

**Data Collection Survey for
Economic and Industrial Development
along Economic Corridors
in Southern Africa**

Final Report

May 2013

JAPAN INTERNATIONAL COOPERATION AGENCY

**PADECO Co., Ltd.
Nippon Koei Co., Ltd.**

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Abbreviations and Acronyms

AAP	Africa Action Plan
ACF	Agricultural Consultative Forum
ADI	Accelerated Agribusiness and Agro-industries Development Initiative
AEO	Authorized Economic Operator
AFD	Agence Française de Développement
AfDB	African Development Bank
AISP	Agriculture Infrastructure Support Project
ASEAN	Association of Southeast Asian Nations
ASNAPP	Agribusiness in Sustainable Natural Plant Products
ASYCUDA	Automated System for Customs Data
AU	African Union
BADEA	Arab Bank for Economic Development in Africa
BAGC	Beira Agricultural Growth Corridor
BBEMS	Beitbridge Border Efficiency Management System
BBR	Beitbridge Bulawayo Railway
BCP	Border Crossing Point
BGS(P)	Best Guess Scenario (Project)
BOA	Border Operations Assessments
BPC	Botswana Power Corporation
CAADP	Comprehensive African Agriculture Development Programme
CBM	Coordinated Border Management
CCFB	Companhia dos Caminhos de Ferro da Beira (Beira Railway Company)
CCGT	Combined Cycle Gas Turbine
CdM	Cornelder de Moçambique
CDN	Corredor de Desenvolvimento do Norte
CEAR	Central East African Railways
CEC	Copperbelt Energy Corporation
CET	Common External Tariff
CFB	Caminhos de Ferro de Benguela
CFM	Portos e Caminhos de Ferro de Moçambique (Mozambique Ports and Railways)
COMESA	Common Market for Eastern and Southern African States
CSTN	Core Strategic Transport Network
CTC	Centralized Train Control

DBSA	Development Bank of Southern Africa
DFID	Department for International Development
DITH	Diversified International Timber Holdings
DMA	District Metered Areas
DRC	Democratic Republic of the Congo
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
EAC	East African Community
EC	European Commission
EDF	European Development Fund
EdM	Electricidade de Mocambique
ENE	Empresa Nacional de Electricidade
ESCOM	Electricity Supply Corporation of Malawi
Eskom	Electricity Supply Commission
FAO	Food and Agriculture Organization
FBW	Free Basic Water
FESRATA	Federation of East and Southern African Road Transport Associations
FSRP	Food Security Research Project
FTA	Free Trade Area
FTF	Feed the Future
GAZEDA	Gabinete das Zonas Economicas de Desenvolvimento Acelerado (Office for Economic Areas with Accelerated Development)
GBI	Green Belt Initiative
GDP	Gross Domestic Product
GIS	Geographic Information System
GOJ	Government of Japan
GoM	Government of Mozambique
GSFF	Global Solidarity Forest Fund
HCB	Hidroeléctrica de Cahora Bassa
HPP	Hydropower Plant
HVDC	High-voltage Direct Current
IBM	Integrated Border Management
ICD	Inland Container Depot
ICT	Information and Communication Technology
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation

IIDS	Integrated Industrial Development Strategy
ILO	International Labour Organization
IMF	International Monetary Fund
IRP	Integrated Resource Plan
IPP	Independent Power Producer
IWRM	Integrated Water Resources Management
JBC	Joint Border Committees
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
LEC	Lesotho Electricity Corporation
LHPC	Lunsemfwa Hydro Power Company
LIMCOM	Limpopo River Basin Commission
LTSP	Longer-term Strategic Project
LWSC	Lusaka Water and Sewerage Company
MASHAV	Israel's Agency for International Development, Cooperation
MCC	Millennium Challenge Corporation
MCLI	Maputo Corridor Logistics Initiative
MFEZ	Multi-Facility Economic Zones
MGDS	Malawi Growth and Development Strategy
MIDP	Development of Medium Scale Irrigation Project
MIDSUP	Malawi Irrigation Development Support Programme
MLGH	Ministry of Local Government and Housing
MME	Micro Manufacturing Enterprise
MMEWR	Ministry of Minerals, Energy and Water Resources
MOTRACO	Mozambique Transmission Company
MoT	Ministry of Transport
MSP	Member States Project
MWRDM	Ministry of Water Resources Development and Management
NEPAD	New Partnership for Africa's Development
NES	National Export Strategy
NLPI	New Limpopo Bridge Project Investments
NRZ	National Railways of Zimbabwe
NSC	North-South Corridor
NSCMI	North-South Corridor Management Institution
NTB	Non-tariff Barriers
NWASCO	National Water Supply and Sanitation Council

