvements**

The following box considers the prioritization of transport improvements by mode according to trade characteristics.

**In case of intra-regional trade**, road transport is preferred in most cases considering the short transport distance and the time/effort required for transshipment.

**In case of inter-regional trade**, most freight is transported through ports except for some high-value materials/products (e.g., rare metals) that are suitable for air transport. Therefore, port improvements are important. Railway transport is preferred for inland transport of heavy mineral resources (e.g., copper, tin, manganese, stone, coals), lumber, and cement. Regarding agricultural products the values of which do not depend on freshness (e.g., cocoa, coffee, cotton, grain), fertilizer, containers, machines, fuel (petroleum, gasoline), if the transport distance is more than about 400-500 km, railway transport is preferred. If the transport distance is less than 400-500 km, road transport is preferred. The preferred mode for perishable food products is road.

In cases where railway development is considered in the short and medium term, in general rehabilitation of existing railways should be undertaken before construction of new railways. Most existing lines have been constructed along high-priority routes for railway transport and the lack of capacity to meet demand is usually a result of limited maintenance and rehabilitation. Since rehabilitating existing lines can be quite costly, funds must be concentrated on rehabilitation works in short and medium term.

Most corridors in Sub-Saharan Africa with high potential for inter-regional trade also have a high potential for intra-regional trade. Therefore, most corridors with high priority for railway development also have priority for road development. The development of such corridors should consider the roles of the respective modes in serving intra- and inter-regional trade by freight type.

### (3) Trade Facilitation Policy by Trade Characteristic

Trade facilitation policy also varies depending on whether the trade is intra-regional or inter-regional. In the case of intra-regional trade, priority issues include policies to reduce trade barriers of neighboring countries (e.g., customs duties, non-tariff barriers), harmonization of traffic laws/regulations, and trade facilitation policies. In the case of inter-regional trade, priority issues include policies to facilitate port procedures and transit facilitation policies.

### (4) Summary

Based on the foregoing analysis, specific measures by type of trade are set out in Table 6-1.

**Table 6-1 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	<ul style="list-style-type: none"> <li>• Integration of transport laws and regulations within the region</li> <li>• Introduction of third-party motor liability insurance within the region</li> <li>• Development of one-stop border posts</li> <li>• Integration of customs software (multi-language) within the region</li> <li>• Increase in customs-exempt commodities</li> </ul>
	Heavy bulk (areas of production and consumption are located along railway lines)	• Rail	
Inter- Regional Trade	Mineral resources (e.g., copper, tin, manganese, stone, coal), timber, cement, etc.	• Rail • Port	<ul style="list-style-type: none"> <li>• Introduction of single window</li> <li>• Development of dry port</li> <li>• Introduction of global positioning systems (GPS)</li> <li>• Implementation of a common customs bond within the region</li> </ul>
	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	

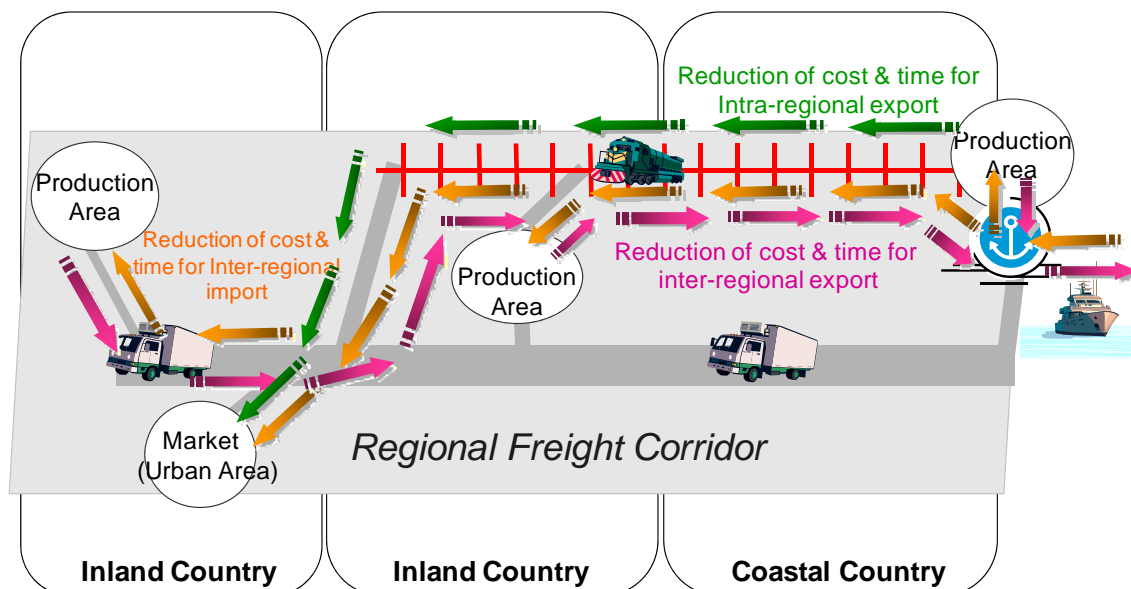
When deciding which modes to prioritize for improvement in each corridor and high-priority trade facilitation measures, it is necessary to specify the type of trade along the corridors (i.e., inter-regional or intra-regional) and take into account industrial potentials along the corridor, locations of production and consumption regions, and economic scale.

In the following sections, issues for improving infrastructure along regional freight corridors will be explored by sector.



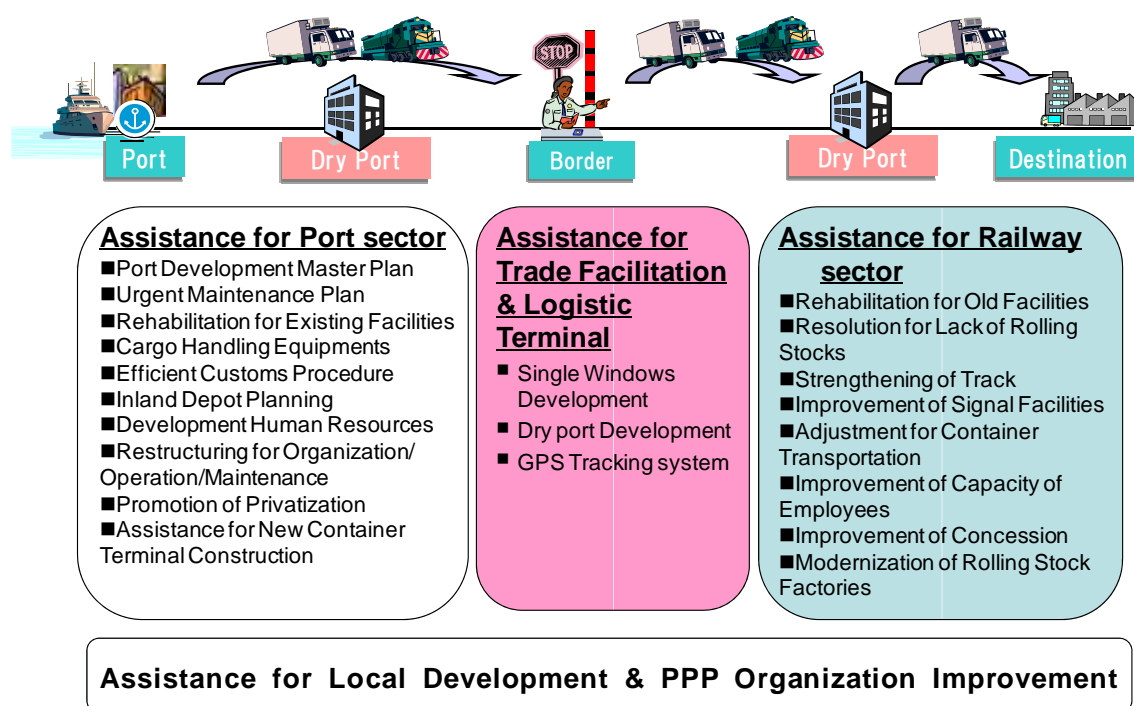
### 6.2.3 Comprehensive Program for Regional Freight Corridors Focusing on Ports and Railways

Figure 6-4 shows the impact of port and railway development on intra-regional and inter-regional trade as defined in this study. Ports contribute not only to the development of the coastal country itself but also to the inland countries by reducing import/export time and costs. Railway development contributes to the countries along the railway corridors, including the inland countries, by also reducing import/export time and costs.



**Figure 6-4 Port and Railway Development Impacts on Regional Freight**

Considering the multi-sectoral approach and prioritization by type of trade characteristic, Figure 6-5 shows related menus of assistance for regional freight corridor development focusing on ports and railways.



**Figure 6-5 Menu of Policy Assistance for Port, Railway, and Logistics Systems**

Development tasks for regional freight corridor infrastructure focusing on ports and railways are summarized in the following sections.

## 6.3 Issues and Measures in Improving Infrastructure along the Regional Freight Corridors Focusing on Ports and Railways

### 6.3.1 Issues and Measures 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 6-2.

**Table 6-2 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 Planning	<ul style="list-style-type: none"> <li>• 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: <ul style="list-style-type: none"> <li>✓ Risk for the investment to become inefficient to the regional development because of too many terminals and extraordinary competition among neighboring ports.</li> <li>✓ Risk preventing a harmonious port development as a whole caused by negligence of other port functions than container handling.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 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</li> <li>• Master planning of development for major ports</li> </ul>
Cargo handling capacity	<ul style="list-style-type: none"> <li>• Bottlenecks like exceeding dwell time of ships and cargos have been revealed because of limitations of capacities of the existing terminals as follows: <ul style="list-style-type: none"> <li>✓ 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</li> <li>✓ Shortage of waterfrontage itself (quay wall length and number of berths) to meet the potential demands</li> <li>✓ Lack of deep navigation channel, anchorage and quay wall to meet the trend of increased ship size</li> </ul> </li> <li>• 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</li> </ul>	<ul style="list-style-type: none"> <li>• 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</li> <li>• Provision of a connection system including a dedicated access road for integrated operation between ICD's and port premises</li> <li>• Deepening of navigation channel, anchorage and quay wall</li> <li>• Planning of facility development in several phases</li> <li>• Development of a new container terminal based on the above mentioned planning</li> </ul>
Service Level (lead time, cost)	<ul style="list-style-type: none"> <li>• Seamless transportation required by clients (consignees) cannot be materialized because of the lengthy lead time at ports for the reasons below: <ul style="list-style-type: none"> <li>✓ Bottlenecks in transportation because of capacity shortage (as mentioned above)</li> <li>✓ Poor connection with land transport particularly with railway transport, and traffic jam and congestion due to the shortage of access road capacity</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Rehabilitation of existing terminals (as mentioned above)</li> <li>• 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)</li> <li>• Improvement and/or development of access roads and terminal gates</li> <li>• Digitalization of customs clearance, ship entrance and cargo discharge, etc, and by integrating them all,</li> </ul>

Issue Area	Problems in Improving Port Infrastructure	Measures in Improving Port Infrastructure
	<ul style="list-style-type: none"> <li>✓ Complicated and poorly coordinated procedures for customs clearance, ship entrance and cargo discharge, etc</li> <li>• 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</li> </ul>	<ul style="list-style-type: none"> <li>development of Single Window</li> <li>• Introduction of appropriate PPP by securing competitiveness</li> </ul>
PPP/Privatization	<ul style="list-style-type: none"> <li>• 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.</li> <li>• The public sector is prone to conclude unilateral concession contracts favorable to the private sector. Such concession contracts may have the risks below: <ul style="list-style-type: none"> <li>✓ 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.</li> <li>✓ Risk to prevent a new terminal development at a reasonable timing</li> <li>• Risk to raise labor disputes accompanying reduction of labor cost</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate introduction of PPP by securing competitiveness among operators</li> <li>• Appropriate review and change of framework and conditions of concession contract at contract renewal and other occasions</li> </ul>

### **6.3.2 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 6-3.

**Table 6-3 Problems and Measures for Improving Railway Infrastructure in Sub-Saharan Africa**

Issue Area	Issues in Railway Infrastructure	Measures to Improvement
Safety and Stability	<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Comprehensive/integrated verification and analysis of the causes of accidents in the fields including tracks, rolling stock, signaling system, telecommunication system and operating system.</li> <li>• Comprehensive/integrated planning and implementation of counter measures against above mentioned causes of accidents.</li> </ul>
Transport capacity (ability)	<ul style="list-style-type: none"> <li>• 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. <ul style="list-style-type: none"> <li>➢ Restricted train speed due to weakness of track such as deteriorated rail, light weight rail, deteriorated sleepers, etc.</li> <li>➢ Shortage of rolling stock (locomotives and wagons)</li> <li>➢ Shortage of active rolling stock due to insufficient capacity to maintain rolling stock</li> <li>➢ Restricted train speed due to no signaling system, out-of-order signaling system and out-of-date signaling system.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Rehabilitation/improvement of track and roadbed, and improvement of capacity for maintenance.</li> <li>• Procurement of new and well-maintained used rolling stock.</li> <li>• Adequate rolling stock maintenance with procurement of spare parts, improvement of rolling stock maintenance abilities, modernization of rolling stock workshop, etc. (improvement of rolling stock operating rate).</li> <li>• Improvement/renewal of signaling system, and adequate maintenance.</li> <li>• Adequate train operation schedule and system.</li> </ul>

Issue Area	Issues in Railway Infrastructure	Measures to Improvement
Service level (train traveling time, frequency, punctuality)	<ul style="list-style-type: none"> <li>• 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. <ul style="list-style-type: none"> <li>➢ 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.</li> <li>➢ It is impossible to secure punctuality, which is the foundation of transport service, due to insufficient transport capacity and frequent accidents.</li> <li>➢ It is impossible to secure the adequate train diagram and frequency, which can not accommodate the potential demand due to insufficient transport capacity.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 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)</li> <li>• Procurement of new and well-maintained used rolling stock, and improvement of rolling stock operating rate (as mentioned above)</li> </ul>
PPP and Privatization	<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of a sound and adequate PPP.</li> <li>• Improvement of the existing concession framework and contract conditions. (definition of the responsibility and risk between government and concessionaire, e.g., vertically separated concession)</li> <li>• Cooperation with port concession</li> </ul>
Education of staff	<ul style="list-style-type: none"> <li>• Insufficient maintenance skills of staff in the fields for track and rolling stock.</li> <li>• Insufficient knowledge, experience and ability of staff,</li> </ul>	<ul style="list-style-type: none"> <li>• Education/training of staff by short-/long-term professionals in the fields of track and rolling stock.</li> <li>• Education/training of staff by</li> </ul>



Issue Area	Issues in Railway Infrastructure	Measures to Improvement
	including governments, railway authorities and concessionaires, in the fields of railway system operation and administration, PPP and Privatization of railway,	short-/long-term professionals in the fields of railway system operation and administration. • Education/training abroad of staff with training courses.

### **6.3.3 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 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.

### **6.3.4 Trade Facilitation Issues**

Factors leading to increased transport time and costs along regional freight corridors in Sub-Saharan Africa relate to port and railway infrastructure as well as related “soft” infrastructure. Table 6-4 sets out problems and issues related to trade facilitation for port and railway traffic.

**Table 6-4 Trade Facilitation Issues**

Issue Area	Trade Facilitation Problems	Trade Facilitation Measures
Complicated Document Procedures at Ports	<ul style="list-style-type: none"> <li>• Submission of numerous documents required for various administrative organizations</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of single window</li> <li>• Integration of inspection items among administrative organizations and development of software for data conversion</li> </ul>
	<ul style="list-style-type: none"> <li>• Handwritten manual procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of preliminary online procedures</li> </ul>
Complicated Document Procedures at Borders	<ul style="list-style-type: none"> <li>• Checking and other procedures separately conducted in two countries</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of one-stop border posts</li> <li>• Integration of customs software (multilingual) within the region</li> </ul>
	<ul style="list-style-type: none"> <li>• Submission of numerous documents required for various administrative organizations</li> </ul>	<ul style="list-style-type: none"> <li>• Integration of procedures among related organizations in each country</li> <li>• Integration of inspection items among administrative organizations and development of software for data conversion</li> </ul>
	<ul style="list-style-type: none"> <li>• Handwritten manual procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of preliminary online procedures</li> </ul>
Long Time Required for Customs Inspection (at Ports and at Land Borders)	<ul style="list-style-type: none"> <li>• High rate of cargo inspection</li> </ul>	<ul style="list-style-type: none"> <li>• Reduction of inspection frequency by introduction of ASYCUDA++ (customs software)</li> </ul>
	<ul style="list-style-type: none"> <li>• Lack of equipment (e.g. scanners, forklifts)</li> </ul>	<ul style="list-style-type: none"> <li>• Equipment procurement and installation</li> </ul>
Customs Escort (Port, Border)	<ul style="list-style-type: none"> <li>• Waiting time and cost for customs escort caravans between ports and border posts</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of GPS tracking system</li> </ul>
Customs Bond (Port, Border)	<ul style="list-style-type: none"> <li>• Delays to prepare customs bonds</li> </ul>	<ul style="list-style-type: none"> <li>• Integration of customs bond systems within the region</li> </ul>
Other Border Crossing Issues	<ul style="list-style-type: none"> <li>• Insufficient cargo security</li> </ul>	<ul style="list-style-type: none"> <li>• Improvement of parking areas including fencing</li> </ul>
	<ul style="list-style-type: none"> <li>• Congestion around border posts</li> </ul>	<ul style="list-style-type: none"> <li>• Improvement of parking areas</li> </ul>
Overloading	<ul style="list-style-type: none"> <li>• Lack of regulation and inspection system for axle load control</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of weighbridges</li> </ul>
	<ul style="list-style-type: none"> <li>• Differences in axle load standards between/among</li> </ul>	<ul style="list-style-type: none"> <li>• Harmonization of axle load standards within the region or</li> </ul>

Issue Area	Trade Facilitation Problems	Trade Facilitation Measures
	countries and regions	subregions
Police Check	<ul style="list-style-type: none"> <li>Excessive number of police checkpoints (corruption and delays)</li> </ul>	<ul style="list-style-type: none"> <li>Reduction of checkpoints</li> <li>Introduction of GPS tracking system</li> </ul>
Corruption	<ul style="list-style-type: none"> <li>Weighbridge, police check, corruption at ports</li> </ul>	<ul style="list-style-type: none"> <li>Introduction of monitoring system for inspection of weight and cargo</li> </ul>

The importance of the introduction of single windows in each country, a tracking system, and improvements in freight transport terminals (dry ports) in order to remove bottlenecks in the regional freight transport system was addressed in Chapter 3 regarding ports. A number of issues will be further examined in this section.

### **(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.

## **6.4 Directions for Assistance to Improve Port Infrastructure**

### **6.4.1 Port Infrastructure Improvement Assistance Measures**

Based on the summary of issues above, measures to improve port infrastructure and their applicability to ports in the West African countries visited are discussed in the following subsections.

## **(1) Assistance in Developing Port Improvement Plans and Determining Priority Projects**

To meet the rapid increase of container demand and to catch up with the trend in introducing PPP, a short-sighted container terminal development is likely to take place. As a result of such hasty developments, investment could be inefficient for the region as a whole if too many container terminals are constructed and extraordinary competition are brought about among the neighboring ports. In this view, particularly in the Western African region, it is very important to establish a regional strategic development plan covering all the competitor ports in the region, where many transport corridors and many ports exist. The strategy is also important for JICA to determine the priority assistance to the regional developments.

A short-sighted container terminal development could hamper an integrated and harmonious port development as a whole, since such development may neglect the port functions other than container handling. In this regard, port master planning is necessary to make an efficient and effective layout of facilities and execute their programmed development. Furthermore, the selection of priority projects based on program is necessary.

