No.

The Research on the Cross-Border Transport Infrastructure: Phase 3

Final Report

March 2009

Japan International Cooperation Agency
PADECO Co., Ltd.
Mitsubishi UFJ Research and Consulting Co., Ltd

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PREFACE

In 2003, the Japan International Cooperation Agency (JICA) conducted the “Research on the Experience and Perspective of ODA on Infrastructure Development in the Developing Countries” in which the role of infrastructure was redefined and issues in infrastructure development for future JICA assistance were identified.

Based on this study’s results, two research studies were then conducted: (i) the “PPP (Public-Private Partnership) Project Study” in 2004 and (ii) the “Research on Program Management: Guide for the Application of P2M to JICA Activities”, from 2003 to 2005, with the aim of reducing the infrastructure gap and taking an integrated approach to infrastructure development. Since addressing cross-border infrastructure gaps was identified as one of the solutions to reducing infrastructure gaps, a Phase 1 research study on cross-border transport infrastructure was conducted from October 2005 to July 2006. It examined the progress of regionalization from a global perspective and summarized the major characteristics of cross-border transport infrastructure. JICA continued with a Phase 2 project, “Research on the Cross-Border Transportation Infrastructure: Targeting the GMS [the Greater Mekong Subregion of Southeast Asia]”, from November 2006 to December 2007, which examined current conditions, identified cross-border transport infrastructure issues, and assessed future directions for JICA assistance in this area.

As Phase 3 of this Cross-Border Transport Infrastructure research series, this study focused on Sub-Saharan Africa, a region where there is a great need to maintain and rehabilitate the cross-border infrastructure connecting ports and 15 landlocked countries. Discussions were held in five research group meetings, with Professor Tsuneaki YOSHIDA of the Department of International Studies, Graduate School of Frontier Sciences, University of Tokyo, as technical advisor. The research group consisted of staff from the Economic Infrastructure Development Department of JICA. This study sets out the analyses undertaken in this study of cross-border transport infrastructure in Sub-Saharan Africa, including a focus on the systems and infrastructure in East Africa. Based on these analyses, future directions for the area are presented.

The Study Team, led by Mr. Yuichiro MOTOMURA of PADECO CO., Ltd. of Japan , conducted field surveys, literature research in Japan, and discussions between the research group and relevant agencies, as well as a public symposium based on the study’s findings. The Team also prepared this report describing the study results.

I hope that this report will contribute to the improvement and enhancement of development assistance in Cross-Border Transport Infrastructure. To all those who cooperated and extended assistance to this study, I would like to express my sincere gratitude.

March 2009

Toshiyuki KUROYANAGI
Director General,
Economic Infrastructure Department
Japan International Cooperation Agency

Executive Summary

1. General Information on the Sub-Saharan Africa Region

Society and Economy

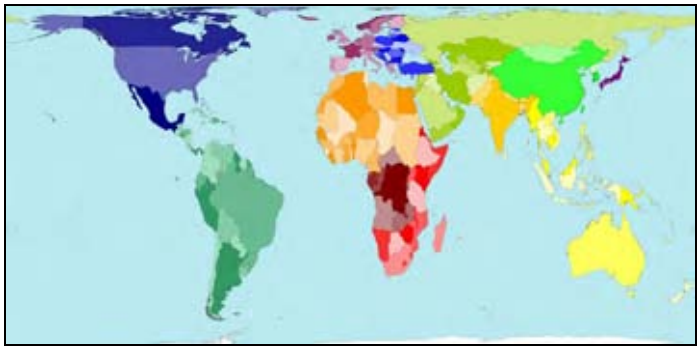


Figure 1.1 World Atlas (by area; 2006)

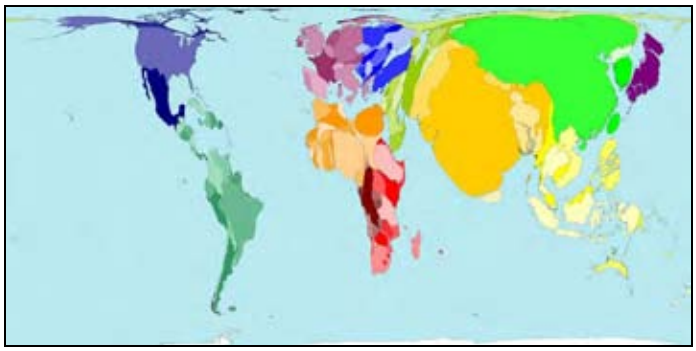
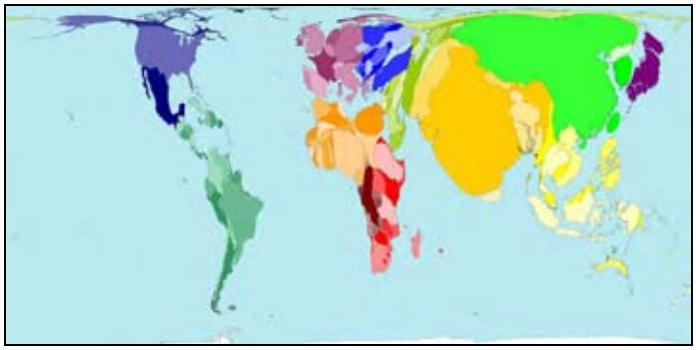
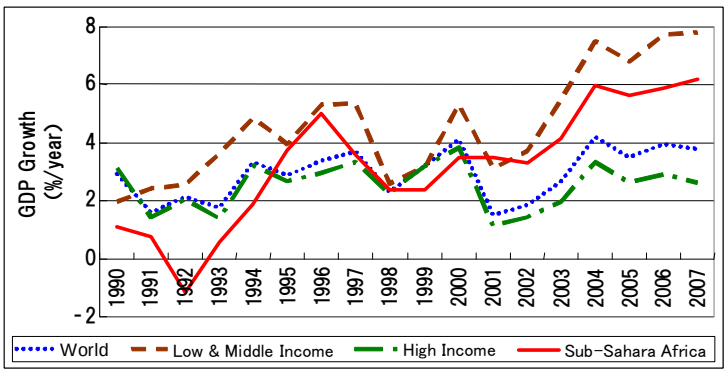


Figure 1.2 Relative Proportion of Population (2002)



Source: Figure 1.1–1.3 © Copyright 2006 SASI Group (University of Sheffield) and Mark Newman (University of Michigan)

Figure 1.3 Relative Proportion of Truck Ownership



Source: Study Team (Prepared from World Bank Data)

Figure 1.4 World GDP Growth Rate

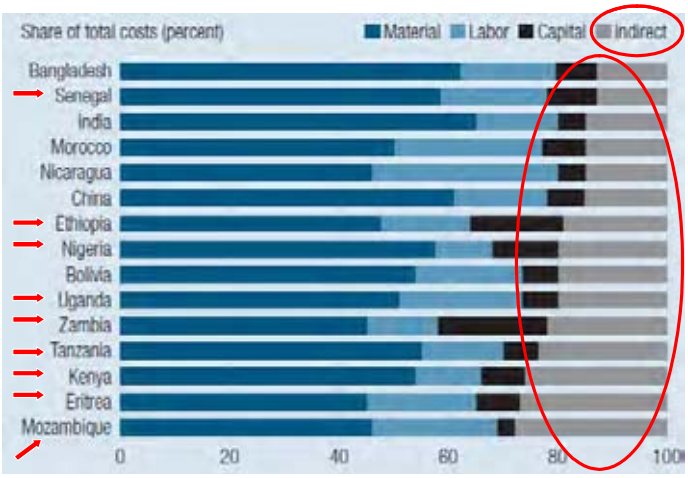
Sub-Saharan Africa is a collective name for the 48 countries in Africa excluding the five countries of North Africa. While Sub-Saharan Africa accounts for 18% of world's area (24.3 million km^2) and 12% of the world's population (799.8 million), its GDP is less than 2% (US$840 billion, 2007) of the world's total, and one-third is accounted for by South Africa. Sub-Saharan Africa's per capita GDP in 2007 was US$1,053, but if South Africa is excluded, the region's GDP is only US$752. About 400 million people—half of the region's total population—live in poverty and subsist on US$1.25 or less a day; 34 of the 48 poorest countries in the world are in Sub-Saharan Africa.

Infrastructure development in the region has been laggard and does not meet the transportation demand. For example, truck ownership ratios in Sub-Saharan Africa are very low as shown in Figure 1.3.

On a more positive note, since 2000 Sub-Saharan Africa has been achieving relatively stable economic growth. Since 2004 it has sustained annual growth rates as high as 6%, which translates into 3–4% per capita. This rapid economic growth is considered to be largely attributable to the surge in global prices of natural resources, which has also led to natural resource development in inland African nations. However, the sharp decrease in mineral resource prices caused by a reduction in speculative investing and decreasing demand for natural resources following the recent financial crisis is likely to dampen short-term economic growth in the region.

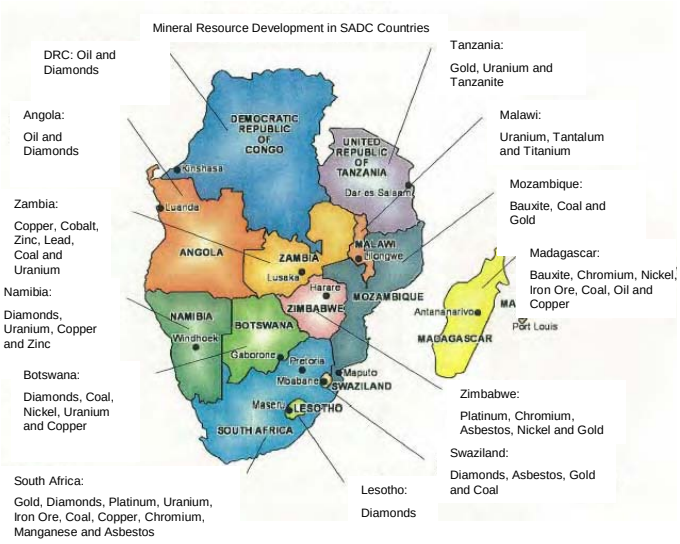
The World Bank has identified sound economic policy, a competitive exchange rate, improvements in governance and management, and declining conflict as major factors contributing to strong economic growth. It points out that in order to sustain rapid economic growth the region should further improve its investment environment, infrastructure, technology, and organizational capacity.

Trade and Industries



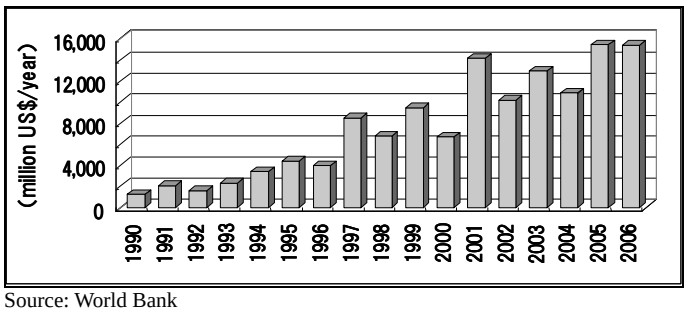
Source: World Bank, African Development Indicators 2007

Figure 1.5 Cost Composition of Private Companies in Sub-Saharan Africa and Other Parts of the World



Source: Conference for Ambassadors in Middle East Region, 2009

Figure 1.6 SADC Countries' Mineral Resource Deposits



Source: World Bank

Figure 1.7 FDI in Sub-Saharan Africa

A total of 20% of Sub-Saharan Africa's GDP is accounted for by agriculture, forestry, and fisheries, while mining accounts for 35% and the service sector for 45%; these percentages have not changed much over the past 40 years. Regarding trade structure, many countries in the region export primary commodities and oil/mineral resources, and import industrial goods. Their largest trading partners are typically their former colonial powers, but trade value with Asia has been increasing in recent years.

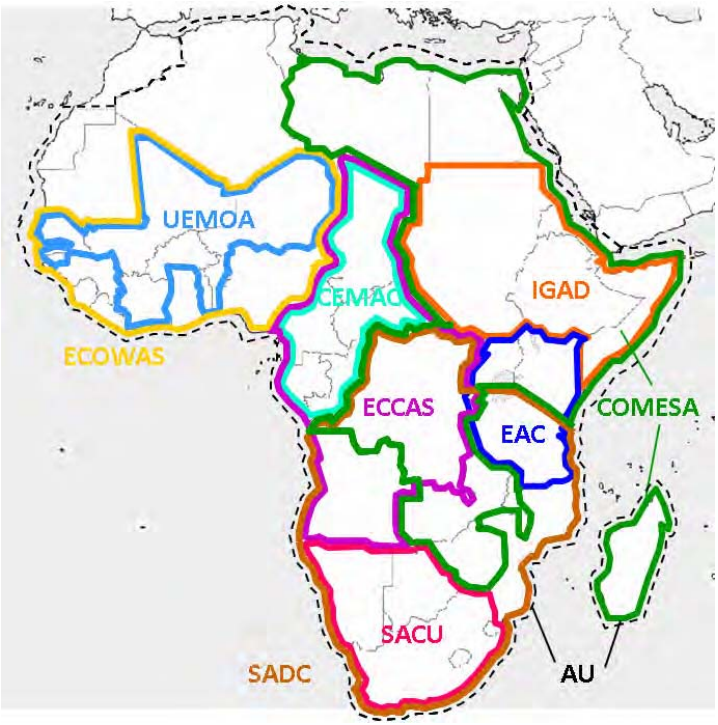
The major constraints on the region's industrial development are: (1) high overhead costs (e.g., cost for transportation, energy, security: Figure 1.5); (2) low agricultural productivity; and (3) high labor costs. The main factor inhibiting industrial development and economic growth in the region has been high transport costs. For example, the agricultural sector, which employs 60–70% of the region's working population, suffers from very low productivity due to high prices for imported fertilizer as a result of high transport costs. For example, average cereal production per hectare in Africa is 1.3 tons whereas in Asia it is 3.7 tons (2005).

Wage levels in urban areas are high due to high food prices and postcolonial policies that favor urban residents, and this has significantly impeded industrial promotion. As a result, capital-intensive industries (e.g., mining) rather than labor-intensive industries are playing a central role in the secondary sector.

As mentioned, high overhead costs, low agricultural productivity, and high labor costs have inhibited the region's economic development, but with the stabilization of political and economic conditions in recent years, oil- and mineral-related foreign direct investment (FDI) mainly from the European Union (EU) and China has been increasing (Figure 1.7). Sharp rises in the prices of natural resources such as oil and minerals has prompted the resource majors and juniors to rapidly step up their invenstment in natural resource development in inland countries (Figure 1.6). This trend also has had a significant ripple effect in stimulating domestic consumption and expanding non-natural resource investment opportunities.

Until recently, the spike in the global price of crude oil, coal, nonferrous metals, and rare metals had strongly driven an influx of FDI into inland African nations where natural resource investments had lagged before due to its prohibitive drilling/mining costs. Capital flight and declining demand caused by the global financial crisis last year has depressed global prices for natural resources. However, as the steady demand from the emerginig economies picks up, commodity prices are likely to return to a long-term upward trajectory.

Regional Integration/Regional Economic Community



Source: Study Team (prepared from a variety of references)

Figure 1.8 Regional Economic Communities (RECs) in Africa

In Africa, where national borders were established artificially by colonial policies according to which a number of small countries in terms of both economic scale and population were formed, interregional cooperation and integration has been a longstanding issue. As a result, numerous regional economic communities (RECs) have been established in the region. Major RECs are shown in Figure 1.8. Their aim is to integrate the economies of neighboring nations and promote the establishment of custom unions, introduction of a common currency, cross-border trading, and the creation of common markets. Some RECs also conduct research studies on transport corridors, e.g., assessing coordination of maintenance activities in different countries, and promoting the conclusion of various agreements to facilitate intraregional movements of people and goods.

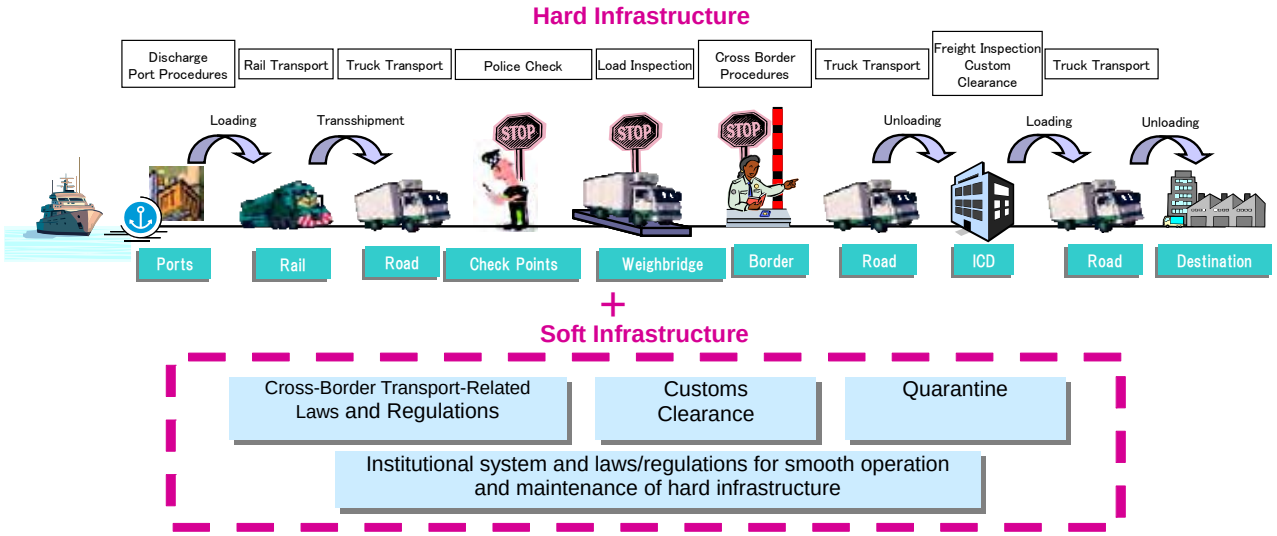
Recently, as these RECs have become more active, they have gained more international presence as recipients of donor assistance. On the other hand, most of these regional bodies are funded by their member states, and their decisions are not legally binding. They often face a number of challenges in promoting effective regional integration.

The African Union (AU), which is by far the largest regional community, includes all 52 states on the African continent except for Morocco.

2. Cross-Border Transport Infrastructure in Sub-Saharan Africa

What is Cross-Border Transport Infrastructure?

In this research study, CBTI is defined as the infrastructure required for transportation that crosses multiple national borders. It comprehensively includes physical "hard infrastructure" such as ports, railways, highways, cargo transshipment facilities, international border facilities, weighbridges (truck scales), and inland container depots (ICDs), as well as "soft infrastructure" such as transport laws/regulations related to border crossing (e.g., customs clearance, quarantine), and organizational systems and resources for smoothly operating and maintaining the hard infrastructure (Figure 2.1). This study aims at analyzing the current situation and issues regarding CBTI in Sub-Saharan Africa, and formulating a CBTI development strategy.



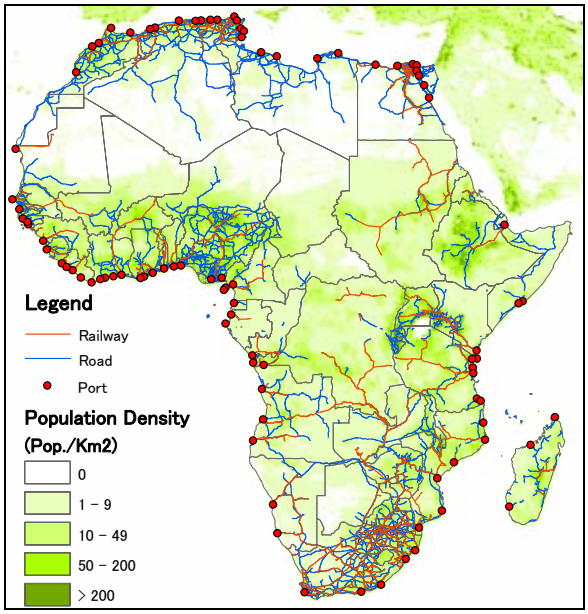
Source：Study Team

Figure 2.1 Main Elements of Cross-Border Transport Infrastructure

Historical Background of CBTI Development in Sub-Saharan Africa

It is critically important to consider the historical background of CBTI development in Sub-Saharan Africa. Ports and the land transport system to serving inland areas were developed in the colonial era. As these African colonies gained independence in 1960s to 1980s, their transport infrastructure progressively degraded due to insufficient investment. Under the import substitution industry policy at the time, the public sector played a leading role in imports of raw materials and exports of agricultural products. As a result, the transportation system, which was integrated into this industry policy, lost its efficiency. From the latter half of 1960s other industrialized nations rapidly underwent a transport revolution and containerization, and significantly improved their transport efficiency. It was not until the 1990s that the containerization "revolution" began in Africa. However, containerization also meant increasing port maintenance costs and a shortage of large-scale port facilities supporting the efficient utilization of container carriers and trucks. Due to these factors, the full cost reduction benefit from containerization has yet to be realized.

Current Situation of CBTI

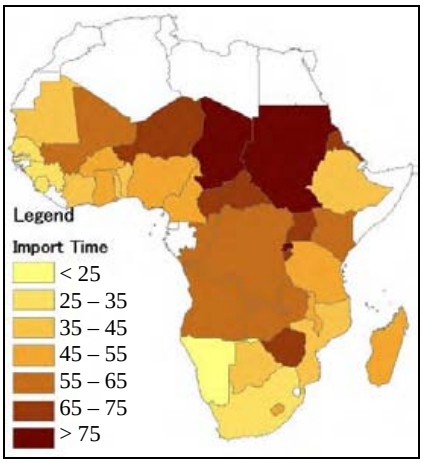


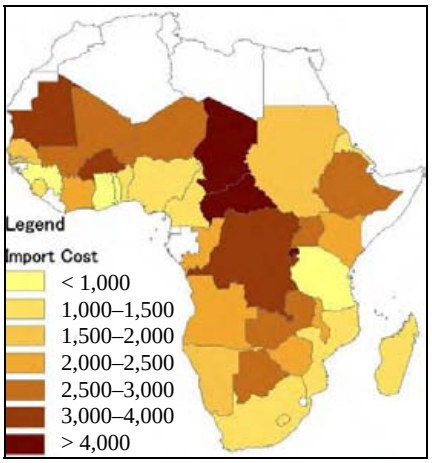
Source: Study Team (prepared from a variety of references)

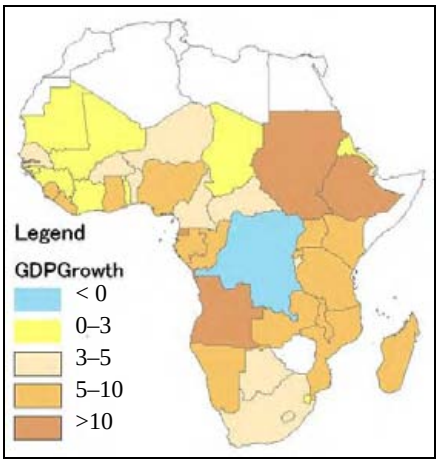
Figure 2.2 Main Roads, Railways, and Ports with Population distribution

Most of the railways and highways in Sub-Saharan Africa were constructed and established in the colonial period, and they form a major CTBI network that provides trading links between densely populated inland areas and ports (Figure 2.2). However, there are few areas suitable for port development in the region due to natural constraints of water depth, and there are a very limited number of locations where large containers can be unloaded.

In addition, due to the poor maintenance of roads, railways, and ports after independence, most of the region's infrastructure is deteriorating. A high percentage of highways are unpaved, and even paved roads are often degraded (Figure 2.6). Regarding railways, since the repair and renewal of rolling stock and track has been delayed, transport volumes have been decreasing. The shortage of port capacity and low port operational efficiency is also a factor, with cargo concentrated in the region's limited ports. These factors have resulted in high transport costs (Figure 2.7), which in turn has caused a decline in competitiveness and increased living costs. Especially inland nations tend to face longer transport times, higher transport costs, and (as a consequence) lower GDP growth rates. Therefore, inadequate transport infrastructure is a major cause of intraregional economic disparities (Figures 2.3–2.5).