NWRS	National Water Resource Strategy
ODA	Official Development Assistance
OKACOM	Permanent Okavango River Basin Water Commission
ORASECOM	Orange-Senqu River Commission
OSBP	One Stop Border Post
PEDSA	Plano Estratégico de Desenvolvimento do Sector Agrário (Agriculture Sector Development Strategic Plan)
PIDA	Program for Infrastructure Development in Africa
PPA	Power Purchase Agreement
PRC	People's Republic of China
RBIG	Regional Bulk Infrastructure Grant
REC	Regional Economic Communities
RIDMP	Regional Infrastructure Development Master Plan
RIDP	Rural Infrastructure Development Programme
RISDP	Regional Indicative Strategic Development Plan
RTMS	Road Transport Management System
RUC	Road User Charges
SACU	Southern African Customs Union
SADC	Southern African Development Community
SADCC	Southern African Development Coordination Conference
SAGCOT	Southern Africa Growth Corridor of Tanzania
SAPP	Southern African Power Pool
SATH	Southern Africa Trade Hub
SDCN	Mozambique's Northern Corridor Development Company
SDI	Spatial Development Initiative
SEB	Swaziland Electricity Board
SEC	Swaziland Electricity Company
SEZ	Special Economic Zone
SFID	Small Farms Irrigation Project
SIDA	Swedish International Development Cooperation Agency
SIP	Strategic Industrial Project
SME	Small and Medium Enterprise
SNCC	Société Nationale des Chemins de Fer du Congo (National Railway Company Operating the inland railways of the DRC)
SNDP	Sixth National Development Plan
SNEL	Societe Nationale d'Electricite

SPV	Special Purpose Vehicle
SR	Swazi Rail
SSATP	Sub-Sahara Africa Transport Policy Program
TANESCO	Tanzania Electricity Supply Company Ltd
TFR	Transnet Freight Rail
TEU	Twenty-foot Equivalent Unit
TICAD	Tokyo International Conference on African Development
TKCMC	Trans-Kalahari Corridor Management Committee
TMSA	Trademark Southern Africa
TPP	Thermal Power Plant
TR/MSP	Transport and Member States Project
TRALAC	Trade Law Centre for Southern Africa
UNComtrade	United Nations Commodity Trade Statistics Database
UNCTAD	United Nations Conference on Trade and Development
UNESCO	UN Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
WB	World Bank
WBCG	Walvis Bay Corridor Group
WCO	World Customs Organization
WHO	World Health Organization
WRC	Water Resources Commission
ZAMCOM	Zambezi Watercourse Commission
ZESA	Zimbabwe Electricity Supply Authority Holdings (Pvt)
ZESCO	Zambia Electricity Supply Company Limited
ZINARA	Zimbabwe National Road Administration
ZRL	Zambia Railways Limited

1. Introduction

1.1 Study Background

With a population projected to reach 340 million by 2020 and with abundant mineral resources, the Southern African Region has been gaining global attention as a growing market with great potential as well as a destination for investment. At the same time, however, the region suffers from various structural problems, including poverty, economic disparities within the region, and serious unemployment, which need to be addressed by improvements in productivity, promotion of private sector investment, and expansion of global and intra-regional trade. For these improvements to materialize, it is essential to develop infrastructure, both “hard” and “soft”, from a regional perspective.

In recent years, a number of regional infrastructure development planning endeavors have been undertaken with relevance to Southern Africa, including the following:

- the NEPAD [New Partnership for Africa’s Development] Africa Action Plan (2010–2015) (AAP), prepared by the African Union (AU);
- the Program for Infrastructure Development in Africa (PIDA), a long-term plan for the next three decades, prepared by the African Union, the NEPAD Planning and Coordination Agency (NPCA), and the African Development Bank (AfDB), among others; and
- the Southern African Development Community (SADC) Regional Infrastructure Development Master Plan (SADC RIDMP), completed in August 2012.

The Japan International Cooperation Agency (JICA), an implementing agency for official development assistance (ODA) of the Government of Japan, has been actively providing support for the development of regional infrastructure. Following the 4th Tokyo International Conference on African Development (TICAD IV) in 2008, JICA undertook several studies related to regional infrastructure development in Africa, including *The Research on the Cross-Border Transport Infrastructure: Phase 3* (2009) and the *Preparatory Survey for the Southern Africa Integrated Regional Transport Program* (2010). The 2010 study examined alternative growth scenarios for Southern Africa and proposed eight priority economic corridors in the region including the Beira (including Sena and Tete), Dar es Salaam, Lobito, Maputo, Nacala, North-South, Trans-Capriivi, and Trans-Kalahari Corridors. It also identified bottlenecks impeding the development of these corridors and proposed directions for transport development for each of these corridors.

Recognizing the importance of establishing an effective industrial value chain by developing regional infrastructure in a comprehensive way, JICA decided to undertake the current study in order to identify specific needs including transport, energy, and water supply infrastructure for economic and industrial development along economic corridors in Southern Africa. It was intended that this study will propose, among other things, candidate infrastructure development projects for future financial and technical assistance by JICA. A joint venture of PADECO Co., Ltd. and Nippon Koei Co., Ltd., two of the leading Japanese consulting firms in this area, was selected by JICA to conduct the study.

1.2 Objectives

The objectives of this JICA study are to:

- survey and examine potential assistance required for the development of infrastructure (in the transport, energy, and water sectors) along major economic corridors in Southern Africa, and
- propose financial and technical assistance to be provided by JICA for this purpose.

1.3 Study Area

The study area surveyed in this study includes the following countries: Angola, Botswana, Malawi, Mozambique, Namibia, South Africa, Zambia, and Zimbabwe. These countries are traversed by the eight priority corridors that were identified in the 2010 JICA Study as described above, i.e., the Beira (including Sena and Tete), Dar es Salaam, Lobito, Maputo, Nacala, North-South, Trans-Caprivi, and Trans-Kalahari Corridors. These eight priority corridors are shown in Figure 1.1. A more specific definition of each corridor used in this study is described in Chapter 4, which presents regional development scenarios for the eight priority corridors.