For example, in the port of Dakar in Senegal, for example, a concessionaire (DP World) plans to construct a container terminal outside the north breakwater in a concession, but plans for a railway container terminal, repairs, or relocation of the existing petroleum berth have not been discussed. Technical assistance to establish a comprehensive port improvement plan in accordance with the new container terminal plan could be productively provided. This also applies to other ports, such as the Port of Takoradi, in which the existing plans including the facility plan are inappropriate.<sup>3</sup> On the other hand, the need for technical assistance is low in some other countries (e.g., Nigeria) that are capable of implementing new port construction projects with government funds. This also holds true for ports that have already prepared a port improvement plan, such as the Port of Tema in Ghana<sup>4</sup>, which prepared such a plan (including the expansion of its container terminal) with the assistance of JICA in 2002.

## **(2) Assistance in the Rehabilitation of Existing Facilities and the Procurement and Introduction of Cargo Handling Equipment for the Purpose of Handling Containers**

Rehabilitation of existing facilities in order to improve the capacity of container handling and augment the level of services can be carried out in a relatively small scale of works and can be considered effective in a short time. This kind of rehabilitation can expect good cost performance. Assistance for systematic terminal operation, such as the expansion of an existing open yard, reinforcement of cargo handling equipment, rearrangement for orderly facilities layout, computerized operation of container handling, streamlining of traffic flow within port premises, is considered effective for the ports in the West African region except for those already developed by operators using foreign investments.

Meanwhile, rehabilitation of the quay wall and cargo handling yard of conventional cargo terminals and deepening of the navigation channel, anchorage and quay wall are also effective in urgently coping with container cargo demand and meet the trend of ships getting larger. In case the capacity of access from land to a port is too small and traffic congestion outside the port becomes a bottleneck for effective port operation, assistance for access road improvement or construction of a new access road will also be effective.

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<sup>3</sup> As of 2010, emergency improvement projects were planned to develop a master plan and construct an offshore oil field support base.

<sup>4</sup> JICA provided technical assistance to develop a master plan of the port development in 2002.

In case PPP has not been introduced, technical assistance for the introduction of an appropriate PPP for port operation being accompanied with the above mentioned assistance is also considered effective.

### **(3) Assistance in Development of an Inland Container Depots**

Container terminal congestion includes the following two types: (i) congestion caused by physical factors, such as the shortage of cargo handling equipment and/or small yard size; and (ii) congestion caused by institutional factors, such as cumbersome customs procedures. The former type of congestion can be alleviated by improving facilities and introducing cargo handling equipment. The latter type of congestion can be mitigated by performing effective customs inspections in inland depots (ICD's) outside the container terminal. Therefore, assistance to develop ICD's will be more effective if their development is studied and implemented together with the above mentioned rehabilitation of existing facilities. As ICD cannot be planned or developed by itself but should be developed as a component of the system of a port as a whole, it is preferable to study the ICD development in the port master plan.

In this regard, as ICD and port terminals should be operated in unison, provision of their smooth transport connection (road) and development of an operation system are indispensable. A collective assistance for both the soft and hard infrastructures including the introduction of PPP will also be effective. In addition, if ICD functions as a container railway terminal, transport capacity of the railway has to be augmented. A collective assistance covering the port and railway developments will be necessary.

On the other hand, the need for assistance in the construction of inland depots was low in the countries visited, since inland depots have been or are being established servicing most ports. For example, an ICD is already planned at a location 20 km from the Port of Dakar in Senegal. Container terminal congestion has already been reduced in many ports including the Port of Tema in Ghana, where an ICD has been constructed and utilized, and the Port of Lagos in Nigeria, where multiple inland container depots have already been constructed. Therefore, the need for new assistance is considered to be low.

### **(4) Assistance in Developing a New Container Terminal**

In case that neither the rehabilitation of existing port facilities nor the development of ICD considered is unable to meet the future container demand, it is effective to plan facilities development and phased development for a new container terminal based on appropriate demand forecast in view of the regional perspective. It is also effective to provide financial assistance for implementing such new container terminal development. In case that PPP has been introduced in the operation of existing terminals and they have been operated by concessionaires (operators using foreign investment), it is important to provide technical assistance to carefully review the contract conditions of the existing concession and ensure sound and appropriate concession framework for the new container terminal to ensure fair competition with the existing terminals. In the case that PPP has not been introduced to the port, appropriate assistance for PPP will be required in developing a new container terminal.

### **(5) Modernization of Clearance of Custom and Cargos, Development of Single Window**

After having introduced PPP, several ports are still suffering from many long-time dwelling cargoes in the ports. This long dwelling is caused primarily by the ineffective and complicated port-related procedures and customs clearance. In this regard, it is necessary to promote the single window system for computerization and integration of these procedures. Both the financial assistance for equipment procurement and system development, and the technical

assistance to establish an appropriate organization to operate the system are considered effective. Furthermore, the computerization of procedures and establishment of the single window system will secure transparency of procedures, eliminate opaque dues and charges, and consequently reduce the transport cost.

Customs clearance has been computerized in the Port of Dakar in Senegal and the Port of Tema in Ghana. However, the procedures are partly carried out with printed documents in these ports and they have not integrated with other port-related procedures. As a result, effective utilization of digitized documents has not been materialized. Meanwhile in the Port of Lagos, as many commodities are prohibited from import, inspection for cargo clearance requires 3 to 4 weeks. Therefore, it is necessary to carefully examine the actual situation and progress of document digitization of ports prior to determining projects for relevant assistance.

## **(6) Introducing appropriate PPP and Reform**

It is very likely that ineffective and inflexible terminal operation of service ports reduces productivity of terminals and that the ports fail in competitiveness because of its longer lead-time and higher cost. On the other hand, a hasty introduction of PPP may result in unilateral concession contract favorable to the private sector. This may happen in case the concession is negotiated with a world wide mega operator. Under the unilateral concession contract, terminal operation will be black-boxed and the public sector cannot properly monitor the actual service level and productivity of the concessionaire. If no competitor operators exist, the terminal operation may be monopolized and the public objectives and interests cannot be pursued by the public sector, or, in case of future development, a new terminal construction cannot be implemented at the right time. It is, therefore, important to introduce PPP with proper risk sharing by both the public and private sectors under a sound concession contract.

For the ports which have not introduced PPP, technical assistance is effective. Assistance may consist of preparation of the PPP framework, study of tender and contract conditions, preparation of tender and contract documents, establishment of an organization to instruct and supervise concessionaires (operators). The PPP framework should be made in relation with detailed demand forecast and financial and risk analyses. For the ports having introduced PPP or having contract with concessionaires, technical assistance will comprise of the reviewing and altering of concession framework and contract conditions as well as revising the relationship with concessionaires.

## **(7) Improvement of Capability of Port Governing Body for Management and Operation**

In parallel to the assistance as previously mentioned, it is necessary to improve the management and operational capability of the port governing body concerned. Recognizing the ownership and being self-reliant, the governing body must develop and expand their own port. As there are several variations in port operation such as direct engagement or outsourcing of cargo handling, lease or concession of existing facilities, public finance or private finance by the concessionaire to develop a new container terminal, etc, the introduction of PPP should be based on the actual situation of the port. In order to transform the port to an appropriate landlord port, the port governing body should carry out institutional and organizational reforms at the right time. It is, therefore, effective to dispatch professionals to the port and to support the attendance of port officials at capacity building seminars.



### 6.4.2 Menu of Port Infrastructure Improvement Assistance

A menu of assistance programs for port infrastructure improvements based on the considerations above is presented in Table 6-5.

**Table 6-5 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	<ul style="list-style-type: none"> <li>• Study on port development strategy for efficient investment to port development in view of regional corridor developments</li> <li>• Study on master planning for efficient and effective facilities layout and programmed facility development, and consequently the selection of priority projects</li> </ul>	Technical cooperation and assistance
Rehabilitation of existing facilities to handle container cargos	<ul style="list-style-type: none"> <li>• 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</li> <li>• Improvement of railway connection accompanied with the assistance above</li> <li>• 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</li> <li>• Improvement of existing access road or development of new access road</li> <li>• Surveys required to implement each item of assistance mentioned above (development planning and feasibility study)</li> <li>• Technical assistance for the introduction of appropriate PPP when required</li> </ul>	Financial cooperation, technical cooperation and assistance
Assistance for development of Inland Container Depot (ICD)	<ul style="list-style-type: none"> <li>• Development of ICD including access (road) and operation system for smooth connection between ICD and terminal</li> <li>• Improvement of railway accompanied with the assistance above</li> <li>• Surveys required to implement each item of assistance mentioned above (development planning and feasibility study)</li> <li>• Technical assistance for the introduction of appropriate PPP when required</li> </ul>	Financial cooperation, technical cooperation and assistance
Assistance for development of a new container terminal	<ul style="list-style-type: none"> <li>• Development of a new container terminal to meet future demand</li> <li>• Surveys required to implement assistance above (study on facilities development, phased development and feasibility) and technical assistance for the introduction of appropriate PPP</li> </ul>	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	<ul style="list-style-type: none"> <li>• Establishment of organization to operate and promote digitization of customs clearance and port-related procedures and integration into a Single Window system</li> <li>• Equipment procurement and system build-up</li> </ul>	Technical cooperation and assistance, financial cooperation

Assistance Measures	Description of Assistance	Type of Assistance
Introduction of appropriate PPP and assistance for institutional reform	<ul style="list-style-type: none"> <li>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)</li> </ul>	Technical cooperation and assistance
Capacity building to improve management and operation capabilities	<ul style="list-style-type: none"> <li>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)</li> </ul>	Technical cooperation and assistance

### 6.4.3 Types of Port Infrastructure in Sub-Saharan Africa

To apply the assistance program menu described above to the port types, the ports in Sub-Saharan Africa have first been classified by topographic condition, cargo type, facility type, location in the network, and management and operation structure, as shown in Table 3-4 (Chapter 3).

Regarding container transport facilities, modern container terminals that use quay gantry cranes have sufficiently large space, but there are still a number of dedicated container handling terminals that have been established by improving conventional or existing facilities. Regarding the management and operation structure, a changeover to the Landlord Ports model has been occurring as described in Chapter 5, and there are a significant number of ports where French or Middle Eastern companies have acquired concessions.

To examine the priority assistance measures that are appropriate for each port type, the ports have been classified into six groups from A to F according to the flow chart in Figure 6-6, and the result of the classification is shown in Table 6-6. First, regional freight transport corridors, a very important concept in the development of Sub-Saharan Africa, are considered. The ports have been broadly roughly classified into two groups depending on whether they are located on a regional freight transport corridor or not. The ports have been further classified in terms of whether they include a hub port and have transit functions with regional features (hereafter referred to as a "transit port" for descriptive purposes), whether they are Landlord Ports (whether the PPP process is advanced), or whether they have been established as modern container terminals. Even if a port is not located on a corridor, if the country has a sufficiently large population, the need for development can be considered high.<sup>5</sup>

<sup>5</sup> A national population of 20 million is set as the dividing line for descriptive purposes.

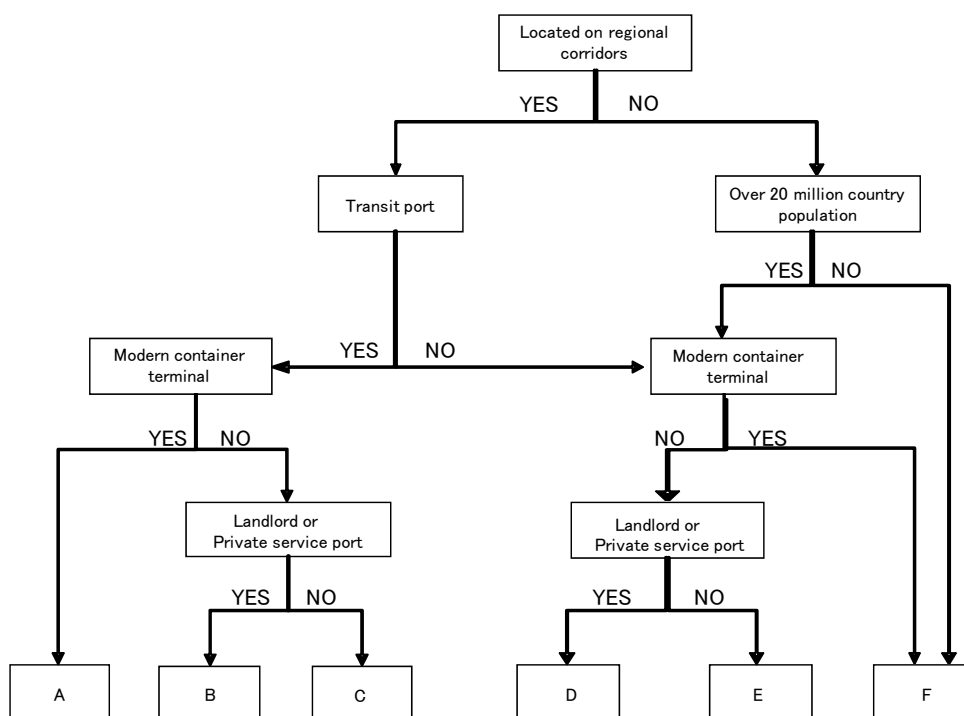


Figure 6-6 Port Grouping Flow Chart

Table 6-6 Types of Ports in Sub-Saharan Africa

Type	Characteristics of Port	Port
A	Transit ports that are located on a regional corridor with a modern container terminal	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	Maputo, Beira, Nacala, Cotonou, Lome, Tema, Abidjan, Dakar, (Conakry) <sup>6</sup>
C	Transit ports that are located on a regional corridor and have a conventional government-operated container terminal	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	Mtwara, Tanga, Toamasina, Luanda, Pointe Noire, Apapa, Onne, Port Harcourt, Calabar, Warri, San Pedro, Conakry
E	Ports with domestic demand that have a conventional government-operated container terminal, not located on a regional corridor, but with high demand expected	Lobito, Matadi, Boma, Nouadhibou, East London*, Richards Bay*
F	Ports with low priority for development assistance	Luderitz, Port Sudan, Assab, Freetown, Banjul, Cape Town*, Port Elizabeth*

Note: \* denotes port in South Africa

<sup>6</sup> The Port of Conakry was classified in Group B, as it is increasing its role as a transit port.

#### **6.4.4 Direction of Assistance by Port Type**

An overview and characteristics of each port type and directions for assistance are described below.

##### **(1) Group A: Transit Ports that are Located on a Regional Corridor with a Modern Container Terminal**

Because the existing facilities include a modern terminal, these ports tend to require software assistance, e.g., to improve the efficiency of customs clearance and border crossing. If congestion in the terminal and long dwell times for containers occur due to increased container handling volumes, the construction of an inland depot or expansion of new container terminal is required. For this group, **(1) assistance in improving the efficiency of customs procedures, (2) assistance in the construction of an inland depot, and (3) assistance for urgent facility improvements (expansion)** must have priority. However, the need for assistance for South African ports is low due to the country's relatively strong economy and the sound operation of its ports.

##### **(2) Group B: Transit Ports that are Located on a Regional Corridor and have a Conventional Container Terminal of Landlord Type**

These ports are the gateway not only for the countries where they exist but also for the inland countries connected to them by transport corridors. They still use conventional facilities or improved conventional facilities. It is important for each port to have a master plan for medium and long term development which is harmonious as a whole with due consideration to other cargo handling than containers. Assistance for port master planning has priority.

Feasibility studies are required for the priority projects selected from the master plan development. If there are problems such as seriously deteriorated existing facilities, their urgent rehabilitation works are necessary. As capabilities for the public sector (port governing body) should be continuously improved to make already introduced PPP's properly function, assistance for capacity building is required to review the PPP framework when needed in order to reinforce the supervising and management structure. As efficiency is required in customs clearance and port-related procedures as well as cross border procedures to reduce transport cost to/from hinterlands, assistance for improvement of these procedures is necessary. In this case, the assistance depends on the progress of Single Window build-up and the improvements should be made not solely for the terminals under concession but for the port as a whole. Technical assistance is necessary to ensure that container terminals can be operated under a competitive and sound concession framework; meanwhile, financial assistance will be necessary for the construction of container terminals and ICD's.

Rehabilitation of existing facilities will affect operation being carried out by the concessionaire. In the case that the concessionaire is a local firm such as a state owned company which usually does not have sufficient capacities in business management and financial investment and in the case where operations are separated from infrastructure investment, assistance will be necessary to construct or rehabilitate the basic infrastructures of ports such as the navigation channel, anchorage and breakwater in addition to quay wall and yard.

For this group, **(1) assistance in the implementation of a master plan and subsequent feasibility studies, (2) assistance in urgent improvements and rehabilitation, and (3) assistance in improving the efficiency of customs procedures** must have priority.

**(3) Group C: Transit Ports that are Located on a Regional Corridor and have a Conventional Government-Operated Container Terminal**

Similar to those in Group B except for the difference in the operation system, the ports of Group C are trade gateways to the outer region for the inland countries as well as for the countries where they are located. They are important hub ports for the region with high potential in demand. Because these are Service Ports, it is desired that the PPP process be facilitated and changed over to Landlord Ports. For this group, all the items described in section 6.4.2 will be candidate assistance. In addition to assistance for hard infrastructure development, priority technical assistance measures include master planning for an efficient and effective facilities layout and their programmed development, development of PPP framework based on detailed demand forecast and financial and risk analyses. Technical assistance for capacity building of the public (port body) is also necessary to integrate these developments. For this group, **(1) assistance in the implementation of a master plan and subsequent feasibility studies, (2) assistance in urgent improvement and rehabilitation, and (3) assistance in facilitating the introduction of PPP** must have priority.

**(4) Group D: Ports for Domestic Demand that have a Conventional Container Terminal of Landlord Type, not Located on a Regional Corridor, but with Future High Demand Expected**

The ports in Group D are not located on the regional corridors however are the hub ports to meet domestic demands and have a considerable volume of cargos. They are landlord ports and most of them have no competitor port. Therefore, without the competition with other ports, their service level is likely to degrade and the lead time for cargo handling is likely to get longer. In addition, the management capability and investment capacity may be insufficient in the case where terminal operation is awarded to a local firm such as a state owned company instead of an international mega operator. As capabilities of the public (port governing body) should be continuously improved, assistance seems necessary for reviewing the PPP framework when needed and reinforcing a supervising and managing structure.

Similar to Group B, in case the concessionaire is a local firm such as a state owned company which does not have sufficient capacities in business management and financial investment, and in case operations are separated from infrastructure investment, assistance will be necessary to construct or rehabilitate the basic infrastructures of ports such as the navigation channel, anchorage and breakwater in addition to quay wall and yard. However, for the ports of Group D the decision should be made based on their potential demand. For this group, **(1) assistance in improving the efficiency of customs procedure, (2) assistance in the construction of an inland depot, and (3) assistance in new container terminal construction by investment/loan** must have priority.

**(5) Group E: Ports with Domestic Demand that have a Conventional Government-Operated Container Terminal, not Located on a Regional Corridor, but with Future High Demand Expected**

The ports of Group E are not located on the regional corridors. They are hubs for the domestic demand and handling a significant volume of cargos. As they are service ports, competition is much less than those of Group D and their service level is likely to degrade and the lead time of cargo handling is likely to get longer. In addition, most of their facilities may have been deteriorated. Similar to those of Group C, all the items described in Section 6.4.2 are candidate assistance measures. Especially, priority of assistance is high for framework development and the expeditious introduction of PPP, rehabilitation of existing facilities and development of ICD, and capacity building of the public (port governing body) to integrate all the developments above. For these ports, although high demand is expected as for Group D, the rehabilitation of

conventional facilities is the most important issue. At the same time, the PPP process should be facilitated in order to convert these ports to Landlord Ports and operating efficiency should be improved with the introduction of cargo handling equipment.

For this group, **(1) assistance in rehabilitation, (2) assistance in facilitating the introduction of PPP, and (3) assistance in introducing cargo handling equipment** must have priority. However, again, the need for assistance for South African ports is low due to the country's relatively strong economy and the sound operation of its ports.

## **(6) Group F: Ports with Low Priority for Development Assistance**

These ports have low priority for assistance because they are not located on a regional corridor and in countries with small populations. Although the Port of Sudan is located on a corridor, it belongs to this group because it mainly handles import and export cargo and already has a modern terminal. For the Port of Cape Town and Port Elizabeth in South Africa, the need for assistance is low because their facilities have already been modernized and are operating efficiently.