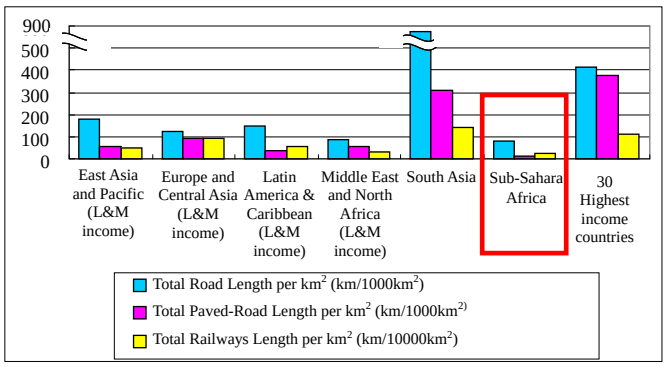






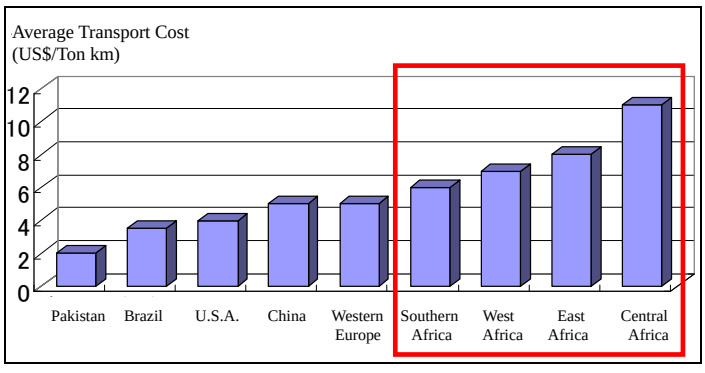
Source: Study Team (from World Bank WDI database)
Note: Time and costs for transporting 20-foot containers from the nearest port)

Figure 2.3 Average import time **Figure 2.4 Average import cost(US$)** **Figure 2.5 GDP growth rate 2007(%)**



Source: Study Team (prepared from WB data)

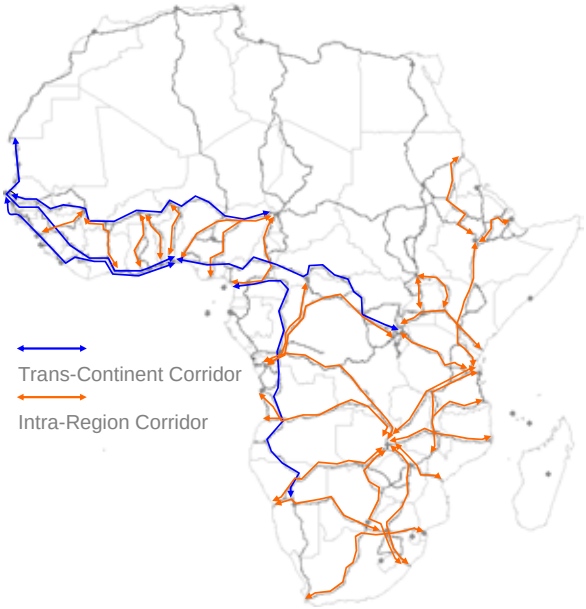
Figure 2.6 Comparison of Road and Railway Infrastructure



Source: Study Team (prepared from WB data)

Figure 2.7 Comparison of Average Transport Cost 2007

Development Priority Corridors and Areas

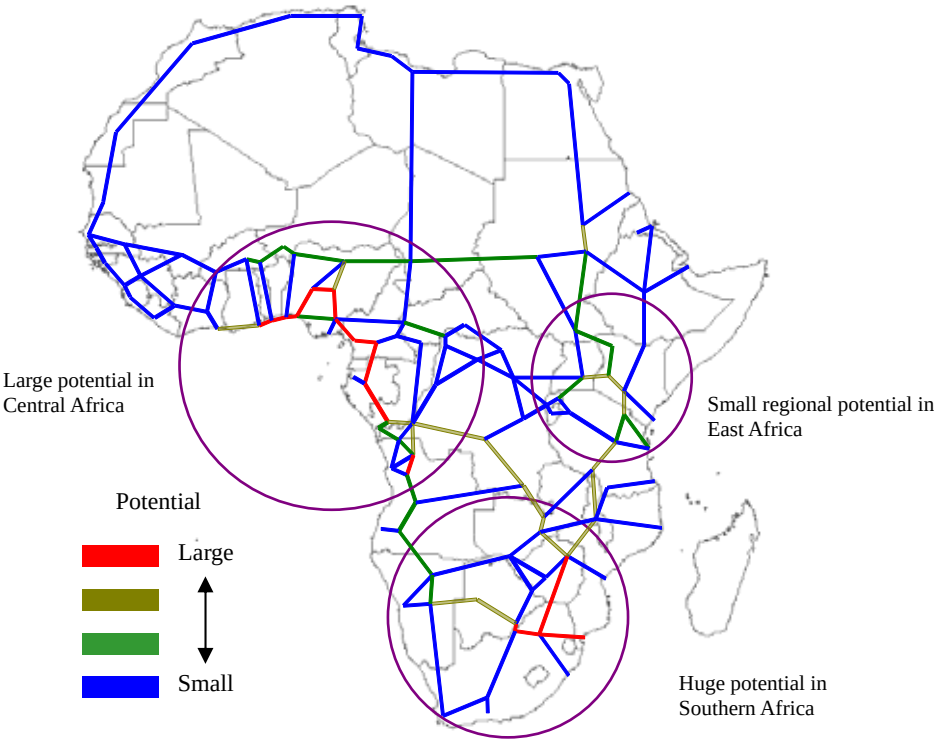


Source: Study Team (prepared from a variety of references)

Figure 2.8 Major Corridors in Sub-Saharan Africa

There are many existing and planned international transport corridors in Sub-Saharan Africa, e.g., the Trans-African Highway (TAH) and the Sub-Saharan Africa Transport Policy Program (SSATP) regional economic corridors (Figure 2.8). In order to determine maintenance priorities for these corridors, the Study Team analyzed potential transport demand along each corridor. Due to the unavailability of detailed statistical data on trade flows, GDP was defined and used as "potential value" of trade quantity. "Potential value" of trade quantity within Sub-Saharan Africa and that of between Sub-Saharan Africa and other regions were analyzed.[1]

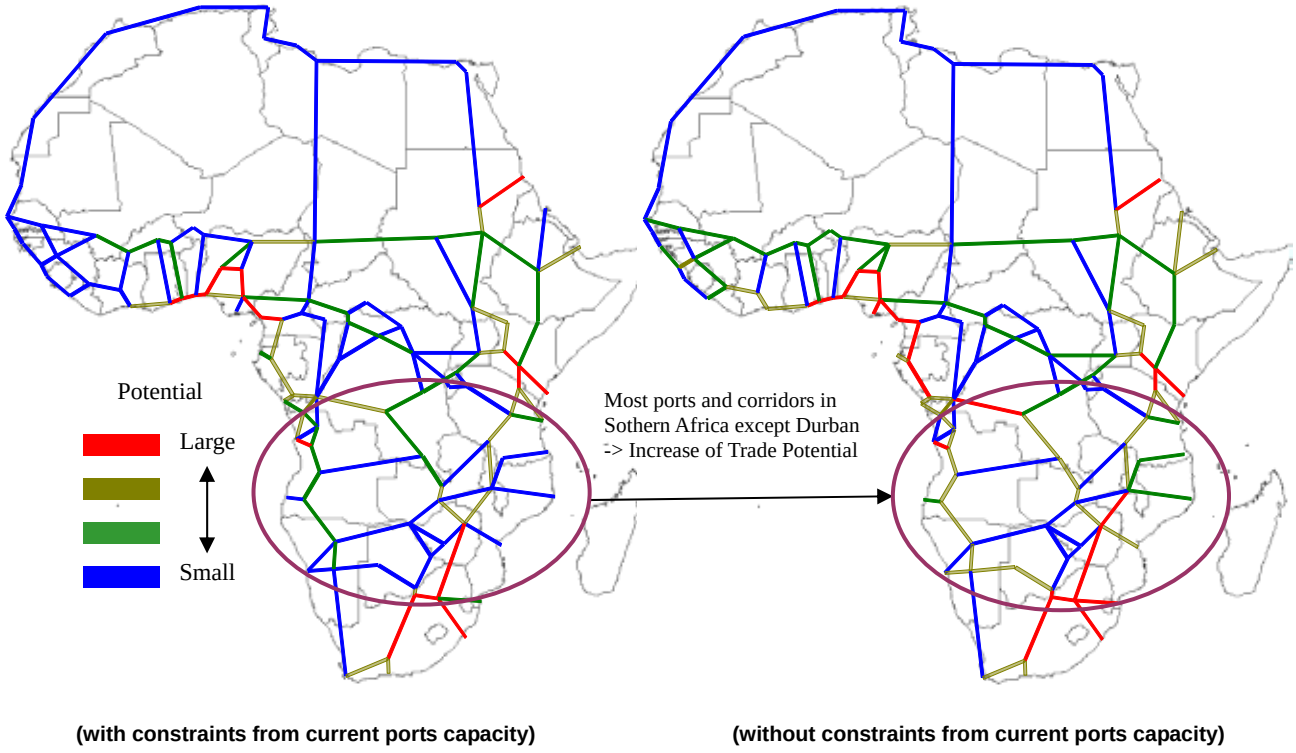
The analysis showed that there is a large potential in corridors around South Africa and Nigeria in terms of intraregional trade, moderate potential in long-distance corridors that link South/Central Africa and East Africa, and small interregional potential in the East Africa region (Figure 2.9).



Source: Study Team

Figure 2.9 Potential Volume of Intraregional Trade

Extra-regional trade potential was analyzed with (1) constraints from the current port capacity, and (2) without constraints. A comparison of the potential of Sub-Saharan Africa with that of the rest of the world showed that trade volume will increase in many ports As well as in inland corridors especially in southern Africa assuming that port capacity constraints are resolved (Figure 2.10). This result suggests that future improvement in port facilities will lead to a more efficient distribution network.



Source: Study Team

Figure 2.10 Potential Value of Trade between Sub-Saharan Africa and the Rest of the World

[1]Analysis Procedures
In the analysis of intraregional trade potential in Sub-Saharan Africa, since trade volume origin-destination (OD) data for each country could not be obtained, the GDP of each country was assumed as their potential, and a gravity model was used to calculate the trade potential OD between each country pair. The results were allocated on major corridor networks by the shortest path search method. For trade potential between Sub-Saharan Africa and the rest of the world, the GDP and the container transaction volume of major ports (assumed to be proportional to the port capacity) of each country along with the gravity model were used in a similar manner as above to calculate the trade potential OD between each country and port. Also, similar calculations were conducted in cases in which all major ports have sufficient capacity (with improved port facilities).
In this analysis, the state of infrastructure such as roads, railways, and ports, and the cost and time required for crossing borders were not considered, so these assumptions differ somewhat from the reality. However, the relative comparison of each corridor's potential can serve as input for broadly assessing relative maintenance priorities.

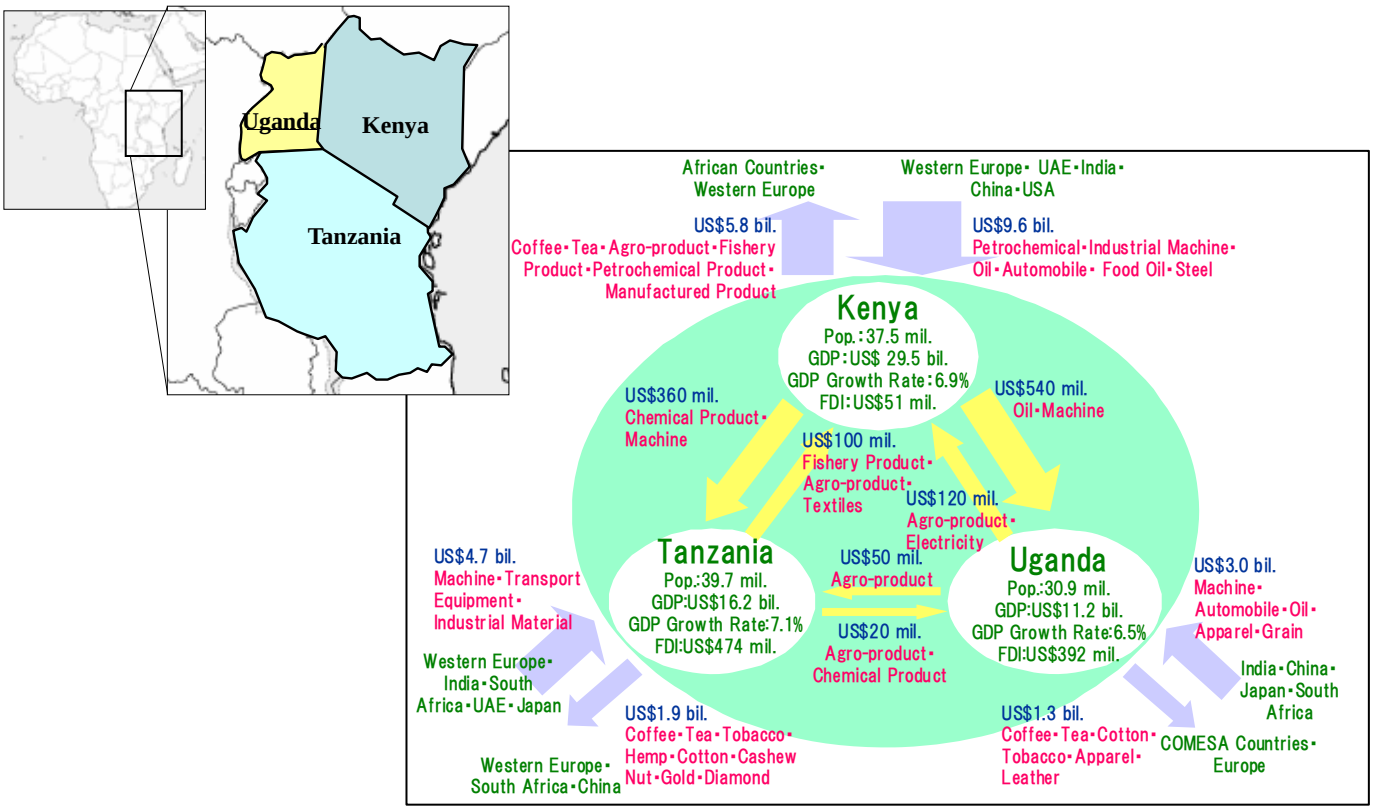
3. Assessment of CBTI – A Case Study in East Africa

CBTI consists of various subsectors including both physical ("hard") and non-physical ("soft") development aspects. Therefore, it is critical that CBTI development proceed not with a project-based approach but with a program approach that addresses development from a comprehensive viewpoint. Accordingly, this study prepared a model program of CBTI development, focusing on three countries in East Africa (Kenya, Tanzania, and Uganda).

Summary of Society and Economy in East Africa

Figure 3.1 summarizes the economy, trade, and investment in the three case study countries. Recently, horticultural products (flowers, ornamental plants, and vegetables) have been at the heart of trade promotion programs of the three countries. The export of these products is rapidly increasing in addition to main traditional products, e.g., coffee, tea, cigarettes. However, there has been difficulty in adding value to agricultural exports in the course of processing (except some products for which mass production, processing, logistics, and exports have been established with foreign investment). In addition, middlemen (intermediaries) lead to complexities in the logistics of agricultural exports, creating obstacles for businesses in price determination and market information sharing. A further limiting factor is that the infrastructure for logistics, e.g., access roads to markets, the cold chain (i.e., refrigerated trucks and facilities), and market information system, has not been developed well (Source: Ministry of Economy, Trade and Industry, "Research on Policy Consistency of ODA and Agricultural Trade", 2007).

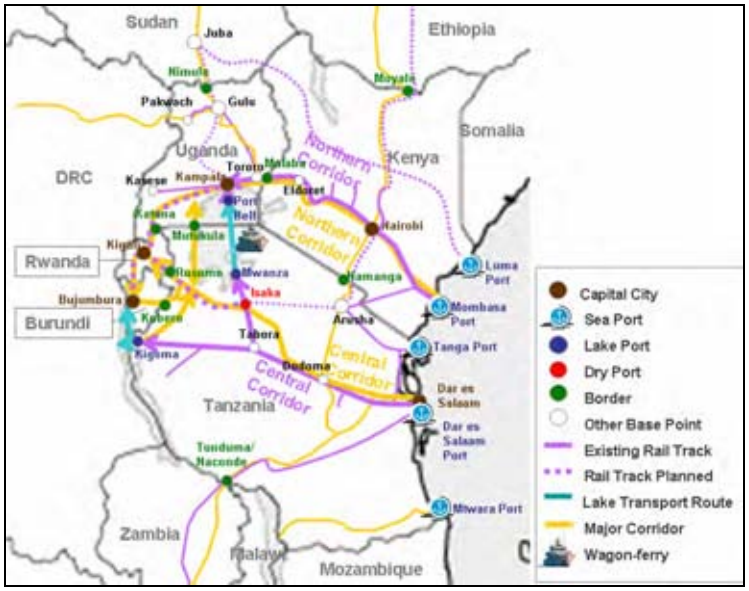
At the same time, regional economic integration is proceeding. The EAC has established a customs union (2005), and will abolish tariffs (by 2010). The Common Market for Eastern and Southern Africa (COMESA) established a Free Trade Area or FTA (2000) and will introduce intraregional tariffs (by 2008). The Southern African Development Community (SADC) will establish a customs union (by 2010) and a common market (by 2015), and will introduce a common currency (by 2018).



Source: Study Team (prepared from a variety of references, FDI data for 2006 and the other data for 2007)

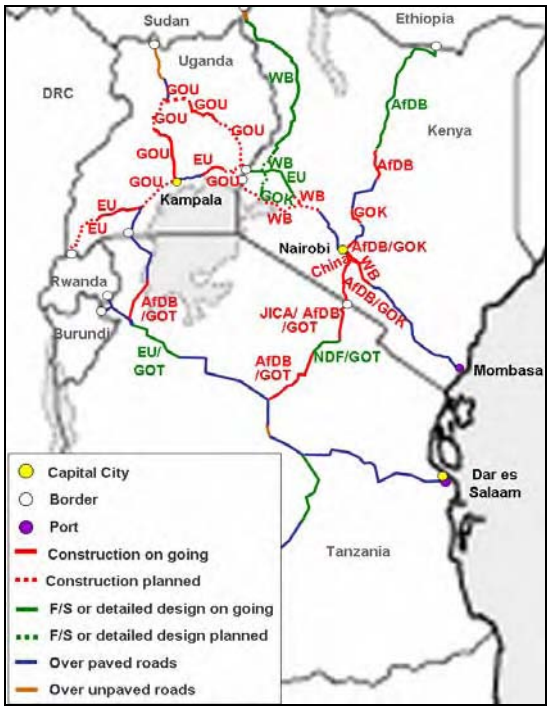
Figure 3.1 Summary of Economy and Trade in the Three Largest Countries in East Africa

Current Status of CBTI in East Africa



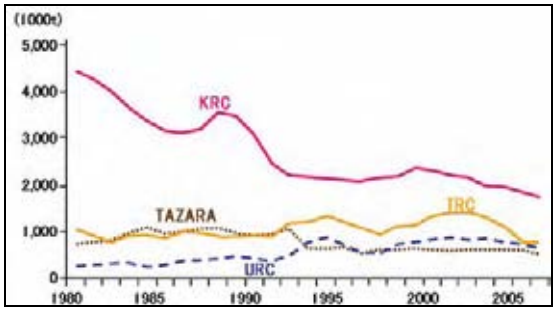
Source: Study Team

Figure 3.2 Major Corridors in East Africa



Source: Study Team

Figure 3.3 Current Status of Major Roads



Source: EAC Railway Master Plan, 2008
Note：KRC: Kenya Railway, TRC: Tanzania Railway,
URC: Uganda Railway, TAZARA: Tanzania-Zambia Railway

Figure 3.4 Transitions in Handling Cargo of Railway Companies (thousands of tons)

There are two major international corridors in East Africa: the Northern Corridor and the Central Corridor (Figure 3.2). Both start from a port and consist of two modes (road and rail). With assistance from the EU, the World Bank, the Afrcian Development Bank (AfDB), and others, CBTI has been developed mainly on the following two major corridors.

Roads

Road infrastructure on the major corridors is being improved with assistance from the Japan International Cooperating Agency (JICA), the Afrcian Development Bank (AfDB), the World Bank (WB), the European Union (EU), and the NDF (Nordic Development Fund) (Figure 3.3). JICA provides considerable research and grant assistance for bridges and roads. In addition, JICA is providing a yen loan for the Arusha (Tanzania)-Athi River (around Nairobi, Kenya) road development project, with co-financing from the AfDB, in conjunction with a One-Stop Border Post (OSBP) project at Namanga.

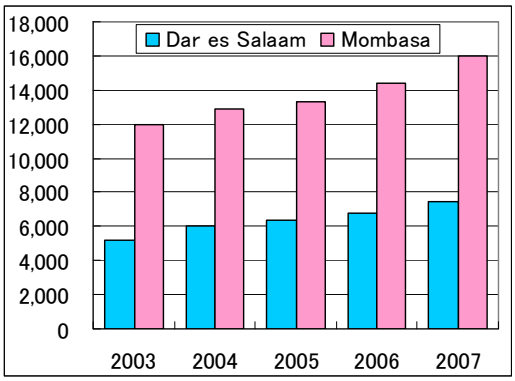
However, there have been problems in maintaining pavements. Road bureaus and road funds for sustainable road maintenance were established in Kenya and Tanzania and are being established in Uganda. While institutional capacities are being enhanced to improve maintenance, the lack of capacity of the private companies that undertake road repair work remains a constraint.

Railways

The region's railways have been deteriorating. While the railways of the three case study countries have been privatized based on concession agreements, transport volumes after privatization have decreased and fallen far behind demand, which has increased with economic growth (Figure 3.4). This in turn has resulted in very long waiting times at ports before loading cargo on trains, leading to a greater depednence on road transport for most cargo. This is because the national railway organizations abandoned maintenance and the rehabilitation of infrastructure and rolling stock after the decision to privatize was taken, so when the operating companies took over the railways, the track and the rolling stock were degraded.

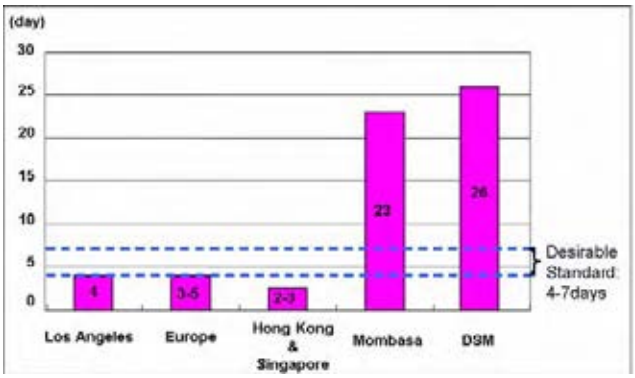
Ports

The performance of region's ports has also been poor. The ports of Mombasa and Dar es Salaam are always crowded because the cargo handling capacity is lagging behind the increasing demand (Figure 3.5). Import and export procedures require considerable time, and the detention of goods at ports has become a major obstacle to distribution (Figure 3.6). To help alleviate this constraint, JICA is assisting a port expansion project at Mombasa Port with yen loans; completion is expected in 2015.



Source: Study Team (prepared from a variety of references)

Figure 3.5 Cargo Handling at Major Ports (in thousands of deadweight tons, dwt)



Source: Study Team (prepared from a variety of references)

Figure 3.6 Detention Days of Cargo at Major Ports in the world (days)

Borders (OSBPs)

One-Stop Border Posts are now being established at international borders, supported by the World Bank, the United States Agency for International Development (USAID), and JICA. At the Namanga border between Kenya and Tanzania, OSBP support is provided in terms of both soft and hard aspects through JICA technical cooperation and yen loans. In Malaba between Kenya and Uganda, the first railway OSBP in East Africa was opened in 2007, and border crossing times for railway freight have been reduced to 30 minutes to one hour, while previously 1–2 days was required. OSBP support is also provided at other international borders by various development partners.

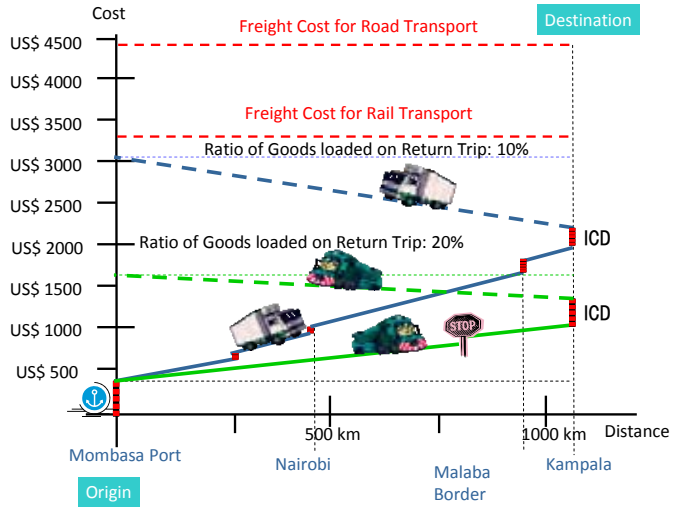
Cross-Border Transport System

Since the road transport agreement concluded by the three case study countries in East Africa is to be applied to Rwanda and Burundi, growth in cross-border transport is envisaged. To address the bond (guarantee) system, one of the barriers impeding cross-border transport, the countries are seeking to establish a common bond system under the auspices of COMESA; a pilot project has already been initiated in the Northern Corridor with support from USAID. Weighbridges, police checks (inspections), and escorts (police accompanying cargo vehicles) to prevent smuggling and the evasion of customs duties are also factors that cause delays in cross-border transport, but these are expected to be improved by the introduction of a global positioning system (GPS) for trucks with World Bank assistance.

The coordination of cross-border transport systems among multiple countries is carried out by the EAC and COMESA, and in the Northern Corridor the Northern Corridor Transit Transport Coordination Authority (NCTTCA) is involved. Also in the Central Corridor, a similar coordination authority is now being established with support from the African Development Bank.

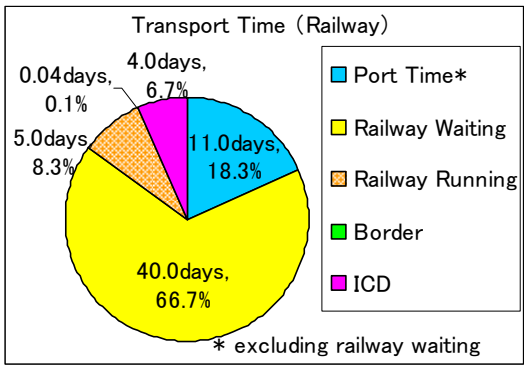
Analysis of Transport Time and Cost

As with the cases in Sub-Saharan Africa, long transport time and high transport cost cause major hurdles for economic development, trade, and private finance. In order to identify the causes for long transport times and high transport costs, the transport time and cost for cargo imported from overseas was analyzed for the Northern and Central Corridors. The results of the analysis for the Northern Corridor (from Mombasa to Kampala) are set out below.



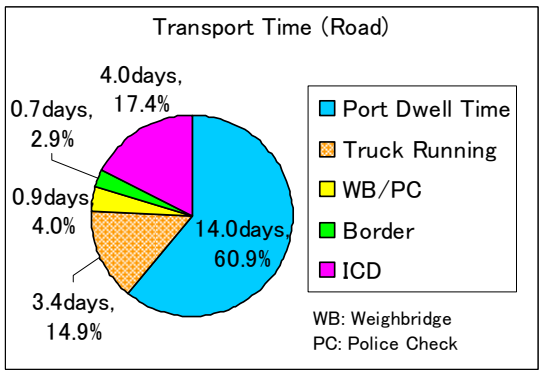
Source: Study Team

Figure 3.7 Time Analysis between Mombasa-Kampala for transit of 40Ft container



Source: Study Team

Figure 3.8 Breakdown of Time and Distance between Mombasa-Kampala (railway)



Source: Study Team

Figure 3.9 Breakdown of Time and Distance between Mombasa-Kampala (road)

Long waiting time at port: Waiting time at port accounts for a significant proportion of the total time required for transportation along this corridor: 61% for road transport, and 85% for railway transport (including railway waiting time) (Figures 3.7–3.9). Especially for rail, cargo is sometimes detained for periods as long as 40 days due to a serious shortage of rail capacity. There are other issues such as the shortage of port infrastructure capacity including berths and yards, delays in customs clearance procedures that involve multiple institutions, and delays in document inspection and cargo acceptance by cargo recipients (e.g., distributors). Also, since cargo storage fees at ports are inexpensive, some ports are used as if they were warehouses to store cargo.

Transit time across national borders and inland container depots (ICDs): The transit time at the Malaba border crossing along the Northern Corridor is 6–8 hours by road, and only about one hour by rail (substantially reduced with the introduction of an OSBP). Therefore, transit time across national borders accounts for 2.9% of total time in the case of road transportation, and for 0.1% of that for rail transportation (Figures 3.8–3.9). The facts indicate that other factors, such as ports, are more influential than transit time across national borders. In the case of regional trade without ports, transit time across national borders accounts for about 6% of total transit time. At the other national borders in EAC, about one day is required for transit time across national borders. More importantly, a few days are required at the ICD at the destination (Kampala) to carry out clearance. In addition, accidental detentions and transportation delays occur frequently due to incomplete preparation for border crossing procedures.