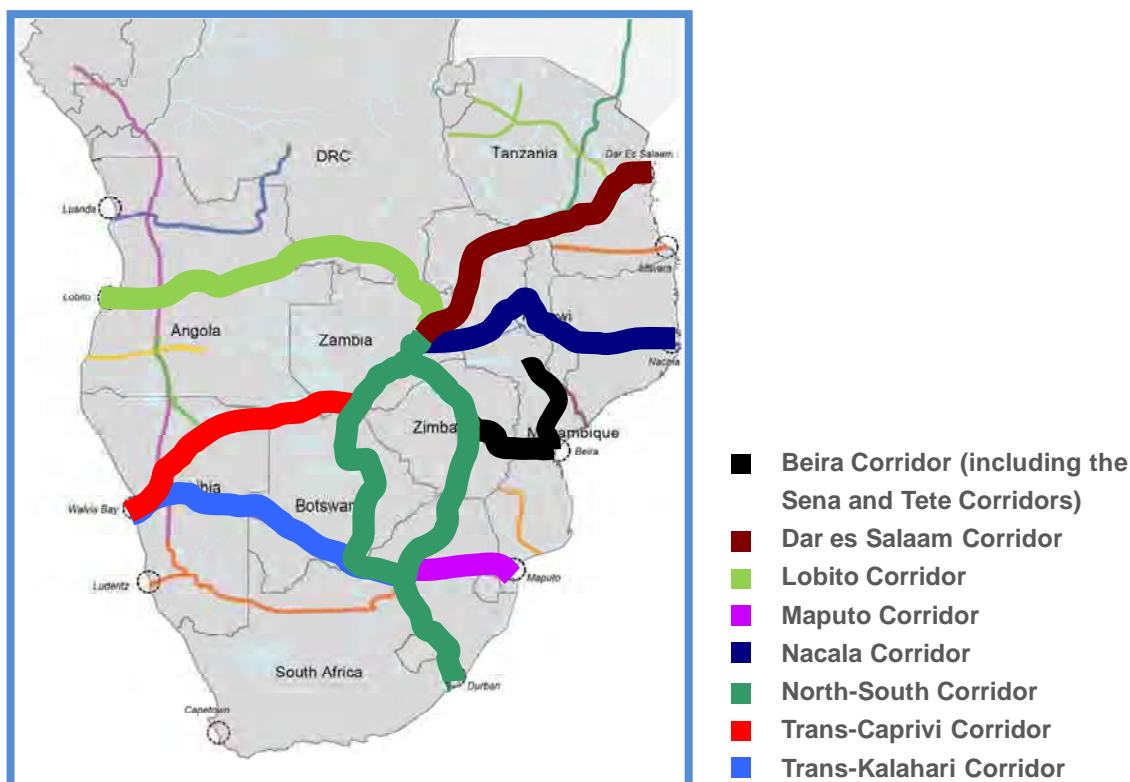


Figure 1.1: Eight Priority Economic Corridors Surveyed

It should be noted that the depth of the survey varied across countries and corridors, depending on the results of past relevant studies and the possibility of identifying potential candidates for future JICA assistance.

1.4 Study Tasks

The JICA Study Team carried out the study according to the tasks in Table 1.1 that were specified in the Terms of Reference provided by JICA.

Table 1.1: Study Tasks from the Terms of Reference (TOR)

No.	Description of Task
1.	Collection and analysis of existing documents, information, and data relevant to the study
2.	Preparation of an inception report, the content of which is to be agreed by JICA and the Development Bank of Southern Africa (DBSA)
3.	Preparation of regional development scenario(s) for eight priority economic corridors in Southern Africa targeted for 2035 (based on discussions between JICA and the JICA Study Team, the target year was changed from 2025 to 2035 during the implementation of the study)
4.	Proposal of JICA Focus Economic Corridors (3–4 corridors) based on an analysis of regional development potential(s), the relationship with Japan, and trends and the comparative advantage of JICA assistance
5.	Proposal of scenario(s) for comprehensive regional development and industrial bases for the proposed focus corridors to develop effective industrial value chains along the corridors
6.	Preparation of a long list of infrastructure projects (in transport, energy, and water supply, about 20 projects in total) needed to develop industrial bases along the proposed focus corridors
7.	Preparation of a long list of technical assistance programs for capacity development to contribute to the development of the proposed focus corridors
8.	Selection of priority projects and programs (4–6 for each) from the long lists above as potential candidates for JICA financial/technical assistance in the medium to long term, and preparation of a project note/document for each project/program (the output of this task was for internal JICA use only.)
9.	Holding of a seminar to present the contents of the draft final report to relevant government organizations, regional economic communities (RECs), DBSA, and the private sector, in collaboration with DBSA

Appendix A presents the summary of proceedings of the study seminar (Task 9), while Appendix B provides the PowerPoint presentation made at the seminar.

1.5 Work Program

1.5.1 Study Team

The JICA Study Team, led by Mr. Yuichiro Motomura, consisted of the members shown in Table 1.2.