## **6.5 Directions for Railway Infrastructure Improvement Assistance**

### **6.5.1 Considerations for Railway Infrastructure Improvement Assistance Measures**

Railway infrastructure improvement assistance measures and their applicability in the West African countries visited are described in the following subsections.

#### **(1) Assistance for the Rehabilitation of Aging/Deteriorated Facilities**

Track, railway roadbeds, and bridges, which are the foundation of safe and stable railway transport services, need to be rehabilitated or replaced. Generally, the railway infrastructure facilities in Sub-Saharan Africa is aging and deteriorated, and reductions in train operating speeds due to speed restrictions and frequent derailments have reduced transport capacity hindering the ability to meet demand.

Safe and reliable railway transport should be guaranteed through the rehabilitation of railway facilities (line equipment) and the trust of customers must be acquired. Specific results include: (i) reductions in the number of derailments, (ii) increased train speeds, (iii) reductions in transport times from the elimination of reduced speed operations, (iv) reductions in out-of-service time from reduced derailment recovery operations, (v) decreases in the cost of derailment recovery operations, (vi) reductions in the cost of repairing derailed rolling stock, (vii) improvements in the operating rate of rolling stock, and (viii) decreases in compensation cost for damaged cargo. Reduced transport times and increased rolling stock availability will directly improve operating efficiency, enabling railways to serve greater demand. Moreover, the cost per unit of transport can be reduced, leading to improved railway operation.

It is important to carry out the comprehensive/integrated verification and analysis of the causes of accidents in the fields including tracks, rolling stock, signaling system, telecommunication system and operating system before the rehabilitation of above mentioned railway facilities, which are the foundation of railway operation. Thus, a comprehensive/integrated planning and implementation of counter measures against above mentioned causes will be secured, and also necessary to address each item shown in the next subsection.

## **(2) Assistance in Addressing Rolling Stock Shortages**

At the same time as procuring new and well-maintained reconditioned rolling stock, assistance can be productively provided for the repair of rolling stock that has broken down and cannot be operated. In West Africa, many railways have reduced transport capacities due to a shortage of active rolling stock, and as a consequence cannot meet the demand. Therefore, while an increase in active rolling stock through procurement of new and well-maintained used rolling stock is required, it is also necessary to provide additional spare parts for the repair of rolling stock that has broken down. There is also an urgent need to improve the maintenance efficiency of rolling stock and improve the operating rate. By increasing rolling stock, the railways can serve greater demand and reduce the cost per unit of transport.

## **(3) Assistance for Rolling Stock Workshop Modernization**

Assistance is required for the modernization of rolling stock workshops for inspecting and repairing rolling stock for more efficient rolling stock maintenance. While each railway in West Africa has facilities capable of overhauling locomotives, wagons, and coaches, these facilities are outdated and therefore efficient rolling stock maintenance is difficult. Example issues include the following: (i) insufficient supply of spare parts; (ii) modernization of workshops for inspection and repair of rolling stock for more efficient rolling stock maintenance; (iii) improvement of the operating rate of the rolling stock, and (iv) education and training to improve staff capability for rolling stock maintenance. A shortage of spare parts, in many cases, tends to result in “cannibalism” maintenance, i.e., taking parts from other broken down locomotives, wagons, and coaches, further decreasing the active rolling stock in a vicious circle.

## **(4) Assistance in Track Upgrading/Strengthening**

The use of heavier rails, additional installation of sleepers, the replacement of sleepers with pre-stressed concrete ones, and increase in ballast thickness will upgrade/strengthen the basic railway facilities. The rails laid for many railways in West Africa are lightweight at less than 40 kg/m, and in many cases are beyond their useful economic life. The insufficient load bearing capacity of tracks due to the insufficient thickness of ballast and an insufficient number of sleepers is also an issue. It is required to use heavier rail, ensure appropriate ballast thickness, and use a sufficient number of good quality sleepers. These measures will ultimately reduce maintenance costs.

## **(5) Assistance in Improving Signaling System Equipment**

Assistance in modernizing or reintroducing signaling system equipment is necessary to improve the safety and efficiency of railway operations. In West Africa there are many cases where trains are operated virtually without a signaling system since the signal system is outdated or out of order due to poor maintenance. Because the signaling system is critical to ensure the safety of train operation, it is essential to improve its reliability.

## **(6) Assistance for Container Transport**

Assistance is needed to increase the number of container-dedicated trains, improve container handling depots, and install and improve container-dedicated sidings and cargo handling facilities. In recent years, the percentage of containerized cargo on Sub-Saharan African railways has increased rapidly, with the trend expected to continue in the future. On the other hand, although container-dedicated trains are operated in Sub-Saharan Africa, there are cases where containers and conventional wagons are mixed. Therefore, it is necessary to increase container transport capacity by increasing container-dedicated rolling stock, completing cargo handling facilities, and installing and expanding cargo handling depots.



## **(7) Assistance in Improving Employee Competency/Capacity**

Generally, in Sub-Saharan Africa the skill of the railway staff is insufficient, and the efficiency of field operations including management, track maintenance, the maintenance of railway facilities such as roadbeds and bridges, rolling stock maintenance, signaling system maintenance, and container handling, is considered to be insufficient. The education/training of the staff by short- or long-term professionals dispatched by JICA or the education/training of railway staff with JICA training courses can be useful to improve the competency/capacity of railway staff. As for long-term measures, the education/training of staff at a Railway College established with JICA grant aid may be useful to improve the competency/capacity of railway staff.

## **(8) Assistance for Improving Concession Frameworks**

The case studies of PPP railway projects described in Chapter 4 of this report include many problematic ones, including ineffective legal systems, poorly prepared contract provisions, the lack of governmental responsibility, a shortage of investment funds, and nonpayment of compensation. If such cases cannot be addressed with self-help efforts of the concessionaire, it is required to consider the possibility of improving the concession framework. However, as the introduction of railway PPPs in Sub-Saharan Africa has been assisted by the World Bank since the 1990s, assistance in this field requires cooperation with the World Bank.

### **6.5.2 Menu of Railway Infrastructure Improvement Assistance**

A general assistance program menu for railway infrastructure improvement based on the considerations above is presented in Table 6-7.

**Table 6-7 Menu of Railway Infrastructure Improvement Assistance**

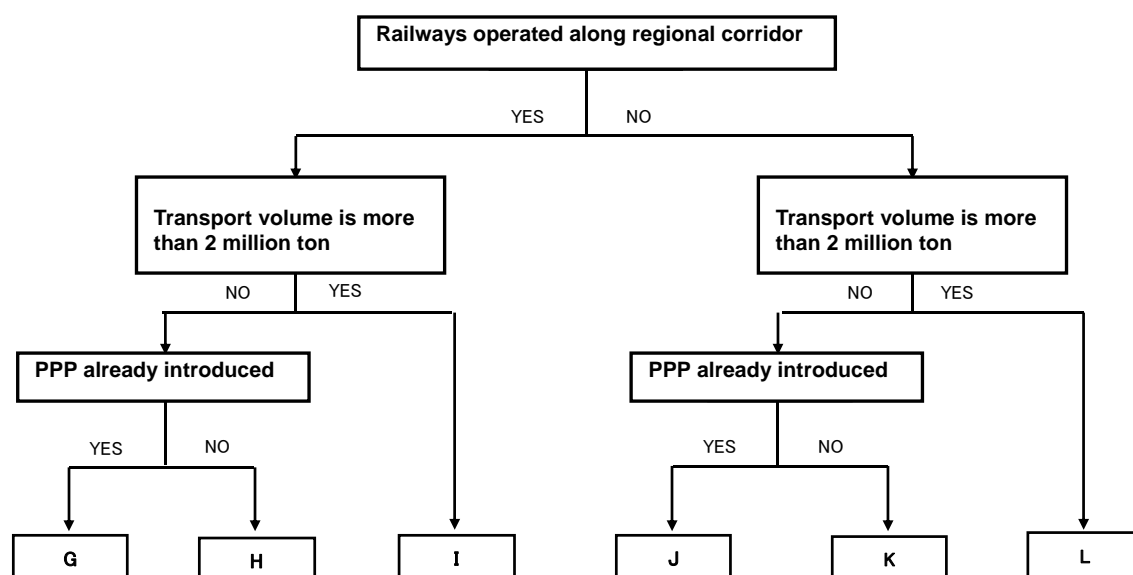
Assistance Measures	Description of Assistance	Type of Assistance
Rehabilitation of the deteriorated facilities	<ul style="list-style-type: none"> <li>Comprehensive counter measures against accidents based on the verification and analysis of the causes</li> <li>Rehabilitation of the track, roadbed, bridges, etc., which are the foundation for safe and stable railway operation</li> </ul>	Technical Cooperation Grant Aid ODA Loan
Addressing the Shortage of Rolling Stock	<ul style="list-style-type: none"> <li>Procurement of new and well-maintained used rolling stock</li> <li>Repair of rolling stock that has broken down and is out of operation</li> </ul>	Technical Cooperation Grant Aid ODA Loan
Modernization of Rolling Stock Workshops	<ul style="list-style-type: none"> <li>Modernization, renewal, and improvement of the rolling stock workshop for the inspection and maintenance of rolling stock to perform efficient rolling stock maintenance</li> </ul>	Technical Cooperation Grant Aid ODA Loan
Track Upgrading/ Strengthening	<ul style="list-style-type: none"> <li>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</li> </ul>	Technical Cooperation Grant Aid ODA Loan
Improvement of the Signaling System	<ul style="list-style-type: none"> <li>Improvement of train operational safety and efficiency by modernization, repair, and reintroduction of a signaling system</li> </ul>	Technical Cooperation Grant Aid ODA Loan

Assistance Measures	Description of Assistance	Type of Assistance
Improvement of Container Transport	<ul style="list-style-type: none"> <li>• Procurement of trains dedicated to containers</li> <li>• Improvement and construction of container stations/depots and container dedicated sidings</li> <li>• Preparedness for and procurement of container loading/unloading equipment</li> </ul>	Technical Cooperation Grant Aid ODA Loan
Staff Training	<ul style="list-style-type: none"> <li>• Education and training of staff by short and long term professionals dispatched by JICA</li> <li>• Education and training of staff with JICA training courses</li> <li>• Education and training of staff at a railway college established by JICA grant aid</li> </ul>	Technical Cooperation Grant Aid
Improvement of Concession Frameworks	<ul style="list-style-type: none"> <li>• Improvement of concession framework (a vertical separation type concession is preferred)</li> <li>• Definition of areas of government responsibility (e.g., rehabilitation/improvement of the railway infrastructure, compensation for passenger train service)</li> <li>• Cooperation with port concession</li> </ul>	Technical Cooperation Grant Aid

### 6.5.3 Types of Railway Infrastructure in Sub-Saharan Africa

Maintenance issues and the priority of assistance measures may vary because Sub-Saharan railways vary in terms of the framework of operation (e.g., government management, private management, or PPP), types of freight and passenger transport, and service area (operated within only one country, or operated along a regional corridor covering two or more countries), and maintenance issues. In this subsection, the 48 railways shown in Table 3-9 (Chapter 3) are divided into several groups in order to consider appropriate assistance programs based on the characteristics of each railway. The railways were first divided into two groups: (i) railways operated along regional corridors covering two or more countries, or (ii) railways operated within only one country, and then classified into six groups by traffic volume,<sup>7</sup> whether a PPP has been introduced or not. The classification flow chart is shown in Figure 6-7.

<sup>7</sup> Based on World Bank reports, AICD reports, case analyses, and other sources, a traffic volume of 2 million tons is set as the breakeven point of profitability including facility maintenance and other costs.



**Figure 6-7 Railway Classification Flow Chart**

Industrial railways are often dedicated to transport specific cargo. For example, industrial railways transporting mineral resources are indispensable for mine operation, and in such cases railway operation is usually integrated with the mine operation. As a consequence, industrial railways pose few problems in terms of the sustainable operation and maintenance of railway facilities, are considered to have low needs for development partner assistance, and are therefore excluded from the classification (however, general railways that transport general cargo and mineral resources are included as recipients of development partner assistance). For these industrial railways, it may be possible to provide cutting-edge technology and know-how that Japan has developed to improve operational efficiency (e.g., by providing high-strength "hyper-eutectoid" steel rails developed by a Japanese manufacturer as industrial railways are operated under severe track conditions and require improvements in wear resistance). However, such improvements could possibly be made on a commercial basis.

The groups were further classified into subgroups as shown in Table 6-8, according to the type of PPP, traffic volume, and railway characteristics. In the following section priority assistance measures are examined based on the typology.

**Table 6-8 Types of Railways in Sub-Saharan Africa**

Type	Feature	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	<ul style="list-style-type: none"> <li>• <u>Type G1 (with traffic volume of 1 million tons or less)</u>: Rift Valley Railways, Tanzania Railways Ltd, Railway Systems of Zambia Ltd, Central East African Railways Company, CDN (Corredor de Desenvolvimento do Norte), Transrail SA</li> <li>• <u>Type G2 (with traffic volume of 1-2 million tons)</u>: Sitarail</li> <li>• <u>Type G3 (exceptional cases)</u>: Beitbridge–Bulawayo Railway Ltd (BOT) and Beira Railway Company</li> </ul>
H	Railway operated along a regional corridor with a traffic volume of 2 million tons or less and a PPP not introduced	<ul style="list-style-type: none"> <li>• <u>Type H1 (with traffic volume of 1 million tons or less)</u>: Ethio-Djibouti Railway Company, Tanzania–Zambia Railway Authority, Mozambique Ports &amp; Railways, SNCC in Democratic Republic of Congo</li> <li>• <u>Type H2 (with traffic volume of 1-2 million tons)</u>: Botswana Railways and TransNamib Holdings Ltd</li> <li>• <u>Type H3 (exceptional cases)</u>: CFB in Angola (Benguela Railway)</li> </ul>
I	Railway operated along a regional corridor with a traffic volume of more than 2 million tons	<ul style="list-style-type: none"> <li>• National Railways of Zimbabwe, PRASA, TFR, Swaziland Railway and GRRL (BOT) in South Africa and Swaziland</li> </ul>
J	Railway operated within only one country with a traffic volume of 2 million tons or less and a PPP already introduced	<ul style="list-style-type: none"> <li>• <u>Type J1 (with traffic volume of 1 million tons or less)</u>: Madarail SA, Togo Rail SA</li> <li>• <u>Type J (with traffic volume of 1-2 million tons)</u>: Camrail</li> </ul>
K	Railway operated within only one country with a traffic volume of 2 million tons or less and a PPP not introduced	<ul style="list-style-type: none"> <li>• <u>Type K1 (with traffic volume of 1 million tons or less)</u>: ONATRA in Democratic Republic of Congo, CFCO (Chemin de Fer Congo–Ocean), Nigerian Railways Corporation, OCBN in Benin</li> <li>• <u>Type K2 (with traffic volume of 1-2 million tons)</u>: Sudan Railways Corporation</li> <li>• <u>Type K3 (exceptional case-1)</u>: PTB</li> <li>• <u>Type K4 (exceptional case-2)</u>: Eritrean Railways, CFM, CFL and Ambion Railway in Angola, Ghana Railway Company Ltd</li> </ul>
L	Railway operated within only one country with a traffic volume of more than 2 million tons	<ul style="list-style-type: none"> <li>• Transgabon Railway</li> </ul>

#### **6.5.4 Directions for Assistance by Railway Types**

##### **(1) Group G: Assistance for the Type of Railways Operated along a Regional Corridor, Covering Two or More Countries, with Traffic Volume of Two Million Tons or Less and a PPP Already Introduced**

Railways along a regional corridor need to provide a reasonable level of transport services with sound management. Due to low traffic volume, railways in this group are difficult to operate on a self-supporting accounting system, covering depreciation and renewal cost for railway facilities. Among the railways in Sub-Saharan Africa that have already introduced a PPP, there are many cases in which operational and financial improvements are required due to problems with the concession framework. The concession frameworks of Tanzania Railways, Ltd. and

Sitarail are based on a vertically separated framework, which makes the responsibilities between the government and concessionaire clear, and allows for easy receipt of development partner assistance. However, it is desirable for other railways to reform their concession frameworks, reviewing their profitability, and **move in the direction of a vertically separated concession framework**. Assessment of the three types within this group follows:

- Type G1 (with traffic volume of 1 million tons or less): Railways in this category are chronically short of funds for maintenance of railway facilities due to low traffic volume. Removing bottlenecks by **(1) rehabilitating aging/deteriorated railway facilities and (2) addressing the rolling stock shortage** is a pressing need, and **(3) improving container transport** is important depending on the level of demand. For the rehabilitation of deteriorated facilities, assistance of development partners is required, due to the magnitude of assistance required. With regards to the rolling stock shortage, the concessionaire must address on his own responsibility, however, it is necessary that development partners provide the concessionaire with assistance according to the review result of profitability, considering the rearrangement of responsibilities between a government and a concessionaire (e.g., by providing a government with assistance for rolling stock procurement, and leasing them to a concessionaire).
- Type G2 (with traffic volume of 1-2 million tons): With this volume of traffic, railways can perform some degree of rehabilitation of aging/deteriorated facilities with their own resources at least to some extent. For the rehabilitation they cannot perform on their own, development partner assistance is desirable. For example, financial assistance by which the government side (e.g., a railway asset management public corporation) purchases rails and the concessionaire performs track rehabilitation using the rails procured may be possible. Development partners may provide assistance for the priority measures, including **(1) capacity expansion of container transport**, and **(2) addressing the rolling stock shortage** if necessary.

Type G3 (exceptional cases): Beitbridge–Bulawayo Railway, Ltd. (BBR) is a railway that was established by a BOT railway concession project with the expectation of profits. Also, Beira Railway Company (CCFB) is a PPP railway project that, on the premise of profits from the development of a huge coal mine (Moatize Coal Project),<sup>8</sup> invested in the rehabilitation of an existing line (the Machipanda line) and the rehabilitation and resumption of a suspended line (the Sena line). Therefore, it can be considered that maintenance and improvement on a commercial basis will be possible.

## **(2) Group H: Assistance for the Type of Railways Operated along a Regional Corridor, Covering Two or More Countries, with Traffic Volume of Two Million Tons or Less and a PPP Not Introduced**

To improve transport along a regional corridor, it is necessary that some reasonable level of railway transport services be provided. Due to low traffic volume, it is difficult for railways in this group to operate on a self-supporting accounting system, covering depreciation and renewal cost for railway facilities. To improve railway operational and financial efficiency, the **introduction of concession** is considered essential in many cases. In those cases, in order to proceed with the maintenance/rehabilitation of aging/deteriorated railway facilities on the premise of development partner assistance, **introduction of a vertically separated concession** that performs the track maintenance/rehabilitation with public (governmental) responsibility is desirable, instead of a vertically integrated concession. There are three H subtypes as presented below:

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<sup>8</sup> Coal mining is scheduled to commence in 2011. There is a risk that railway traffic volume and profitability depend on the international price of coal and the quantity of coal demanded.

- Type H1 (with traffic volume of 1 million tons or less): These are railways at the same level as those of Type G1 and, therefore, the same measures and cooperation with other development partners as those of Type G1 are required.
- Type H2 (with traffic volume of 1-2 million tons): These are railways at the same level as those of Type G2 and, therefore, the same measures and cooperation with other development partner assistance as those of Type G2 are required.
- Type H3 (exceptional cases): Benguela Railway long transported copper from Zambia and Congo, but it was devastated by civil war more than 20 years ago. The government is now rehabilitating the railway. This is a special case, thus development partner assistance should be considered carefully.

**(3) Group I: Assistance for the Type of Railways Operated along a Regional Corridor, Covering Two or More Countries, with Traffic Volume of More Than Two Million Tons**

The relatively high traffic volume in this group enables the railway to be a self-supporting accounting system, covering depreciation and renewal cost for railway facilities. If the railway operation is profitable, improvements in operational efficiency by introducing a PPP are not a pressing need. Therefore, assistance measures may be considered in the future based on government policy.