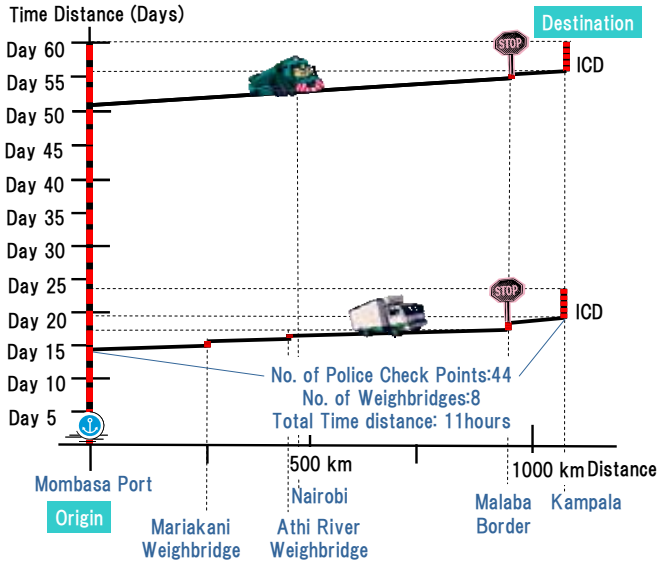
Although transit across national borders is still of some importance, the impact of improvements in transit across national borders in East Africa is relatively insignificant from the view of total transport system. The total improvement of transit across national borders should be considered.

Weighbridges, police checks, and police escorts:

There are many weighbridges and police checkpoints to control illegal loading/unloading and overloading in transit countries. If necessary, police escorts are also provided. Although weighbridges normally require three minutes for transit, some weighbridges may require five hours due to congestion caused by the lack of proper equipment and design problems. Also, unofficial payments have been reported, imposing a significant psychological burden on companies.

Slow travel speed: The travel speed of trucks is fast due to good pavement conditions, but normally trucks do not run at night because of security concerns. Trains cannot operate fast due to poor track maintenance; their average speed is about only 10 km per hour.

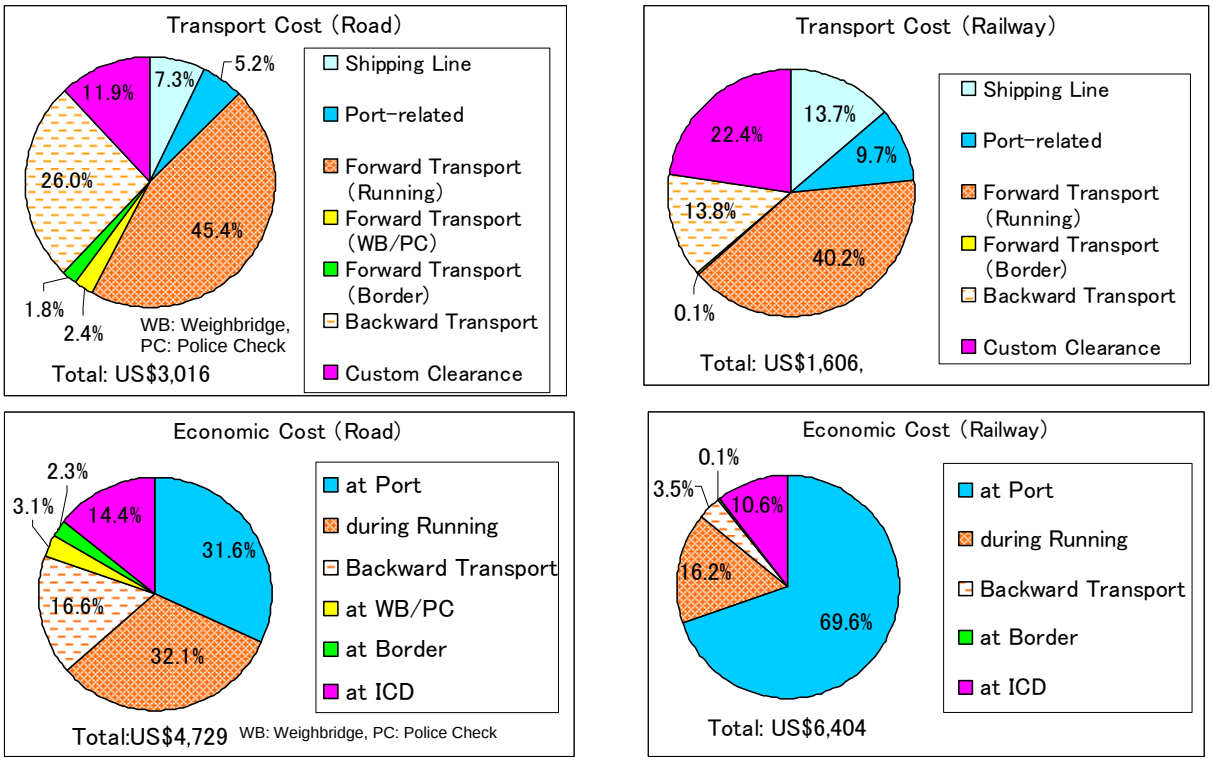
Required cost: Required costs consist of transport fees and procedural charges at ports and ICDs. A key factor is the additional costs associated with the return run. Since the cargo volume of the homeward trip (from inland to port) is overwhelmingly small compared with that of the outward trip (from port to inland), loads are typically carried one way only, and consequently the cost of the homeward trip is included in the cargo transport fee of the outward trip. Also, there is a large difference between the financial cost and the transport price (fees that are actually paid to the distributor); one of the reasons for this is said to a protective policy for distributors. On the other hand, the rates charged by trains are lower than those of trucks (Figure 3.10–3.11).



Source: Study Team

Figure 3.10 Cost Analysis between Mombasa-Kampala for Transit of 40-foot Containers

Economic cost: Economic cost is defined as the required cost plus the value of time of the cargo. Economic cost significantly affects business activities. Long port waiting time results in a significant percentage of port-related economic cost, especially with respect to railway transport. It is clear that ports are a major bottleneck in the distribution system (Figure 3.11).



Source: Study Team

Figure 3.11 Breakdown of Required and Economic Cost between Mombasa-Kampala for Transit of 40-foot Containers

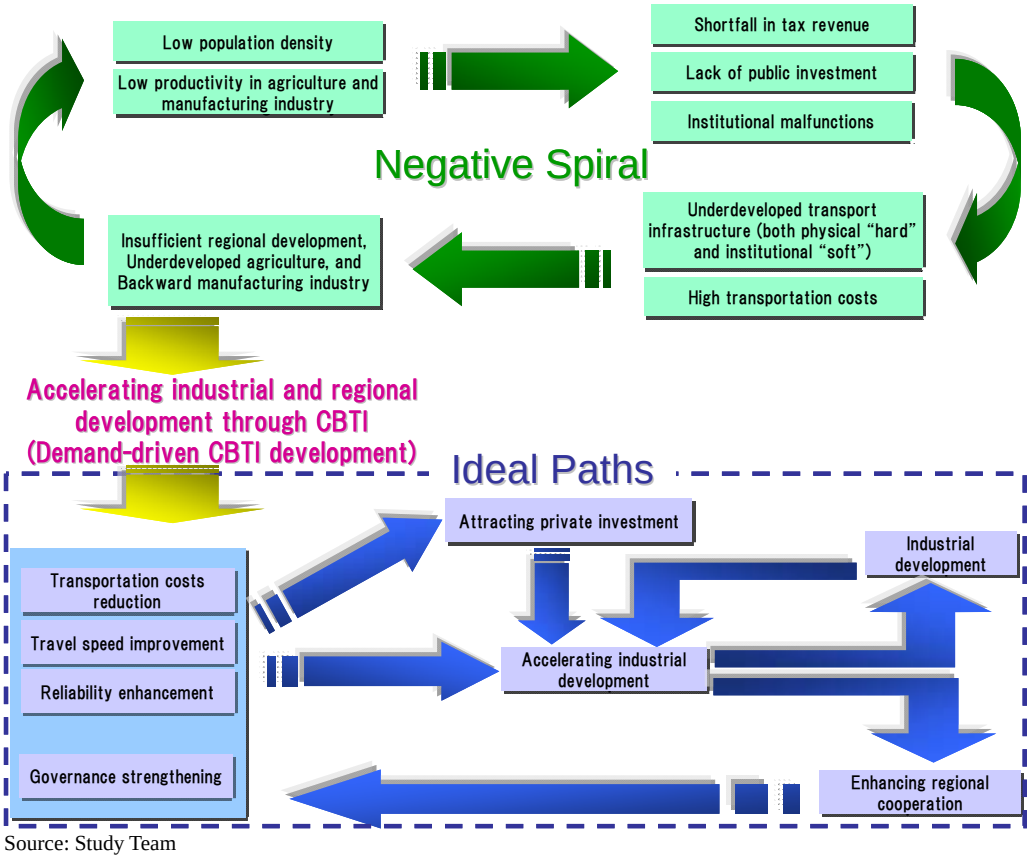
4. Cross-Border Transport and Economic Development in East Africa

The linkage between industrial development and trade should be considered together with public-private initiatives and CBTA develop to strengthen industry and trade. Accordingly, in preparing a model program for CBTI development in East Africa, this study examined the economic development measures that should be implemented together with CBTI development.

CBTI Development and Industrial and Trade Promotion

To maintain sustainable economic growth in Sub-Saharan Africa, it is important to break the "negative spiral" resulting from a delay in transport infrastructure development, together with laggard regional and industrial development in this subregion (Figure 4.1). Transport demand for CBTI in Sub-Saharan Africa is certainly lower than that in the Greater Mekong Subregion (GMS) of Southeast Asia, the study area in the previous phase of this research series. Thus, implementation of strategies to stimulate traffic demand through industrial development in conjunction with CBTI development is very much needed in this subregion.

In this study, the following measures may be proposed as industrial development and trade promotion strategies in conjunction with CBTI strategies: (1) elimination of various barriers to promote market expansion within and outside the subregion, (2) development of the agro-processing industry and promotion of export of primary agricultural products, and (3) effective linkages with mineral resource development. The development of industrial human resource and employment creation should be implemented as a sub-strategy to complement these three strategies.



Source: Study Team

Figure 4.1 CBTI Development and Trade and Industry Promotion in Sub-Saharan Africa

Strategy 1: Reduction of physical and institutional barriers to contribute to the expansion of interregional and intraregional markets

Efforts should be made to increase the flexibility of freight rates by further promoting deregulation of the transport/distribution industry in the region and eliminating freight cartels, in order to maximize the effects of CBTI development for reducing transport costs. At the same time, it may be effective to indirectly support the ongoing market integration and currency unification in many RECs and to carry out measures to reduce trade barriers.

Strategy 2: Development of the agro-processing industry, promotion of the export of primary agricultural products, and demand stimulation

As a basic policy, it is recommended to provide comprehensive support with a view to the value chain from input, production to processing, distribution, and export, and to promote the export of strategic agricultural products through effective linkages with CBTI development (i.e., to provide support that will add value at each stage of the value chain):

1. Production phase: Provide support to enhance access to market information. In particular, develop mobile phone and information technology (IT) infrastructure (including wireless local area network or LAN facilities) in rural areas along corridors and secondary roads (taking public-private initiatives/cooperation into consideration.)
2. Processing phase: Provide support for agro-processing and packaging techniques. Enhanced processing techniques will help to keep products from deteriorating during transport and therefore resolve various problems related to quarantine issues.
3. Distribution phase: Improve distribution systems (the building of secondary roads feeding main corridors, developing a cold chain along a corridor, and fundamentally improving the distribution system by building Agro-Processing export processing zones (EPZs)/special economic zones (SEZs), taking public-private initiatives/cooperation into consideration).
4. Distribution/export phase: Support quality control/management and product tracking/traceability management.
5. Processing/distribution/export phase: Construct an EPZ/SEZ near a mode junction (port) or a border to draw agro-processing businesses, and develop it as a core of processing and distribution systems. In addition, stimulate the demand of businesses related to agriculture and service industries, with a view to including related service industries (e.g., microfinance and other finance businesses, logistics, retailing, taking public-private initiatives/cooperation into consideration).

Strategy 3: Linkage with mineral resources development

Considering the current status of mineral resources development in Sub-Saharan Africa, it is recommended to conduct the following actions to secure mineral resources in coordination with CBTI development:

1. To build access infrastructure in specific mine development projects (e.g., construction of roads to inland mines, upgrading of embarkation ports), based on cooperation with mining juniors/minors, especially in targeting rare and non-ferrous metals.
2. The targeted region is Southern Africa, which has large amounts of rare and non-ferrous metal deposits. (The region is more promising in terms of the type and scale of deposits than East Africa.)
3. Coordination of CBTI development with other commitments at the fourth Tokyo International Conference on African Development (TICAD-IV) (e.g., support for infrastructure development for electricity, water, and sewage services), for example combining the development of electric power resources with those of mines and related infrastructure.

Sub-strategy: Development and employment promotion of industrial human resources

This study proposed the development of industrial human resources and employment promotion as a complementary strategy. Targeting the logistics and transport industries addressed in Strategy 1 and the agro-processing and distribution industries addressed in Strategy 2, concrete actions are recommended as follows:

1. Development of industrial human resources for the logistics and transport industries: Support forwarders and logistic service providers in customs clearance, border crossing procedures, and the like.
2. Capacity building among customs officers: Strengthen the JICA Technical Cooperation Project (TCP) scheme.
3. Development of industrial human resources for the agro-processing and distribution industries: Transfer processing technologies, support business owners in business management techniques, and provide technical support related to distribution quality control and tracking/traceability management, among other measures.
4. Capacity building for quarantine officials: Conduct capacity building using the JICA Technical Cooperation Project (TCP) and other schemes (especially for the quarantine of agricultural products for strategic export).

Views on Public-Private Initiatives for Cross-Border Transport Development

Table 4.1 shows the directions of public-private initiatives/cooperation for CBTI development combined with industrial development and trade promotion measures. For the implementation of these measures, Other Official Flows (OOF) as well as Official Development Assistance (ODA) will be considered and incorporated.

Table 4.1 Directions of Public Private Initiatives/Cooperation for CBTI Development

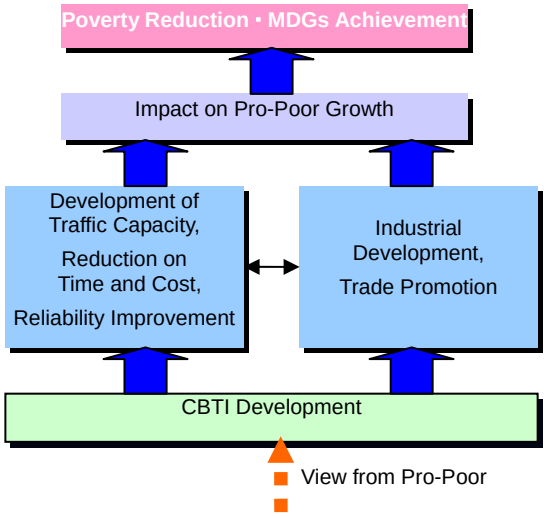
Type	Directions of Public-Private Initiatives/Cooperation for CBTI Development
Supporting Infrastructure Development	✓ Develop supporting infrastructure (e.g., electricity, water, sewerage, ports, access roads and railways) for EPZ/SEZ construction at transportation nodes and national borders ✓ Develop cross-border access roads and railways for mine development ✓ Develop physical distribution infrastructure (e.g., cold chain)
Public-Private Partnerships (PPPs)	✓ Apply for port operation under PPP (for Mombasa and Dar es Salaam Ports) ✓ Apply to a construction project for a cross-border bridge ✓ Apply to operation and maintenance, and service delivery of infrastructure projects ✓ Capacity building for government officials in charge of PPP projects
Policy Making and Institutional Development	✓ Assist RECs in establishing customs unions, free trade zones, and monetary union. ✓ Collaborate among industry, government, and academia to implementing the above ✓ Improve food safety standard and quarantine system (responding to EUREP-GAPan internationally recognized set of am standards) ✓ Assist deregulation of transport/distribution industry
Corporate Social Responsibility (CSR) and Bottom of Pyramid (BOP)	✓ Support CSR activities of private companies located in EPZs/SEZs ✓ Provide projects linking One-Stop Border Post (OSBP) development and HIV prevention ✓ Assist small and medium enterprises (SME)/non-profit organization (NPO) activities for fair trade of primary agricultural products (especially of the main export products of each country) ✓ Provide market information on agriculture products (e.g., through the development of mobile phone network and wireless LAN systems.)
Public Financing	✓ Risk sharing between public and private sectors in high risk projects such as mine development
Others	✓ Through public-private cooperation, develop human resources in the distribution industry and assist business management of domestic distribution companies ✓ Assist private companies located in EPZ/SEZ in securing human resources (e.g., through the provision of short-term vocational training) ✓ Support NPOs/nongovernmental organizations (NGOs) involved in agriculture development / trade promotion projects

Source: Study Team (prepared from reports and papers by the Ministry of Foreign Affairs, Japan, and Keidanren, Japan Federation of Economic Organizations)

5. Strategic Directions for CBTI Development in Sub-Saharan Africa

CBTI development is essential for facilitating industrial development, trade, economic revitalization, and poverty reduction in Sub-Saharan Africa. However, complex factors are inhibiting the facilitation of cross-border transport, and it is impossible to fully improve the entire cross-border transport system by implementing individual projects. Therefore, when forming and implementing CBTI projects, it is necessary to adopt a program approach, seeking more effective measures by keeping the entire vision and strategy of CBTI development in mind, and considering the synergy with related projects currently implemented by various development partners. Thus, the Study Team proposed the following future directions of CBTI development support in Sub-Saharan Africa and a model program of CBTI development in East Africa.

Poverty Reduction and MDGs Achievement through CBTI Development



Source: Study Team

Figure 5.1 Future Goal of CBTI Development

In Sub-Saharan Africa, poverty reduction is the most important development goal. CBTI development will contribute to achievement of the Millennium Development Goals (MDGs), which is an international commitment concerning poverty reduction.

CBTI development will reinforce physical infrastructure, reduce transportation costs, and improve transport system reliability to help increase the required traffic capacity. This is expected to facilitate industrial development, trade, and economic growth contributing to poverty reduction, i.e., pro-poor growth (Figure 5.1).

In order to achieve the MDGs, it is estimated that by 2015 an annual economic growth rate of 7%[2] and an annual trade volume growth of 12% will be required. To provide this increase in trade volume, a 2.4-fold increase in traffic volumes is required by 2015.[3] Therefore, this expansion of traffic capacity was set as the CBTI development goal by 2015.

2. African Development Indicator 2007
3. Based on a regression analysis of trade growth rate and GDP growth rate in Sub-Saharan African countries over the past five years, this is the estimated trade growth rate required for 7% GDP growth.

Comprehensive Themes and Strategic Direction for CBTI Development

The comprehensive themes that show the future direction of CBTI development in Sub-Saharan African consist of two pillars: (1) Integration of Sub-Saharan Africa and (2) Linkage between Sub-Saharan Africa and the Rest of the World. In addition, the Study Team recommended the following four items as strategic directions for implementing CBTI development in order to achieve the comprehensive themes (Figure 5.2):

Comprehensive Themes

Integration of Sub-Saharan Africa:
By providing seamless and efficient transportation services on an integrated transportation network, promote economic and social integration between and among countries in Sub-Saharan Africa.

Linkage between Sub-Saharan Africa and the rest of the world:
By providing seamless and efficient transportation services with the rest of the world, promote economic and social linkage between Sub-Saharan Africa and the global economy.

Strategic Directions

Perspective as a system: Consider all CBTI:
elements as a system, and carry out improvement after understanding mutual relations and the significance of each element.

Coordination with Regional Economic Communities (RECs):
Carry out CBTI development in coordination with "soft" infrastructure improvement activities implemented by RECs.

Effective linkage with trade and industrial development:
Carry out CBTI development linking with trade promotion and industrial development policies.

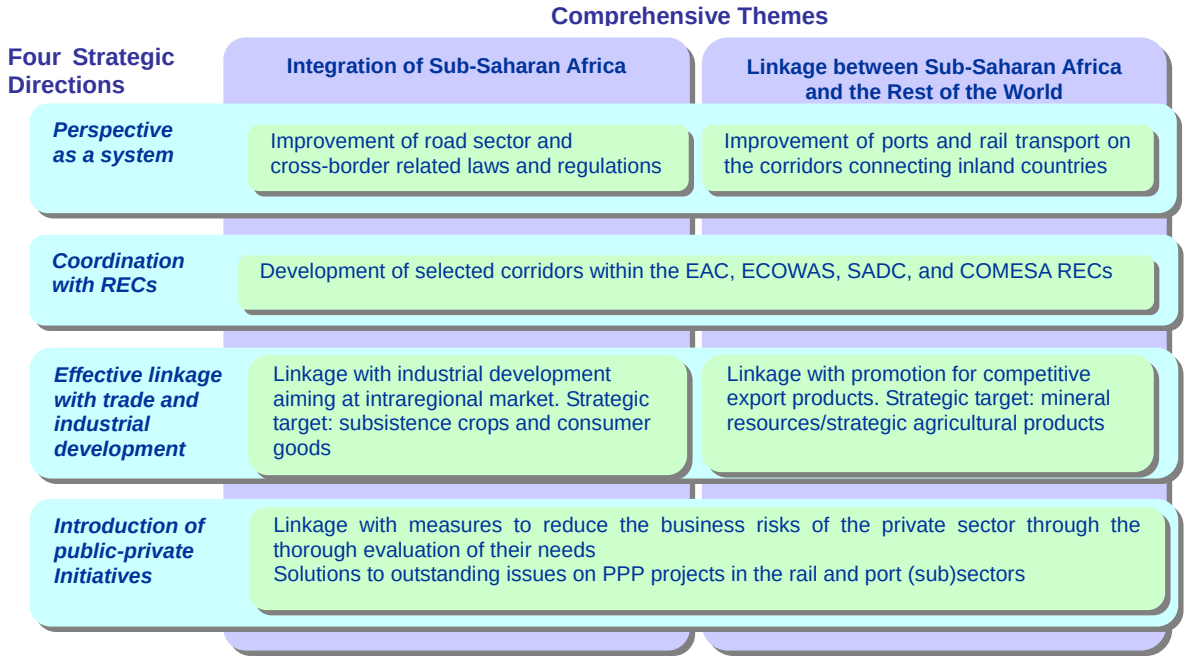
Introduction of public private initiatives/cooperation:
By understanding the needs of the private sector, carry out CBTI development that can reduce the business risks of the private sector.

Source: Study Team

Figure 5.2 Comprehensive Themes and Strategic Direction for CBTI Development in Sub-Saharan Africa

Priority CBTI Subsectors

Based on a program approach, the Study Team examined priority subsectors in CBTI development. Figure 5.3 summarizes the six strategies on subsectors incorporating the two comprehensive themes and four strategic directions as discussed in the previous section.



Source: Study Team

Figure 5.3 Priority Subsector in CBTI Development

Detailed Strategies by Subsectors

Based on the above matrix, the Study Team recommends the following detailed strategies by subsector:

Port Subsector: This is the highest-priority subsector. It is essential to improve cargo handling volumes at existing ports in the short term to address the shortage in the number of ports and their capacity. Both "hard" infrastructure development and "soft" infrastructure improvement will be crucial for this subsector, especially regarding specific measures for container terminal improvement.

Railway Subsector: Railways should be a focus for improving long-distance transport between ports and inland countries as well as providing access to mine resources. To address the aging infrastructure, efficient implementation of the operation system/framework (including privatization) is urgently required.

Road Subsector: Construction of missing links and development of rural roads is important from a pro-poor perspective. Also, strengthening of the operation and maintenance capacity is still needed. Cross-border transport laws/regulations are recognized as one of the bottleneck areas to be addressed through coordination by the RECs.

Civil Aviation Subsector: It is recommended to improve the air transport sector concurrently with the development of industrial products suited for air transport such as light and high-value goods.

Soft Infrastructure: This issue is important because of its critical impact on cross-border movement. RECs must implement strategic measures addressing these issues in coordination with measures to improve hard infrastructure.

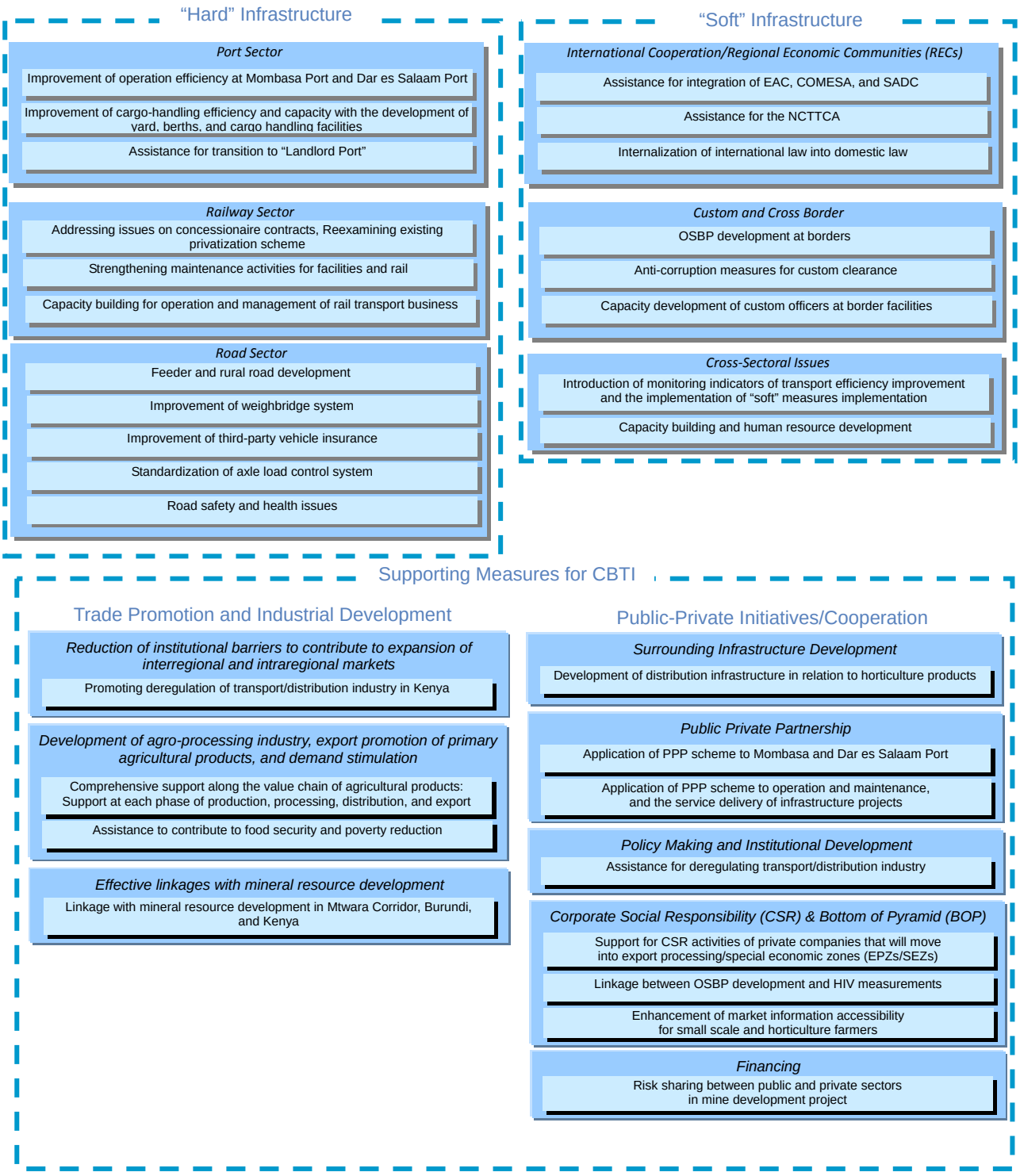
The following are supporting measures for CBTI that should be implemented in collaboration with CBTI development.