Table 1.2: JICA Study Team

No.	Name	Responsibility	Company
1.	Mr. Yuichiro Motomura	Team Leader/Comprehensive Regional Development Planning	PADECO Co., Ltd.
2.	Mr. Morikata Ikegami	Regional Infrastructure Development Planning (Transport)	PADECO Co., Ltd.
3.	Mr. Michio Hasegawa	Regional Infrastructure Development Planning (Energy)	Nippon Koei Co., Ltd.
4.	Mr. Masato Fujinami	Regional Infrastructure Development Planning (Water Supply)	Nippon Koei Co., Ltd.
5.	Mr. Kenji Kimura	Regional Infrastructure Development Planning (Integrated)	PADECO Co., Ltd.
6.	Mr. Bruce Winston	Economic Integration and Trade Policy Analysis	PADECO Co., Ltd.
7.	Mr. Kensuke Shimura	Industrial Development and Investment Promotion 1	Mitsubishi UFJ Research and Consulting Co., Ltd.
8.	Ms. Masumi Shimamura	Industrial Development and Investment Promotion 2	Mitsubishi UFJ Research and Consulting Co., Ltd.
9.	Ms. Masako Hatta	Project Evaluation and Economic Analysis	PADECO Co., Ltd.
10.	Mr. Kazuo Iiyama	Environmental and Social Analysis	Nippon Koei Co., Ltd.
11.	Ms. Risa Yokoyama	Comprehensive Regional Development Planning Coordination	PADECO Co., Ltd.

1.5.2 Work Flow

The work flow of the study is presented in Figure 1.2.

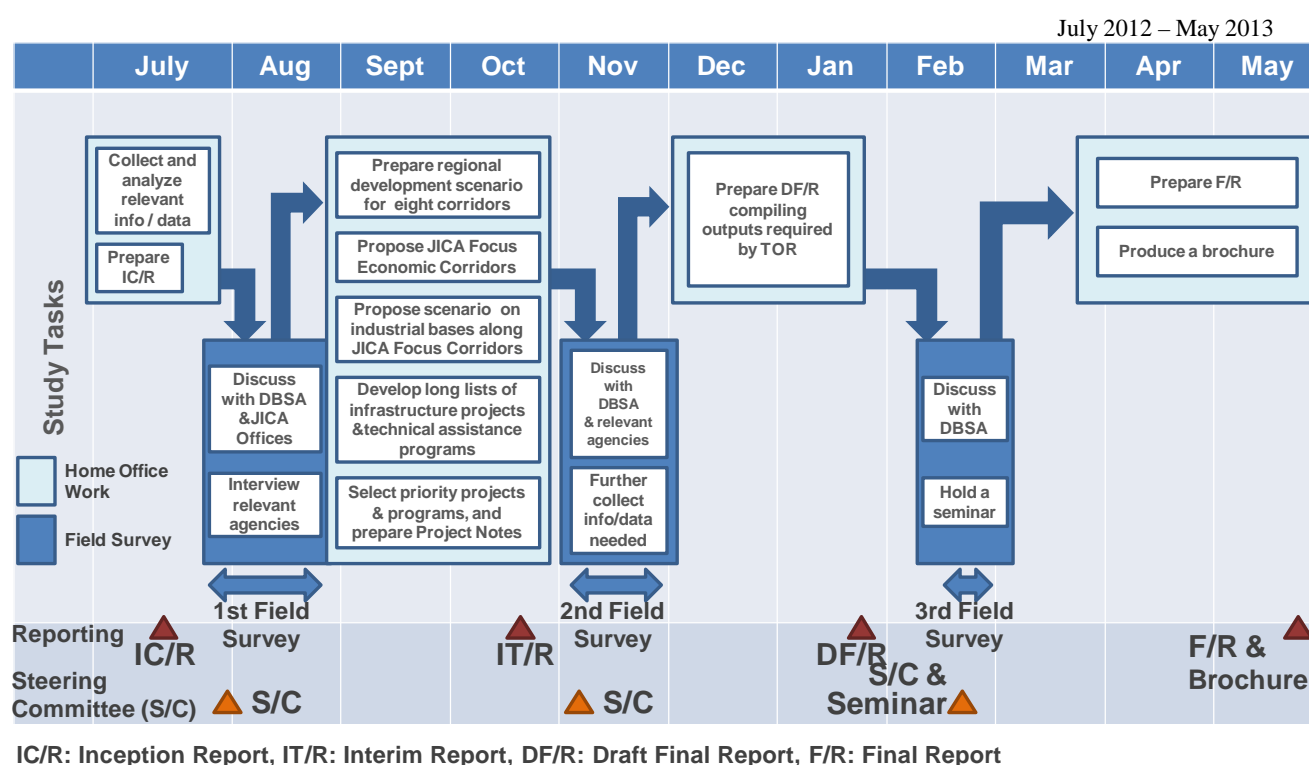


Figure 1.2: Flow of the Study

1.5.3 Organization of Study Implementation

The study was implemented in cooperation with the Development Bank of Southern Africa (DBSA) based on a memorandum of understanding signed between JICA and DBSA in May 2010 for the support of socioeconomic development in Southern Africa. The implementation of the study was organized as illustrated in Figure 1.3.