**(4) Group J: Assistance for the Type of Railways Operated within Only One Country with Traffic Volume of Two Million Tons or Less and a PPP Already Introduced**

As with railways operated along regional corridors, railways operated in only one country also need to provide a reasonable level of transport services with sound management. Due to low traffic volume, it is difficult for railways in this group to operate on a self-supporting accounting system, covering depreciation and renewal cost for railway facilities. As noted, among the railways in Sub-Saharan Africa that have already introduced a PPP, there are many cases where improvement is required because of problems with the concession framework. The concession framework of Madarail SA is vertically separated, which makes the responsibilities between the government and concessionaire clear, and allows for easy receipt of development partner assistance. For other railways, however, it is desirable to reform the concession frameworks, reviewing their profitability, and **move in the direction of a vertically separated concession framework**. Railways operated within only one country generally have shorter operational route length than those operated along regional corridors traversing two or more countries. Therefore, transport volume in terms of ton-km is usually rather small compared to that of railways operated along regional corridors assuming transport volume in terms of tons is the same or similar. As a consequence, railways operated within only one country should strive to transport greater tonnages to assure sound and profitable operation. It is also important that these railways strive to transport greater tonnages of container cargo (e.g., construction of ICD at the inland terminal station, improvement of container handling equipment, etc.) or mineral resources (e.g., development of a new mine) aggressively. There are three J subtypes as presented below:

- Type J1 (with traffic volume of 1 million tons or less): These are railways at the same level volume of transport as those of Type G1 and rather small traffic volumes in terms of ton-km, and therefore need to strive to transport greater tonnages to assure sound and profitable operation. Therefore, the same measures and cooperation with other development partners as those of Type G1 are required.
- Type J2 (with traffic volume of 1-2 million tons): These are railways at the same level volume of transport as those of Type G2 and rather small transport volume of Ton-Km,

therefore, they have to make efforts to transport much more volume so as to operate the railways in sound and profitable conditions. Therefore, the same measures and cooperation with other development partner assistance as those of Type G2 are required.

**(5) Group K: Assistance for the Type of Railways Operated within Only One Country with Traffic Volume of Two Million Tons or Less and a PPP Not Introduced**

Railways operated within only one country are required to provide railway transport services at a reasonable level. Due to low traffic volume, it is difficult for railways in this group to operate on a self-supporting accounting system, covering depreciation and renewal cost for railway facilities. To improve railway operational and financial efficiency, the introduction of a PPP is considered essential in many cases. In those cases, to proceed with maintenance/rehabilitation of aging/deteriorated facilities on the premise of receiving development partner assistance, the introduction of a vertically separated concession that performs the track maintenance/rehabilitation with public (governmental) responsibility is desirable instead of a vertically integrated concession. There are four K subtypes as presented below:

- Type K1 (with traffic volume of about 1 million tons or less): These are railways at the same level as those of Type J1 and, therefore, the same measures and cooperation with other development partners as those of Type J1 are required.
- Type K2 (with traffic volume of about 1 to 2 million tons): These are railways at the same level as those of Type J2 and, therefore, the same measures and cooperation with other development partners as those of Type J2 are required.
- K3 (exceptional case-1): PTB (a public corporation) in Senegal is a railway that operates commuter service between Dakar and Thies (about 70 km) with 4.5 million passengers per year (unusual in Sub-Saharan Africa). However, fares are set low,<sup>9</sup> and CFA 1.3 billion (about 60%) of CFA 2.2 billion of the annual revenues are paid by the government as compensation for restrictions imposed on public services<sup>10</sup> (2008). Although PTB is profitable without the depreciation cost, it is making losses after taking depreciation into account. Since railway commuter services in large cities have many beneficial effects, including the alleviation of road congestion, the suppression of global warming gas emissions, and reduction in air pollution, assistance from development partners is required for the maintenance, continuation and development of the railway.<sup>11</sup>
- K4 (exceptional case-2): (i) Railways in Eritrea (Eritrean Railways) operate on a light railway with a track gauge of 950 mm and a line length of 118 km, using several small locomotives and rail cars. (ii) Railways in Angola (FM, CFL, and Ambion Railway) were devastated by civil war more than 20 years ago, and rehabilitation by the government is ongoing. These railways are special cases, and it is appropriate to see how the situation develops. (iii) As for railways in Ghana (Ghana Railway Company, Ltd.), aging and deterioration of the railway system, including track, rolling stock (locomotives, coaches, and wagons), signaling and communication system, and station facilities is significant, and indeed the railways are not functioning, with only 300.9 km of the total line length of 929.4 km (32.4%) in operation. The government of Ghana established the GRDA (Ghana Railway Development Authority) in 2008, considering the introduction of a PPP to improve railway operational and financial efficiency. The assistance of development partners is required. The EU is now undertaking a study of

<sup>9</sup> An ordinary ticket for a section of about 30 km costs CFA 150 (about JPY 30 equivalent), a one-month commuter pass costs CFA 4,500 CFA, and a one-month student commuter cost CFA 3,500. Thus, the discount rate is high.

<sup>10</sup> A delay in payment occurs due to the financial circumstances of the government.

<sup>11</sup>Source: Activities Report 2008 (PTB).



the feasibility of rehabilitating GRC's Western Line, including rolling stock provision and signaling system improvements. Therefore, it would be advisable to wait to see the study result.

#### **(6) Group L: Assistance for the Type of Railways Operated within Only One Country with Traffic Volume of More than Two Million Tons**

The relatively high traffic volume in this group enables the railway to operate on a self-supporting accounting system, covering depreciation and renewal cost for railway facilities. If the railway operation is profitable, improvements in operational efficiency by introducing a PPP are not a pressing need. Therefore, assistance measures may be considered in the future based on government policy.

#### **6.5.5 Measures for Development Partner Assistance in PPP Projects**

This section summarizes 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 6-8 at the end of the section.

#### **6.5.6 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 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:

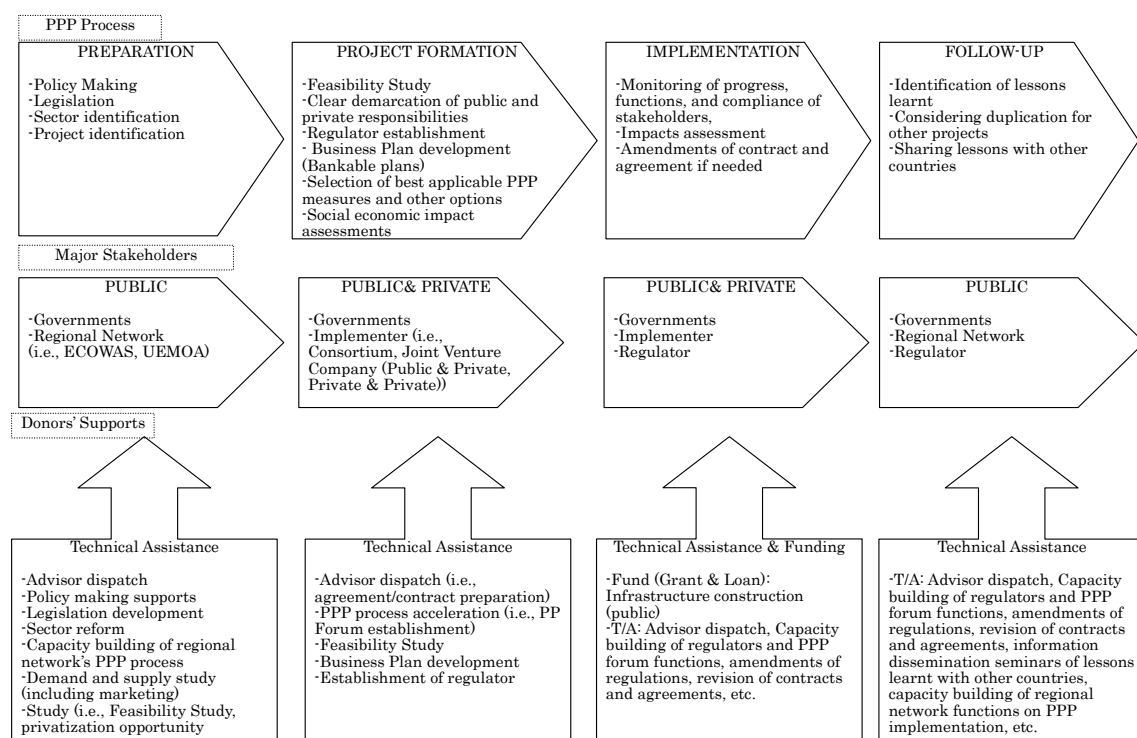
1. Review and assessment of the current concession (e.g., clarifying the division of responsibility and risks between government and private sector, stipulating required contract provisions, developing a modified contract proposal);
2. Assistance regarding the establishment of an independent auditing 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).

#### **6.5.7 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 6-8 Development Partner Assistance Measures for the PPP Infrastructure Project Process**

## 6.6 Directions of Assistance for 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. As summarized in Section 6.3, many of the problems and issues especially in the port sector have been due to insufficient improvement of soft infrastructure related to institutions and systems. Based on the foregoing, this section addresses the facilitation of trade and relevant soft infrastructure issues. Based on Section 6.3, 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.

- (1) **Addressing Port and Railway Problems and Issues through Trade Facilitation**  
Implementation of trade facilitation measures will result in: (i) a reduction in time required for port procedures, (ii) a reduction in port terminal congestion, (iii) facilitation of cargo transfers between railways and ports, and (iv) a reduction in transport cost due to integrated electronic cargo management from port to the final point of customs procedure in landlocked countries.
- (2) **Coordination of Hard Infrastructure Improvement and Trade Facilitation Assistance**  
The specific problems and issues related to each port or railway are complex. Insufficiencies on both the hard and soft sides exist simultaneously. After understanding the problems and issues specific to each port or railway, trade facilitation measures should be implemented in parallel to the improvement of equipment and facilities, to provide efficient procedures and operations, in a balanced manner.

### (3) **Implementation of Trade Facilitation Measures from the Perspective of the Corridor as a Whole or a Country**

The three kinds of trade facilitation measures proposed in this study will help solve the problems of ports and railways in the region. Furthermore, the facilitation measures will alleviate problems and issues of trade and freight transport for corridors as a whole or within specific countries. Therefore, assistance for these measures, from the broad perspective of a corridor or of countries, will help improve and integrate the aspects of trade and freight transport.

Assistance measures in the three fields (single windows, cargo tracking systems, and dry ports) are described below.

#### **6.6.1 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.

Since the organizations and institutions related to single window implementation are wide-ranging and complex, a three-phase assistance program has been proposed (refer to Table 6-9). However, the specific situations related to the establishment of single windows vary depending on the country, and there are cases in which consensus building among stakeholders may take a long time. Therefore, the assistance program described in the table should be considered as indicative only, with the actual assistance in each country to be determined based on appropriate modification of the required services by phase.

**Table 6-9 Concept of Assistance for the Phased Introduction of Single Windows**

Assistance Items	Assistance Measures
Preliminary Research for Introducing the Single Window: Phase 1	This phase involves preliminary research to identify the specific project for introducing the single window. Based on an evaluation of the existing customs management structure, other relevant regulatory authorities, and the private sector, it will analyze the needs for technical assistance, training, and regulatory reform required for introducing a single window. Also, it will develop an action plan and monitoring and evaluation plan for training and reform in Phase 2.
Technical Assistance for Preparing for the Introduction of the Single Window: Phase 2	The objectives of Phase 2 are (i) implementation of matters proposed in Phase 1, and (ii) presentation of options for establishing the single window. For the former, this phase will conduct technical assistance and training for customs, port authorities, border authorities, dry ports, and the private sector, to accomplish the following objectives: <ul style="list-style-type: none"> <li>(i) Preparation of a customs management structure that with the Revised Kyoto Convention of the World Customs Organization;</li> <li>(ii) Preparation of an organizational structure for customs management ready for introducing the single window;</li> <li>(iii) Preparing systems at ports/borders for integration;</li> </ul>

Assistance Items	Assistance Measures
	(iv) Preparing the relevant regulatory authorities for integration;
	(v) Addressing legal issues; and
	(vi) Assuring compliance by the private sector with the introduction of the single window.
Technical Assistance for Introducing the Single Window: Phase 3	After completion of Phases 1 and 2, the single window. Will be introduced. According to the situation of each country, Phase 3 will conduct the following services (as required):
	(i) Training in ICT and customs software for customs staff,
	(ii) Training in ICT and customs software for trade-related organizations,
	(iii) Deciding on and procuring single window software,
	(iv) Revising the training program for customs staff,
	(v) Introducing equipment (e.g., computers, applications);
	(vi) Improving communications infrastructure at specific points (e.g., borders, ports);
	(vii) Promotion of the single window; and
	(viii) Monitoring and evaluation.

Source: ECOWAS, 2009, A Comparative Feasibility Study on the Development of Single Windows in the Main Ports of the Abidjan–Lagos Corridor, Final Report. Financed by the World Bank and undertaken by PADECO.

### **6.6.2 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.

### **6.6.3 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.



## **Chapter 7 Pilot Assistance Program for Regional Freight Transport Focusing on Ports and Railways**

### **7.1 Introduction**

While Chapter 6 examined assistance measures for the implementation of freight transport corridor improvements focusing on ports and railways, in this chapter specific assistance models are assessed, taking examples of corridors in West Africa. 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.

This chapter selects the corridors for pilot assistance programs. The evaluation criteria applies are set out in Table 7-1 below.

**Table 7-1 Selection of Corridors  
for Pilot Assistance Program and Evaluation Criteria**

No.	Evaluation Criteria	Contents
1	Reduction in freight transport cost	Contribution to cost reduction of regional freight transport in West Africa
2	Interest of countries to benefit	High level of interest of countries to benefit from corridor development
3	Development partner coordination	Existing assistance from other development partners and expected coordination among development partners
4	Information on corridor	Availability of information to formulate a realistic assistance program
5	Combination of various assistance approaches	Possibility of combining assistance approaches of various development partners
6	Existing lines and railway plan	Existing railway or planned railway lines (already examined in a feasibility study) along the corridor
7	Possibility of program realization	High possibility of realization of assistance program and relatively few problems implementation capacity of prospective recipient organization(s)

Based on this evaluation process, two corridors were assigned high priority for the Pilot Assistance program:<sup>1</sup>

**Pilot Corridor 1: Dakar–Bamako Corridiro**

**Pilot Corridor 2: Abidjan–Ouagadougou–Niamey Corridor**

The following sections present pilot assistance programs involving corridor improvements.

<sup>1</sup> This evaluation presented here is the conclusion of this study and does not necessarily represent the assistance priorities of JICA.



## **7.2 Assistance for Dakar–Bamako Corridor Improvement (Senegal and Mali)**

### **7.2.1 Corridor Development and Infrastructure Improvement**

#### **(1) General Characteristics of the Region along the Corridor**

Senegal is located on the Atlantic coast of West Africa with a population of about 12 million and a GDP of USD 13 billion (2008). The country is relatively stable politically and has experienced economic growth in recent years. It holds an important position within the African Union (AU). Main commodities produced include peanuts, cotton, marine products, and phosphates, while mineral resource deposits of iron ore, gold, and crude oil have been identified. Service sectors such as trade and telecommunications are well developed and constitute 65% of GDP. About 42% of the population live in urban areas (2007). The Government of Senegal has been promoting reforms in liberalization and privatization since 1980.

Mali is a landlocked country with a population of about 12 million and a GDP of about 8.7 billion (2008). The agricultural and livestock sectors employ about 80% of the workforce and contribute about 50% of GDP. The principal product is cotton. Mali is ranked third among Sub-Saharan African countries in gold production. Although Mali's monoculture economy is greatly affected by the climate and commodity prices, the country has experienced economic growth since 2005.

Mali is Senegal's most important export partner receiving about 20% of its exports, while Senegal is the second import partner of Mali after the EU. The majority of export from Senegal to Mali is re-exportation. A significant number of Malians emigrate to Senegal for work.

#### **(2) General Characteristics of the Corridor**

The Port of Dakar, a start/end point of the corridor, has long prospered as a gateway port of West Africa. Export and import goods for Europe and Asia transit via the Port of Dakar, while goods for landlocked countries (Mali in particular) also transit via Dakar. Some goods destined for Mali utilized the Port of Abidjan in the past, but now transit via the Port of Dakar Port due to instability in Côte d'Ivoire.

Since resources in northern and eastern Senegal are exploited, railway networks through the landlocked regions present great potential. Senegal exports cement, salt, and seafood products. In addition, farm animals are exported from Mali to Senegal.

The northern section of the road corridor network (via Kidira) has been improved with assistance from the EU. JICA has assisted bridge construction along the southern section, and the World Bank and AfDB have also provided assistance for this section. While road transport is faster than rail transport, there are many problems such as the clearance delays at borders and traffic congestion. Measures should also be taken to reduce road deterioration due to overweight trucks. The adoption of an overloading regulation system including truck axle load controls and the installation of weighbridge stations is currently being studied. Truck transport along the corridors must be escorted by Senegal customs officers and drivers are required to pay this service. In addition, there are many checkpoints (e.g., customs, police) and requests for informal payments increases transport costs.

The total length of the railway between Senegal and Mali is 1,236 km (Dakar–Bamako); it is managed by Transrail (cargo and passenger) (see Figure 7-1). The railway line in Senegal is 906 km with a main line of about 643 km connecting Dakar–Thies–Tambacounda–Kidira, and three

branch lines of about 263 km<sup>2</sup> including the Thies–Saint Louis line, the Diourbel–Touba line, and the Guinguineo–Lydiance line. The Mali railway constitutes a main line of 593 km about connecting Bamako–Kayes–Kidira and a branch line of about 60 km between Bamako–Koulikoro.<sup>3</sup> Existing infrastructure conditions and details of the management of Transrail are described in Section 5.3.2



**Figure 7-1 Map of the Dakar–Bamako Corridor**

### **(3) Corridor Characteristics and Priority Areas of Support**

Following the classification of corridor characteristics presented in Section 6.3, the Dakar–Bamako Corridor plays an essential role in both intra-regional and inter-regional trade. As for intra-regional trade, Senegal exports cement, fertilizer, and seafood to Mali, while Mali exports farm animals and vegetables to Senegal. As for inter-regional trade, both countries import mainly grain and food and light industry products (household appliances) from Europe and Asia. The import of heavy industrial machines such as big generators and construction machines has been increasing. In addition, new resource development projects (e.g., phosphate rock in Matam, iron ore along the border) are ongoing and the export of mineral resources along the corridor is expected to increase. Improvement of railway transport is very important as a mode for inland transport considering that the distance for inter-regional trade for Mali exceeds 500 km, i.e., distances at which railway transport is generally more efficient than road transport. Further, as the main import products from Senegal to Mali are from near Dakar, the intra-regional trade distance often exceeds 500 km. As inter-regional and intra-regional trade demand is high along this corridor, priority policies include measures to facilitate trade to the port, e.g., port and dry port improvements, introduction of a port single window, and adoption of tracking systems for transit cargo.

### **(4) Port Infrastructure Improvement Issues**

As the Port of Dakar is a “transit port located in a regional corridor and having a conventional container terminal of the landlord type”, i.e., port classification B, it is important to develop a master plan taking into account the development of the hinterland and connection to road transport networks. It is also necessary to assess the feasibility of priority projects. In addition, the efficiency of customs clearance and cross-border procedures should be improved in order to reduce transport costs to/from the landlocked countries.

<sup>2</sup> This service is now stopped without the Diourbel–Touba section.

<sup>3</sup> This service is now stopped.

Since the cargo containerization is well developed in West Africa, most transit cargo is packed in containers. Issues to be resolved regarding the Port of Dakar for the corridor include facilitation of container cargo transport. Therefore, at the port the main issue consists of improvement of transit cargo handling procedures and customs clearance. Similar improvements regarding cargo handling procedures and customs clearance are also required at the dry port.