Supporting Measures for CBTI 1: Trade Promotion and Industrial Development: The agro-processing industry, which contributes to export promotion, is highlighted in the strategies of this sector. Regarding the effective linkage with mineral resources development, Southern Africa with its abundant deposits of rare and non-ferrous metals, should receive emphasis. In addition, mining development in East Africa can also be considered.

Supporting Measures for CBTI 2: Public-Private Initiatives/Cooperation: A new approach considering "to what extent the public sector can support the wide range of activities by the private sector" and "how to pull and promote private investments" is required on the public sector side. It is necessary to introduce a mechanism to substantially hedge the mining risks of the private sector.

Model CBTI Development Program in East Africa

Based on the subsector strategies mentioned above, the Study Team listed required measures and prepared the model program, classifying these measures into short-term measures that should be implemented within a few years and medium- and long-term measures. The short-term measures that should be implemented with high priority for CBTI development in East Africa are summarized in Figure 5.4.



Source: Study Team

Figure 5.4 Short-Term CBTI Measures in East Africa

Directions of Japanese Official Development Assistance (ODA) in East Africa

For the future directions of Japan's assistance to East Africa with regard to CBTI development, it is needed to consider assistance programs that focus on the comparative strengths of Japan, together with coordination with other development partners. Also, strategic views from both "hard" and "soft" infrastructure aspects are indispensable for effective aid delivery, because institutional and organizational malfunctions still remain. Among the above long list of priorities for CBTI development in East Africa, the right column shows selected areas that can fully utilize the past experience and know-how of Japan's foreign assistance.

Port Development: Along with the ongoing yen loan project for Mombasa Port development, simplification of port procedures and improvement of access to arterial roads and railways are recommended. In the case of Dar es Salaam Port, which is more congested than Mombasa Port, simplification of port procedures are also required, as well as yard expansion.

Rail Transport Improvement: Streamlining operation and management of business administration, increase in rolling stock, rail track rehabilitation.

Cross-Border System Improvement: Introduction of information technology in customs clearance procedures in coordination with OSBP development, improvement of weighbridges and police checks with utilization of a global positioning system (GPS) vehicle tracking system.

Industrial Development Support: Agro-processing industry development, mineral resource development, human resource development, construction of EPZ/SEZs at ports and at nodes of regional corridors (in coordination with CBTI development).

Issues for Future JICA Assistance

The results of this study suggest the following issues that JICA should assist for the development of CBTI in Sub-Saharan Africa in the future.

Project Formulation in East Africa: Further research is necessary to formulate concrete projects in East Africa. The Study Team recommended detailed strategies in the following subsectors: ports, railways, cross-border facilities, and industrial development, to be assisted by Japanese ODA. It is necessary to conduct research to identify project scope to facilitate the immediate implementation.

Study of Private Needs and Public-Private Risk Sharing: Trade promotion/industrial development and public-private cooperation are essential for the development of CBTI. A study of schemes and application methods for public-private risk sharing based on recognition of private needs is important. In particular, it is also essential to build a framework for decision making to adopt private demands quickly.

Response to Operational and Management Problems of Ports and Railways: It is essential to formulate a framework that can accumulate knowledge and propose measures for the operation and management problems in the port and railway subsectors, currently the most important transport subsectors. In particular, it is necessary to accumulate the knowledge for the solutions of various problems in privatization.

Study of Subsector Issues: Analysis of issues in each subsector for the implementation of CBTI and complementary policies should proceed with the research results to be fed back into the CBTI program. Related subsector studies should actively involve analyses of roles of CBTI.

Evaluation of Regional Impacts of CBTI Development: It is necessary to evaluate how much CBTI development helps reduce poverty, develop industry, and promote trade.

The Research on the Cross-Border Transport Infrastructure: Phase 3

Final Report

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List of Abbreviations

AfDB	African Development Bank
AU	African Union
BOP	Bottom of Pyramid
BRICs	Brazil, Russia, India, and China
CBTI	Cross Border Transport Infrastructure
CEMAC	Communaute economique et monetaire de l'afrique centrale
CFAs	Clearing and Forwarding Agents
CFS	Container Freight Station
COMESA	Common Market for Eastern and Southern African States
COTIF	Convention Concerning International Carriage by Rail
CPA	Coordinated Parallel Approach
CSR	Corporate Social Responsibility
DRC	Democratic Republic of the Congo
DWT	Dead Weight Tonnage
EAC	East Africa Community
EARH	East Africa Railways and Harbors
EATTFP	East Africa Trade and Transport Facilitation Project
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
EPSA	Enhanced Private Sector Assistance for Africa
EPZ	Export Processing Zone
EU	European Union
FDI	Foreign Direct Investment
F/S	Feasibility Study
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GIS	Geographic Information System
GMS	Greater Mekong Subregion
IGAD	Intergovernmental Authority of Development
ICAO	International Civil Aviation Organization
ICD	Inland Container Depot
ICT	Information and Communication Technology
IDA	International Development Association
IFC	International Financial Corporation
IFS	International Financial Statistics
ILO	International Labour Organization
IMF	International Monetary Fund
IT	Information Technology
JBIC	Japan Bank for International Cooperation
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt fur Wiederaufbau
LME	London Metal Exchange
LPI	Logistics Performance Index
MCC	Millennium Challenge Corporation
MDGs	Millennium Development Goals
NCTTCA	Northern Corridor Transit Transport Coordination Authority
NDF	Nordic Development Fund
NEPAD	New Partnership for Africa's Development
NES	National Export Strategy
NGO	Non Governmental Organization
NIES	Newly Industrializing Economies

NPO	Non-Profit Organization
KPA	Kenya Port Authority
KRA	Kenya Revenue Authority
KRC	Kenya Railway Corporation
KRL	Rift Valley Railways Kenya Limited
OAU	Organization of African Unity
ODA	Official Development Assistance
OOF	Other Official Flow
OSBP	One Stop Border Post
PPP	Public Private Partnership
RAHCO	Reli Assets Holding Company
RCTG	Regional Customs Transit Guarantee
RECs	Regional Economic Communities
RVR	Rift Valley Railways
SACU	Southern African Customs Union
SADC	Southern African Development Community
SAPROF	Special Assistance for Project Formulation
SDI	Spatial Development Initiative
SEZ	Special Economic Zone
SSATP	Sub-Sahara Africa Transport Policy Program
STAP	Short Term Action Plan
TA	Technical Assistance
TAH	Trans African Highway
TAZARA	Tanzania Zambia Railway
TEU	Twenty-Foot Equivalent Units
TICAD	Tokyo International Conference on African Development
TICTS	Tanzania International Container Terminal Services Ltd.
TIR	Trans-ports Internationaux Routiers
TPA	Tanzania Port Authority
TRA	Tanzania Revenue Authority
TRANROADS	Tanzania National Roads Agency
TRC	Tanzania Railway Corporation
TRL	Tanzania Railways Limited
UEMOA	Union Economique et Monetaire Ouest-Africaine
UNECA	United Nations Economic Commission for Africa
UPA	Uganda Port Authority
URA	Uganda Revenue Authority
URC	Uganda Railway Corporation
URL	Rift Valley Railways Uganda Limited
USAID	United States Agency for International Development
VOMS	Vehicle Overload Management System
WB	World Bank
WDI	World Development Indicator
YD	Yamoussoukro Decision

Introduction

Background and Objectives of the Study

Recent globalization strengthened ties of individual economies to the global economy bringing sustained economic growth in many countries, at least up until recently. This process inevitably led to an increase in traffic across borders, both people and goods. As a consequence, Cross-Border Transport Infrastructure (CBTI), which enables such movements, has become increasingly important and will remain so regardless of the consequences of current (early 2009) readjustments in the global economy. Indeed, for small developing countries with small domestic markets, CBTI is even more important under current economic conditions. With this realization, the Japan International Cooperation Agency (JICA) has carried out two research studies investigating possibilities for assisting developing counties in the field of CBTI; phase one involved basic research and phase two application of basic research, targeting the Greater Mekong Subregion (GMS) of Southeast Asia,[1] while the current (research) study has focused on Sub-Saharan Africa.

Sub-Saharan Africa is defined as all African countries except the five countries of North Africa (which are relatively well developed), and contains 34 of the world's poorest 48 countries. It is generally recognized that one reason for the laggard development of Sub-Saharan Africa is the poor state of the region's transport infrastructure and consequent high transport costs, which results in low productivity and high prices, and a low level of private investment and foreign direct investment. A special problem is that of landlocked countries, which have to transport most of their imports/exports through ports in neighboring countries and consequently face high transport costs, which slows their economic development. It is an urgent task for the Sub-Saharan Africa to upgrade its transport infrastructure, particularly CBTI, in order to promote economic development, to alleviate poverty, and to achieve the Millennium Development Goals (MDGs). Also, considering that the overall economic level in Sub-Saharan Africa is still low, industrial development must be undertaken concurrently with CBTI improvements in order for the CBTI improvements to be effective.

As the host country of the Tokyo International Conference on African Development (TICAD), Japan has demonstrated its policy of positively engaging itself to contribute to the development of Africa. In TICAD-IV in 2008, Japan declared that it would double its official development assistance (ODA) to Africa over three years, strengthened its cooperation with the African Development Bank (AfDB) by providing yen loans through Enhanced Private Sector Assistance (EPSA), and announced a plan to promote development of the private sector. To provide effective assistance for CBTI, it is necessary for Japan to conduct rigorous analyses taking the above factors into account, including the need for regional/industrial development with private sector initiative, and the specification of an effective strategy for CBTI development.

Acknowledging the foregoing, this research study seeks to identify desirable directions for Japan's strategy for official development assistance in the field of CBTA based on an analysis of the current situation and future prospects of "hard" (physical facilities) and "soft" (institutional aspects) aspects of CBTI.

The authors hope that this research study will be of use to those who are already involved or will be involved in the development of Sub-Saharan Africa.

[1] Comprising Cambodia, two provinces of the People's Republic of China, the Lao People's Democratic Republic, Myanmar, Thailand, and Viet Nam.

Organization of Study Implementation

An ad hoc advisory committee, with the JICA Economic Infrastructure Department serving the secretariat function, plus representatives of the JICA Africa Department, an academic expert, was established to discuss methodology and finding of the study. Five advisory committee meetings were held during the study. The members of the advisory committee as well of the study team are shown below:

Advisory Committee Chairperson:

Professor Tsuneaki Yoshida	Professor, Graduate School of Frontier Sciences, University of Tokyo

JICA Staff/Officials:

Toshiyuki Kuroyanagi	Director General, Economic Infrastructure Department
Koichi Miyake	Executive Technical Advisor to the Director General, Economic Infrastructure Department
Ichiro Tambo	Executive Technical Advisor to the Director General, Economic Infrastructure Department
Tomiaki Ito	Deputy Director General, and Group Director for Transportation and ICT [Information and Communications Technology], Economic Infrastructure Department
Akira Nakamura	Deputy Director General, and Group Director for Urban and Regional Development, Economic Infrastructure Department
Hiroshi Takeuchi	Director, Transportation and ICT Division I, Economic Infrastructure Department
Tomoyuki Naito	Director, Transportation and ICT Division II, Economic Infrastructure Department
Naomichi Murooka	Senior Program Officer, Transportation and ICT Division II, Economic Infrastructure Department
Kenichi Konya	Senior Program Officer, Transportation and ICT Division I, Economic Infrastructure Department
Taro Okawa	Transportation and ICT Division I, Economic Infrastructure Department
Ai Wakamiya	Transportation and ICT Division I, Economic Infrastructure Department
Kazumasa Sanui	Senior Program Officer, Transportation and ICT Division II, Economic Infrastructure Department
Makoto Kanagawa	Transportation and ICT Division II, Economic Infrastructure Department
Masaya Omae	In-house Consultant for Transportation, Economic Infrastructure Department
Mayumi Syoji	Special Advisor, Africa Department

Study Team:

Yuichiro Motomura	Team Leader/Transport Infrastructure/Facility Planning (PADECO Co., Ltd.)
Bruce Winston	Cross-Border Transport Network Planning (PADECO Co., Ltd.)
Hajime Onishi	Industry Development/Trade Promotion Planning (Mitsubishi UFJ Research and Consulting Co., Ltd.)
Satoshi Ogita	Transport Planner I (PADECO Co., Ltd.)
Masako Hatta	Transport Planner II (PADECO Co., Ltd.)

Implementation Schedule of the Study

Through a comprehensive literature review, interview surveys, a one-month field assignment, other forms of information collection, and data analyses, this study developed future CBTI development goals, a CBTI development strategy, and a preliminary CBTI development program. During its home-office assignment, the study team presented the study findings to five advisory committee meetings. The knowledge of JICA staff and a leading academic expert helped the study team refine its output. In addition, JICA sponsored a seminar on CBTI in Sub-Saharan Africa with many participants from the public, private, and academic sectors; the results of the panel discussion during the seminar were incorporated in the study.

The schedule of the study was as shown below:

Date(s)	Event	Outline
21 August 2008	1st committee meeting	Presentation and discussion of study methodology
2 September 2008	2nd committee meeting	Presentation and discussion of progress of the study and field trip plan
1–28 October 2008	Field trip	Interviews with transport and customs related officials, international agencies, JICA offices, local private firms, and site visits to major ports, roads, and border checkpoints in Kenya, Uganda, and Tanzania
27 November 2008	3rd committee meeting	Presentation and discussion of field trip findings and study progess
24 December 2008	4th committee meeting	Presentation and discussion of CBTI development goals and development strategies
29 January 2009	Seminar	Presentation of study findings and panel discussion on public-private partnership (PPP) initiatives in Sub-Saharan Africa
20 February 2009	5th committee meeting	Presentation and discussion of CBTI development goals and development strategies

Outline of Seminar

The outline of the seminar held on 29 January 2009 is as shown below:

Purpose: (i) to present the result of the study for experts and private firms, (ii) to discuss issues and future on CBTI in Africa, (iii) to report the on-going assistance on CBTI in Africa sponsored by JICA, and (iv) to incorporate opinions of experts and private firms in the study based on the panel discussion and questionnaire surveys for participants.

Date and Time: 13:30 – 17:00, 29 January 2009

Venue: JICA Research Institute, Tokyo, Japan

Number of Participants: 158 (excluding JICA staff, the study team, and panelists)

Major Participants: JICA, development consultants, constructors, trading companies, manufacturer, government agencies, education institutions, and NGOs.

Agenda:

Opening Remarks

Eiji Hashimoto	Vice President, JICA

Session 1: Lecture on Issues and JICA Assistance on CBTI in Africa

Direction of JICA Assistance in Africa

Kae Yanagisawa	Executive Advisor to the Director General, Africa Department, JICA

Direction of JICA Assistance for CBTI in Africa

Akira Nakamura	Deputy Director General, Economic Infrastructure Department, JICA

Present Situations, Issues and Development Strategy on CBTI in Africa

Yuichiro Motomura	Study Team Leader, President, PADECO Co., Ltd.

Q & A

Session 2: Panel Discussion on CBTI development and PPP in Africa

Moderator

Mitsuya Araki	President, The International Development Journal Co., Ltd.

Panelists

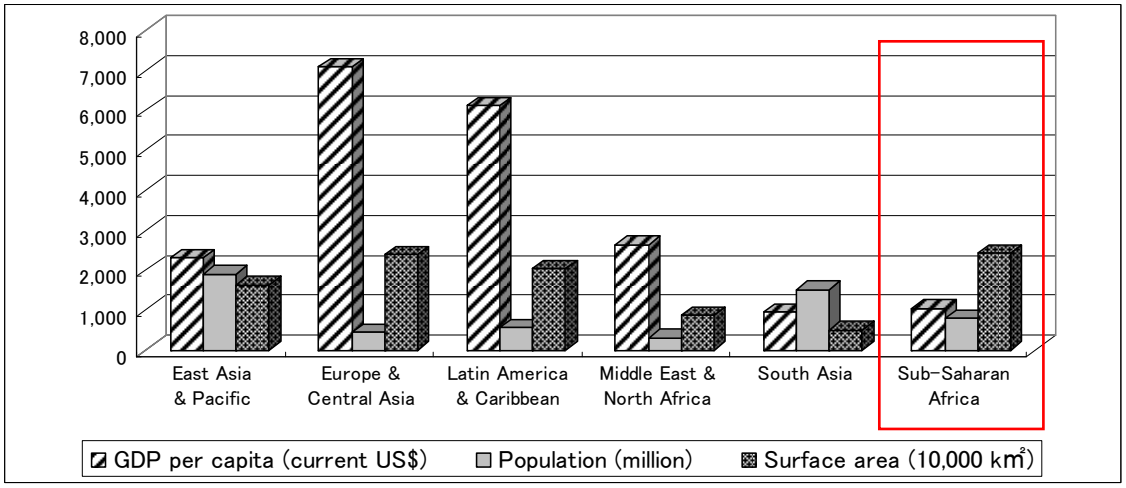
Prof. Tsuneaki Yoshida	Professor, Graduate School of Frontier Sciences, University of Tokyo
Masaki Miyaji	Visiting Senior Advisor, Africa Department, JICA
Katsumi Hirano	Director General, Area Studies Center, Institute of Developing Economies
Yuji Okazaki	Senior Special Advisor, JICA
Yuichiro Motomura	Study Team Leader, President, PADECO Co., Ltd.

Chapter 1 Conditions and Development Issues in Africa

1.1 Economy

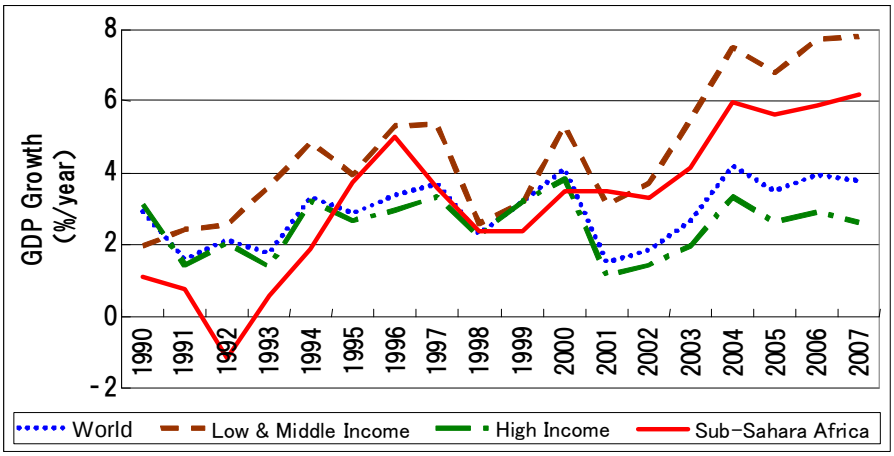
Sub-Saharan Africa encompasses 48 countries, including all African countries except the five moderately developed North African countries. Sub-Saharan Africa covers an area of 24.27 million km^2 equivalent to 18% of the total world land area, and has a population of 799.8 million (i.e., about 12% of the world's population); it has a total gross domestic product of US$840 billion (in 2007 prices), amounting to 2% of the world's GDP, of which South Africa accounts for 33%. The GDP per capita of Sub-Saharan Africa amounts to US$1,053, which is generally lower than found in other middle-to-low income regions (Figure 1.1.1). Moreover, GDP per capita of the 47 Sub-Saharan African countries excluding South Africa is only US$752. About half of the region's population, about 400 million people, may be classified as poor, i.e., they live on US$1.25 per day or less. A total of 34 of the poorest 48 countries in the world are in Sub-Saharan Africa (statistical data are from World Bank Statistics, 2007).

While poverty stricken, Sub-Saharan Africa has registered a stable economic growth above the world average since 2001. It has achieved a remarkable GDP growth of 6% per annum (see Figure 1.1.2), with a stable GDP per capita growth rate of 3–4% since 2004. This strong growth is attributable to an upsurge of primary resource prices, which has led to foreign investors' direct investment in basic African resources. The World Bank (John Page, 2008) cites a favorable impact on African economic growth due to improvements in economic policy, the increased strength of African currencies, improved institutions and governance, and decreased conflicts, along with further improvements in the investment environment, infrastructural improvements, technological innovations, and institutional strengthening as factors for maintaining this growth trend.



Source: Compiled from the World Bank, World Development Indicator Database

Figure 1.1.1 Major Indicators of the World's Middle-to-Low Income Regions – Population, Surface Area, and GDP per Capita (2007)



Source: Compiled from "World Development Indicator Database", World Bank

Figure 1.1.2 The World's GDP Growth Rate (1990–2007)

1.2 Natural Conditions

Sub-Saharan Africa has a diverse climate, including desert (e.g., the Sahara, the world's largest), tropical rainforest, Savannah, highlands, and temperate zones with very cold winters (e.g., in South Africa); Figure 1.2.1 presents a classification of African climates. Most of the countries in the region are endowed with a temperate climate suitable for agriculture. The region is rich in such tourism resources as forest, wildlife, and natural parks, which attract international visitors. The region also includes mineral-rich countries, with natural resources such as crude oil, gold, copper, and diamonds; also, rare metals, yet to be tapped, have recently attracted the attention of foreign investors.

Af : Tropical rain forest climates
Am : Tropical monsoon climates
Aw : Tropical savanna climates
BWh : Desert climates (average annual temperature above 18 °C)
BWk : Desert climates (average annual temperature below18 °C)
BSh : Steppe climates (average annual temperature above 18 °C)
BSk : Steppe climates (average annual temperature below 18 °C)
Cwa : Humid subtropical climates (least month average precipitation below 60mm)
Cfa : Humid subtropical climates (least month average precipitation above 60mm)
Cwb : Oceanic climates (least month average precipitation below 60mm)
Cfb : Oceanic climates (least month average precipitation above 60mm)
Csa : Mediterranean climates (warmest month average temperature above 22 °C)
Csb : Mediterranean climates (warmest month average temperature below 22 °C)
H : Highland climates

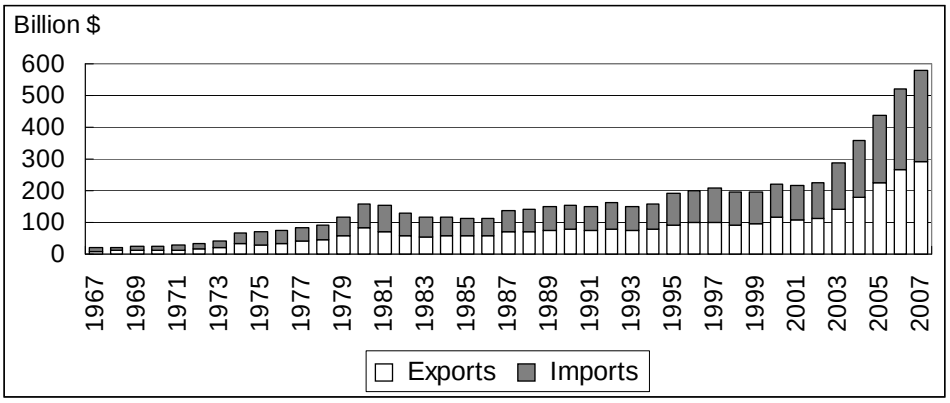
Source: Dan Scollon, "Koppen-Geiger Climate Classification"

Figure 1.2.1 African Climate Classification

1.3 Trade Structure

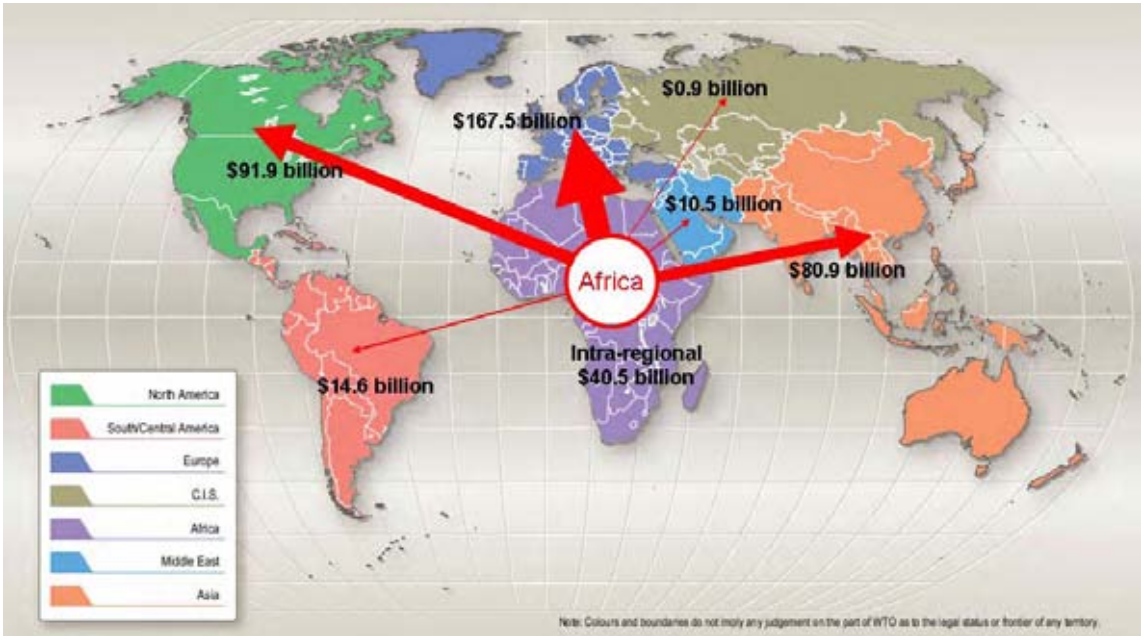
The trade structure of Sub-Saharan Africa is characterized by exports of primary commodities (e.g., oil) and imports of industrial goods. Major export destination countires traditionally have included European Union (EU) countries (e.g., France, Germany) and other industrialized countires (e.g., the United States, Japan), but recently trade volume with China, India, and other Asian countries, as well as with the Middle East, has increased substantially.

During the 1990s, the region's trade volume growth was rather moderate compared with that of the other regions of the world, but the first decade of the 21st century has seen a remarkable per annum growth of 15% in trade (i.e., the equivalent annual average rate of increase from 2000 to 2007 according to World Bank data). Still, as of 2007, Sun-Saharan Aftrica's share represented a mere 2.2% of world trade volume. Figures 1.3.1–1.3.5 summarize these trends.