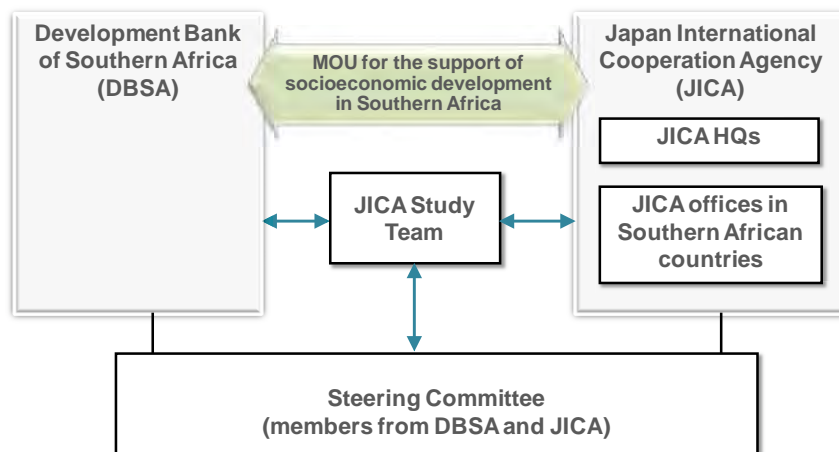


Figure 1.3: Organization of Study Implementation

2. Overall Development Scenario(s)

This chapter proposes overarching scenario(s) for the development of regional economic corridors in Southern Africa. Formulating overarching scenario(s) was necessary since the objective of developing regional corridors is to generate benefits for multiple countries, which requires the perspective of the entire region. Indeed, there are common elements in the type of development desirable for different corridors in the region. The overall scenario(s) proposed in this chapter have been focused on industrial development and will be the basis for the corridor-by-corridor industrial development scenario(s) presented in Chapter 4.

2.1 Approach for Preparing Regional Development Scenario(s)

2.1.1 Innovative Approach

Overall development scenario(s) for regional economic corridors in Southern Africa have been prepared with an innovative approach, which is considered critically necessary for the region to achieve its full development potential following a clear vision of its future. The approach employed is presented in Figure 2.1, which is in essence as follows:

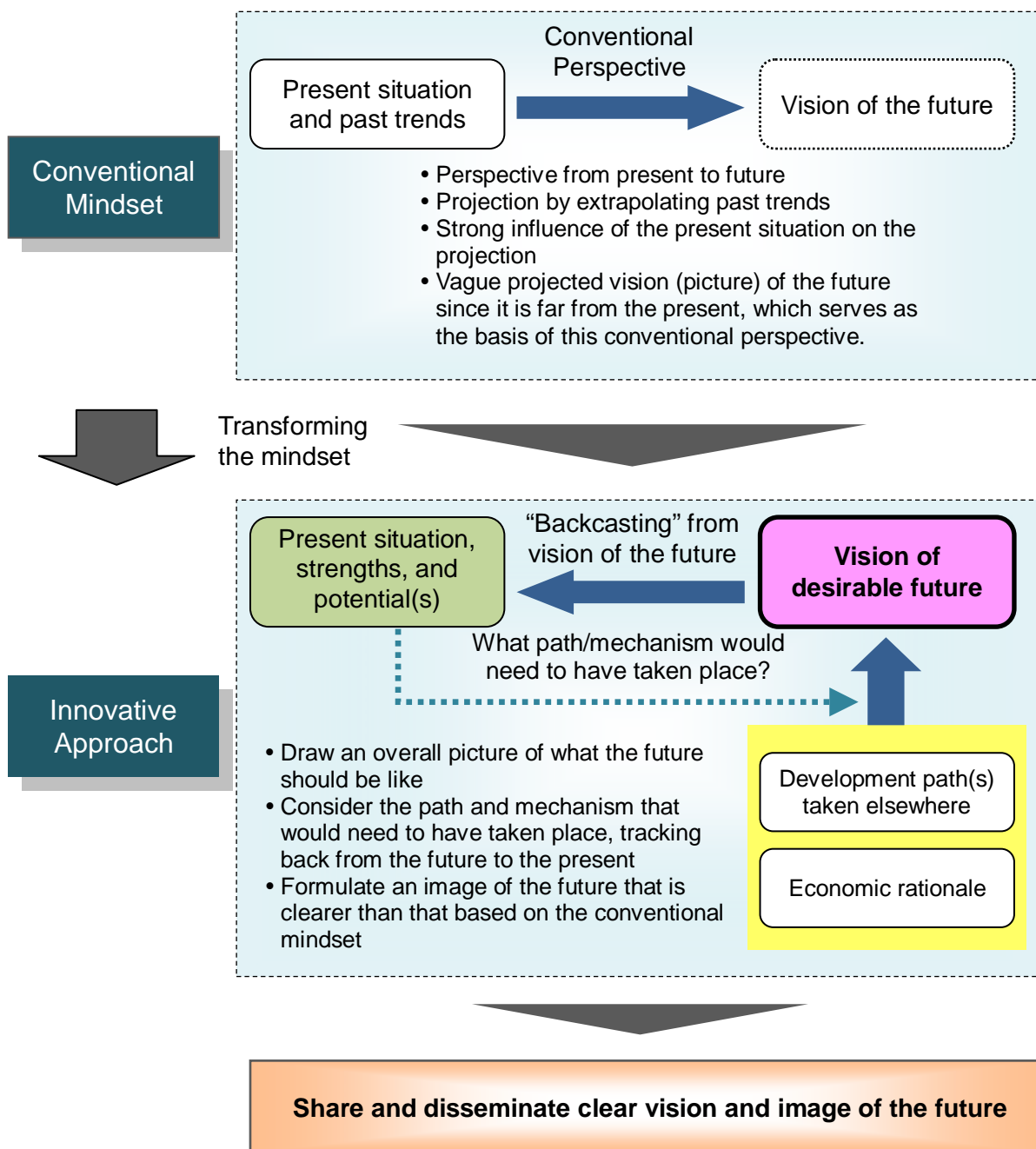
- to formulate an overall vision (or picture) of what the industrial development situation in the region should be after 20 years, and
- to consider the path and mechanism that would need to take place, tracking back from the future to the present.¹