DP World obtained a concession contract at the Port of Dakar in 2008. This concession comprised not only the remodeling, construction, and management of a modernized container terminal, but also the construction and management of new container facilities on the side of the northern breakwater. At present, DP World is conducting a study of the facilities layout plan including the approach channel, reclamation, and land access. The construction of a new container terminal will greatly affect the expansion and management of the entire Port of Dakar so that the repair or transfer of the oil berth and bulk terminal management can be ensured. In the development of the master plan by the Dakar Port Authority, it is important to preserve the public interest by ensuring coherence with the new container terminal layout plan constructed and managed by DP World pursuant to its concession.

Integration of a railway container terminal with the entire Port of Dakar Port is necessary for the transport of transit containers along the corridor. Securing land for the railway container terminal is required, taking into account traffic congestion and possible oil price increases.

The construction of a dry port for transit containers has been mentioned. Procedures at the Port of Dakar are relatively smooth, but it takes seven days to process containers (2009). Hence, a dry port would play an important role in reducing congestion within the port. In addition, as transit containers are bound by the customs escort requirement until crossing the Mali border, waiting time until the formation of a formation and payments are made to the customs authority have become factors for the high land transport costs. Therefore, the implementation of a tracking system for container transport trucks would have significant impacts.

Port infrastructure improvement projects for the Dakar–Bamako Corridor can be summarized as follows:

- Development of the Dakar Port Master Plan;
- Container Terminal Extension Project (laying out and execution of the facilities plan);
- Railway Container Terminal Improvement Project (laying out and execution of the facilities plan);
- Dry Port Improvement Project in Senegal (laying out and execution of the facilities plan);
- Dry Port Improvement Project in Mali (laying out and execution of the facilities plan); and
- Development of a Transit Freight Transport Tracking System (execution of the system).

## **(5) Railway infrastructure Improvement Issues**

As Transrail is of the “type of railway operated along a regional corridor, covering two or more countries, with traffic volume of about 1 million tons or less and a PPP already introduced”, i.e., of the Type G1 railway group, the following measures are essential: (i) rehabilitation of aging/deteriorated railway facilities that are a bottleneck for railway transport; (ii) resolution of the rolling stock shortage, (iii) and expansion of the capacity for container transport in accordance with demand. Assistance for the rehabilitation of the deteriorated railway facilities will be costly, requiring collaboration among development partners.

Railways in Senegal and Mali were constructed by France during the colonial era, and since independence they have been administered as national railways. In 2003, Transrail, a corporation whose main shareholder is CANAC International Ltd. of Canada, has taken charge of the operation of railways in both Senegal and Mali with full responsibility including rehabilitation, operation, and transfer (ROT) with a 25-year concession contract. Although this operation has include management of passenger and freight transport between Dakar–Bamako (1,236 km), the management situation has been difficult for a long time without any external financial assistance. Outstanding debt has made routine operations and infrastructure investment difficult. After a creditor meeting in 2006, CANAC withdrew and was replaced by VECTURIS Co. Ltd., a large Belgian company, which has taken over the management of the railway.

Although the railway infrastructure is owned by the governments of Senegal and Mali, the two governments have not guaranteed the maintenance of the railway facilities, and Transrail has not been able to receive any assistance from development partners. VECTURIS has been discussing the reformation of the concession framework with both governments, as well as with the World Bank, AfDB and the EU, among others.

In the new concession contract, a loan of CFA 170 billion is expected with the guaranty of the two governments. Details include: (i) infrastructure improvement costing CFA 130 billion (for 600 km), and (ii) both rolling stock and telecommunications improvement costing CFA 40 billion. Concerning (i), both governments will become the borrowers required to repay. As for (ii), Transrail will be obliged to repay.

Railway issues in Senegal and Mali include the following:

- The railways form a corridor connecting Senegal and landlocked Mali, which creates competition with other sectors along the corridor. Hence, the railways must increase infrastructure investments in order to increase transport volume and to be competitive.
- There was a recent agreement to start up an organization to own and manage the entire railway infrastructure of Senegal and Mali. Therefore, it is necessary to modify the concession contract with Transrail, to specifically include the responsibility of the rehabilitation of the railway infrastructure (especially the track) by both governments and create a framework for support from development partners.
- At present, there are 20 locomotives among which 14 are operable, but only 10 are active. There are 700 freight wagons of which 450 are operable, but only 80% of those are active. Improvement of the rolling stock operating rate (availability) is urgently required.
- It is necessary to improve the efficiency of maintenance through the modernization of rolling stock workshops.
- Since the signaling system is not in operation, which may lead to serious security and safety problems, immediate improvement is required.
- Containerization has been increasing in recent years. As container transport continues to increase, expansion of container transport capacity is necessary.
- Although there are limitations due to the nature of single track, there is ample scope for increasing transport volume by implementing improvements to railway infrastructure, rolling stock (especially modernization of break and coupler system), service systems, and the management of labor.
- A reduction in the number of staff in each department and an improvement in staff skills through education and training is also necessary.

## **(6) Trade Facilitation Issues**

Customs clearance at the Port of Dakar is considerably less complicated than in other ports countries. The rate of container cargo inspection by the customs authority is relatively low, with only 15–20 containers per day inspected by scanner and 40 containers per day of goods subject to sampling verification. As the Port of Dakar has already adopted a single window and document procedures are simple compared to those in other West African countries, if everything goes smoothly, it takes about 4–5 days for completion of the various procedures at the port. However, this time is still long when compared to the time required for procedures in developed countries, indicating scope for improvement. For example, the single window only functions in the case of the initial application; the applicant must directly request modification procedures to each relevant organization. In addition, if a cargo owner does not come to receive his/her goods, customs does not take action according to the rule, leading to cases where many containers stay more than 90 days, which reduces the efficiency of container yard management.

Transit cargo bound for Mali via road transport must be escorted by custom officers. About 5%–10% of the cargo value is paid for the customs escort, an amount that far exceeds the cost of the escort. In addition, a bond is required to insure payment of customs duties if the goods do not leave the country. As the Port of Dakar's competitive position for transit goods destined for landlocked countries has been declined due to high customs costs and other issues, the introduction of a GPS cargo traceability (tracking) system is recommended in order to facilitate smooth transport operations over such a wide area. Although cargo tracking systems are used by some big logistics companies, such systems are not part of the customs control system.

There are about 20 police checkpoints between Dakar and Bamako at which drivers are often requested to make informal payments. Logistics companies must provide this expense to drivers in addition to their daily allowances. However, as both the Governments of Senegal and Mali have discussed this problem recently, the number of checkpoints has been reduced and the number of requests for informal payments is expected to decrease accordingly.

Regarding railway transport, an agreement has been concluded between Senegal and Mali and there is no problem regarding lengthy customs clearance procedures.

## **(7) Improvement Issues Relative to PPP Law/Regulatory Aspects**

Currently there is a BOT Law in Senegal. The legal system previously established by the French covering only the commission of public services was extremely limited. In 2004, the BOT Law was enacted to extend the scope of negotiation between the public and private sectors for each project. The current law stipulates the selection process of companies, the procedures for negotiation between government and the private sector, the rights of private companies, and restrictions on the confiscation of assets to protect private investment. In addition, if further revisions of the law are necessary, the government is ready to respond flexibly.

The Senegal National Federation of private companies has observed that private companies in Senegal are short of experience concerning PPPs and accordingly are not competitive in international bids; they cannot respond to big projects and are obliged to become subcontractors to international firms with low prices. The government hopes to reinforce the competency of domestic companies and to create domestic preference measures at the time of bidding in order to allow domestic companies to accumulate experience.

There is also an independent organization, Conseil des Infrastructures, which covers the observance of law, transparency, and guarantees of equality for PPP infrastructure projects in all the sectors. This structure, created in 2004, based on the results of a World Bank study, is the first PPP general inspection organization in Africa. All PPP infrastructure projects are to be

notified to the Conseil des Infrastructures and to receive advice before implementation. However, in practice this organization has experienced the following problems:

- 1) The obligation to notify this organization is not sufficiently known among government agencies and therefore some PPP projects are implemented without the required notice (especially within local government organizations).
- 2) It is necessary to inform the public of the existence of this organization, to monitor the implementation of PPP projects, to strengthen organizational capacity for feedback, and to organize staff training.
- 3) The dispatch of database specialists to integrate the existing PPP law and rules of each ministry is expected (for about 1 year) with USAID assistance.

In order to activate PPP projects in West Africa, it is desirable to strengthen the functions of this structure, increase the transparency of PPP projects and the observance of laws and rules, promote PPP projects, and learn from the experience of other Sub-Saharan countries. Mali modified its public project contract law in 2008 to better implement PPP projects. A UEMOA document of 2005 set out guidelines for the implementation of public project contracts and public service commissions, including procedures for conflict resolution. Subsequently, each member country was requested to respond in accordance with its national law. At present, the modification of existing laws and the establishment of public corporation law by sector allows the private sector to conclude management concession contracts, but, the law does not cover all PPP projects. Also, there is no independent inspection organization covering all sectors or functions regarding project inspection, the sharing of lessons learned, or the promotion of implementation in Mali. While the number of PPP transport infrastructure projects is expected to increase, special departments or staff arrangements for this purpose have not been established.

## **(8) Pilot Assistance Program**

Table 7-2 and Figure 7-2 indicates pilot assistance programs for corridor improvement corresponding to the issues outlined above. Each project is described in the following subsections.

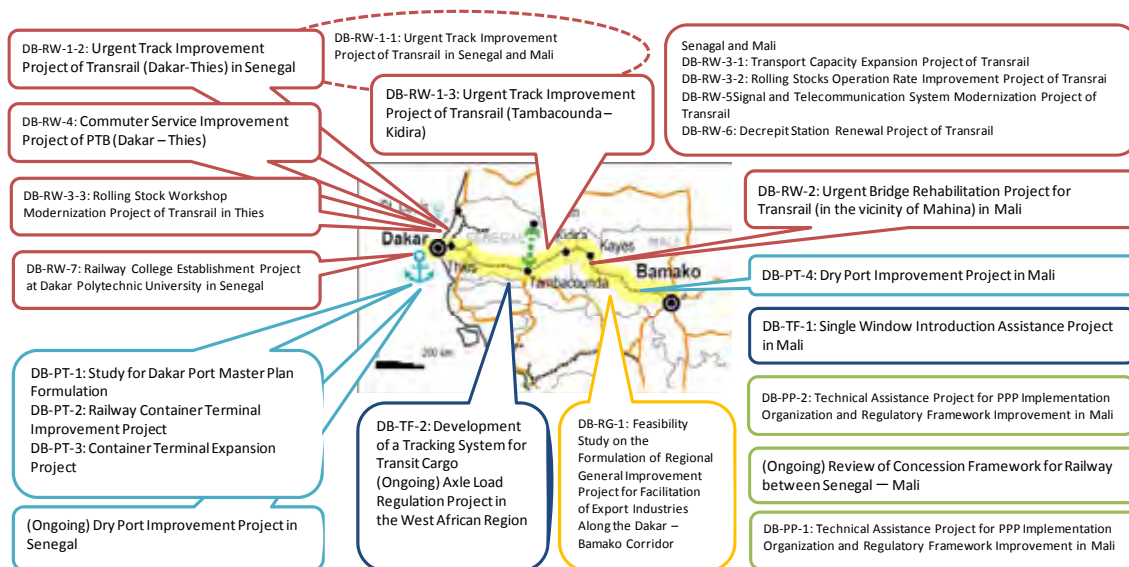
**Table 7-2 Pilot Assistance Improvement Program  
for the Dakar–Bamako Corridor**

Code	Project Name	Type of Assistance	Implementing Agency
<b>Regional Development Assistance</b>			
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)
<b>Port (including Trade Facilitation) Development Projects</b>			
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

Code	Project Name	Type of Assistance	Implementing Agency
(Ongoing)	Dry Port Improvement Project in Senegal	Technical Cooperation, Financial Assistance	MICATTI, Senegal Customs
<b>Railway Development Assistance Projects</b>			
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
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
<b>Assistance for the Legal System Related to PPP Development</b>			
DB-PP-1	Capacity Strengthening of Conseil des Infrastructures in Senegal	Technical Cooperation	Ministry of Finance, MICATTI



Code	Project Name	Type of Assistance	Implementing Agency
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)
<b>Other Trade Facilitation Projects</b>			
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 7-2 Map of Dakar-Bamako Corridor Pilot Assistance Improvement Program**

### **7.2.2 Regional Development Assistance Project: DB-RG-1: Feasibility Study of the Formulation of a General Regional Improvement Project for Facilitation of Export Industries along the Dakar–Bamako Corridor**

This regional development assistance project will analyze the present state and problems for infrastructure improvement in various sectors (e.g., transport, electric power, telecommunications) for resource development and industry creation along the Dakar–Bamako Corridor, and formulate a general regional development master plan for the economic development of the area.

The Dakar–Bamako Corridor extends over 1,200 km from Senegal to Mali. In this corridor, a Niger Strategic Development Initiative sponsored by the New Partnership for Africa's Development (NEPAD) serves as the main freight transport corridor for both intra-regional and inter-regional trade linking the Port of Dakar to East Senegal and Bamako via road and railway (Transrail). Road improvements are ongoing along this corridor and railway rehabilitation will commence soon with development partner assistance. However, regarding freight transport demand, import traffic exceeds export traffic, with demand in only one direction, which increases freight transport costs. On the other hand, mineral resource development is in progress in the interior of Senegal and northwestern Mali. In addition, there is potential for an increase in agricultural production (e.g., cotton), which may lead to growth in related export industries. For these purposes, general regional development with a focus on the development of export industries is recommended in parallel to regional freight transport corridor infrastructure improvement. Implementation of this project ensures sustainability of the regional corridor investment and the economic development of the region along the corridor.

### **7.2.3 Port Development Projects**

#### **(1) DB-PT-1: Study to Formulate a Dakar Port Master Plan**

The objective of this project is to develop measures to connect the port with land transport and to ensure transport efficiency by increasing port security and improving environmental conditions.

The 25-year concession obtained by DP World in the Port of Dakar includes not only the management and administration of a container terminal, but also the rehabilitation of the existing terminal and the construction of a new terminal. Rehabilitation of the existing terminal has already commenced and the construction of the new terminal the north breakwater is expected. However, there are still problems including measures to serve envisaged future cargo demand and connections with land transport. Also, an improvement plan for the entire port including the southern zone, which has sewage disposal issues, and the improvement of a deteriorated oil berth, has not yet been formulated. Therefore, for the Port of Dakar to serve as the gateway to the Dakar–Bamako Corridor, a port development master plan including environmental improvements and connection links with road and railway transport is to be developed. One the large steel industrial firm, Arcelor Mittal Co., Ltd., has concluded a USD 2.2 billion investment contract for iron mining in Senegal, including the construction of a new industrial port for shipping iron ore near the Port of Dakar and the construction of a 750 km rail line to the deposits. Therefore, the master plan should take into account this plan for the construction of a new port.

Reduction of transport cost materialized by smooth connection with land transport can decrease the price of import commodities and increase competitiveness of export commodities of Senegal and Mali and consequently contribute to the economic development of these countries.

## **(2) DB-PT-2: Railway Container Terminal Improvement Project (including Railway Terminal(s), Handling Equipment, Peripheral Roads)**

This project aims to improve the railway container terminal to allow for efficient handling and to reduce land transport costs to/from inland countries by improving railway transport. While an existing single railway line comes from a northern switch yard, the container storage yard and space for loading trains are not separated, resulting in inefficient handling operations. The time to load a container and to change locomotives is lengthy, making regular operations difficult.

## **(3) DB-PT-3: Container Terminal Expansion Project**

This project aims to ensure safe navigation of large size vessels by deepening and widening the navigation channel when DP World builds a new container terminal.

Upon completion of the container terminal expansion project, the container terminal concessionaire (DP World) will reclaim the exterior waters of the existing northern breakwater to construct a new container terminal with a water depth of 14 m. At present, the water depth at the Port of Dakar is only 11 m with a narrow channel width of 200 m. Although the construction of the new terminal is included in a concession contract awarded DP World, there are possibilities for improvement of the navigation channel and affiliated facilities.

For future expansion, the navigation channel will be deepened and widened. Reduction of maritime transport cost of containers by use of a large container vessel, will subsequently lead to price reduction of import commodities and price competitiveness of export commodities will contribute to the economic development of Senegal and Mali.

## **(4) Ongoing Dry Port Improvement Project in Mali**

The project objective is to materialize efficient inspection and customs clearance of transit cargos.

This ongoing project is developing an efficient dry port to reduce transport costs and promoted economic development. There are two construction project sites, at Sikasso and Kayes, in which land has been acquired (40 ha and 50 ha, respectively) and a feasibility study has already been completed.

There are a number of well-maintained dry ports in landlocked Mali. Although many of the dry ports accommodate customs clearance, their cargo handling facilities are insufficient. Since Mali owns bonded zones with warehouses in the Ports of Nouadhibou, Dakar, Conakry, Abidjan, Tema, Lome, and Cotonou, these zones can be used to keep cargo for a fixed period. However, since these facilities are not efficiently utilized, Mali plans to build dry ports, one in Sikasso and another in Kayes. While ensuring finance, Mali is studying the implementation structure to adopt a PPP system that would allow Mali to entrust its management to the private sector. Land of 40 ha and 50 ha respectively have been already acquired and feasibility study has been conducted.

Construction of a yard and warehouse where cargo inspection and customs clearance can be conducted, management and administration office, custom office and quarantine office are to be implemented. A shunting yard and loading/unloading yard of railway, gate and fence, and weighing bridge are also to be constructed. In implementing the project, relationship with the bonded areas located at the gateway ports are to be taken into account.

Reduction of the land transport cost of container cargos can be materialized by efficient cargo inspection and customs clearance. Price of import commodities can be consequently reduced

and competitiveness of export commodities can be promoted. Thus, the project can contribute to the economic development of Mali.

#### **(5) DB-PT-4: Dry Port Improvement Project in Senegal**

The project aims to improve cargo storage and thereby materialize smooth logistics.

Cargo is stored for long periods inside the port zone due to traffic congestion in the Port of Dakar and in Dakar urban districts due to the increasing cargo volume. In order to resolve this problem by moving cargo away from the port, the dry port improvement project was initiated in 2006 about 2 km from the port. Construction was completed in June 2009 and is currently at the stage of private operator selection for a concession. The land adjacent to the dry port has already been acquired to accommodate future expansion. In order to increase customs efficiency, it is desirable that this dry port include all procedures for customs clearance and cargo inspection.

The project consists of warehouses including bonded ones, office buildings for wholesalers, forwarders and custom, solid waste collection system, car turnarounds and cargo platforms, roads, workshop, fuel station, canteen, etc. They have been already constructed.

Reduction of transport cost of import and export commodities can contribute to the economic development of Senegal.

### **7.2.4 Railway Improvement Assistance Projects**

#### **(1) DB-RW-1-1: Urgent Track Improvement Project for Transrail in Senegal and Mali**

The purpose of this project is to reduce the numerous derailments and to ensure safe and stable transport by rehabilitating the track of Transrail in Senegal and Mali. Transrail, which would require development partner assistance, would improve aging/deteriorated railway infrastructure over a length of 600 km at a cost of CFA 130 billion.

Transrail's track in Senegal and Mali is very old and in poor condition. There are so many derailment incidents mainly due to the poor track condition. Also due to insufficient rolling stock maintenance, there were 216 derailments in 2008 and 144 derailments in 2009, endangering railway safety and stable transport. The rail weight is light at 36 kg/m, 30 kg/m, and 26 kg/m. The 36 kg/m rails were laid between 1966 and 1992, but, the 30 kg/m rails (length: 600 km) and the 26 kg/m rails (length: 150 km) are more than 70 years old and have deteriorated. Track rehabilitation will result in increased train speeds due to a reduction in restricted speed operation, a reduction in out-of-service time due to reduced derailment recovery operations (which will reduced transport time). In addition, decreased derailment recovery costs, decreased costs for repair of derailed rolling stock, an improved rolling stock operating rate (availability), and reduced compensation costs for damaged cargo can be anticipated. All of these project benefits will result in increases transport volume and customer confidence in railway transport, thereby creating a "virtuous circle".