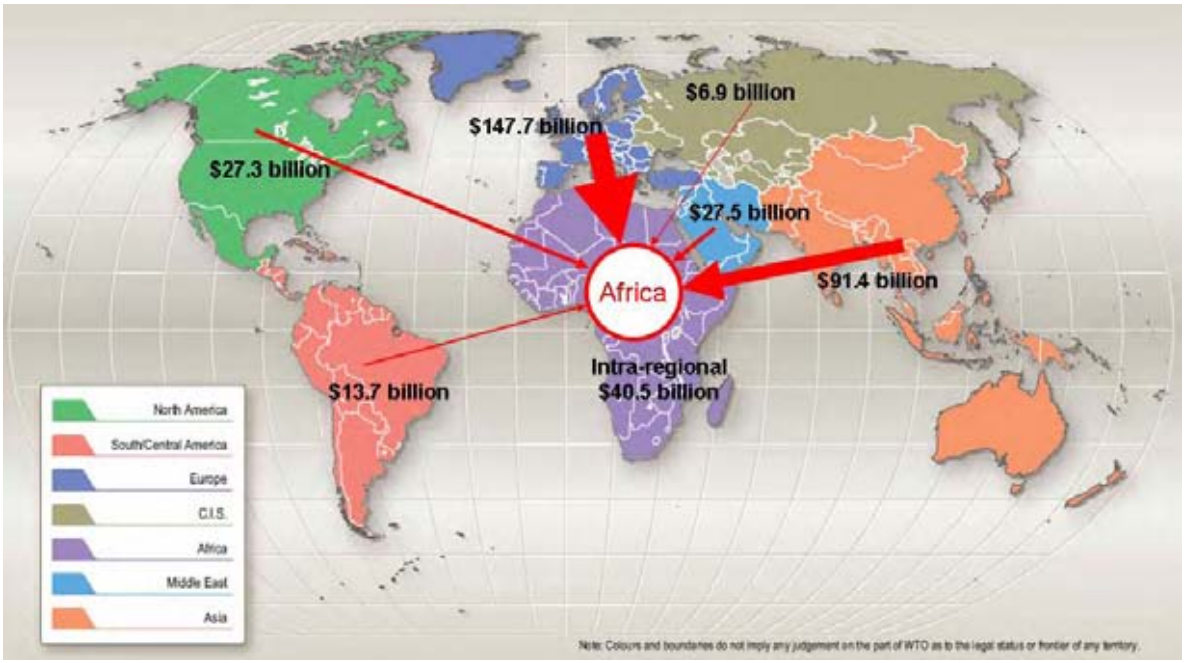
Source: Compiled the statistics from "World Development Indicator Database", World Bank

Figure 1.3.1 Trend of Annual Trade Volume of Sub-Saharan African Countries (1967–2007)



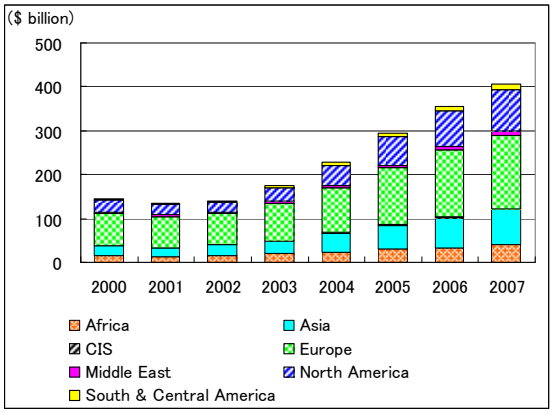
Source: Compiled data and maps from International Trade Statistics, 2008, World Trade Organization (WTO)

Figure 1.3.2 African Exports Bound for Other Regions of the World (2007)



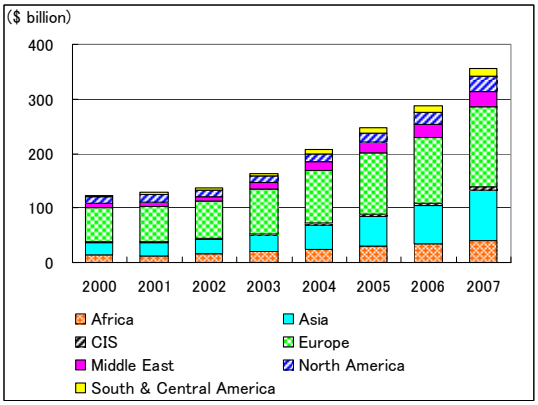
Source: Compiled data and maps from International Trade Statistics, 2008, WTO

Figure 1.3.3 African Imports Originating from Other Regions of the World (2007)



Source: Compiled from WTO Database

Figure 1.3.4
Trend of African Exports to the Other Regions of the World (2000–2007)



Source: Compiled from WTO Database

Figure 1.3.5
Trend of African Imports from Other Regions of the World (2000–2007)

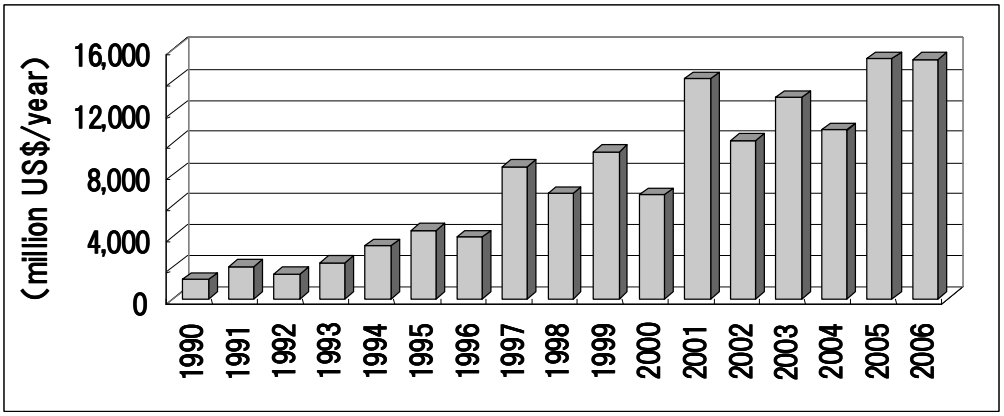
1.4 Investment

To date, Foreign Direct Investment (FDI) has not been active in Sub-Saharan Africa compared with other developing countries and other regions (see Figure 1.4.1 for the data for Sub-Saharan Africa). However, recently, FDI has increased in the mineral resources sector (see Figure 1.4.2), with surging demand worldwide, in particular on the part of newly industrializing countries such as China and India. Increased in the prices of primary resources since late 2003 have made resource investments feasible in areas where previously returns were deemed marginal. In particular, aggressive investments have been made by major Western resources conpanies and smaller enterprises targeting African resources including in inland countries.

In addition, since 2000 political regimes in Africa have stabilized, which has invigorated resource investments in African economies, which has also lead to investments into such sectors

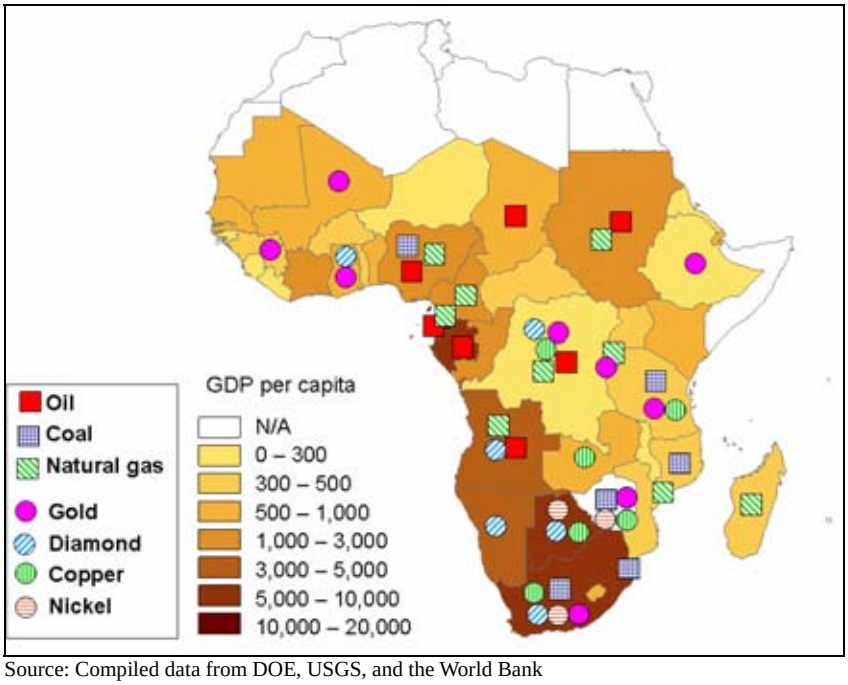
as finance, communications, and retail enterprises. As exemplified by the huge investments by Western telecommunications giants into the African mobile communications market, Sub-Saharan Africa has also been seen as a new consumer economy with a population of 800 million.

On the other hand, speculative withdrawals of funds due to the financial crisis commencing in late 2008 has shrunk demand and triggered a collapse in the prices of mineral resources, which has adversely affected investments in Sub-Saharan resources. However, over the long term, the economy of Sub-Saharan Africa is likely to turn around, due partially to the steady demand for resources by newly industrializing countries.



Source: Compiled data from "World Development Indicator Database", the World Bank

Figure 1.4.1 FDI Inflows into Sub-Saharan Africa (1990–2006)



Source: Compiled data from DOE, USGS, and the World Bank

Figure 1.4.2 GDP per Capita and Major Natural Resources in Each Country (2006)

1.5 Issues in Industrial Development and Transport

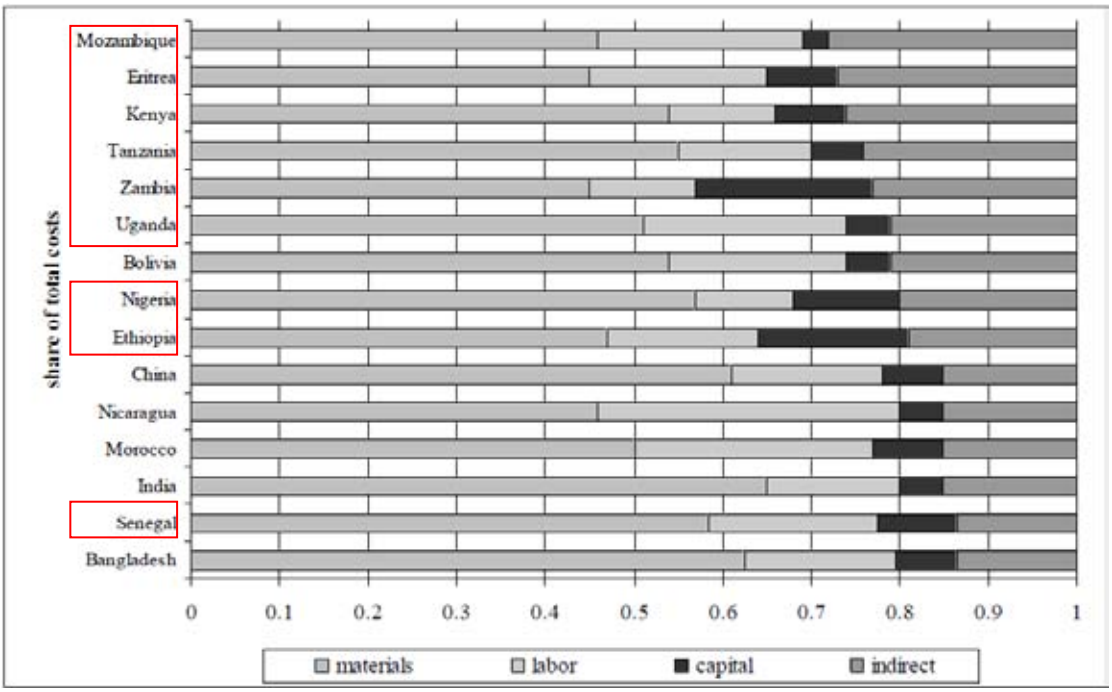
Figures 1.5.1 to 1.5.5 present an overview of issues in industrial development in Sub-Saharan Africa.

The shares of various industrial sectors in Sub-Saharan Africa have been about 20% agro-forestry-fishery, 35% for mining and manufacturing, and 45% for the services sector. These shares have been basically unchanged over the past 40 years.

Major industrial development constraints for the region are deemed to be: (i) high indirect costs (e.g., for transport, energy, land, communications, security); (ii) lower agricultural productivity; and (iii) higher labor cost. Among indirect costs, a higher transport cost structure (Eifert, Gelb and Ramachandran, 2005), compared with Asia and Latin America, is seen to be a major bottleneck for industrial development and economic growth (see Figure 1.5.1 and 1.5.4).

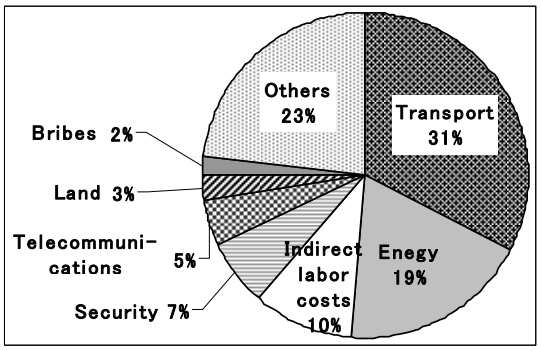
In the agriculture sector, which employs 60-70% of the working population, productivity is very poor, due to high fertilizer prices attributable to high transport costs, coupled with a higher number of small-scale farmers. This poor productivity is reflected in low average harvest yields per hectare of 1.3 tons (2005) for Africa, compared with the Asian average of 3.7 tons.

A higher urban wage rate, attributed to higher food prices and preferential provisions for urban dwellers, also hinders development. All these constraints have resulted in the capital-intensive subsectors (e.g., mining) rather than the labor-intensive subsectors being at the core of the secondary industry sector.



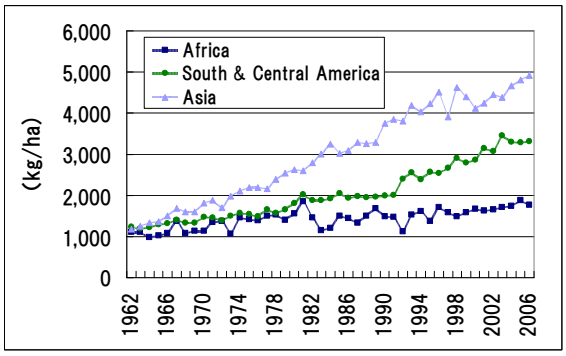
Source: Extracted from Eifert, Gelb and Ramachandran, 2005

Figure 1.5.1 Cost Structure of the Private Enterprises in Sub-Saharan Africa



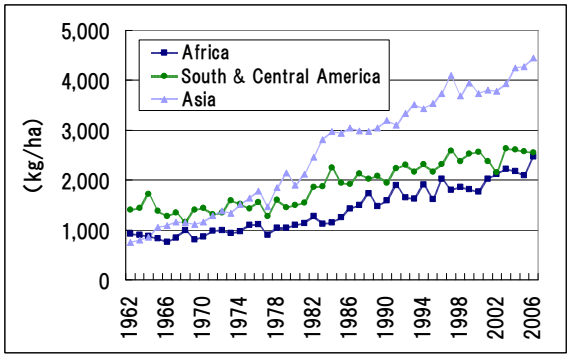
Source: Compiled data from Eifert, Gelb and Ramachandran, 2005

Figure 1.5.2
Indirect Costs of the Private Enterprises in the Sub-Saharan Africa (Kenya)



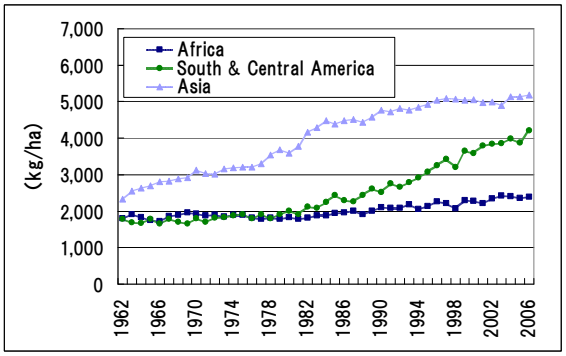
Source: Statistics compiled by the Food and Agricultural Organization (FAO)

Figure 1.5.3
Comparison of Maize Hectare Yield



Source: Statistics compiled by FAO

Figure 1.5.4
Comparison of Wheat Hectare Yield



Source: Statistics complied by FAO

Figure 1.5.5
Comparison of Rice Hectare Yield

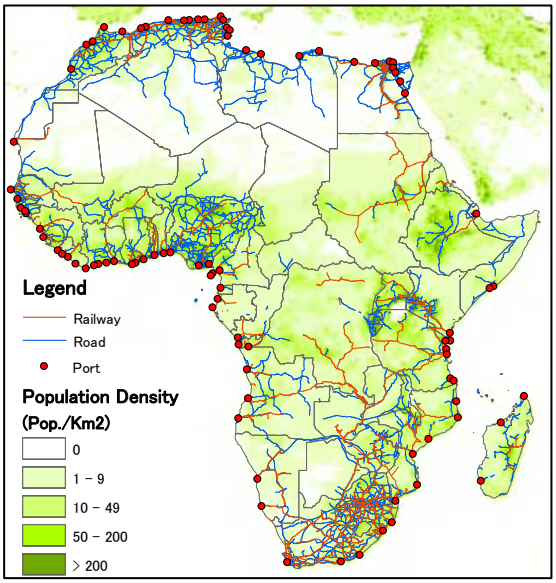
Figures 1.5.6 to 1.5.11 present an overview of issues in transport development in Sub-Saharan Africa.

Most Sub-Saharan logistics infrustructure (e.g., ports, raiways, trunk roads) was constructed during the colonial period. Densely populated inland agglomerations are networked by Cross-Border Transport Infrastructure (CBTI) to service the trade of landlocked countries via ports (see Figure 1.5.10). However, due to the limited availability of navigable inland waterways and the lack of sufficient navigable depth for ports, there are few large-scale container terminals.

Moreover, after independence the limited capacity to maintain roads, railways, and ports has led to deteriorated physical distribution infrastructure. Trunk roads are not well paved, and paved roads are frequently degraded. With respect to railways, rehabilitation and rolling stock repair are well overdue, with capacity decreasing every year. The lack of capacity and operation inefficiency of ports are often cited as freight and cargo shipments converge to the few well-serviced ports.

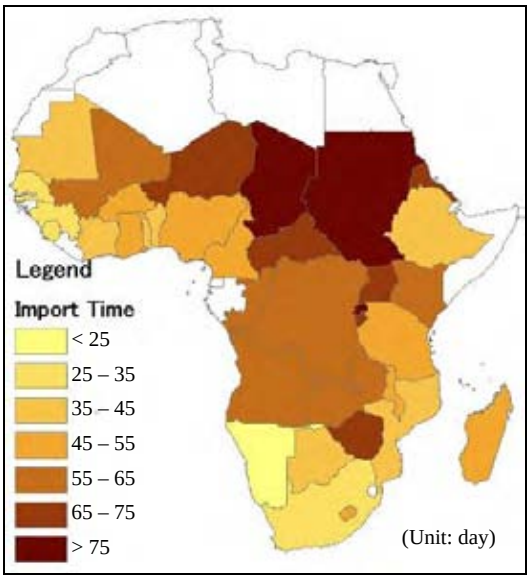
As mentioned, higher transport costs pose a huge bottleneck to industrial growth in the region, a consequence of insufficient services and the provision of poor physical distribution infrastructure, along with poor institutional and operational arrangements. Poor logistics

distribution infrastructure, in terms of physical as well as "soft" aspects, leads to long transport times, which increases economic costs.
The significant economic cost of lost time incurred around the ports and associated service facilities is largely a result of limited port and railway capacity. Other elements of high transport costs in the region include high road transport costs due to poor road conditions and transport cost increases due to railway capacity constraints and reduced cost competitiveness. These high costs are more prevalent inland, resulting in intraregional economic disparities (Figures 1.5.7, 1.5.8, and 1.5.10).



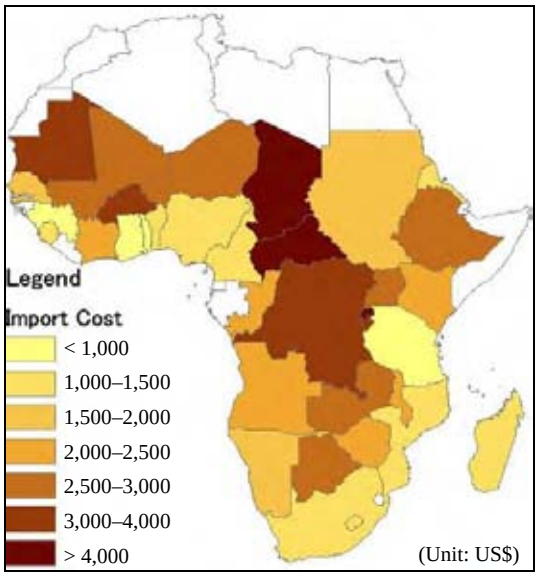
Source: Compiled from various sources

Figure 1.5.6 African Trunk Roads and Railway Network – Distribution of Ports and Populations



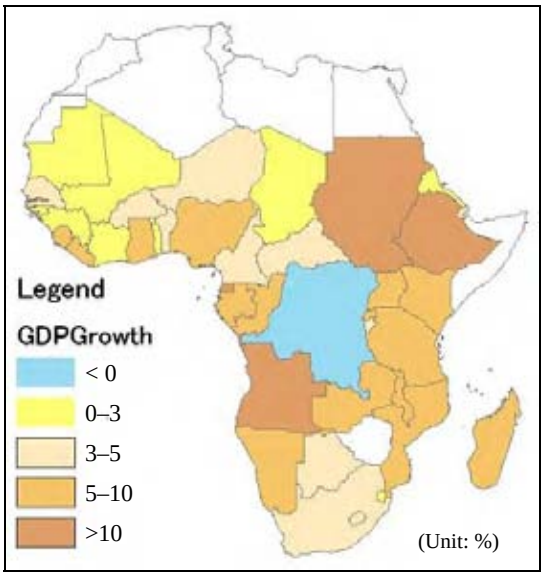
Source: Compiled from World Development Indicators, the World Bank

Figure 1.5.7 Import Time in Average Days from the Port of Unloading (20-ft Container)



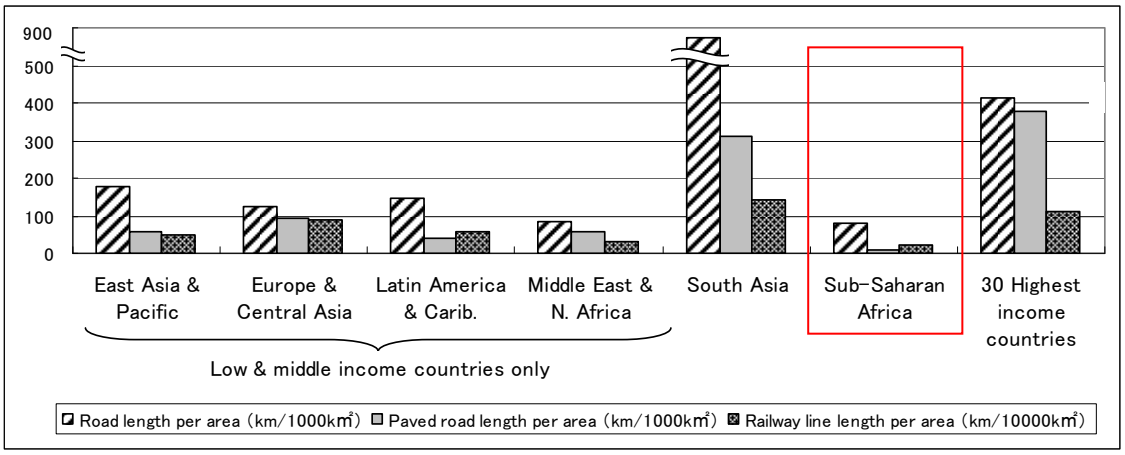
Source: Compiled from World Development Indicators, the World Bank

Figure 1.5.8 Average Transport Cost from the Port of Unloading (20-ft Container)



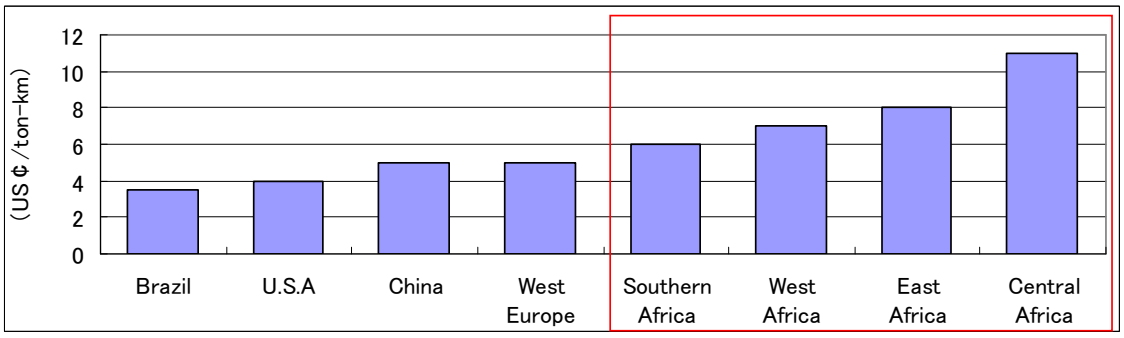
Source: Compiled from World Development Indicators, the World Bank

Figure 1.5.9 Average GDP Growth Rate (2007)



Source: Compiled from World Development Indicators 2006, the World Bank

Figure 1.5.10 Transport Infrastructure Provision in Various Regions



Source: Compiled from Teravaninthorn and Raballand, Transport Prices and Costs in Africa, 2008

Figure 1.5.11 Comparison of Average Transport Cost

1.6 Regional Integration

Regional integration through regional cooperation has been a long-standing issue for Sub-Saharan Africa, which today consists of a collection of countries with small-sized economies and small-to-medium populations, transected by arbitrarily drawn national boundaries due to the colonial era policies. Movement toward regional integration has produced many regional economic communities (RECs) in Sub-Saharan Africa, as shown in Table 1.6.1 and Figure 1.6.1. These RECs aim at economic integration with neighboring countries, e.g., through establishment of customs unions, introduction of a common currency, promotion of cross-border trade, and establishment of common markets. With respect to transport policy, RECs undertake studies on region-wide corridors, coordination with concerned countries on corridor development and provision, and promotion of agreements to facilitate the cross-border movement of goods and people.

Recently, the profile of RECs has increased as they have become recipients of assistance from international development partners. On the other hand, there are many issues affecting REC effectiveness such as determining REC partner country contributions and the lack of enforcement power vis-à-visa participating countries.

The African Union (AU), which is by far the largest regional community, includes all 52 states on the African continent except for Morocco. Roles of AU are shown in the next section.