As shown in the figure, this approach differs from the conventional mindset of making future projections by extrapolating past trends, which may not be appropriate for Southern Africa, a region that is endowed with abundant natural resources that are significantly underutilized at present. Once the region's potential is unleashed, its future will not be a mere extension of the past but one entirely different from what has gone before. Critically needed now, therefore, is a clear vision and image of an optimal future for the region, which can be obtained from an assessment of development paths taken elsewhere (e.g., in Asia), and an assessment of possible growth mechanisms given the strengths and potentials of the region (see Appendix C for major trade statistics of the focus countries, which partly indicate their strengths and potentials).

2.1.2 Assumptions

International experience has shown that changes in national industrial structures do not take place spontaneously but occur in conjunction with strong national political will, including an intention to achieve growth-oriented structural transformation. Various conditions need to be met for the economy of a country or region to undergo such a structural change. In view of the global experience, the JICA Study Team made several assumptions in preparing the overall development scenario(s) for the Southern Africa region (see Figure 2.2 and the following text box for a summary of these assumptions).

¹ The approach is inspired by innovative approaches to futures studies developed by others, e.g., (i) Martin Wachs and Sam Cole, "Dare to Dream: Bringing Futures into Planning", *Journal of the American Planning Association*, Autumn 2001, Vol. 76, N. 4, pp. 373–82; and (ii) African Futures and Phyllos IPE [International Political Economy], *A Guide to Conducting Futures Studies in Africa*, 2002. Also informative on this subject was the interview of the JICA Study team with Mr. Lovemore Bingandadi, Corridors Advisor, Southern African Development Community (SADC), 1 August 2012.



Source: JICA Study Team

Figure 2.1: Innovative Approach for Industrial Development in Southern Africa

Six Assumptions

- The political will necessary for the envisioned development is in place.
- Adequate institutional mechanisms and capacity are also in place.
- The required physical infrastructure is developed without delay under the initiative of the governments in the region.
- Development leads to “win-win” outcomes within the region.
- The private sector plays a vital role in transforming the region’s industrial structure, with the governments not discouraging the private sector rather providing an environment conducive to private sector initiative.
- Particular attention is paid to the impact of industrial development on job creation especially for the youth.

Source: JICA Study Team

Figure 2.2: Assumptions Made in Formulating the Scenario(s)

Development of a country or a region is a political as well as an economic process. It succeeds only when both aspects, especially the complex interaction between the two, are fully taken into consideration, and appropriate visions, strategies, and action plans are fleshed out and executed.² Since this study focuses on the economic aspects of development, it was assumed that the necessary political will and intention³ as well as adequate institutional mechanisms and capacity⁴ are or will be put in place to promote industrial development in the region. It was also assumed that necessary physical infrastructure will be developed without delay under the initiative of the governments in the region, since inadequate infrastructure would be a critical bottleneck for industrial development.

In developing the future scenario(s), the industrial development to take place in the region needs to be based on the strengths and potentials of each country and by creating effective synergies within the region, not with all “competing for a slice of the pie”. Consistent with the ideal of the Southern African Development Community (SADC) and the Common Market for Eastern and Southern Africa (COMESA), it was therefore assumed that all Southern African countries will choose to work together for mutual harmony and benefit based on their respective strengths and potentials for industrial development. It is critical that the development to be undertaken lead to “win-win” outcomes within the region.

In this respect, a concrete example is the Comprehensive African Agriculture Development Programme (CAADP), adopted by African leaders in 2003 under the New Partnership for Africa’s Development (NEPAD) initiative. It has now become the basic reference point for African governments for improving agricultural productivity and reducing hunger.⁵ CAADP addresses policy and capacity issues across the entire agricultural sector on the continent. (Box 2.1 presents an overview of CAADP.) The recent progress in establishing a framework for continental and regional policy coordination alongside the implementation of national policies has been a major turning point in pushing forward with agricultural transformation as the a foundation for industrializing Africa.

² See Izumi Ohno and Kenichi Ohno, *Dynamic Capacity Development: What Africa Can Learn from Industrial Policy Formulation in East Asia*, 13 March 2009

³ There must be a compelling national/regional vision that imparts a shared sense of intention for broad-based economic growth as well as credible, sound, and committed leadership that seeks long-term economic transformation and growth.

⁴ Robust institutional arrangements and capacity to realize effective implementation are essential.

⁵ United Nations Economic Commission for Africa, *Economic Report on Africa 2012: Unleashing Africa’s Potential as a Pole of Global Growth*, 2012

Box 2.1: Transforming African Agriculture through CAADP Framework

The Comprehensive Africa Agriculture Development Programme (CAADP) is the agricultural program of the NEPAD, which in turn is a program of the African Union (AU), established by the AU assembly in 2003. CAADP is entirely African-led and African-owned and represents African leaders' collective vision for agriculture in Africa, which is to reach a higher path of economic growth through agriculture-led development. To achieve this goal, African governments have agreed to increase public investment in agriculture by a minimum of 10% of their national budgets and to raise agricultural productivity by at least 6% per year.