#### **(2) DB-RW-1-2: Urgent Track Improvement Project for Transrail (Dakar–Thies: 70 km) in Senegal**

The project focuses on track rehabilitation of the section of Transrail (Dakar–Thies: 70 km) in Senegal, specifically in the track rehabilitation zone of DB-RW-1-1. There were 56 derailments in this section in 2009, corresponding to 38.9% of the total number of annual derailments of 144. Therefore, track rehabilitation in this section will substantially reduce the number of derailments for Transrail.

**(3) DB-RW-1-3: Urgent Track Improvement Project for Transrail  
(Tambacounda–Kidira: 175 km) in Senegal**

The project focuses on track rehabilitation of the section of Transrail (Tambacounda–Kidira: 175 km) in Senegal, specifically in the track rehabilitation zone of DB-RW-1-1. There were 40 derailments in this section in 2009, corresponding to 27.8% of the total number of annual derailments of 144. Therefore, track rehabilitation in this section will also substantially reduce the number of derailments for Transrail.

**(4) DB-RW-2: Urgent Bridge Rehabilitation Project for Transrail (in the vicinity  
of Mahina) in Mali**

This project aims at eliminating the current speed limitation (10 kph) by rehabilitating the 300 m bridge carrying the Transrail line across the Bafing river (near Mahina). With development partner assistance, Transrail will improve the railway infrastructure along 600 km at a cost of CFA 130 billion. The priority for this project is high. Although an assessment is necessary to determine whether rehabilitation or replacement of bridge is warranted, the rehabilitation/replacement of this bridge will allow for an increase in train operating speeds and reduced transport time by eliminating restricted speed operation and increasing the operating rate (availability) of rolling stock. As a result, transport volume is expected to increase and the cost per unit transport volume will be further reduced.

**(5) DB-RW-3-1: Transport Capacity Expansion Project for Transrail (assistance  
for the procurement of rolling stock) in Senegal and Mali**

To expand transport capacity in the short term, this project will assist Transrail with the procurement of 5 locomotives and 200 wagons in order to alleviate their rolling stock shortage. Although Transrail hopes to increase the number of its rolling stock, the investment environment is not favorable at present, with low transport volumes. With access to assistance from development partners, Transrail will increase the number of its rolling stock and improve its telecommunication system at a cost of CFA 40 billion.

Transrail carries out railway operations specifically for cargo transport between Dakar–Bamako (1,236 km). The company owns 20 locomotives among which 14 are operable, but of which only 10 are active. It has 700 wagons out of which 450 wagons are operable. About 80% of these operable wagons are active, and the number of active wagons is insufficient to accommodate the demand, resulting in a cargo queue for railway transport at the Port of Dakar. An increase in Transrail's rolling stock will increase its transport volume leading to a reduction in unit transport costs. Since increasing the rolling stock operating rate by means of rolling stock workshop modernization/improvement or education/training of railway staff will take time, this short-term transport capacity expansion project (providing assistance for rolling stock procurement) will have an important impact.

**(6) 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**

The project will assist the purchase of rolling stock spare parts on behalf of Transrail, resulting in improving the operating rate (availability) of rolling stock. Although Transrail has strived to increase the operating rate of its rolling stock, its supply of spare parts has been insufficient due to a shortage of funds, which is one of the factors for the low operating rate. As the supply of repair parts is expected to directly increase the operating rate, assistance for the procurement of spare parts, which costs relatively little, can be effective emergency palliative measure.

**(7) DB-RW-3-3: Modernization of Rolling Stock Workshop for Transrail in Thies, Senegal**

The project aims at the modernization of the rolling stock workshop at Thies, which is Transrail's largest rolling stock workshop, to ensure efficient maintenance operation of Transrail's rolling stocks. With development partner assistance, Transrail intends to increase the number of its rolling stock and to improve telecommunication system at a cost of CFA 40 billion. Transrail currently has a system to inspect and repair rolling stock with a minimum set of facilities but it does not yet have a concrete concept for the modernization of its rolling stock workshops, which includes four main rolling stock workshops in Senegal (Thies, Dakar, Guineo, and Tambacound) and two in Mali (Bamako and Kayes). Although the rolling stock workshops have facilities to overhaul locomotives, wagons, and coaches, they are in such poor condition that efficient maintenance cannot be conducted. The supply of spare parts imported from Canada, India, and the United States is insufficient, leading to a low rolling stock operating rate.

**(8) DB-RW-4: Commuter Service Improvement Project for Petit Train de Banlieue (PTB: Dakar–Thies: 70km) in Senegal**

The project will rehabilitate and improve the track of the commuter line (Dakar –Thies: 70km) operated by the Petit Train de Banlieue (PTB), in order to reduce the large number of derailments on this line and construct the a new type of tracks in order to accommodate future commuter transport demand. PTB hopes to carry 75,000 commuters per day in the future. For this purpose, PTB is currently conducting a study to develop three-rail track with a gauge of 1,000mm + 1,435mm for the Dakar–Thies line.<sup>4</sup> In addition, PTB intends to branch its railway to a new airport in the future, utilizing double tracked railway with a one-track line for PTB.<sup>5</sup> The rails between Dakar–Thies are 36 kg/m, which is relatively heavy for railways in Sub-Saharan Africa. However, this section connecting directly with the Port of Dakar is part of the main line with dense traffic, resulting in deterioration of the aging track. PTB carried 4.5 million passengers (with a maximum 25,000 passengers per day) in 2008. Although the number of scheduled train operations was 7,670 in 2008, 277 operations were suspended for operational reasons. A total of 163 cases were due to derailment and track failure. Similar to the case of Transrail, this section experiences many derailments, and accordingly rehabilitation of this track section will allow a reduction in restricted speed operation and a reduction of out-of-service time by reducing derailment recovery operations (resulting in a reduction in operation time and transport time). In addition, a decrease in derailment recovery costs, a decrease in the repair costs of derailed rolling stock, and improvements in the operating rate (availability) of rolling stock can be anticipated.

**(9) DB-RW-5: Signaling and Telecommunication System Modernization Project for Transrail in Senegal and Mali**

This project will modernize the signaling and telecommunication system of Transrail in order to ensure the safe and stable operation of the railway. With assistance from development partners, Transrail intends not only to increase the number of its rolling stock, but also to improve the telecommunication system, at a cost of CFA 40 billion. However, Transrail does not have a concrete concept for its modernization of signaling and telecommunication system at present.

There is no interlocking system between the signaling system and turnouts, and the turnouts are operated manually, resulting in a safety problem. Without the interlocking system between traffic lights and turnouts properly integrated with the signaling and telecommunication system, the stationmasters in a blocked section have to communicate with each other before allowing

<sup>4</sup> Assistance from China and India is now being studied.

<sup>5</sup> The track between Dakar–Thies (70 km) is double-tracked with each one-track line shared with Transrail.

trains to depart. As there are few train services currently, the priority of this project is not high. However, if transport volume growth leads to an increase in the number of trains in operation, this project will be essential to ensure the safety of railway transport service.

#### **(10) DB-RW-6: Renewal Project for Deteriorated Transrail Stations in Senegal and Mali**

This project will improve the service level by remodeling deteriorated station buildings. As Transrail has stopped passenger service between Dakar–Bamako, currently it operates passenger service only between Kayes–Bamako. The volume of cargo transported by Transrail between Dakar–Bamako was 373,000 in 2006, 388,000 tons in 2007, and 379,000 tons in 2008. Although there is no urgent issue at cargo handling stations, it is important to supply good service by remodeling deteriorated stations serving passengers.

#### **(11) DB-RW-7: Project to Establish a Railway College at Dakar Polytechnic University in Senegal**

This project will establish a railway section at Dakar’s polytechnic university in order to educate and train railway staff to improve their skills. Railway staff in the countries visited in West Africa lack sufficient skills, which has led to management inefficiency in various fields, including railway operation/management; maintenance of track, roadbeds, bridges, rolling stock, signaling system; and container handling. Maintenance conditions of tracks are extremely poor. Thus, urgent improvement in track maintenance capability is a particular requirement. Currently, since high-cost European technicians are commissioned to repair rolling stock which cannot be repaired by local staff, it is urgent to improve the rolling stock maintenance skills of the local staff on site. Although each railway trains its staff on the job, the training provided is insufficient.

### **7.2.5 PPP Regulatory Framework Assistance Projects**

#### **(1) DB-PP-1: Capacity Strengthening of Conseil des Infrastructures in Senegal**

As described in detail above, the Conseil des Infrastructures in Senegal was created in 2004 as an independent organization based on the results of a World Bank study. As the first general PPP inspection organization in Africa, it covers the observance of law, transparency, and guarantees of equality for PPP infrastructure projects in all sectors. This structure, created in 2004, based on the results of a World Bank study, is the first PPP general inspection organization in Africa. While all PPP infrastructure projects are to be notified to the Conseil des Infrastructures and to receive advice before implementation, as detailed above, the organization has experienced a number of problems. This project is expected to strengthen the capacity of the organization and encourage PPP projects in Sub-Saharan Africa.

#### **(2) DB-PP-2: Technical Assistance Project for Improvement of the PPP Implementation Organization and Regulatory Framework in Mali**

The project will promote PPP infrastructure improvement project implementation by introducing special departments in government organizations and encouraging the smooth implementation of PPP projects and operation. In parallel, the project will improve PPP regulations (including a study of the revision of existing laws and regulations) concerning all sectors and to build a legal base in order to simplify legal procedures for the implementation of PPP projects. If positive results are obtained from this project, the public fiscal responsibility for infrastructure improvement will be reduced, efficient management will be achieved with private involvement, the regional economy will be improved, and lessons learned will be conveyed to other Sub-Saharan countries.

Although the concerned ministry and regional economic communities (ECOWAS and UEMOA) understand the importance of PPPs for future infrastructure improvement projects, there is no special department designated for project promotion, plan formulation, the coordination of different actors, or inspection of implementation results. In addition, there has been no improvement of laws related to all PPP projects. The PPP project in the framework of present railway concession (Transrail) depended on the modification of existing laws and regulations. In ongoing PPP railway projects railway has been management at a disadvantage in comprehending contract contents, and has suffered from a lack of consultation between/among the different parties and an absence of an inspection organization. Accordingly, it is essential to create a special department to elaborate and promote a plan between/among government organizations, improve relevant laws and regulations, and establish an independent inspection organization. This project is expected to reduce the financial burden of infrastructure development by the government, and to introduce efficient operation/management by the private sector.

### **(3) Ongoing Review of Concession Framework for Railway between Senegal and Mali**

With assistance from the World Bank and AfDB, the Governments of Senegal and Mali are to review the concession framework with Transrail. It is proposed that the contract will be modified from a “vertical integration” commission to one of “vertical separation” and infrastructure improvement to be the responsibility of the public sector (i.e., a return to the initial state), which will acquire funds for this purpose. Both countries would be required to create a company for infrastructure management for the purpose of asset management, funds acquisition, and independent inspection of the project, to have separate accounts for cargo and passenger transport, and subsidize passenger transport service. Revision of the existing contract would be the quickest way and best approach for maintaining current railway service. This project is expected to provide a practical solution to the public and private sector responsibilities and risk distribution, and to increase the service levels of Dakar-Bamako railway services.

#### **7.2.6 Other Freight Transport System Improvement Projects**

##### **(1) DB-TF-1: Assistance for the Introduction of a Single Windows in Mali**

This project aims at introducing Single Window systems to Mali. In Mali there are numerous documents required and various agencies related to procedures for cargo export and import, resulting in complications that increase cost and time. The solution to this problem would be to introduce a single window system, to reduce the time and the cost necessary for export/import cargo procedures, shorten the time and cost necessary for the required documents, reduce border crossing times, reduce customs clearance procedures at the final point in dry ports, and finally shorten delays caused by procedure errors. At present, concrete measures to introduce a single window system have not been taken in Mali, document procedures have been improved, e.g., customs clearance involves a unified format (log book) formulated by ECOWAS. Implementation of this project would lead to a shorter time for cargos transported to Mali.

##### **(2) DB-TF-2: Development of a Tracking System for Transit Cargos**

This project aims at introducing a tracking system for transit cargos between Dakar to Mali. will eliminate customs escorts and subsequent waiting time and reduce the transport cost of transit containers. Transit cargo volume from the Port of Dakar to Mali has increased due to the instability in Côte d’Ivoire starting in 2002. As the transport of transit cargo to Mali uses the present corridor road, a convoy must be formed and escorted by custom officers. Since the escort fee and waiting time for the convoy has increased transport costs, it is recommended to introduce a cargo tracking system using GPS technology for trucks carrying containers.



Although the Government of Senegal has been planning one since 2008, no detailed feasibility study has been conducted and the implementation date is yet to be determined,

### **(3) Ongoing Project for Axle Load Regulation in West Africa**

This project aims at supporting implementation of axle load regulation in West African countries. Pavement damage caused by overloading is a big problem in West Africa. Road life is often reduced by half due to overloading, thereby increasing road maintenance costs. In addition, transport costs are increased because of the reduced speed of trucks. Although policies against overloading have been established by the countries and RECs, axle load standards vary across countries. However, the application of different axle load standards makes it difficult to apply broad-based controls, and as a consequence freight must be transshipped at national borders.

As a response to this issue, regional measures were taken in West Africa more than 10 years ago under the auspices of ECOWAS and UEMOA. Three countries with weighbridges (Ghana, Niger, and Mali) started to apply this regulation in advance of other UEMOA countries. However, since this regulation has not yet been applied in other countries in West Africa (full adoption is scheduled for 2011), transporters tend to use corridors or ports in countries where there is no such regulation in order to reduce costs. In order to ensure a “level playing field” (especially between the road and railway modes), it is important to implement axle load controls on a (sub) regional basis. Since the implementation of the UEMOA axle load regulation is expected, there are many issues to be resolved such as the strengthening of weighbridges and other related facilities in order to realistically and efficiently implement the regulation. This project is expected to reduce the damage caused by overloaded tracks, and improve efficiency and sustainability of road sector investments. It also assures fair competition between road and railway transport.

## **7.2.7 Prioritization of Dakar–Bamako Corridor Projects**

The Dakar–Bamako Corridor are prioritized in Table 7-3.

**Table 7-3 Prioritization of Dakar–Bamako Corridor Projects**

Code	Project	Priority Assessment
<b>Regional Development Assistance Project</b>		
DB-RG-1	Feasibility Study for the Formulation of a General Regional Improvement Project for Facilitation of Export Industries along the Dakar–Bamako Corridor	Surface transport between Senegal and Mali generally responds only to demand in one direction, resulting in increased freight transport costs. However, mineral resource development is in ongoing in the interior of Senegal and in northwestern Mali. In addition, there is potential for increase in agricultural production such as cotton, allowing the promotion of export industries. For this purpose, recommendations include the development of regional improvements along the corridor and encouragement of export industries parallel to the regional freight corridor infrastructure improvement.
<b>Port (including Trade Facilitation) Development Projects</b>		
DB-PT-1	Study to Formulate a Dakar Port Master Plan	The priority is to keep proper functions of the port as a whole, responding to the expansion works in progress. Furthermore, it will be necessary to develop a master plan for the entire Port of Dakar, taking into account connections with surface transport.

Code	Project	Priority Assessment
DB-PT-2	Railway Container Terminal Improvement Project (including Railway Terminal(s), Handling Equipment, Peripheral Roads)	The improvement of railway transport infrastructure is essential to accommodate the increasing container cargo volume due to the container terminal rehabilitation and expansion. Therefore, if the railway improvement is not addressed in the concession of DP World, its implementation should be accorded the highest priority.
DB-PT-3	Container Terminal Expansion Project	The construction of a new container terminal outside of the northern breakwater planned by DP World would allow for large ships to enter, thereby reducing costs. Assistance for some lanes and exterior facilities for this new terminal is required. However, the development is currently being implemented by DP World and therefore its priority is low.
DB-PT-4	Dry Port Improvement Project in Mali	It is preferable to implement this project together with DB-PT-2 and DB-PT-3 in order to reduce transit cargo transport costs.
(Ongoing)	Dry Port Improvement Project in Senegal	This project has already been carried out and will reduce or eliminate traffic congestion in the terminal. The public operator is being selected.
<b>Railway Development Assistance Projects</b>		
DB-RW-1-1	Urgent Track Improvement Project for Transrail in Senegal and Mali	Provided that Transrail can obtain development partner assistance, the project will improve deteriorated railway infrastructure over 600 km at a cost of CFA 130 billion. The rehabilitation of deteriorated tracks, which is the cause of many derailments, is the first-priority project.
DB-RW-1-2	Urgent Track Improvement Project for Transrail (Dakar–Thies: 70 km) in Senegal	As this section has Transrail’s highest frequency of derailments, the project is urgent and should be carried out as a first priority.
DB-RW-1-3	Urgent Track Improvement Project for Transrail (Tambacounda–Kidira: 175 km) in Senegal	This section is among the worst in terms of frequency of derailments. Its priority is ranked second after DB-RW-1-2.
DB-RW-2	Urgent Bridge Rehabilitation Project for Transrail (in the vicinity of Mahina) in Mali	Removing the 10 kph speed limit for this 300 m bridge is one of the projects to be carried out as a first priority.
DB-RW-3-1	Transport Capacity Expansion Project for Transrail (assistance for the procurement of rolling stock) in Senegal and Mali	As an increase in rolling stock will allow for increased transport volume and reduce transport costs per unit of transport, assistance for rolling stock procurement is important. However, track rehabilitation should be carried out before this project.
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	The procurement of spare parts can directly improve the operation rate (availability) of rolling stock at a low cost. However, track rehabilitation should be carried out before this project.

Code	Project	Priority Assessment
DB-RW-3-3	Modernization of Rolling Stock Workshop Project for Transrail in Thies, Senegal	Sustaining rolling stock quality is essential in order to ensure transport safety, reliability, and high-speed service. However, implementation is difficult without an improved capability for rolling stock maintenance. The implementation schedule shall be decided according to the increase in rolling stock reflecting transport trends as well as progress in staff training.
DB-RW-4	Commuter Service Improvement Project for Petit Train de Banlieue (PTB: Dakar–Thies: 70km) in Senegal	The present railway (on which larger volumes are anticipated in the future) is an urban railway carrying a midrange volume of commuters. Since this rare railway in Sub-Saharan Africa alleviates traffic congestion, saves energy, and reduces air pollution, this project has a high priority.
DB-RW-5	Signaling and Telecommunication System Modernization Project for Transrail in Senegal and Mali	If the transport volume increases, the introduction of a signaling and Telecommunication system will become essential for safety. Therefore, this project should be carried out, taking into account priority issues such as track rehabilitation and the need for additional rolling stock.
DB-RW-6	Renewal Project for Deteriorated Transrail Stations in Senegal and Mali	It is important to remodel the deteriorated passenger station buildings in order to improve the level of service. Since this project is not so pressing, the timing of its implementation should be decided based on the progress of other priority projects.
DB-RW-7	Project to Establish a Railway College at Dakar Polytechnic University in Senegal	Over the middle and long term, it is necessary to improve the skills of railway staff, which directly influences transport safety and reliability.
<b>Assistance for the Legal System Related to PPP Development</b>		
DB-PP-1	Capacity Strengthening of Conseil des Infrastructures in Senegal	This project aims at improving the transparency of PPP projects in Senegal in respect of legal and regulatory aspects. In addition, the promotion of PPP projects is necessary to activate these projects in parts of Sub-Saharan Africa. Therefore, this project should be carried out continuously in the intermediate term.
DB-PP-2	Technical Assistance Project for Improvement of the PPP Implementation Organization and Regulatory Framework in Mali	Although PPP projects have been implemented in Mali, there have been some problems. Smooth implementation of PPP infrastructure projects and the expansion to other project types should be facilitated with the establishment of a specialized department in the government, enactment of relevant laws, and the creation of an inspection organization. These proposals should be considered as intermediate- and long-term measures.
(Ongoing)	Review of the Concession Framework for Railway between Senegal and Mali	The first priority for assistance for railways should be given to improving the existing concession framework. Defining the management responsibility for railway infrastructure is a prerequisite condition for development partner assistance.