Table 1.6.1 Major Regional Economic Communities of Sub-Saharan Africa

Name	Participating States
IGAD: Intergovernmental Authority of Development	Somalia, Djibouti, Sudan, Eritrea, Ethiopia, Kenya, Uganda
COMESA: Common Market for Eastern and Southern African States	Egypt, Libya, Djibouti, Sudan, Eritrea, Ethiopia, Kenya, Uganda, Burundi, Rwanda, Congo, Angola, Zambia, Zimbabwe, Malawi, Mauritius, Madagascar, Swaziland, Seychelles, Comoros
EAC: East African Community	Kenya, Uganda, Tanzania, Rwanda, Burundi
SADC: Southern African Development Community	Tanzania, Mozambique, Congo, Angola, Zambia, Zimbabwe, Malawi, Mauritius, Madagascar, Swaziland, Botswana, South Africa, Lesotho, Nambia
SACU: Southern African Customs Union	Swaziland, Botswana, South Africa, Lesotho, Namibia
ECCAS: Ecomonic Community of Central African States	Central Africa, Chad, Gabon, Cameroon, the Congo, Equatorial Guinea, Sao Tome and Principe, Rwanda, Burundi, Congo (Democratic), Angola
CEMAC: Communaute economique et monetaire de l'afrique centrale	Central Africa, Chad, Gabon, Cameroon, the Congo, Equatorial Guinea
ECOWAS: Economic Community of West African States	Nigeria, Gambia, Burkina Faso, Senegal, Benin, Mali, Niger, Togo, Côte d'Ivoire, Guinea-Bissau, Ghana, Guinea, Liberia, Sierra Leone, Cape Verde
UEMOA: Union economique et monetaire Ouest-africaine	Burkina Faso, Senegal, Benin, Mali, Niger, Togo, Côte d'Ivoire, Guinea-Bissau

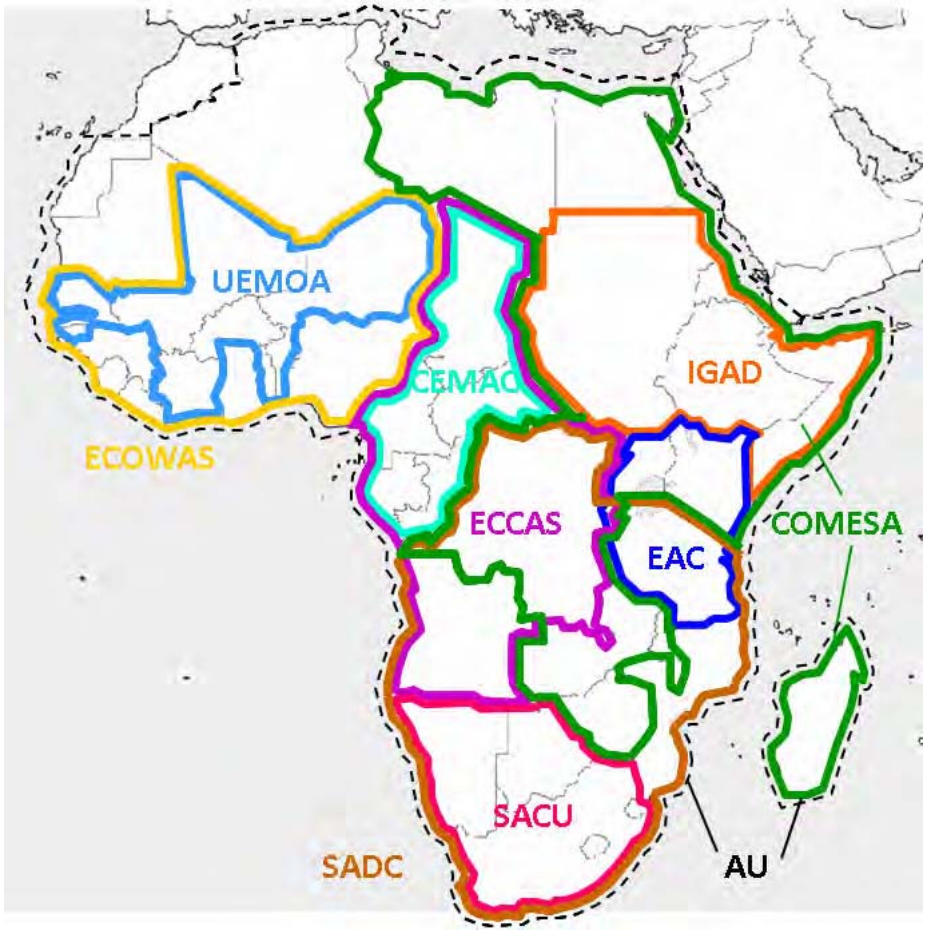


Figure 1.6.1 Geographical Position of Major Regional Communities in Africa

1.7 Trends in Foreign Assistance

1.7.1 Global Trends

With the adoption of the Millennium Development Goals (MDGs) in 2000, donors have doubled their Official Development Assistance (ODA) budget and have focused their assistance on lower-income countries of Sub-Saharan Africa. With this impetus, ODA funds inflow to Sub-Saharan Africa has rapidly increased, as has the grant component, which is now 72.8% of total aid to the region.

In addition, the Organization of African Unity (OAU) adopted in 2001 an initiative, titled New Partnership for Africa's Development (NEPAD), to promote African development through partnerships with industrialized countries, with infrastructure development as one of its targets along with industrial and human resources development. In 2002 with a move of the OAU to the African Union (AU), it was decided that the AU would serve as the executing organ of NEPAD. The international development community has expressed support for the NEPAD initiative and has proceeded with assistance under the banner of this new partnership.

1.7.2 Official Development Assistance (ODA) by Development Assistance Committee (DAC) Countries

(1) Japan

Japan has increased its share of bilateral assistance to the African Region since 2000. Japan has hosted the Tokyo International Conference on African Development (TICAD) four times since 1993, and has formulated its African development assistance strategy based on consultations at these TICAD conferences held once every five years. Japan also aggressively assists the NEPAD initiative. Japan's assistance has centered on grant assistance as the African Region has a concentration of heavily indebted states; among grant assistance, technical assistance has especially been active.

At the TICAD IV held in May 2008, Prime Minister Takeo Fukuda announced an assistance program, including a US$400 million equivalent in yen loans over the coming five years and measures to promote Japanese enterprises' investments in Africa. Under the TICAD IV initiative, Japan is expected to extend more aggressive assistance to Sub-Saharan Africa with an all-out effort by the Ministry of Foreign Affairs and JICA.

(2) The World Bank

The World Bank has renewed recognition of the critical importance of infrastructural development since 2000, considering it an essential element in Sub-Saharan African development. At the Group of Eight (G8) summit in 2005, three priority tiers of assistance to the African Region were expressed: (i) good governance and human resources development, (ii) economic growth, and (iii) poverty reduction. The World Bank has aggressively been addressing these objectives in collaboration with NEPAD, providing assistance through its Sub-Saharan Africa Transport Policy Program (SSATP).

(3) African Development Bank (AfDB)

AfDB is a development finance institution that was established in 1964 to assist African economic development. With the adoption in 2001 of NEPAD by OAU, the AfDB is recognized as a leading institution in promoting African infrastructural development. AfDB has implemented many projects listed in the Short Term Action Plan (STAP) formulated by NEPAD in 2002. Their priority sectors include: (i) Agriculture and the Regional Development; (ii) Social Development; (iii) Transport; (iv) Rural Water Supply and Sanitation; (v) Private Sector Development; (vi) Governance; (vii) Regional Economic Cooperation and Integration; (viii) Environment; and (ix) Capacity Improvement of Assistance Recipient Institutions. More AfDB loans have been extended to the infrastructure sector, of which more than 30% are allocated to the transport sector.

(4) United States

Since the terrorist attacks in the United States on 11 September 2001, the country has been strategically strengthening its assistance to Africa, under the premise that poverty provides breeding grounds for terrorism. The previous (Bush) administration put forth objectives of African assistance, including: (i) establishment of peace and security; (ii) health (HIV/AIDS), hunger alleviation, and education; and (iii) free economy promotion through "aid and trade".

(5) European Union (EU)

At the Africa-Europe Ministerial Conference held in Brussels in October 2001, the EU declared eight priority sectors for African assistance: (i) conflict prevention and resolution; (ii) regional cooperation and integration; (iii) the environment; (iv) HIV/AIDS and communicable diseases;

(v) food security; (vi) human rights and democracy; (vii) the return of cultural items that were stolen; and (viii) assistance with Africa's external debt as well as support of NEPAD. The EU has established consultations with respective Communities in Africa; for example, the EU has regularly held Ministerial dialogues with the SADC since 1994 and with ECOWAS since 2000. In the area of infrastructural development, the EU participates in NEPAD's coordination committee, the Infrastructure Short-Term Action Plan (STAP), and it supports the Sub-Saharan African Transport Program (SSATP).

(6) United Kingdom

The United Kingdom makes it a policy to prioritize assistance for poverty reduction in low-income African countries. In particular, it targets 16 countries, with an emphasis on former British colonial states. Its poverty reduction assistance includes a diverse set of programs, but emphasis is put on: (i) basic areas of primary education, food provision, financial assistance, water supply, and HIV/AIDS; and (ii) governance and capacity building including institutional building, human resources development, and performance evaluation. The United Kingdom has also extended bilateral assistance in Africa through international collaboration with NEPAD. Moreover, in accordance with the basic principle of NEPAD, it is providing financial and technical assistance through program implementation toward promoting intra-African trade as a means of poverty reduction.

(7) France

France puts a high priority on African development. It assumes a central and leading role in establishing aid structures among both industrialized countries and African countries. It puts emphasis on the Francophone countries of Western Africa, and on South Africa, Mozambique, Angola, Ethiopia, and Kenya.

France has also been aggressive in assisting NEPAD regarding: (i) institutions and governance; (ii) economic growth and sustainability; (iii) infrastructural development assistance; and (iv) agriculture. With respect to transport infrastructure, France is engaged in the Western African Road Corridor Project. It is also examining the potential of assisting the railways sector in Mali and Senegal.

(8) China

China has recently become aggressive in assisting Africa. China's assistance now covers almost all African countries with the number increasing over the years. Its assistance mainly includes: (i) construction assistance; (ii) materials grants-in-aid and food supply; and (iii) technical assistance. In particular, construction assistance accounts for more than 80%. Such construction assistance is extended to sectors such as: (i) manufacturing; (ii) agriculture; (iii) traffic and transportation; (iv) hydropower generation; and (v) energy. China's engagement in NEPAD includes the agricultural and mining sectors, in particular.

Chapter 2 Analysis of Cross-Border Transport Infrastructure in Sub-Saharan Africa

2.1 Definition of Cross-Border Transport Infrastructure (CBTI)

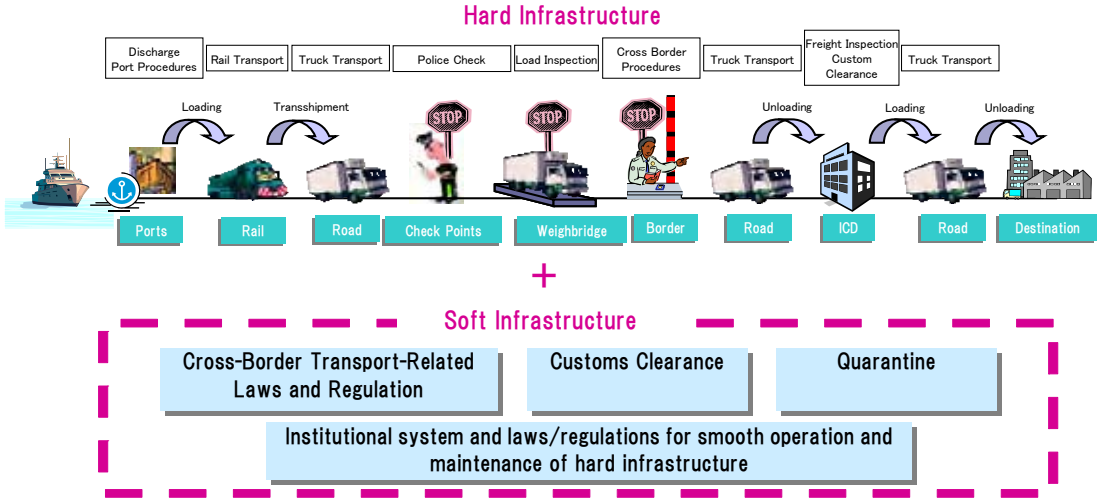
In this study, Cross-Border Transport Infrastructure (CBTI) is defined as the infrastructure necessary for traffic crossing borders between countries, including not only "hard" infrastructure consisting of international transport corridors and including ports/harbors, railways, airports, roads, transshipment facilities, border facilities, weighbridges, and inland container depots (ICDs), but also supporting "soft" infrastructure, including maintenance management, financial measures, organizations/institutions, operational schemes, cross-border traffic regulations, and human resources. Soft CBTI includes regional economic communities (RECs) and international agreements, border crossing facilitation measures (e.g., regarding customs clearance and quarantine procedures) to support the entire CBTI system. Table 2.1.1 and Figure 2.1.1 show the various components of CBTI.

The cross-border traffic to be covered in the study are not only those between Sub-Saharan African countries but also those between Sub-Saharan Africa and other parts of the world. Therefore international ports/harbors and international airports are also among those to be addressed. Since cross-border transport in Sub-Saharan Africa at present is mainly cargo traffic (logistics), which is essential for promoting the economic growth and industrial development, this study basically focuses on cargo traffic movement.

Table 2.1.1 Components of CBTI

Type	Major Components
Hard Infrastructure	Major infrastructure: ports, railways, airports, and road infrastructure facilities (plus freight transit facilities, border facilities, weighbridges, and ICDs)
Soft Infrastructure Supporting Hard Infrastructure	Maintenance, financial measures, organizations, operation schemes, cross-border regulations (e.g., regarding police checks), and capacity development
Soft Infrastructure for CBTI System	RECs, international agreements, custom and quarantine measures, bonding systems, etc.

Source: The Study Team



Source: The Study Team

Figure 2.1.1 CBTI Components

2.2 Review of Issues Relating to CBTI in Sub-Saharan Africa

2.2.1 Historical Review of CBTI Development in Africa[1]

(1) From the Colonial Period to the 1980s

Historically, the typical colonial transport system in Africa consisted of penetration lines or transport corridors (mainly railways based) linking export ports with their hinterlands. For example, the origin of the modern railway system in Kenya was the port of Mombasa and the railway line built in the 1890s and the first years of the 20th century, linking the port to Nairobi and Kisumu with a ferry connection to Port Bell near Kampala and Jinja in Uganda, and on to Mwanza, Bukoba, and Musoma in Tanzania. During the first three decades of the 20th century, the railway was extended with a number of branch lines.[2]

While there was an increase in transport investments for a short period of time in many Sub-Saharan African countries in the 1960s at about the time of independence (with many new ports, railways, and roads built before or after independence), from the 1960s to the mid-1980s transport was accorded a low priority in Africa. During this period, there was a shift from centralized to decentralized and local economic development in the industrialized countries, as well as a shift from an export orientation to an import orientation with a focus on self-reliance and local rural development in many Sub-Saharan African countries.[3] Transport was downgraded in national plans; while provision was sometimes made for rural roads, few new trunk roads were built and maintenance was neglected. By the mid-1980s transport infrastructure in Africa was generally worse than it was in the late 1960s.

While the deterioration in African transport systems between the 1960s and the 1980s was due in part to underinvestment in transport infrastructure, the economic institutions developed as part of the import-substitution industrialization policies implemented by most African countries after independence also played a role. These policies generally included the following elements: (i) development of an industrial sector on the basis of the existing small concentrated home market for industrial goods and the import of machinery and often the necessary production inputs: (ii) high customs barriers to protect infant industries and secure government revenue; (iii) an overvalued currency, which reduced the costs of imported machinery and production inputs; (iv) agricultural policies focusing on export crops to finance the imports necessary for the industrialization process, and stable food production to guarantee food security[4]; and (v) the

[1] This section draws extensively from: (i) Patrick O. Alila, Meleckidzedeck Khayesi, Walter Odhiambo, and Poul Ove Pedersen, *Development of African Freight Transport – The Case of Kenya*, DIIS [Danish Institute for International Studies] Working Paper No. 2005/6, 2005; (ii) Poul Ove Pedersen, *The Logistical Revolution and the Changing Structure of Agriculturally Based Commodity Chains in Africa*, CDR [Centre for Development Change] Working Paper 2.12, October 2002; (iii) Poul Ove Pedersen, *The Tanga-Moshi-Arusha Corridor: Decline or Restructuring of an African Transport Corridor*, CDR Working Paper 01.6, October 2001; (iv) Poul Ove Pedersen, *The Role of Freight Transport in Economic Development: An Analysis of the Interaction between Global Value Chains and Their Associated Transport Chains*, DIIS Working Paper No. 2007/12, 2007; (v) Poul Ove Pedersen, *The Changing Structure of Transport under Trade Liberalisation and Globalization and its Impact on African Development*, CDR Working Paper 00.1, January 2000; and (vi) Poul Ove Pedersen, *Zimbabwe's Freight Transport and Logistical System*, CDR Working Paper 02.4, February 2002.

[2] Patrick O. Alila, Meleckidzedeck Khayesi, Walter Odhiambo, and Poul Ove Pedersen, *Development of African Freight Transport – The Case of Kenya*, DIIS [Danish Institute for International Studies] Working Paper No. 2005/6, 2005, p. 9.

[3] Around 1970 there was change in development thinking from modernization theory to dependency theory and basic needs strategies; while modernization theory saw transport infrastructure as a main precondition for development, the basic needs strategy shifted the focus to rural development. However, in the 1990s a new economic geography introduced by Paul Krugman and other economists focused attention again on transport and location issues, which led to increased donor support for transport investments.

[4] During this period, in most Sub-Saharan African countries production and marketing of major agricultural cops

development of social services, mainly education and health, in both rural and urban areas. Import substitution policies led to sellers' markets in which almost anything that could be produced could be sold, often at the factory gate. There was little or no incentive to develop an effective marketing and distribution system.

As foreign currency became scarcer in the 1970s, truck fleets stagnated or contracted in most Sub-Saharan African countries. Import permits were generally reserved for parastatals and other large enterprises, and it became more difficult for individuals to own vehicles. Trucks were concentrated in the capital cities and large regional cities where the parastatals were headquartered. Rural transport, which had before independence been undertaken mainly by private rural traders, was taken over by marketing boards, which either invested in the own truck fleets or outsourced transport to state transport companies or sometimes to private trucking enterprises.[5] The resulting centralization of transport was expected to result in greater efficiency, but in fact transport became less efficient. At the same time, demand for transport increased because, as a consequence of various factors (e.g., improved extension services, subsidized farm inputs), the production of the main crops moved out to peripheral areas located farther from the market and where the infrastructure was poor. The efficiency of rural transport is generally low, due to the seasonal demand for transport, which results in few return trips, but traditional rural traders, who bought a range of crops and distributed consumer goods and farm inputs, had a greater chance of obtaining return loads than the specialized crop parastatals. As a result, the costs of the marketing boards increased and they had increasing difficulty of adequately serving the farmers. Also, a strong focus on monocropping tended to increase seasonality and this reduce transport efficiency.

When the parastatals found it increasingly difficult to maintain their crop purchasing monopoly in rural areas during the 1970s, their transport monopoly supported by restrictive licensing practices became a means to maintain their trade monopoly. Licenses and import allocations were generally not given to vehicles stationed in rural areas because such trade was seen as undesirable. The centralization of rural transport capacity in the crop parastatals meant that small entrepreneurs and farmers could not easily find transport for alternative products and other products, which contributed in part to the lack of diversification of products and markets.

Transport policy continued to favor railways during this period from the late 1960s to the 1980s, e.g., by controlling development of roads parallel to railway lines[6], by refusing licenses to parallel trucking routes, by requiring parastatals to use the railways as much as possible. However, investment in track maintenance and new rolling stock was insufficient and railways also began to decline; most African railways were built for strategic reasons and have historically operated with deficits, although that of Zimbabwe has been reported as an exception.[7] Also, railways were not equipped to serve specialized markets; consider, for

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were controlled by crop-specific parastatal marketing boards, which were responsible for the post-harvest trade, collection, and processing of controlled crops.

[5] The situation of rural transport in Kenya has generally been less severe than elsewhere in Africa because parastatal monopolies were maintained less strictly there than elsewhere, and because of the establishment of a dense network of minibuses (*matatus*) all over Kenya beginning in 1973. Patrick O. Alila, Meleckidzedeck Khayesi, Walter Odhiambo, and Poul Ove Pedersen, *Development of African Freight Transport – The Case of Kenya*, DIIS [Danish Institute for International Studies] Working Paper No. 2005/6, 2005, p. 6.

[6] E.g., the last links in the main roads parallel to railway lines in Tanzania and Ghana were not built until the late 1950s, on the eve of independence. Patrick O. Alila, Meleckidzedeck Khayesi, Walter Odhiambo, and Poul Ove Pedersen, *Development of African Freight Transport – The Case of Kenya*, DIIS [Danish Institute for International Studies] Working Paper No. 2005/6, 2005, p. 6.

[7] Zimbabwe inherited a railway (and road) network that at independence in 1980 was probably the best in Sub-Saharan Africa (other than that of South Africa), but it only served the urban and white settler areas. Poul Ove Pedersen, *The Role of Freight Transport in Economic Development: An Analysis of the Interaction between Global*

example, one study found that in Tanzania it often took more than a month to ship goods by rail from western Tanzania to Dar es Salaam; another study found that in Ghana in 2000 the railway was still unable to carry containers.[8]

(2) The Effect of the "Logistical Revolution" on Africa: From the 1990s to Present

The "logistical revolution" and containerization developed rapidly from the late 1960s in the industrialized and industrializing countries, but did not have significant impact on African transport until the late 1980s or early 1990s. While African imports were containerized to some extent, since European importers wanted to protect their goods, African transport infrastructure was not ready to export the containers. But during the 1990s, trade liberalization and structural adjustment policies triggered a process of change that was invigorated by increased competition from South Africa following the end of the embargo on South Africa in 1994. Transport has no longer been viewed as an isolated activity, but has become closely integrated with trade and production in complex logistic systems in which travel timer and timing are at least as important as transport costs.

Major changes begun during this period and continuing to the present include the following:

(i) Rapid containerization has reduced the cost of transshipment and made door-to-door transport possible. Containerization of high-value goods has increased the security of transport, while containerization of bulk goods has increased the flexibility of transport since a container can be shipped when full without waiting for collection of an entire shipload. Containerization has also allowed for greater market segmentation and product differentiation, a rapid rationalization of liner shipping, and integrated door-to-door transport organized and controlled by a rapidly growing sector of international freight forwarders.[9]

(ii) Containerization has also increased the size of transport vehicles, which has increased maintenance problems and created demand for new larger-capacity infrastructure, and led to serious bottlenecks in all modes of transport; particularly in the case of road transport, increases in vehicle size and an inability to control excess vehicle loads has led to rapid road deterioration.[10]

(iii) Institutional and organizational factors in transport have become increasingly important, since (a) transport costs are quite sensitive to the efficient utilization of transport capacity (which depends very much on the ability to obtain return freight and vehicle turnaround time), and (b) transport speed and reliability have become more important as a result of globalization and just-in-time production, which requires goods to be delivered in vary narrow time windows, which in turn requires greater frequency of service on the various modes of transport. Again, the focus has increasingly shifted to multimodal, door-to-door transport, which has led to changes in the transport sector to which large state organizations have found it difficult to respond.

(iv) Sub-Saharan African shipping companies, airlines, ports, and railways have been slowly commercialized or privatized. Parastatals and large private enterprises that previously

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Value Chains and Their Associated Transport Chains, DIIS Working Paper No. 2007/12, 2007, p. 11.

[8] Poul Ove Pedersen, *The Logistical Revolution and the Changing Structure of Agriculturally Based Commodity Chains in Africa*, CDR [Centre for Development Change] Working Paper 2.12, October 2002, p. 7.

[9] However, many containers are still emptied or loaded at or near the port, for a number of reasons, e.g., many containers hold consolidated shipments with goods to several consignees, the cost of loading/unloading containers is low due to low labor costs, and trucks can carry more goods without the container; few potential recipients of containers have the forklifts or cranes necessary to handle the containers.

[10] Roads with a design life of 20–25 years have deteriorated significantly in 5–10 years; consider, for example, that when axle load is doubled, road deterioration increases by about 30 times.

operated their own truck fleet have increasingly outsourced their transport requirements to transport firms to reduce costs and compete with foreign investing in Sub-Saharan Africa.[11] Therefore, the trucking industry in Sub-Saharan Africa has been growing. However, ports remain major bottlenecks in the Sub-Saharan African transport system, including in East Africa.[12]

(v) Sub-Saharan African transport networks have became increasingly hierarchical, leaving most of the region in a relatively peripheral position.[13] This development is most apparent in air transport, with the international route network increasingly focused on a few hub airports (e.g., Nairobi and Addis Ababa in East Africa, Johannesburg in Southern Africa, Abidjan and Dakar in West Africa). Regarding sea transport, there is strong competition among ports to achieve hub status, with sea transport becoming increasingly hub and spoke oriented with the increase in containerization, although to some extent such concentration of traffic has been limited by the poor state of cross-border land transport.

(vi) Although infrastructure networks remain important, new efficient forms of supply management and information systems, which coordinate transport and storage with production and marketing, are more important than previously. These new forms of logistic organization are more difficult to develop with donor funding, but are necessary to link with the global economy.[14]

2.2.2 Road Sector

(1) Overview

Road transport is the most important mode of transport in Sub-Saharan Africa. Road network development in the region, however, has lagged far behind that in other parts of the world. According to the World Bank's World Development Indicator, the total length of highways in Sub-Saharan Africa is 1.66 million km, with a highway density of 104km/1,000km^2.[15] Only 9% of the total length has been paved and even arterial highways are largely left unpaved (Figure

[11] Licensing of trucks for hire was administered less strictly beginning in the 1990s. For example, in Kenya by 2002 fees on licenses for trucks for hire (and on buses) were abolished and licenses are now issued on request; today anyone with a truck can transport goods for others. Patrick O. Alila, Meleckidzedeck Khayesi, Walter Odhiambo, and Poul Ove Pedersen, *Development of African Freight Transport – The Case of Kenya*, DIIS [Danish Institute for International Studies] Working Paper No. 2005/6, 2005, pp. 18, 46. Also, the number of small trucks per hire increased in the cotton-growing areas of Zimbabwe in the late 1990s and in the coffee-growing area of Moshi, Tanzania a taxi-like system of pickups developed. Poul Ove Pedersen, *The Logistical Revolution and the Changing Structure of Agriculturally Based Commodity Chains in Africa*, CDR [Centre for Development Change] Working Paper 2.12, October 2002, p. 14.

[12] As ships became larger, inefficiency in freight handling leads to longer waiting times for ships, while the costs of waiting increase. While there has been increasing pressure from the shipping industry to increase port efficiency, ports have been major revenue earners for the governments and for politically powerful groups that benefit from inefficient and corrupt practices at the port. Attempts to reorganize the region's ports have met with great resistance, although progress has been achieved in recent years.

[13] Maersk became a dominant shipping line in Africa in the 1990s when it established a hub-and-spoke system based on a round-the-world route linking the east coast of North America–the Mediterranean Sea–Singapore–Hong Kong–the west coast of North America. Similar, less successful attempts have been made to create hub-and-spoke networks within Africa (e.g., Durban, Abidjan, and Dakar have to a limited extent served as hub ports). However, many of the ports that aspire to hub status have serious capacity problems that constrain their development as hubs. Poul Ove Pedersen, *The Logistical Revolution and the Changing Structure of Agriculturally Based Commodity Chains in Africa*, CDR [Centre for Development Change] Working Paper 2.12, October 2002, p. 13; and Poul Ove Pedersen, *The Changing Structure of Transport under Trade Liberalisation and Globalization and its Impact on African Development*, CDR Working Paper 00.1, January 2000, p. 7.