CAADP focuses on improving food security, nutrition, and increasing incomes in Africa's largely farming-based economies. For the first time in many decades, African policymakers are looking to smallholder farming as an option for sparking a successful rural transformation.

Considering that improving food security and boosting productivity of subsistence/ smallholder farming are critical common agenda items for Southern African countries, CAADP, with effective policy coordination among member countries, is expected to provide an important breakthrough for the common benefit of the entire region to achieve agricultural transformation.

Source: NEPAD-CAADP website [www.nepad-caadp.net/] and JICA Study Team

In the process of industrial development, it is the private sector that plays a vital role in effecting concrete changes "on the ground". Public-private sector collaboration is also a key to the process of industrial development and structural transformation. The government or the public sector in general must not discourage the private sector but should provide an environment conducive to greater private sector initiatives. In other words, it should be acknowledged that the private sector is the main driving force capable of bringing changes and innovation on the ground and, as such, efforts of the government should be directed toward restructuring the economy by creating an environment that facilitates and promotes greater private sector activities. In this context, infrastructure development along economic corridors is a prerequisite for attracting private sector investment and promoting domestic, intraregional, and interregional economic activities. Eventually, public sector involvement in the economy should become more indirect – e.g., focusing on regulatory and supervisory functions as private sector activities increase. This is what occurred, for example, in East Asia, particularly in leading countries of the Association of Southeast Asian Nations (ASEAN), e.g., Malaysia, Thailand.⁶

Job creation is also important. In view of the serious unemployment and underemployment situation in Southern Africa, changes in the industrial structure of the region must be accompanied by a significant increase in opportunities for new jobs especially for the youth. For example, this process occurred in East Asia, where industry played a key role in generating employment opportunities. East Asian economies generally attained both rapid economic growth and relatively equitable income distribution by increasing employment opportunities and wages rather than focusing on income redistribution policies. In preparing the industrial development scenario(s) for Southern Africa, an emphasis was placed on increasing job opportunities and earnings of people who would otherwise be unemployed or employed in informal sectors and household enterprises.

⁶ On the other hand, the Asian experience with large-scale infrastructure development provides support for the proposition that government may undertake this significant role as a central player. Indeed, there may be a good reason to adopt such a centralized governmental approach for mega development since it requires adequate capacity for planning and budgeting, huge resource mobilization (including donor management), intersectoral coordination, and consideration of social and environmental impacts.

2.2 Envisioned Industrial Development over the Next 20 Years

As is evident from the current export structures of the countries in the region, primary production and the export of natural resources are dominant features of the Southern African economy at present (see Appendix C for trade statistics of the focus countries). However, countries in the region should endeavor to diversify their economies away from a concentration on such primary production. As mentioned, the key to success in this respect will be to build on the strengths and potentials of each country, especially by strengthening the extraction of mineral resources and by expanding the economic base toward industries downstream from the primary sectors. The development or revitalization of agriculture as well as expansion toward downstream industries such as food processing will also be critical for the region as described later in this section. Moreover, the development of the tertiary (services) sector will not only substantially improve the employment environment but also contribute to the development of various kinds of manufacturing industries through the provision of necessary services.

Based on diverse international experience with industrial development as well as on the JICA Study Team's understanding of strengths and potentials in the region, a desirable future has been envisioned for the secondary, agricultural, agro-industry, and tertiary sectors in Southern Africa. A planning horizon of 20 years (rather than only up to 2025) was used in developing this envisioned future since a period of two decades was deemed more appropriate for applying the proposed innovative approach, which requires not being too strongly influenced by views of the present situation.

Importantly, the envisioned future proposed in the following subsection is described as if it has already happened, rather than as something that will, or is likely to, happen.

2.2.1 Envisioned Future of the Secondary Sector

As reasonably expected, the secondary sector including mining and manufacturing in Southern Africa develops vertically, i.e., from upstream (mineral resources extraction, which is a major strength of the Southern African economy at present) to downstream including the manufacturing of basic materials, other intermediate products, and finished products. In this development process, the sector also achieves horizontal development or diversification of production through the combination of a variety of products produced in different stages of fabrication/processing. A similar development process is achieved in agriculture as described later in this section.

The importance of industrializing Africa was sensibly expressed in a recent publication of the United Nations Economic Commission for Africa as follows:

Industrial production creates job opportunities at high skill levels, and facilitates dense linkages among service and agricultural sectors, rural and urban economies, and consumer, intermediate and capital-goods industries. In addition, the prices of manufactured exports are less volatile and less susceptible to long-term deterioration than those of primary goods, making industrialization particularly strategic in highly commodity-dependent developing countries. The move to industry is therefore a critical tool in creating jobs, reducing poverty and developing outlying regions. Finally, it can spur technological advances and innovation as well as productivity gains. In short, it can play the leading development role more suitably than any other sector.⁷

⁷ United Nations Economic Commission for Africa, *Economic Report on Africa 2012: Unleashing Africa's Potential as a Pole of Global Growth*, 2012, p. 109.

Figure 2.3 illustrates the envisioned future of the secondary sector in Southern Africa. The main features of the future of the sector are described below.