Code	Project	Priority Assessment
<b>Other Trade Facilitation Projects</b>		
DB-TF-1	Assistance for the Introduction of a Single Window in Mali	As a single window has been already introduced in Senegal, this system should be introduced urgently in Mali in order to simplify procedures along the entire corridor.
DB-TF-2	Development of a Tracking System Building for Transit Cargo by Truck	As the volume of transit containers is expected to increase as a result of container terminal expansion in the Port of Dakar, this project should be implemented as soon as possible.
(Ongoing)	Project for Axle Load Regulation in West Africa	As this project has already been carried out, it can be expected to lead a “level playing field (fair competition) between railway and road transport. An axle load regulation was implemented in Mali prior to other countries. A temporary UEMOA standard is to be applied from March to December 2010, and a final UEMOA standard is to be applied beginning in 2011.

As mentioned, priority port projects include: (i) the railway container terminal improvement project (improvement of railway terminal, handling facilities, and peripheral roads), (ii) development of a Dakar port improvement master plan and feasibility study, (iii) a dry port improvement project in Mali, (iv) a dry port Improvement project in Senegal, and (v) a container terminal expansion Project.

The following railway projects are required immediately: (i) urgent track improvement projects, (ii) the urgent bridge rehabilitation project, (iii) the rolling stock operating rate (availability) improvement project, and (iv) the project to establish a new railway college. Projects to implement over the intermediate term include: (v) project to increase transport volume through the procurement of rolling stock, (vi) a signaling and telecommunications system modernization project, and (vii) a rolling stock workshop modernization project. The long term project is (viii) the renewal project for deteriorated stations. For the Commuter Transport Railway Improvement Project for PTB, an evaluation of the implementation period from the point of view of regional corridor improvement is necessary.

### **7.3 Assistance Program for Abidjan–Ouagadougou–Niamey Corridor Improvement (Ghana–Burkina Faso–Niger Corridor)**

#### **7.3.1 Corridor Development and Infrastructure Improvement**

##### **(1) Overview of the Region along the Corridor**

With a population of about 20 million and a GDP of USD 23 billion (2008), Côte d’Ivoire is a middle income country located on the Guinean coast. It accounts to about a third of the GDP of the eight member countries of UEMOA. Playing a principal role in the West African economy, Côte d’Ivoire has been divided since 2002 by a political crisis within the country. Although its manufacturing sector is relatively developed by West African standards, its main economic sector is agriculture with cocoa and coffee the main export. Recently, its oil production has been increasing.

Burkina Faso is landlocked with a population of about 15 million and a GDP of USD 8 billion (2008). Since the abandonment of a socialist regime in 1990, the country has been relatively stable politically. Its economy is based mainly on agriculture with cotton an important export. Furthermore, foreign investment is increasing for the development of mineral resources such as

gold. The country has implemented reforms and has performed well economically in recent years.

One of the landlocked countries at the southern end of the Sahara, Niger has a population of about 15 million and a GDP of USD 5 billion (2008). According to the human development index published by United Nations Development Programme (2008), Niger ranks 174th out of 179 countries ranked, making it is one of the poorest countries in the world. The country is sometime politically unstable. Uranium production and agriculture/pasturage are the economic pillars, but these tend to depend on climate or resource prices resulting in an unstable economy. Uranium exploration and mining, which commenced in 1970, is undertaken by foreign companies licensed by the government.

Côte d'Ivoire and Burkina Faso maintain a close relationship, with landlocked Burkina Faso strongly dependent on Côte d'Ivoire for its exports and imports.<sup>6</sup> Many Burkina Faso nationals work on coffee farms in Côte d'Ivoire. Thus, the economy of Burkina Faso has been seriously affected by the Côte d'Ivoire crisis commencing in 2002. For this reason, Burkina Faso participated in efforts to resolve this domestic conflict as well as other conflicts in its neighboring countries. In 2007, the Ouagadougou Agreement was concluded by the mediation of the president of Burkina Faso in an effort to bring an end to the Ivoirian crisis. For Niger, Côte d'Ivoire is an important trading partner with its goods transported via Burkina Faso. At the same time, Côte d'Ivoire plans to strengthen intra-regional trade with the member countries of UEMOA and ECOWAS.

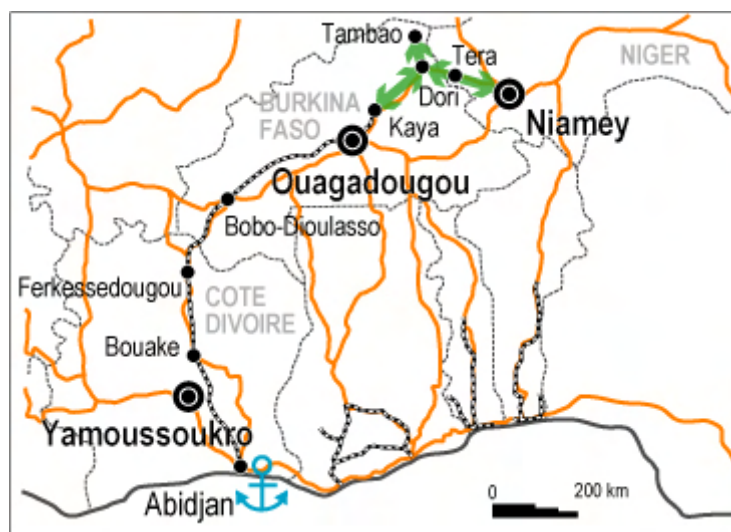
## **(2) The Corridor**

The starting/end point of this corridor is the Port of Abidjan and road and railway access is available to Burkina Faso, Mali, and Niger. The maintenance level of the road and railway is relatively high compared with the level along other corridors in West Africa. After the crisis in Côte d'Ivoire commenced in 2002, railway cargo transport decreased to less than half of the original transport volume, but it began to recover in 2009. Although maintenance is undertaken with limited resources, transport capacity is insufficient to meet demand due to deteriorated railway track and a lack of operable rolling stock. Since road transport is more expensive than railway transport due to the customs escort fees and informal payments demanded by rebellious troops, railway transport is preferred and railway traffic is expected to increase.

There is a 1,145 km railway line between Abidjan–Ouagadougou serving both cargo and passengers managed by Sitarail in Côte d'Ivoire and Burkina Faso. In Côte d'Ivoire, there is a line of about 660 km connecting Abidjan–Ouagadougou–Border, while there is a line of about 485 km in Burkina Faso connecting Ouagadougou–Niangoloko–Border and another line of 103 km between Ouagadougou and Kaya (however, the operation of this stopped in 2003). A feasibility study of new construction for a Kaya–Dori–Niamey section and a Dori–Tambao section (see Figure 7-3) is being undertaken by ECOWAS (with EU assistance). The present state of infrastructure management by Sitarail is described in detail in Section 5.3.3.

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<sup>6</sup> Imports from Côte d'Ivoire represent about 25% of Burkina Faso's total imports (2005).



**Figure 7-3 Map of the Abidjan–Ouagadougou–Niamey Corridor  
Showing New Lines (in green) Under Study by ECOWAS with EU Assistance**

### **(3) Characteristics of the Corridor and Priority Assistance Fields**

In terms of the definitions presented in Section 6.3, the Abidjan–Ouagadougou–Niamey Corridor plays an important role for both intra-regional and inter-regional trade. For intra-regional trade, there are many exports of live animals from Burkina Faso to Côte d'Ivoire. In terms of inter-regional trade, both countries import fuel, food, and light industrial products. Burkina Faso exports cotton and gold while Côte d'Ivoire exports cocoa, coffee, wood, oil, bananas, pineapples, and coconut oil. Among inter-regional export products, gold is exported via air. However, from the point of view of surface transport distance, it is preferable to use railway transport for other inter-regional export products. Among the inter-regional export products of Côte d'Ivoire, fruits such as bananas and pineapples are very suitable for road transport. Furthermore, a manganese mining project is being studied in the northern region of Burkina Faso. In the point of view of inter-regional trade, the large trade in live animals in the border areas could benefit from not only road transport improvement, but also the implementation of a one-stop border post.

With this background, the improvement of both the road and railway is necessary for providing adequate surface transport. Along with port improvements, it is also necessary to prioritize the implementation of institutional and other “soft” infrastructure improvements such the introduction of single windows, a tracking system for transit cargo, and one-stop border posts.

### **(4) Port Improvement Issues**

The Port of Abidjan is “a transit port located on a regional corridor having a conventional container terminal of the landlord type” belonging to the port class B, which also includes the Port of Dakar. This type of port still uses old facilities, so it is necessary to formulate a master plan including the development of the port hinterland and connection to road transport networks. In addition, it is necessary to carry out a feasibility study of priority projects in the master plan. If there is significant facility deterioration, emergency improvement or rehabilitation measures will be required. Efficiency improvements for customs clearance and cross-border procedures are required to reduce the transport cost to landlocked countries. In this group, priority should be given in the following order: (i) assistance for master plans and feasibility studies, (ii)



assistance for emergency improvements and rehabilitation, and (iii) assistance for efficiency improvements in customs clearance.

## **(5) Railway Improvement Issues**

Sitarail is of the “type of railway operated along a regional corridor, covering two or more countries, with a traffic volume of about 1-2 million tons and a PPP already introduced”, i.e., Type G2 railway group. With this traffic volume, Sitarail can perform rehabilitation of its aging/deteriorated railway facilities with its own resources to some extent. For the rehabilitation work that Sitarail cannot perform on its own, development partner assistance to supplement its scarce funds is desirable. For example, development partner financial assistance by which the government (e.g., a railway asset management public corporation) purchases rails, and the concessionaire rehabilitates the track, using the rails purchased by the government, may be possible. Then, development partners would provide assistance for the priority measures, including (i) measures to reduce rolling stock shortages and (ii) expansion of container transport capacity.

The Côte d’Ivoire and Burkina Faso railways were constructed by France during the colonial era. After independence, both railways were administered as national railways. In 1994, the first concession contract was concluded with Sitarail as the concessionaire and railway management commenced in August 1995. According to the contract, the railway infrastructure and rolling stock belonged to the two governments and only the management was entrusted to Sitarail for a period of 15 years until 2010. A total of 67% of Sitarail stock is held by several private sector companies. The Bollore group, a French-based company, owns more than 50% of this private capital. Through three contract revisions, the PPP scheme is now a rehabilitate-lease or rent-transfer (RLT) concession contract with still 20 years until the expiration of the contract in 2030.

Sitarail operates railway transport for both passenger and freight between Abidjan and Ouagadougou (1,145 km). Although the transport volume was 510,000 in 1996 immediately after the start of the concession, it reached 880,000 tons in 2000 and 1.01 million tons in 2001. The company earned CFA 2 billion in profit in 2000. However, the Ivorian crisis in 2002 led to a reduction in freight traffic to/from the affected region. The progress from the mid-1990s to the early 2000s was followed by a decrease in traffic to 870,000 tons in 2002 and 180,000 tons in 2003. Although an increase was observed in 2006 (810,000 tons) and 2007 (910,000 tons), traffic decreased thereafter due to the global economic crisis commencing in 2008. Traffic is now increasing again and is expected to reach 1.01 million tons in 2010.

A railway investment fund including monies from the two governments has been established. The fund is managed by a commission consisting of the Ministries of Finance and Transport of the two governments, and SOPAFER-B (the railway asset management corporation established by the Government of Burkina Faso) and SIPF (the railway asset management corporation established by the Government of Côte d’Ivoire), which provides technical advice. As mentioned in Chapter 5, this fund is to be operated and managed by a “roundtable” group. Regarding fund management, Sitarail is to include the cost of upgrading of infrastructure and equipment in its annual budget and the roundtable group (with regular meetings four times per year) to prepare the budget, with budget execution left to Sitarail, including procurement through competitive bidding. Thus, Sitarail has been able to access the infrastructure upgrading fund but its profit ratio remains low. To address this situation, the upgrading of infrastructure and replacement of equipment with public funds is desired. It is expected that an agreement will be reached by the countries on a Common Vision clearly specifying the sharing of responsibility between the governments. However, securing funds is likely to be difficult.

Railway issues in Côte d’Ivoire and Burkina Faso include the following:

- The railways form a corridor connecting Côte d'Ivoire and landlocked Burkina Faso, which creates competition with other transport modes along the corridor. Hence, the railways must increase their investment in infrastructure in order to increase their transport volume and to be competitive.
- Although Sitarail strives to maintain its track, slopes, and side ditches, without sufficient financial support, its railway facilities are deteriorating, requiring urgent rehabilitation. Since the rails between Ouagadougou, Bobo-Dioulasso, and the border are not only light weight at 30 kg/m but also more than 55 years old, replacement will be necessary in the near future.
- Although a Railway Investment Fund has been established and is operational for improvement and rehabilitation of entire railway infrastructure, the cost is estimated to be several billion CFA. However, it is difficult to secure these funds without the assistance of international development partners.
- At present, there are 30 locomotives of which only 20 are operable and active. There are 949 freight wagons of which 874 are operable and active. This rolling stock is insufficient to accommodate the transport demand, resulting in a cargo queue for railway transport at the Port of Abidjan.
- It is necessary to increase the efficiency of maintenance activities through the modernization of rolling stock workshops.
- Since the signaling system is not in operation and this may lead to serious safety problems, immediate action is necessary.
- Containerized transport has been increasing in recent years and therefore expansion of container transport capacity is necessary.
- Although there are limitations due to the single track, there is ample scope for increasing the transport volume by making various railway system improvements in parallel, e.g., improvements in railway infrastructure, rolling stock, service systems, and the train operation system.
- It is necessary to educate/train the staff to improve skills.

## **(6) Issues Concerning Improvements in the PPP Regulatory Framework**

Burkina Faso and Côte d'Ivoire do not have laws for PPP implementation covering all sectors such as the Senegal BOT Law. According to the Ivorian Center for the Promotion of Investment (CEPICI, from the French acronym), PPPs can be implemented under the existing investment law, with regulations and the content of contracts negotiated between the parties. Departments called "Entreprise publique étatique nationale à caractère (EPEN)", created in many ministries, are in charge of PPP projects. In Burkina Faso, PPP projects can be carried out in accordance with the agreements and the decisions of the Cabinet Office; the content of contracts can also be defined by the parties, similar to the case of Côte d'Ivoire. Since the countries do not have a department for PPP projects or for their promotion, the establishment of such a department is recommended by UEMOA.

Although both countries allow for concessions to the private sector under existing laws and regulations, regulatory framework improvements covering all PPP projects are warranted. At present, there is no independent inspection organization covering all sectors, nor is there project monitoring, a sharing of lessons learned, and the promotion of implementation.

Although PPP projects in the countries' transport sectors concern only railways (Sitarail) and ports (Côte d'Ivoire) at present, PPPs are expected for airport construction (Burkina Faso) and toll highways (Côte d'Ivoire). Since PPP transport infrastructure projects are expected to increase in the countries, it is necessary to assess PPP implementation in detail within existing laws and regulations (e.g., whether a specialized law is necessary or not) as well as the establishment of a special department for PPPs and an inspection organization.



## **(7) Trade Facilitation Issues**

Côte d'Ivoire is now in the process of introducing a single window system at the Port of Abidjan. A public corporation called APS NET has been established for this purpose. However, many issues remain, such as the enactment of laws and regulations for single window operation as well as the preparation of telecommunications network infrastructure for information management and computer/hardware and IT staff training. In addition, since the present single window covers only procedures at the Port of Abidjan, its expansion to other Ivoirian ports and border crossings is desirable.

Burkina Faso has not implemented any concrete single window projects. However, with assistance from the World Bank, AfDB, and the EU, it has undertaken capacity building for the simplification of procedures and process adjustments aimed at improving customs clearance efficiency. Also, the GC Net system introduced already in Ghana is planned to be introduced in Burkina Faso and a delegation was sent to Ghana recently to promote this project. Currently, export and import cargo in Burkina Faso requires 11 different documents. In view of these complicated procedures, emergency implementation of a single window is recommended.

Concerning transit road transport from ports to landlocked countries, there are various problems related to customs escorts, checkpoints, and corruption. In Côte d'Ivoire, cargo for road transport from the Port of Abidjan is required to be escorted by paid customs officers within areas controlled by the government. The cost for this service is CFA 100,000 per truck. If and when a truck crosses into areas controlled by rebels, there are many checkpoints operated by the rebellion forces that conduct cargo checks and extort illegal payments from drivers. Transport security is a problem in these areas held by rebels. Although addressing this political instability problem is important, it is also necessary to abolish the customs escort system in the government-ruled areas ruled by implementing a GPS tracking (traceability) system, which will increase cargo transport security.

As for axle weight regulations, regulations according to the UEMOA standard were adopted in March 2010 in the concerned countries along the corridor.

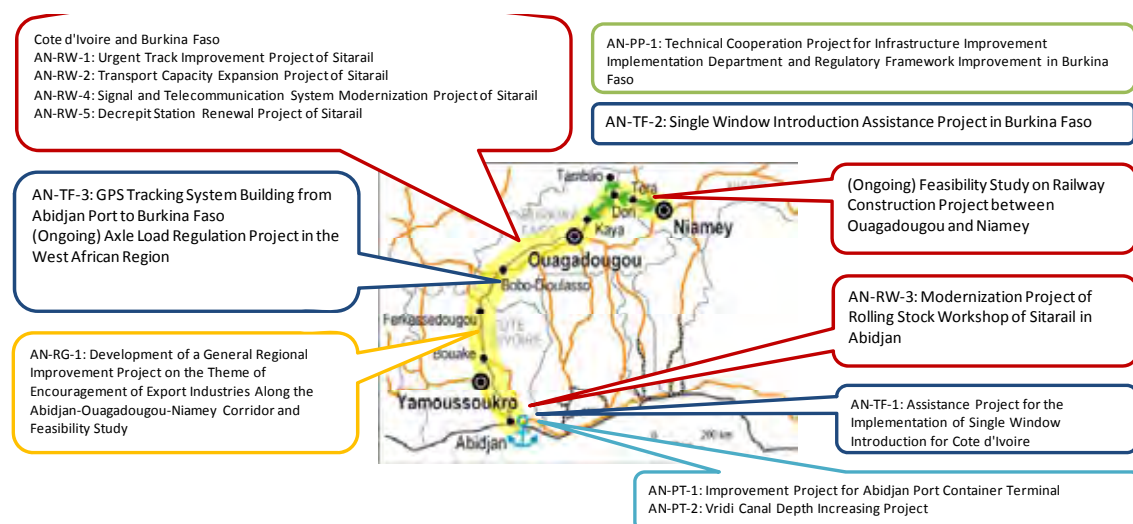
## **(8) Pilot Assistance Program**

Table 7-4 and Figure 7-4 present the pilot assistance program for the Abidjan–Ouagadougou–Niamey Corridor.

**Table 7-4 Pilot Assistance Program  
for Abidjan–Ouagadougou–Niamey Corridor Improvement**

Code	Project Name	Type of Assistance	Implementing Agency
<b>Regional Development Project</b>			
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)
<b>Port (including Trade Facilitation) Development Projects</b>			
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

Code	Project Name	Type of Assistance	Implementing Agency
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
<b>Railway Development Projects</b>			
AN-RW-1	Urgent Track Improvement Project for Sitarail (assistance for the procurement of rail) in Côte d'Ivoire 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
AN-RW-3	Modernization of Rolling Stock Workshop Project for Sitarail in Abidjan, Côte d'Ivoire	Technical Cooperation, Financial Assistance (Loan/Grant Aid)	SIPF, Sitarail
AN-RW-4	Signaling and Telecommunication System Modernization Project for Sitarail in Côte d'Ivoire 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'Ivoire 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	
<b>Assistance for the Legal System Related to PPP Development</b>			
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
<b>Other Trade Facilitation Projects</b>			
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 7-4 Map of Abidjan–Ouagadougou–Niamey Corridor Improvement Pilot Assistance Project**

### **7.3.2 Regional Development Project: 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**

This regional development assistance project will analyze the present state and problems for infrastructure improvement in various sectors (e.g., transport, electric power, telecommunications) for resource development and industry creation along the Abidjan–Ouagadougou–Niamey Corridor.