[14] While the development of such new logistic systems in the industrialized countries were driven by increasing wages and cost considerations, they are more expensive than traditional systems of transport organization in low-income countries, reducing the incentive for change.

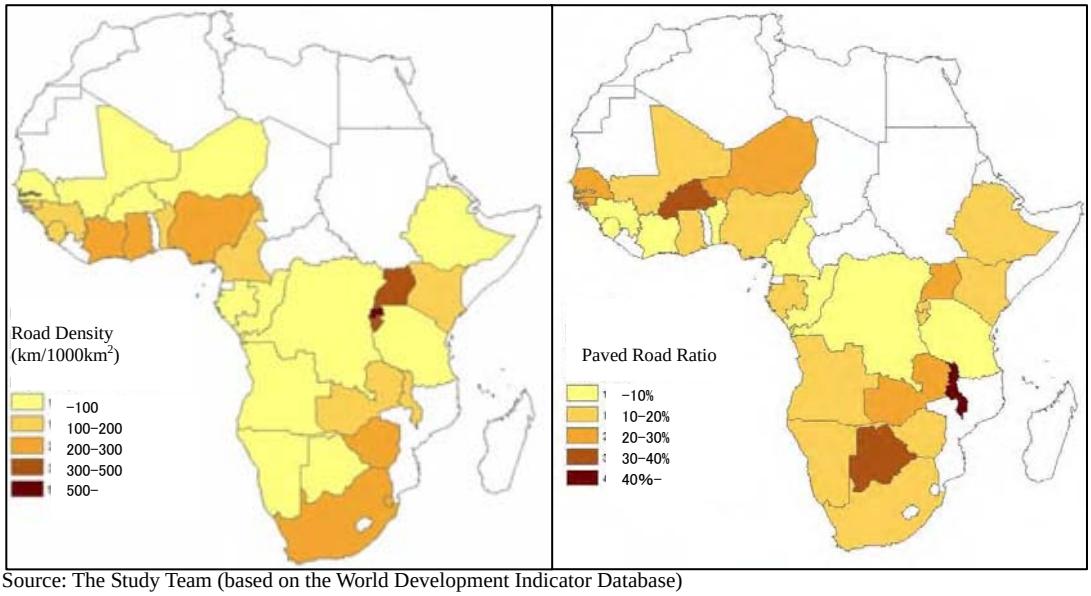
[15] Values of road density compared for reference: 3,160 for Japan, 1,600 for the UK, 1,030 for India, 700 for the United States, 190 for Indonesia, and 110 (km/1,000km^2) for Thailand. Source: World Road Statistics, 2005 from the Japan Road Association

2.2.1). Regarding road density, while South Africa and Nigeria have a high-density network of roads, in other Sub-Saharan countries, the density is very low. Such scarce road infrastructure is considered a major cause of high transport costs in the region (see Chapter 1).

Moreover, there are many problems regarding maintenance management. Due to the chronic shortage of maintenance and rehabilitation budgets, operation by overloaded trucks, and the lack of capacity by contractors to effectively maintain and rehabilitate roads, even already paved road sections are deteriorated rapidly in the region. These factors are also a major cause for high transport costs.

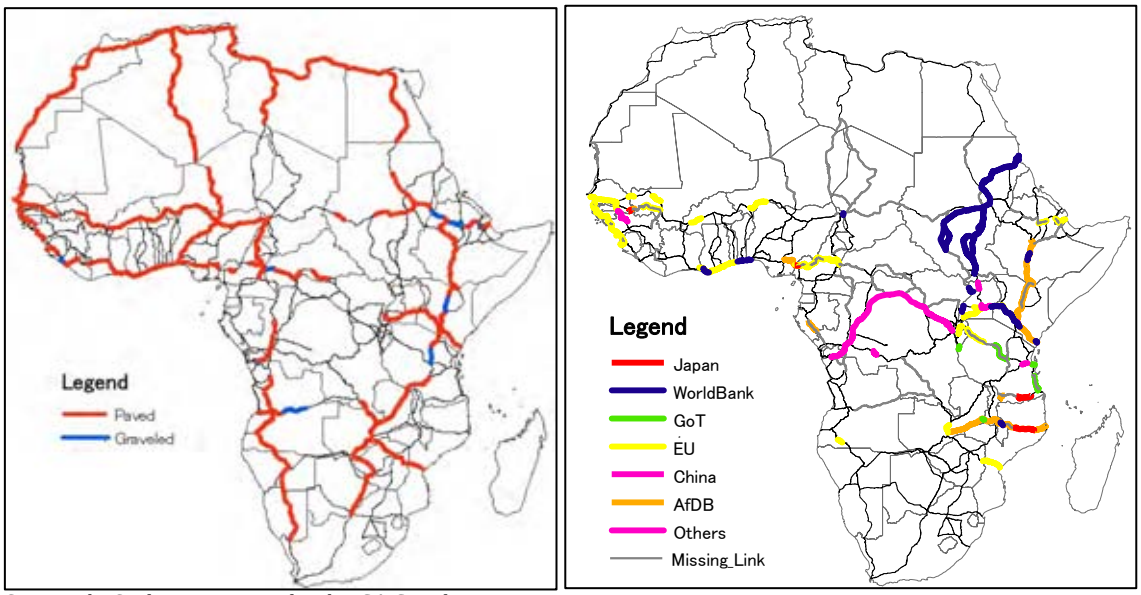
Considering this situation, various international development partners are actively supporting road improvement. Trunk roads along each international transport corridor (mentioned below) in particular have received support from many development partners, including from Japan, the World Bank, the European Union (EU), and the African Development Bank (AfDB). Development partners are providing active support for roads in East Africa and West Africa as shown in Figure 2.2.2. In addition, recognizing that securing financial resources for road maintenance is an important task, a Road Funds has been established, a World Bank-led special fund to establish an institutional scheme for suitable road maintenance.

In addition, there are many other problems with the legal system for road transport. Integration of regulations of cross-border transport including traffic regulations is underway in the region, but harmonization issues remain. Legal and institutional aspects of these issues are detailed in Chapter 4 mainly for the case of East Africa.



Source: The Study Team (based on the World Development Indicator Database)

Figure 2.2.1 Road Density and Paved Road Ratio



Source: The Study Team prepared with JICA Corridor Map

Figure 2.2.2 Pavement and Donor Assistances on Major Road Network

(2) International Traffic Corridor

As the necessity to develop CBTI in Africa has been recognized since at least the 1970s, several development partners prepared international corridor strategies. Regarding road sector in particular, AfDB and the World Bank have developed Sub-Saharan Africa-wide international corridor networks, and have assisted projects to improve them. Major international corridor plans are summarized below. (Although the Sub-Saharan Africa Transport Policy Program, SSATP, covers not only roads but also ports and railways, it is included in this section for convenience.)

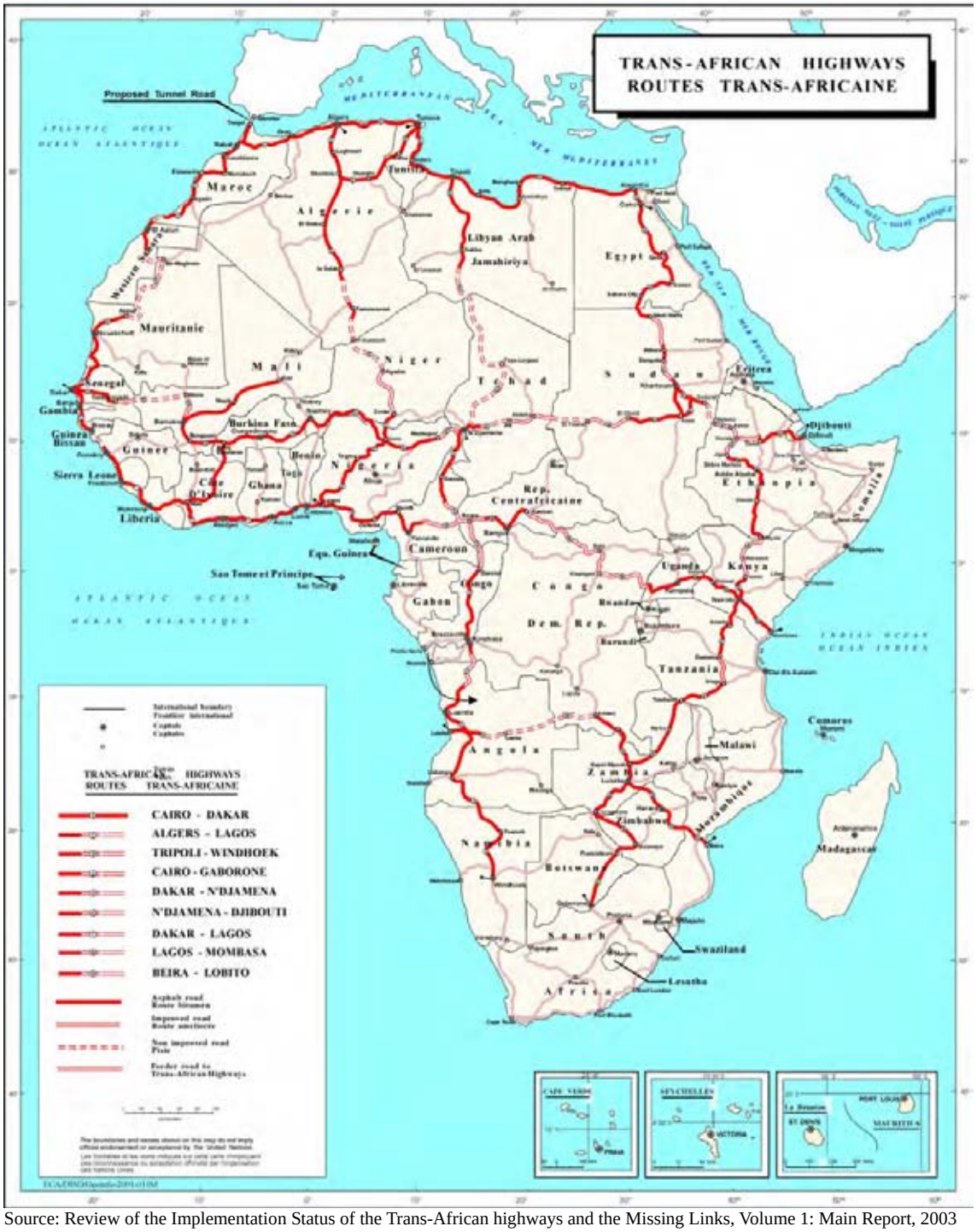
(i) Trans-African Highway (TAH)

The Trans-African Highway (TAH), the first comprehensive regional transport network in Sub-Saharan Africa, was proposed in 1971. This corridor plan covers only road development as suggested by its name; it does not include railways or ports. However, due to funding shortages, the concept failed to receive approval by many Sub-Saharan African countries and even now is largely undeveloped. On the other hand, in 2003, the United Nations Economic Commission for Africa (UNECA) reviewed progress of TAH development, and called, together with AfDB, for development and maintenance of nine TAH routes, with funding to be provided by the countries traversed by the route. Table 2.2.1 and Figure 2.2.3 summarize the TAH route.

Table 2.2.1 Route of the Trans-African Highway

	Section	Length (Km)
TAH1	CAIRO–DAKAR	8,640
TAH2	ALGIERS–LAGOS	4,500
TAH3	TRIPOLI–WINDHOEK	9,610
TAH4	CAIRO–GABORONE	8,860
TAH5	DAKAR–N'DJAMENA	5,220
TAH6	N'DJAMENA–DJIBOUTI	4,500
TAH7	DAKAR–LAGOS	4,010
TAH8	LAGOS–MOMBASA	6,260
TAH9	BEIRA–LOBITO	3,520
Total		54,120
	(Duplicated Route	1,670)
	Total Net Length	52,450

Note: JICA, Research on Assistance for Transport Infrastructure in Africa, 2008



Source: Review of the Implementation Status of the Trans-African highways and the Missing Links, Volume 1: Main Report, 2003

Figure 2.2.3 Trans Africa Highway

(ii) SSATP Regional Economic Corridors

The SSATP (Sub-Sahara Africa Transport Policy Program) corridors include major international corridors in Sub-Saharan Africa under the SSATP established in 1987 by the World Bank and UNECA. The SSATP now encompasses 35 Sub-Saharan African countries, with funding from 11 development partners, led by the World Bank, and operated in cooperation with eight Sub-Saharan African economic communities and five international organizations (Table 2.2.2). The SSATP emphasizes development of transport corridors from each inland nation to large-scale international ports to promote trade in Sub-Saharan Africa and focuses on development of eight regional economic corridors. Meanwhile, the SSATP itself is mainly engaged in strategy formulation/research studies, policy deployment, human resources/capability development, workshops, and seminars for comprehensive improvement of transport infrastructure in the region (with an annual budget of about US$6 million from 2004 through 2011). Each development partner including the World Bank prepares its infrastructure investment program based on SSATP strategies. Table 2.2.3 summarizes major achievements of the SSATP, and Figure 2.2.4 shows the SSATP corridor network.

Table 2.2.2 SSATP Development Partners and Participating Countries

Donors (11)	World Bank (Host), Europe Committee, UNECA, AfDB, Denmark, France, Ireland, Norway, Sweden, United Kingdom, and Islamic Development Bank
Member Countries (35)	Angola, Benin, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic , Chad, Cote d'Ivoire, Congo, Democratic Rep. of Congo, Ethiopia, Gabon, Gambia, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Swaziland, Tanzania, Togo, Uganda, Zambia, and Zimbabwe
RECs in Sub-Saharan Africa (8)	Communaute Economique et Monetaire de l'Afrique Centrale (CEMAC), Common Market of Eastern and Southern Africa (COMESA), East African Community (EAC), Economic Community of Central African States (ECCAS), Economic Community of West African States (ECOWAS), InterGovernmental Authority on Development (IGAD), Southern African Development Community (SADC), and Union Economique et Monétaire Ouest Africaine (UEMOA)
International Agencies (5)	United Nations Economic Commission for Africa (UNECA), African Union (AU) Committee/New Economic Partnership for Africa (NEPAD), African Development Bank (AfDB), International Labour Organisation (ILO), and the United States Agency for International Development (USAID)

Source: World Bank Sub-Sahara Africa Transport Policy Program Website

Table 2.2.3 Major Achievements of the SSATP

Fields	Achievements
Road Maintenance and Operations	• Establishment of road funds in 27 countries to secure budget for road maintenance. • Establishment of road agencies/authorities in 18 countries in Sub-Saharan Africa • Capacity building of road agencies/authorities for road management and finance • Reduction in the average time for payment to contractors to 32 days from 9-12 months before
Strategy for Transport Services	• Assistance for development of regional transport policies and strategies in Malawi and Ethiopia • Studies of urban transport systems in Dakar (Senegal), Douala (Cameroon), Nairobi (Kenya), and Kampala (Uganda), focusing on institutions, finance, and regulation
Trade Promotion	• Establishment of a one-stop border post at Malaba between Kenya and Uganda (Northern Corridor) • Reduction in truck turnaround times between Mombasa and Kampala from 10 days in 1995 to 6.25 days in 2005 (Northern Corridor) • Monitoring at Beit Bridge to identify the causes for delays; sensitization process formulated through Beit Bridge action plan committee (North-South Corridor) • Establishment of one-stop border posts at Chirundu, Zambia, and development of Beit Bridge (North-South Corridor) • Establishment of corridor management group (North–South Corridor) • Completion of Dar es Salaam port security audit (North–South Corridor) • Carrying out a workshop organized by Comité International du Bassin du Congo Oubangui–Sangha (CICOS)/SSATP in October 2006, identifying for the first time many issues regarding traffic flow impediments in the Congo basin (Central African Corridor) • Establishment of a one-stop border post at Cinkansé (between Burkina and Ghana), which is under construction, and a border post at Paga (Burkina and Ghana), which has been initiated (Western Corridor) • Adoption by member states of an agreement/memorandum of understanding on the establishment of corridor management committees/groups in Western Africa (Western Corridor) • Action taken by government of Ghana to reduce the number of authorized checkpoints between the port of Tema and the border of Burkina Faso to four checkpoints (Western Corridor)
Cross-Cutting Issues	• Studies of cross-cutting issues such as gender, road safety, and job development, related to corridor development
Dissemination	• Development and provision of guidelines and tools in various sectors • Preparation of a video to promote transport policy

Source: SSATP (2007), Second Development Plan 2008–2011

Source: SSATP Working Paper No. 86 (2007), Institutional Arrangements for Transport Corridor Management in Sub-Saharan Africa

Figure 2.2.4 SSATP Corridor Network

(iii) Regional Spatial Development Initiative (SDI)

SDI is a concept that was put forward in 1996 in accordance with the industrial development strategy of South Africa. This concept is based on SADC's Development Corridor initiative and at first their targets were mainly within the SADC subregion, but later with NEPAD's intervention the coverage of SDI has been expanded and now includes not only traffic corridors (e.g., roads, railways, bridges, ports, inland waterways) but also other infrastructure (e.g., electric power facilities).

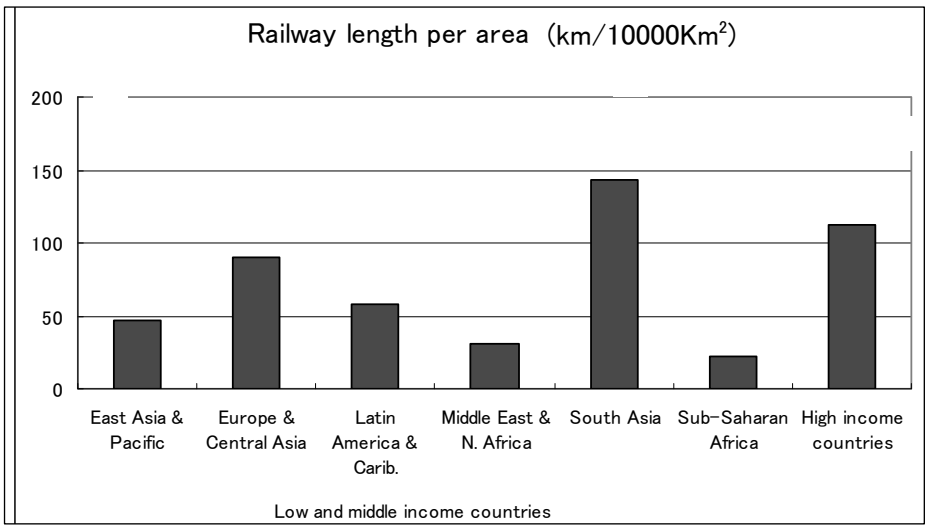
2.2.3 Railway Sector

As mentioned in the historical background, Sub-Saharan African railways were mostly developed in the colonial era to transport export goods mainly along the routes linking ports with inland areas. Total railway network length in the region is about 54,000 km, 20,000 km of

which is in South Africa. As for operations, 100,000 ton-km of the total 130,000 ton-km cargo handling are within South Africa, indicating the relative development of this sector in that country(see Table 2.2.4). Railway network density in the region is lower than elsewhere in the world, as shown in Figures 2.2.5–2.2.6.

It is generally expected that railway transport can be used such as for goods headed to inland countries or the transport of mineral resources (i.e. coal or iron ore) other than rare metals since it is economically more advantageous for longer-distance and heavier-cargo carriage than motor transport.

In recent years, the World Bank has promoted railway privatization in many countries in the region.[16] Concession schemes are in force in Tanzania, Kenya/Uganda, Cameroon, Gabon, Zambia, Zimbabwe, Mozambique, and Senegal/Mali. Railways in Djibouti/Ethiopia and the Democratic Republic of Congo are also undertaking concessions.



Source: Adapted by the Study Team from the World Bank Railway Database

Figure 2.2.5 Railway Density in the World

[16] Sub-Saharan Africa Review of Selected Railway Concessions, World Bank, 2006

Source: The Study Team based on the JICA Corridor Map Database

Figure 2.2.6 Railway Network in Africa

Table 2.2.4 Railway Routes in Sub-Saharan Africa

Country	Data Year	Gauge (mm)	Total Route km	Total Locomotives	MU Passenger Fleet	Passenger Coaches	Freight Wagons	Passenger-km (000,000)	Freight Ton-km (000,000)
Cameroun	1998	1,000	1,006						
Congo	2005	1,067	795	29		52	1,070	135	231
Cote D'Ivoire	1995	1,000	639	55	8	92	1,910	181	312
Ethiopia	1991	1,000	781	22		31	590	157	50
Gabon	2004	1,435	731	28	1	54	788	92	1,949
Ghana	2004	1,067	977	61		157		85	242
Kenya	2002	1,000	2,634	152		228	5,154	288	1,538
Malawi	1999	1,067	710					19	56
Mali	2000	1,000	734	23	1	44	501	204	279
Namibia	1995	1,067	2,382	50	0	113	1,627	49	1,082
Nigeria	2000	1,067	3,557			494	2,744	363	105
Senegal	2000	1,000	906	29	3	129	755	138	371
South Africa	2005	1,067	20,247	2,646	1,150	3,251	94,210	991	109,721
Sudan	2005	1,067	5,478	115		176	4,651	40	766
Tanzania	2006	1,000	2,722	86		134	1,828	433	1,970
TAZARA (Tanzania)	2000	1,067	1,860	75		128	2,235	518	780
Uganda	2004	1,000	259	43			1,431		218
DRC	2005	1,067	3,641	136			3,876	140	444
Zambia	1999	1,067	1,273	62		74	5,758	186	554
Zimbabwe	1997	1,067	2,759	169		282	11,385	583	4,871
Total			54,091	3,781	1,163	5,439	140,513	4,602	125,539

Source: World Bank Railway Database

Issues with the African railway network include the following:

- Many railways face serious deterioration of rolling stock and facilities, which has led to a decline in cargo traffic volume and operating speeds. As a result, existing railways have failed to serve demand.

- Although privatization initiatives (e.g., concessions) have been carried out, some problems with public-private agreements and risk sharing as well as with private operating companies' management to secure profits have resulted in the rolling stock/facility deterioration mentioned above, and have hampered smooth operations. The concession issue is detailed in Chapter 4.
- Railway gauge differs between and among regions. It is 1,067mm in the Southern African region while in East Africa, 1,000mm is used; 1,067mm, 1,000mm, and 1,435mm are all found in West Africa, strongly preventing interconnection and expansion of the railway network. In response, there is an initiative to standardize railway gauges in the region (at 1,435mm), but the feasibility of this initiative is open to question.

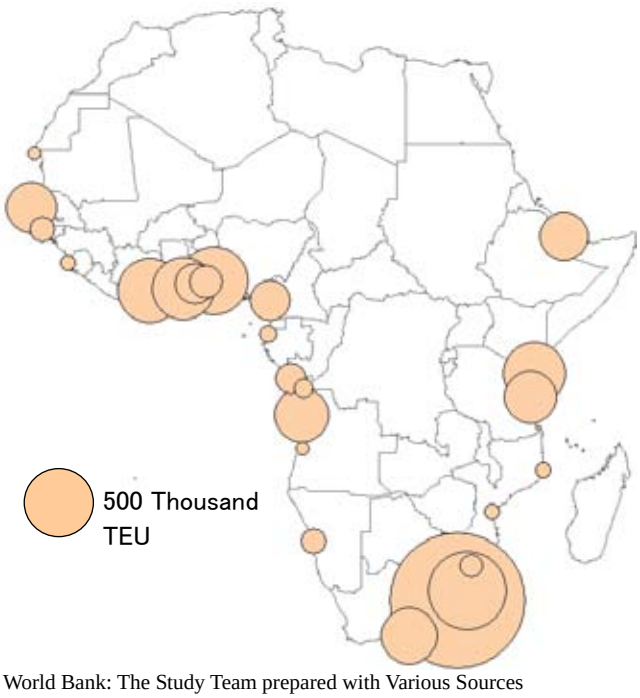
2.2.4 Port Sector

The number of international ports in Sub-Saharan Africa is small considering the geographic expanse of the region. This is partly due to natural limitations since most African coastal areas are not suitable for ports/harbors. Cargo handling volumes at major ports are shown in Figure 2.2.7 and Table 2.2.5. Annual container handling volumes are relatively large at 2.30 million TEUs at Durban, South Africa, followed by Cape Town, South Africa, with 760,000 TEUs. Ports in the 3000,000–500,000 TEU class in Sub-Saharan Africa include Port Sudan, Mombasa, Dar es Salaam, Luanda, Lagos, Accra, Abidjan d'Ivoire, and Dakar. Bulk handling volumes are also relatively large at ports in South Africa, due to heavy cargo such as iron ore and coal, which are major exports of South Africa. In addition to South Africa, Nairobi and Abidjan handle large volumes of bulk freight.

The maximum depth for container vessels at ports other than South Africa is generally less than 10m. At present, Nacala in Mozambique is the only port that can accommodate "over-Panamax" ships[17] with more than 4,000 TEU capacity used for the long route between Asia and Europe. Container ports that accommodate Panamax[18] ships (2,000 TEUs) with more than 12m depth are Port Sudan, Djibouti, Beira, Durban, Cape Town, Port Elizabeth, and Lome. The international container transport network has developed a hub-and-feeder system and at present Port Salalah of Oman, Dubai of the United Arab Emirates serve as hubs for East Africa and Durban of South Africa serves as a hub for all of entire Africa. In addition, container liners with medium-sized container ships directly connect several ports in Africa with the rest of the world through liner service.[19]

Due to the scarcity of ports, recent rapid containerization, and Africa's economic growth, many ports are flooded with cargo in volumes beyond their handling capacity, leading to long waiting times. The handling capacity of Durban Port has already reached 90% of its capacity.[20] Scarcity of port handling capacity necessarily adds to the time required for transport to the destination, leading to increased transport costs. In addition, while the size of container ships is growing, most ports in Sub-Saharan Africa cannot accommodate Panamax ships due to water depth constraints. Therefore, transshipment is required to accessing most ports in the region, which adds to transport time and costs. Port development initiatives can reduce time and cost, but it is necessary to expand cargo handling capacity and develop facilities to accommodate larger container ships.

[17] The possibility to accommodate over-Panamax ships does not depend on only depth but also many other constraints such as berth length, approach, and crane capacity. Moreover, it is commercially difficult to make a port call if the port does not generate sufficient cargo demand.
[18] Based on the maximum dimensions that will fit through the locks of the Panama Canal.
[19] For example, there are liners between Japan and Mombasa, and between China and Ghana, Togo, and Nigeria.
[20] SADC Port Authorities



World Bank: The Study Team prepared with Various Sources

Figure 2.2.7 Container Volumes of African Ports

Table 2.2.5 Cargo Volumes, Number of Berths, and Depth of Major Sub-Saharan Africa Ports

Name of Port	Country	Container Volume (TEU)	Year	Tons of Cargo (1000t)	Year	No. of Berths	No. of Container Berths	Maximum Depth for Container Vessels
Port Sudan	Sudan	326,701	2006	N/A		19	4	14
Massawa	Eritrea	24,280	2001	N/A		N/A	N/A	N/A
Djibouti	Djibouti	294,902	2007	7,502	2007	15	2	12
Mombasa	Kenya	479,355	2006	12,920	2004	18	5	10
Dar Es Salaam	Tanzania	352,548	2006	7,643	2006	11	3	11.5
Mtwara	Tanzania	5,000	2007	69	2007	N/A	N/A	9.8
Nacala	Mozambique	26,709	2001	743	2001	5	2	15
Beira	Mozambique	46,775	2004	1,367	2004	12	3	12
Maputo	Mozambique	62,516	2006	4,002	2001	14	4	10
Durban	South Africa	2,334,999	2006	29,459	2002	57	6	12.8
Cape Town	South Africa	764,753	2006	13,667	2006	34	7	14
Port Elizabeth	South Africa	407,278	2006	8,123	2006	10	1	12.2
Saldanha Bay[1]	South Africa	N/A		36,664	2005	N/A	0	(23)
Richard Bay[2]	South Africa	N/A		89,256	2006	26	0	(19)
Walvis Bay	Nambia	83,263	2006	2,419	2002	8	2	12.8
Lobito	Angola	24,000	2002	600	2002	2	N/A	10
Luanda	Angola	377,206	2006	3,000	2003	3	1	9.5
Pointe Noire	Congo,Rep.	122,600	2006	N/A		9	N/A	9.5
Libreville	Gabon	39,000		N/A		N/A	N/A	3
Douala	Cameroon	200,251	2006	N/A		13	3	9.5
Port Harcourt	Nigeria	5,000	2006	N/A		N/A	N/A	
Lagos	Nigeria	587,600	2006	N/A		34	6	10.5
Cotonou	Benin	140,500	2006	N/A		8	1	11
Lomé	Togo	215,800	2006	N/A		6	2	12
Tema & Takoradi	Ghana	476,451	2006	6,183	2000	14 7	N/A	9.6 10
Abidjan	Côte d'Ivoire	507,119	2006	15,506	2003	34	5	10.6

Name of Port	Country	Container Volume (TEU)	Year	Tons of Cargo (1000t)	Year	No. of Berths	No. of Container Berths	Maximum Depth for Container Vessels
Freetown	Sierra Leone	31,700	2006	N/A		7	2	9.9
Conakry	Guinea	85,300	2006	N/A		12	1	10.5
Banjul	Gambia	44,152		N/A		4	3	10
Dakar	Senegal	331,191		9,000	2002	47	16	10
Nouadhibou	Mauritania	21,000		N/A		N/A	N/A	8
Matadi	DRC	46,000		N/A		10	2	8.9

Source: Based on: http://www.ports.co.za/; Basic Design Study Report on the Project for Reinforcement of the Dredging Capabilities for Beira Port in the Republic of Mozambique. JICA, 2004; The Study on Urgent Rehabilitation Program of Ports in the Republic of Angola, JICA, 2006; The Development Study of Ghana Seaports in the Republic of Ghana, JICA, 2002; Research on Assistance for Transport Infrastructure in Africa, JICA, Tanzania Port Master Plan, Tanzania Ports Authority, 2008; and Guide to Port Entry, Maryland Nautical, 2008

Notes: 1.Export port for iron ore 2.Export port mainly for coal

A world trend of port management privatization in the form of public-private partnerships (PPPs) is also active in Sub-Saharan Africa and it is summarized in Table 2.2.6, which shows that privatized ports are handling cargoes more efficiently than are publicly operated ports.

Table 2.2.6 Port Efficiency and PPP in Sub-Saharan Africa

Port	Average Container Output (Moves/hour)	Operator	Equipment
Abidjan	20	PPP	gantries
Dar es Salaam	20	PPP	gantries
Douala	20	PPP	gantries
Toamasina	18	PPP	mobile crane
Djibouti	17	PPP	gantries
Durban	15	Public	gantries
Tema	14	PPP	gantries
Elizabeth	13	Public	gantries
Apapa (Lagos)	12	Recent PPP	gantries
Capetown	12	Public	gantries
Mombasa	10	Public	gantries
Dakar	10	Recent PPP	mobile crane
Maputo	10	PPP	gantries
Beira	9	PPP	gantries
Port Sudan	8	Public	gantries
Walvis Bay	8	Public	ship's gear
East London	8	Public	ship's gear
Luanda	8	Recent PPP	ship's gear
Matadi	7	Public	ship's gear
Pointe Noire	7	Public	ship's gear

Source: Ocean Shipping Consultants - AICD

Since the East African subregion has many lakes, lake transport is also frequently used to carry cargoes from an inland country to a coastal country. In areas where arterial roads are unimproved, ferries can be as effective to carry cargo from a lakeside port to a road transport terminal along a paved arterial road or a railway terminal on the other side of the lake. For example, on Lake Victoria, several railway ferry routes linking Tanzania/Kenya with Uganda were operated but the operation is now on a nonscheduled basis.

2.2.5 Civil Aviation Sector

Air transport is mainly used to export/import lightweight cargo. In Sub-Saharan Africa, it is used to export horticultural products and fresh food such as fish or carry very expensive mineral resources such as gold and diamonds. There is a case where a mining company constructed its own airport at one of its mines.

Civil aviation networks within the Sub-Saharan Africa region have been gradually become more hierarchical and, particularly, international air transport routes tend to concentrate on international hub airports such as Nairobi, Addis Ababa, Johannesburg, and Abidjan. Cargo handling volumes at Johannesburg and Nairobi are particularly large. In addition to the above-mentioned international hub airports, Accra and Entebbe handle a relatively large volume of cargo (Table 2.2.7).

Table 2.2.7 Cargo Volumes of Major Airports in Sub-Saharan Africa

Airport	Total Cargo (tons)
Nairobi	140,643
Accra	46,842
Addis Ababa	26,570
Entebbe	26,372
Abidjan	21,615
Dar Es Salaam	16,287
Durban	14,972
Douala	13,185
Lusaka	13,177
Port Elizabeth	9,757
Maputo	8,807
Lome	5,595
Bamako	5,282
Kigali	5,074
Lilongwe	4,358
Cotonou	4,283

Source: The Aviation & Aerospace Almanac, 2002
Note: It is considered that Johannesburg Airport serves about 300,000t of cargo volume. However, the above source as well as other documents do not include Johannesburg Airport.

2.3 Future Goals for CBTI Development toward Pro-Poor Growth

This section examines future goals for CBTI development from the viewpoint of pro-poor growth required for Sub-Saharan Africa.

2.3.1 CBTI Development and Poverty Alleviation/MDGs

In general, CBTI development increases the capacity and efficiency of transport infrastructure, thereby bringing direct benefits such as shorter transport times, increased transport reliability with less unpredictable incidents (e.g., delays at international borders), and lower transport costs. These direct benefits in turn lead to economic development along transport corridors and higher income for local residents, and thus CBTI contribute to the solution of various development problems, e.g., through poverty reduction.

Based on such benefits from CBTI development, contributions to the internationally committed achievement of MDGs (Millennium Development Goals) were targeted for Sub-Saharan Africa

up to 2015. Table 2.3.1 shows targeted MDG indexes. The contribution of CBTI development to achieving MDGs is summarized in Table 2.3.2. As shown, it is expected that CBTI improvement will decrease transport costs as well as stimulate industrial and trade development, and as a result will contribute to poverty alleviation.

However, infrastructure development and economic growth may sometimes exacerbate income gaps and regional differences and have limited effect on poverty reduction. Therefore, it is essential to introduce the pro-poor concept in seeking to alleviate poverty in Sub-Saharan Africa—CBTI development should aim for pro-poor growth, i.e., economic growth that effectively alleviates poverty.

Table 2.3.1 Baselines and Targets for MDGs

MDGs	Baselines (Year)	Latest Data (Year)	Goal (Year)
Goal 1. Eradicate poverty			
▪ Population below the poverty line (%)	44 (1990)	46.4 (2005)	38 (2015)
Goal 2. Achieve universal primary education			
▪ Primary completion rate (% of relevant age group)	43 (1990)	58 (2004)	100 (2015)
Goal 3. Promote gender equality			
▪ Ratio of girls to boys in primary and secondary school	78.4 (1991)	86.5 (2004)	100 (2015)
Goal 4. Reduce child mortality			
▪ Under five mortality rate (# per 1000)	161 (1990)	149 (2004)	54 (2015)
Goal 5. Improve maternal health			
▪ Maternal mortality rate (# per 100,000)	870 (1990)	826 (2005)	218 (2015)
Goal 6. Halt and begin to reverse the incidence of HIV/AIDS and malaria			
▪ HIV prevalence among adults age 15–49 (%)	0.5 (1990)	6 (2005)	-
▪ Annual malaria mortality (out of 100,000)	-	199 (2000)	-
Goal 7. Ensure environmental sustainability			
▪ Proportion of people with access to safe water (%)	53(1990)	65 (2004)	76 (2015)
▪ Proportion of people with access to sanitation (%)	29.8(1990)	37 (2004)	66 (2015)
Goal 8. Develop a global partnership for development			
▪ Debt service (% of exports)	13.5 (1990)	7.9 (2004)	-

Source: World Bank, Accelerating Development Outcomes in Africa Progress and Change in the Africa Action Plan, 2007

Table 2.3.2 Contribution of CBTI Development to Achievement of MDGs

Eight Goals for MDGs	Contribution of CBTI
(1) Strengthen the African Private Sector	• Reduction in transport time for imports • Increase in efficiency and private investment through reduction of transport costs
(2) Increase the Economic Empowerment of Women	• Increase in job opportunities in non-agricultural sectors through infrastructure development
(3) Build Skills for Competitiveness in a Global Economy	• Reduction of transport costs , promotion of industry/trade, and increase in local benefits → Increase in opportunities for learning, investment, industrial and development • Technology transfer through increase of foreign private investment
(4) Raise Agricultural Productivity	• Reduction in transport costs, promotion of industry/trade, and increase in local benefits → Increase in investment opportunities for agriculture
(5) Improve Access to and Reliability of Clean Energy	• Reduction in transport costs, increase in investment in energy sector, and generating capacity through private investment

Eight Goals for MDGs	Contribution of CBTI
(6) Expand and Upgrade Road Networks and Transit Corridors	• Direct contribution of CBTI development
(7) Increase Access to Safe Water and Sanitation	• Reduction in transport costs, promotion of industry/trade, and increase in local area benefits → Investment for water supply and sanitation • Expansion of access by regional road development

Source: The Study Team (with reference to World Bank, Accelerating Development Outcomes in Africa Progress and Change in the Africa Action Plan, 2007)

2.3.2 Future Goals for CBTI Development

It is estimated that the achievement of MDGs will require an annual economic growth rate of 7% up to 2015.[21] (Of course, this economic growth should be pro-poor.) Accordingly, the increase in trade volume to support this annual economic growth rate of 7% was estimated from a regression analysis of GDP and trade volume growth rates over the past five years for Sub-Saharan African countries; the result was that an annual trade volume growth rate of 12% to be required to support this economic growth rate,[22] which means that 2.4 times the 2008 level of trade volume will be required in 2015.

Since it is generally supposed that increases in trade volume are roughly proportional to the cargo traffic volume increase, it is likely necessary to increase the present CBTI transport capacity by 2.4 by 2015. Accordingly, it will be necessary to have CBTI that furthers an increase in trade volume by not only physically expanding infrastructure but also reducing transport costs, which include not only monetary costs but also time costs and transport reliability. For example, a 10% decrease in transport costs will lead to a 25% increase in trade volume based on recent analyses.[23] It is expected that capacity expansion of hard infrastructure as well as efficiency improvement of soft infrastructure can contribute to the achievement of such cost reductions.

Based on the foregoing, this study has set the future goal for CBTI development by 2015 to target pro-poor growth for achieving MDGs through expanding necessary transport capacity and reducing transport costs to realize a trade volume that will be 2.4 times as large as the present level.

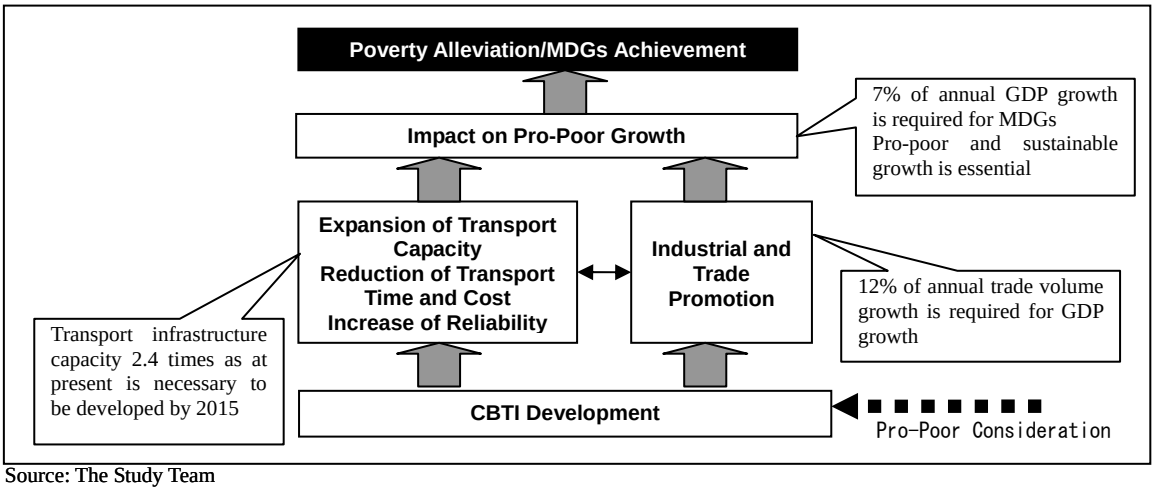
Of course, it is impossible to achieve the required economic growth or pro-poor growth only with CBTI development. It is essential that CBTI development in coordination with development in other sectors such as industrial development and trade promotion, and that CBTI be developed in way that will benefit the poor. Also, it is necessary to consider importance of CBTI development separately in each country and region because CBTI development will may bring different benefits depending on the stage of economic growth in each country.

Figure 2.3.1 summarizes the findings of this section.

[21] African Development Indicators

[22] Based on a regression analysis of trade growth rate and GDP growth rate in Sub-Saharan African countries over the past five years, this is the estimated trade growth rate required for 7% GDP growth.

[23] Gael Raballand and Patricia Macchi, *Transport Prices and Costs: The Need to Revisit Donors' Policies in Transport in Africa*, 2008.



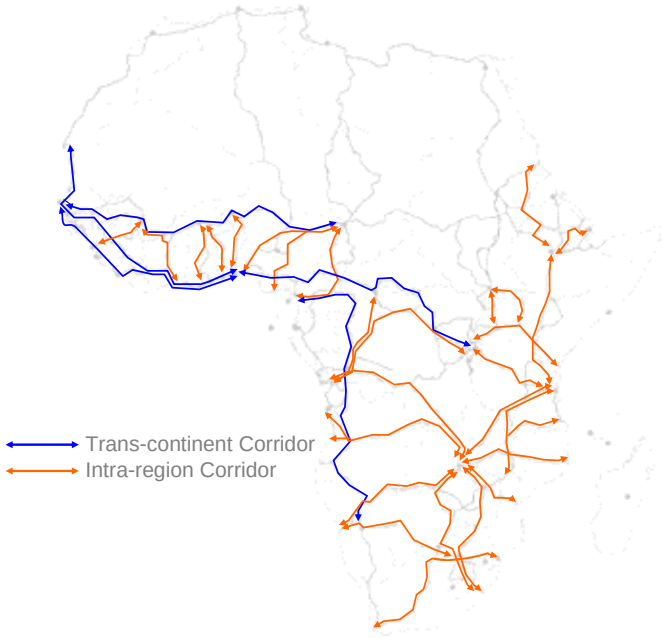
Source: The Study Team

Figure 2.3.1 CBTI Development in Sub-Saharan Africa

2.4 Analysis of International Transport Corridor Potential

2.4.1 Calculation of Trade Potential

Potential corridor trade volumes were analyzed to examine international transport corridor sections that should be considered for improvement. As mentioned, in Sub-Saharan Africa there are many existing/planned international corridors including TAH and SSATP regional economic corridors. To exhaustively analyze corridors such as these, this study defined target corridors, using the list of corridors given in JICA Studies of How to Support Transport Infrastructure in Africa (Project Studies), 2008. Figure 2.4.1 shows these target corridors.



Source: The Study Team

Figure 2.4.1 Target Corridors for Trade Potential Analysis

An estimation approach to analyze the potential of trade volumes would ideally involve the use of origin-destination (OD) data for the volume of trade between Sub-Saharan African countries

or between a country and a port (or ports), but since such data is difficult or impossible to obtain, two potentials were analyzed: (i) the potential of trade within the Sub-Saharan African region and (ii) the potential of interregional trade between Sub-Saharan Africa and the rest of the world; gross domestic product (GDP) was assumed as the trade volume potential to derive substitute indicators. The method of calculation adopted is more specifically described below. The methodology analyzed the relative corridor trade potential rather than absolute magnitudes. Another caveat is that the analysis did not take into consideration the actual situations of roads, railways, and ports, or of border-crossing costs/time. The relative comparison of potential among corridors can, however, provide a broad assessment of the priority sections for future improvement.

(i) Trade Potential within the Sub-Saharan African region

The GDP of each country was assumed as the level of its trade volume potential. The gravity model[24] was adapted to prepare ODs of trade potentials between each country pair, and to distribute them to the corridor network by the shortest path search method, and analyze potentials by corridor. The equation used to estimate such potentials was as follows:

$$PIntra_{ij} = \frac{GDP_i \times GDP_j}{d_{ij}^{2.1}}$$

Where:

$PIntra_{ij}$	Potential of trade within the Ssub-Sahara African region between country i and Country j
GDP_n	GDP of Country n
d_{ij}	Distance between Country i and Country j (between capital cities)

Sudan and DRC were each divided into two parts for the calculation[25] since both are so large that simple calculation of the distance between capital cities would have produces significant errors.

(ii) Potential of Interregional Trade between Sub-Saharan Africa and the Rest of the World

The GDP of each country and the container handling volume of each port were assumed as the country's level of trade potential and the port's level of trade potential, respectively, to estimate the interregional trade potential between the country and the port by the following equation:

$$PInter_{ij} = \frac{GDP_i \times Port_j}{d_{ij}^{2.1}}$$

where:

$PInter_{ij}$	Potential of interregional trade between Country i and Port j
GDP_n	GDP of Country n
d_{ij}	Distance between Country i (capital city) and Port j

Here, since *PInter* is determined, using a virtual value of port capacity, the relative GDP scale of each country has become inconsistent with the level of its trade potential. That is, any country

[24] A factor of 2.1 was applied to the distance multiplier, as was used in the gravity model estimated in World Bank, Road Network Upgrading and Overland Trade Expansion in Sub-Saharan Africa, 2006. The multiplier of GDP should also be estimated such as by regression analysis but 1.0 was used here for the sake of simplicity.

[25] In proportion to regional population, the allocation was defined as 30% to the southern and 70% to the northern Sudan and 40% to the eastern and 60% to the western DRC.

near a large-capacity port may show an increasing trade volume regardless of its GDP scale. Therefore, the total of each country's interregional potentials was corrected, using the country's GDP. The correction approach used is presented below:

$$PInter_{ij}' = PInter \times \frac{GDP_i}{\sum_j PInter_{ij}}$$

where:

$PInter_{ij}'$ Corrected potential of interregional trade between Country i and Port j

Two cases were supposed to determine port capacity levels as follows: use of existing container handling volume (in TEUs) or hypothetically assigning 1 million TEUs to each port whose capacity was deemed unlimited. Interregional trade potentials were analyzed by corridor for the case where ports had no limitation.

As in the case of intraregional trade, Sudan and DRC were separated into two parts since their land area is so large that simple calculation of the distance between capital cities would have produced significant errors.

2.4.2 Analytical Results of Trade Potential

(i) Potential of Trade within Sub-Saharan Africa

Figure 2.4.2 sets out the results of the analysis. It was found that corridors around South Africa and Nigeria each had a large potential – these are marked in red. There was an area of medium potential along the long corridor linking South Africa/Central Africa with East Africa. Regional potentials, although relatively small, were also observed in the East African region.

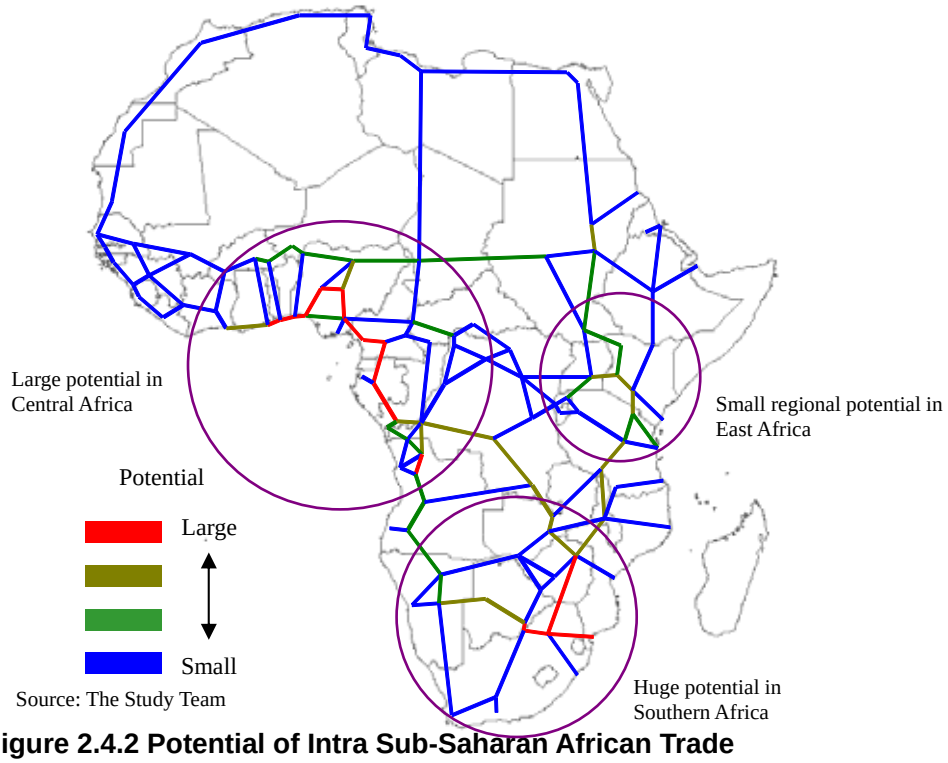
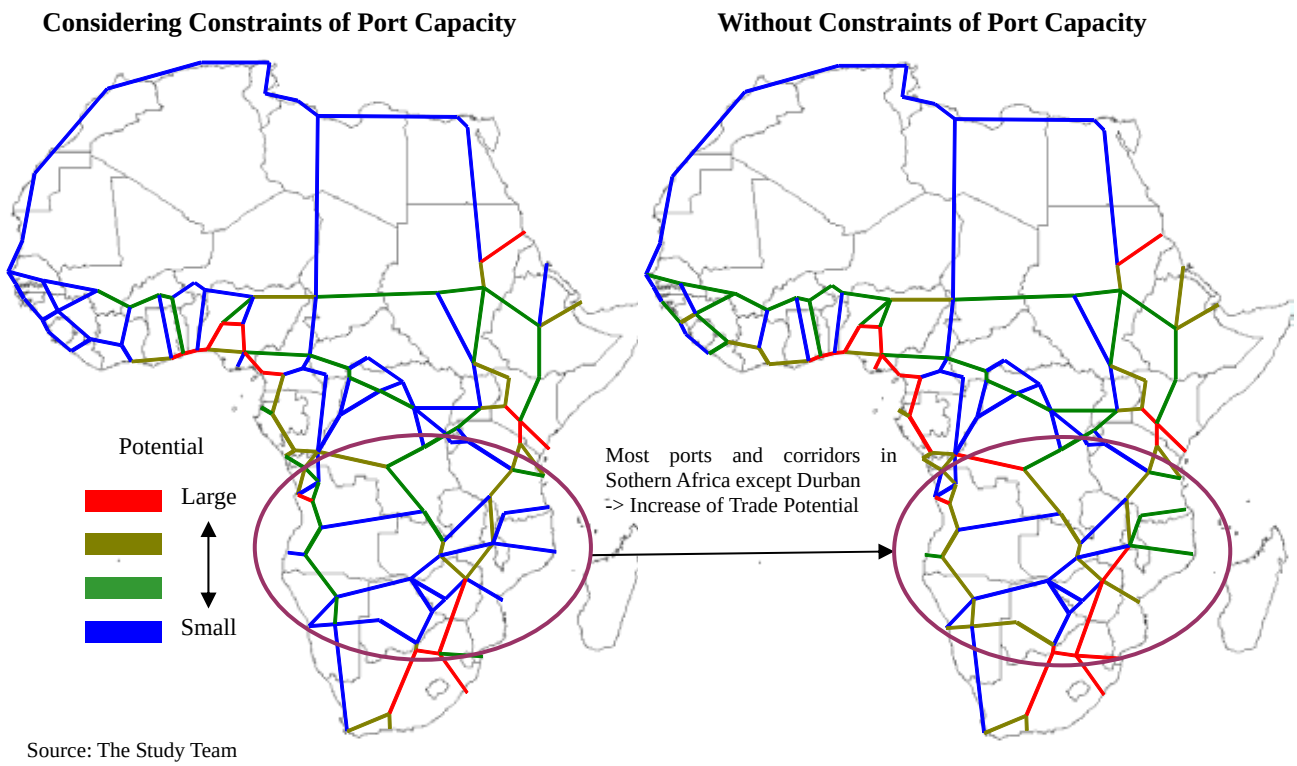


Figure 2.4.2 Potential of Intra Sub-Saharan African Trade

(ii) Interregional Trade Potential between Sub-Saharan Africa and the Rest of the World

Figure 2.4.3 shows the analytical results of interregional trade potential between the subject region and the rest of the world. The interregional trade potential analysis used two cases: one with the existing port capacity constraints and the other without these constraints (but assuming all ports have a sufficiently large handling capacity). The comparison of these two cases found that all over Sub-Saharan Africa, there are ports/corridors where trade volume is likely to increase if the scarce port capacity problem is resolved, i.e., if ports/harbors are further improved in the future. Particularly, ports in Eastern and Southern Africa such as Mtwara, Maputo, Nacala, and Beira, were found to have higher throughputs. Meanwhile, presently thriving ports (such as Durban and Mombasa) were found to have smaller relative increases in trade volumes.

These results indicate that port improvement will realize more a desirable pattern freight movement, i.e., one that will utilize ports nearer to destination, avoiding use of distant ports due to limited port capacity, and mitigate the congestion of existing ports, thereby possibly reducing transport costs. The observed increase in trade volume along inland corridors also indicated the possibility that port improvement may change freight movement patterns across the region.



Source: The Study Team

Figure 2.4.3 Potential of Trade between Sub-Saharan Africa and the Rest of the World