The Abidjan–Ouagadougou–Niamey Corridor extends from Côte d'Ivoire to Burkina Faso and Niger with a total length of about 1,650 km. With the Port of Abidjan as the gateway, this corridor consists of roads and railways (Sitarail) inland. The port and border crossings in the corridor were closed for a long time due to the Ivoirian crisis dating back to 2002, resulting in a significant decrease in inland cargo (to/from Mali and Burkina Faso). However, the landlocked countries depend on this corridor as an intra-regional and inter-regional freight channel and recent relative political stability has led to transport volumes reaching levels obtained before the crisis. The existing railway lines have been rehabilitated and a feasibility study of the Ouagadougou–Niamey section has been conducted with EU assistance. However, an imbalance between imported and exported freight has led to increased freight transport costs, with road transport serving demand in only one direction. However, mineral resource development is in progress in Burkina Faso and Niger and there is potential for an increase in agricultural production (e.g., cotton), which will allow for the promotion of export industries in the region. For this purpose, strategies for general regional development will be prepared and feasibilities of major projects will be examined, specifically focusing on the facilitation of export industries in parallel to regional freight transport corridor infrastructure improvements. Implementation of this project would improve the sustainability of transport investment, and enhance the economic development of Abidjan–Ouagadougou–Niamey corridor.

### **7.3.3 Port Development Projects**

#### **(1) AN-PT-1: Project to Improve the Port of Abidjan Container Terminal**

This project aims at promotion of railway transport by developing a railway container terminal at Abidjan Port.

In the Port of Abidjan, the handling volume at the existing terminal is nearing its capacity. An Anglo-Dutch consortium signed a BOT contract for construction of a new container terminal in Locodjoro with operation for 30 years commencing in September 2000 with financial assistance from AfDB. Meanwhile, taking into account the access difficulties in West African ports for large container ships of more than 2,500 TEUs to enter, the public port corporation of Abidjan (Port Autonome d'Abidjan, PAA) has decided to construct a new port on Boulay Island located in Ébrié Lagoon.<sup>7</sup> PAA has commenced a large-scale port expansion project including expansion of the container terminal on Boulay Island (Île Boulay). The first stage of the plan includes the construction of a container terminal with a water depth of 15 m and quay length of 600 m by 2012.

A new bridge will be constructed to connect Boulay Island and the city. However, the connection to the railway, which is an important link for the Abidjan–Ouagadougou–Niamey Corridor as well as for Locodjoro and Ile Boulay, has not been studied sufficiently. Therefore, railway container terminals including construction of sidetracks have to be planned and constructed in adjacent to the existing and planned container terminals of the port. Planning of the railway should be consistent with the new port development and concession contract

Reducing transport cost of transit cargos and lowering commodity price in Mali and Burkina Faso, the project is expected to contribute to economic development of these countries.

#### **(2) AN-PT-2: Project to Increase the Depth of Vridi Canal**

The purpose of this project is to increase the depth of Vridi Canal, to allow large-scale ships to access the port and to reduce container transport costs.

Vridi Canal, which provides access to the Port of Abidjan, currently has a water depth of 11.5 m. The new container terminal on Boulay Island has a water depth of -15 m and is planned to accommodate large container ships. As it is necessary to increase the water depth so that the calling of large vessels is not limited by tides, PAA plans the canal deepening from existing - 11.5 m to -15.0 m.<sup>8</sup>

Enabling large container ships to enter the port, reducing the maritime container transport cost, reducing commodity price of Côte d'Ivoire, Burkina Faso and Mali and promoting the competitiveness of export commodities, the project can contribute to economic development of these countries.

### **7.3.4 Railway Development Projects**

#### **(1) AN-RW-1: Urgent Track Improvement Project for Sitarail (Assistance for the Procurement of Rail) in Côte d'Ivoire and Burkina Faso**

This project will urgently supply rail in order to assist Sitarail in improving its railway infrastructure. Although Sitarail has worked toward improving all aspects of its entire railway infrastructure, the total cost is estimated to be of the order of CFA several billion.

<sup>7</sup> The groundbreaking was held in June 2008.

<sup>8</sup> The present state requires confirmation.

The rails between Abidjan and Ouagadougou are light weight of 30/36/37 kg/m and are more than 55 years old. Track maintenance conditions are good compared to those of Transrail. However, the rails will soon reach the end of their useful economic life. Since some rails are extremely worn out, their rehabilitation/replacement is urgently required. Although Sitarail has strived to maintain tracks, slopes and side ditches, without sufficient financial resources, its railway facilities are being deteriorated gradually, making the rehabilitation works an urgent issue.

**(2) AN-RW-2: Transport Capacity Expansion Project for Sitarail (Assistance for the Procurement of Rolling Stock) in Côte d'Ivoire and Burkina Faso**

The project will assist Sitarail in procuring 5 locomotives and 200 wagons in order to alleviate its shortage of rolling stock. Although Sitarail is interested in increasing its rolling stock, its transport volume has not been sufficient to justify such a large-scale investment.

Sitarail of Côte d'Ivoire and Burkina Faso manages railway freight transport operations between Abidjan–Ouagadougou. It operates about 20 locomotives (with 30 in its possession) 874 wagons (with 949 in its possession), but these cannot accommodate the transport demand, resulting in a cargo queue for railway transport at the Port of Abidjan. An increase in Sitarail's rolling stock will allow it carry large volumes and thereby gain customer confidence. Also, unit transport costs can be reduced by increasing transport volume (with increased revenue) by augmenting rolling stock. Because increasing the operating rate of rolling stock with modernization/improvement of rolling stock workshops or education/training of railway staff will take time, this short-term transport capacity expansion project (assistance for rolling stock procurement) is important.

**(3) AN-RW-3: Modernization of Rolling Stock Workshop of Sitarail in Abidjan, Côte d'Ivoire**

The rolling stock workshop at Bobo-Dioulasso, in Burkina Faso is the second largest among the rolling stock workshops of Sitarail, and is able to overhaul and manufacture wagons and coaches. This workshop can carry out small repairs and maintenance of locomotive bogies and engines, but it cannot overhaul locomotives. A large-scale rolling stock workshop, located at Abidjan, is capable of overhauling locomotives. Compared with those of Transrail, conditions at these workshops are fairly good, but the facilities are poor and obsolete, and efficient maintenance cannot be undertaken. Therefore, modernization of the rolling stock workshop at Abidjan, Sitarail's largest rolling stock workshop, is necessary.

**(4) AN-RW-4: Signaling and Telecommunication System Modernization Project for Sitarail in Côte d'Ivoire and Burkina Faso**

The project will modernize the signaling and telecommunications system of Sitarail, thereby contributing to safe and reliable operation of the railway. Sitarail does not have a concrete concept for modernization of signaling and telecommunication system at present. There is no interlocking system between the signaling system and turnouts and the turnouts are operated manually, resulting in a safety problem. Without the interlocking system between traffic lights and turnouts properly integrated with the signaling and telecommunication system, the stationmasters in a blocked section have to communicate with each other before allowing trains to depart. As there are few train services currently, the priority of this project is not high. However, if transport volume growth leads to an increase in the number of trains in operation, this project will be essential to ensure the safety of railway transport service.

#### **(5) AN-RW-5: Renewal of Deteriorated Stations of Sitarail in Côte d'Ivoire and Burkina Faso**

This project will improve service by remodeling deteriorated station buildings. Sitarail does not yet have any concrete plans for station remodeling.

Sitarail operates three return trains per week for passenger transport between Abidjan–Ouagadougou with a volume of 500,000 in 2008. Freight transport volumes between Abidjan–Ouagadougou were 812,000 tons in 2006, 907,000 tons in 2007, and 830,000 tons in 2008. Some deteriorated station buildings were observed during the site survey conducted along the railway line. Although the remodeling of cargo handling stations can wait until it is absolutely necessary, it is important to supply good service by remodeling deteriorated stations serving passengers.

#### **(6) Feasibility Study of Railway Construction Project between Ouagadougou and Niamey (Ongoing)**

This feasibility study concerns the rehabilitation of the track between Abidjan–Ouagadougou–Kaya with a precondition of 1,260 km standard gauge as well as construction of a railway between Kaya–Dori–Tera–Niamey. The study is to include traffic demand forecasting, economic and financial analysis, environmental impact assessment, social impact assessment, preliminary design, and legal/institutional analysis. Agreements to facilitate trade between Côte d'Ivoire and Burkina Faso will be reviewed and the possibility to apply them to Niger will be assessed. The study will further include examination of the institutional changes necessary to allow the three concerned countries to own a single railway company similar to Sitarail to carry out the management and implementation of freight transport along the corridor linking the three countries.

ECOWAS and UEMOA are carrying out a feasibility study of the 1,646 km long section between Abidjan–Ouagadougou–Niamey with EU assistance.<sup>9</sup> There is an existing railway line between Abidjan–Ouagadougou with train service operated by Sitarail. Although there is also an existing line between Ouagadougou–Kaya, no train service is in operation. Partial construction is being carried out between Kaya and Dori (about 100 km). The construction of this line was commenced in 1980 due to anticipated manganese exploitation, but then was stopped.

#### **(7) Assistance Project for PPP Regulatory Framework: AN-PP-1: Technical Cooperation Project for Infrastructure Improvement Implementation Department and Regulatory Framework Improvement in Burkina Faso**

The project aims at promoting smooth implementation and operation of PPP infrastructure projects by means of establishing a special department in the government organization. Simultaneously, the project aims to improve PPP regulations (including a study on the modification of existing laws and regulations) concerning all the sectors including the infrastructure sector and to build a legal base allowing for simplified legal procedures at the PPP project implementation stage.

Although the relevant ministries and regional communities (ECOWAS and UEMOA) understand the importance of PPP promotion in the practice of future infrastructure improvement projects, a special department for project promotion, plan formulation, coordination of different actors or implementation inspection is yet to be established. Furthermore, legal improvements encompassing all PPP projects have not progressed in Burkina Faso. PPP projects within the framework of the present railway concession (Sitarail) are

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<sup>9</sup> Technical Study on the B2 Railway Route Abidjan–Ouagadougou–Kaya–Niamey: West Africa/Côte d'Ivoire–Burkina Faso–Niger.

managed by the modification of existing laws and regulations. As for PPP railway concession projects in progress, railway management suffers from the obscurity of contract contents, lack of consultation from different parties, the absence of an inspection organization, and more. Therefore, the creation of a special department within the government organization is required to promote and elaborate the plans to improve relevant laws and regulations and to establish an independent inspection organization is necessary.

Implementation of this project is expected to reduce the financial burden of the public sector on infrastructure improvements and improve efficiency of management. Entry of the private sector will stimulate the regional economy. The versatility of such a scheme along with the lessons obtained will be transferred to other Sub-Saharan countries.

### **7.3.5 Other Freight Transport System Improvement Projects**

#### **(1) AN-TF-1: Project for Assisting the Introduction of a Single Window in Côte d'Ivoire**

This project aims at assisting the introduction of a Single Window in Côte d'Ivoire. The Port of Abidjan is the main international port in West Africa, serving not only the intra-regional trade of Côte d'Ivoire, but also the transit cargo of the neighboring landlocked countries of Burkina Faso and Mali. However, cargo dwell times are more than 12 days at Abidjan, due to complicated port procedures involving many organizations, as is the case in other ports in West Africa. It is necessary to improve port procedures in order to reduce the long dwell times and reduce export and import costs borne by the trading community.

To respond to these issues, Côte d'Ivoire is in the process of introducing a single window system. Abidjan Port Synergy Network (APS Net), a public corporation, established for the purpose of simplifying port procedures, has commenced single window operations. With the adoption of a single window, cargo information will be inputted into the Sydam World customs software and the Port Activity Management System's (SYGAP) port cargo management software. APS Net intends to hire 40 full-time staff to manage the single window. However, there are a number of issues regarding the practical use of the single window, which were addressed in the Comparative Feasibility Study on the Development of Single Windows in the Main Ports of the Abidjan-Lagos Corridor (2009, World Bank/ECOWAS/PADECO).

#### **(2) AN-TF-2: Project to Introduce Single Windows in Burkina Faso**

This project aims at assisting the introduction of Single Windows in Burkina Faso. According to the World Bank, import and export cargo in Burkina Faso requires 11 documents each, increasing the time and costs for traders. Accordingly, it is necessary to make import and export procedures in the country more efficient, by reducing the number of documents required, reducing border crossing time, reducing the time for customs clearance at the final point in the dry port, and finally to shorten delays caused by procedural errors. At present, no concrete projects have been implemented in Burkina Faso to introduce a single window, but capacity building for procedural simplification and process improvements is currently underway with AfDB and EU assistance. Burkina Faso has planned to adopt the GCNet system already introduced in Ghana, and they dispatched a delegation recently to Ghana for this purpose.

#### **(3) AN-TF-3: Development of a GPS Tracking System from the Port of Abidjan to Burkina Faso**

This project aims at assisting the development of a GPS Tracking System from the Port of Abidjan to Burkina Faso. Although transit traffic decreased due to Ivorian political instability commencing in 2002, the Port of Abidjan retains a large share of the transit cargo market since it is centrally situated to serve the export and import transit traffic of the landlocked countries of

West Africa. On the other hand, the transport costs and risks for cargo transported between the Port of Abidjan and the landlocked countries are increasing, with costly customs escorts required in Côte d'Ivoire and Burkina Faso, as well as security issues outside of the areas in Côte d'Ivoire ruled by the Ivorian government. Under this project a GPS transit cargo transport tracking system will be installed in container trucks to reduce the transport costs by making customs escorts unnecessary and reducing risks in non-government-controlled areas. While such a cargo tracking system has not yet been implemented by the governments along the corridor, automatic cargo tracking is now under development by APS Net within the framework of single window system.

#### **(4) Axle Load Regulation Project in West Africa (Ongoing)**

As noted, pavement damage caused by overloading is a big problem in West Africa. Road life is often reduced by half due to overloading, thereby increasing road maintenance costs. In addition, transport costs are increased because of the reduced speed of trucks. Although policies against overloading have been established by the countries and RECs, axle load standards vary across countries. However, the application of different axle load standards makes it difficult to apply broad-based controls, and as a consequence freight must be transshipped at national borders.

As a response to this issue, also as noted, regional measures were taken in West Africa more than 10 years ago under the auspices of ECOWAS and UEMOA. Three countries with weighbridges (Ghana, Niger, and Mali) started to apply this regulation in advance of other UEMOA countries. However, since this regulation has not yet been applied in other countries in West Africa (full adoption is scheduled for 2011), transporters tend to use corridors or ports in countries where there is no such regulation in order to reduce costs. In order to ensure a "level playing field" (especially between the road and railway modes), it is important to implement axle load controls on a (sub)regional basis. Since the implementation of the UEMOA axle load regulation is expected, there are many issues to be resolved such as the strengthening of weighbridges and other related facilities in order to realistically and efficiently implement the regulation. This project is expected to reduce the damage caused by overloaded trucks, and improves efficiency and sustainability of road sector investments. It also assures faire competition between road and railway transport.

### **7.3.6 Prioritization of Abidjan–Ouagadougou–Niamey Corridor Projects**

The prioritization of Abidjan–Ouagadougou–Niamey Corridor projects is presented in Table 7-5.

**Table 7-5 Prioritization of Abidjan–Ouagadougou–Niamey Corridor Improvement Projects**

Code	Project	Priority Assessment
<b>Regional Development Project</b>		
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	Since corridor land transport generally has demand in only one direction to serve, from Côte d'Ivoire to Burkina Faso, freight transport costs are higher. However, mineral resource development is ongoing in northern Burkina Faso and near the border with Niger. Also, there is potential for increased agricultural production (e.g., cotton), allowing for the promotion of export industries. For this purpose, it is recommended to develop a regional improvement strategy for the corridor and encourage export industries in parallel to the development of the regional freight transport corridor.



Code	Project	Priority Assessment
<b>Ports (including Trade Facilitation) Development Projects</b>		
AN-PT-1	Project to Improve the Port of Abidjan Container Terminal	This is a high-priority project to reduce port traffic congestion, promote railway transport, and facilitate transit cargo.
AN-PT-2	Project to Increase the Depth of Vridi Canal	Increased depth is necessary to allow the access of large ships, which will reduce costs; accordingly, the construction of a container terminal with increased water depth on Boulay Island has high priority.
<b>Railway Development Projects</b>		
AN-RW-1	Urgent Track Improvement Project for Sitarail (assistance for the procurement of rail) in Côte d'Ivoire and Burkina Faso	Although Sitarail has strived to maintain its track, slopes, and side ditches, these facilities are deteriorating due to a lack of financial resources. The deteriorated or worn rails should be replaced urgently.
AN-RW-2	Transport Capacity Expansion Project for Sitarail (assistance for the procurement of rolling stock) in Côte d'Ivoire and Burkina Faso	Since an increase in rolling stock can increase transport capacity and reduce transport costs per unit transported, this project has a high priority.
AN-RW-3	Modernization of Rolling Stock Workshop of Sitarail in Abidjan, Côte d'Ivoire	Sustaining rolling stock quality is essential in order to ensure transport safety, reliability, and high-speed service. However, implementation is difficult without an improved capability for rolling stock maintenance. The implementation schedule shall be decided according to the increase in rolling stocks reflecting transport trends as well as staff training progress.
AN-RW-4	Signaling and Telecommunication System Modernization Project for Sitarail in Côte d'Ivoire and Burkina Faso	If transport volume increases, the introduction of a signaling system will be essential for safety. Therefore, this project should be carried out, taking into account priority issues such as track rehabilitation and the need to increase rolling stock.
AN-RW-5	Renewal of Deteriorated Stations for Sitarail in Côte d'Ivoire and Burkina Faso	It is important to remodel the deteriorated station buildings for passengers to provide a higher level of service. However, since this project is not so pressing, the timing of its implementation period should be decided depending on the progress of other priority projects.
(Ongoing)	Feasibility Study of Railway Construction Project between Ouagadougou and Niamey	As noted, this project is ongoing.
<b>Assistance for the Legal System Related to PPP Development</b>		
AN-PP-1	Technical Cooperation Project for Infrastructure Improvement Implementation Department and Regulatory Framework Improvement in Burkina Faso	The smooth implementation of PPP infrastructure projects and the application of PPPs to other projects should be accompanied with the establishment of a specialized department in the government, the enactment of a proper law, and the creation of an inspection organization in Burkina Faso. Intermediate and long-term term measures should be taken.
<b>Other Trade Facilitation Projects</b>		
AN-TF-1	Project for the Implementation of a Single Window in Côte d'Ivoire	Taking into account the ongoing introduction of a single window, it is preferable to commence this assistance project very soon.
AN-TF-2	Project to Introduce a Single Window in Burkina Faso	The implementation of this project will be more efficient with the introduction of a single window in Côte d'Ivoire.

Code	Project	Priority Assessment
AN-TF-3	Development of a GPS Tracking System from the Port of Abidjan to Burkina Faso	Introduction of a GPS tracking system has synergies with the introduction/improvement of a single window.
(Ongoing)	Axle Load Regulation Project in West Africa	Already implemented, this project is expected to ensure a “level playing field” (fair competition) between railway and road transport. Mali implemented an axle load regulation in 2009, before the other countries. A temporary UEMOA standard has been applied from March to December 2010 and a final UEMOA standard is to be applied in the region beginning in 2011.

The priority port projects are as follows: (i) improving the Port of Abidjan railway container terminal and (ii) increasing the depth of Vridi Canal.

As for railway projects, the following project requires urgent/emergency implementation: (i) the rail supply project for Emergency Tract Improvement. The intermediate-term projects include: (ii) the project to increase transport capacity with the procurement of rolling stock, (iii) the signaling and telecommunications system modernization project, and (iv) the rolling stock plant modernization project. Long-term projects include: (v) the project to remodel deteriorated stations. Also, it is necessary to monitor the progress of the feasibility study of railway construction and rehabilitation for the 1,646 km Abidjan–Ouagadougou–Niamey section funded by the EU. Additional projects assisted by other development partners also should be closely monitored on a continuing basis.