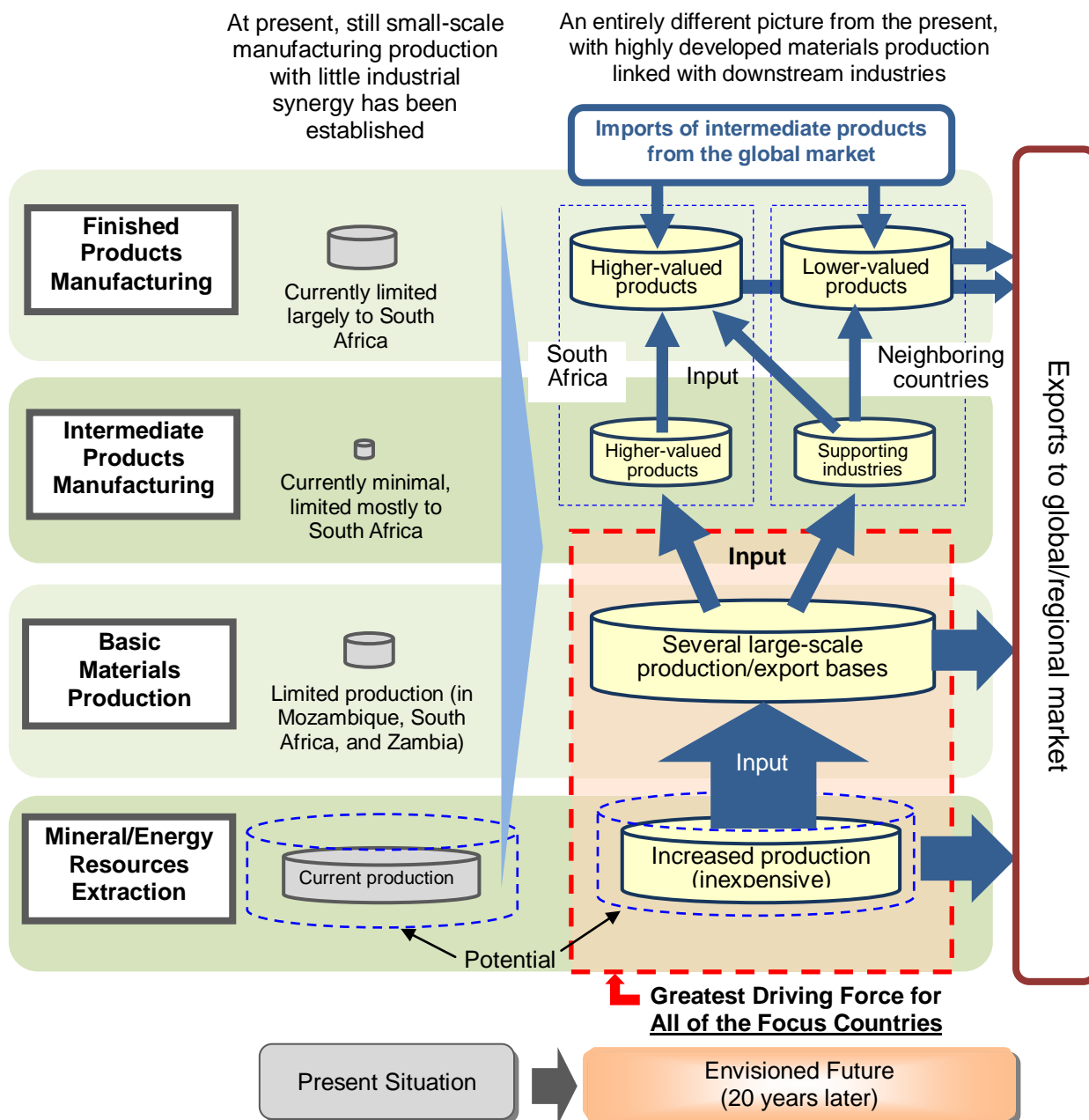
(1) Basic Materials Industries as the Greatest Driving Force

Basic materials industries utilizing natural/energy resources have become the greatest driving force of the Southern African regional economy, not only in South Africa but also in other focus countries. These resources have enabled various basic materials industries to develop on a large scale in different places within the region. These industries include copper fabrication, the iron and steel industry, the heavy chemicals industry, and aluminum production. In particular, the heavy chemicals industry has grown dramatically using natural gas resources extracted offshore the east coast of the continent. These basic materials industries have become core industrial bases for exports outside the region as well as supply bases for intermediate products to South Africa. Examples of envisioned large-scale development of basic materials industries in the region are provided in Table 2.1.

Table 2.1: Examples of Envisioned Large-Scale Basic Materials Industries in Southern Africa

Example	Description
<i>Example 1:</i> Copper fabrication and the iron/steel industries in Zambia (Nacala and North-South Corridors)	Zambia has solidified its status as an important base for manufacturing and supplying copper rod in Southern Africa through the development of Multi-Facility Economic Zones and individual plants along the corridors in and around the Lusaka and Copperbelt. Zambia has secured cost-effective raw material suppliers in the local manufacturing (supply) chain. At the same time, iron/steel has generated large spillover effects in all manufacturing sectors, which has facilitated industrial development in the region.
<i>Example 2:</i> Aluminum production in Mozambique (Maputo Corridor)	Development of the Mozar Aluminum Smelter in Mozambique has created synergetic effects with its small and medium enterprise linkage program supported by the International Finance Corporation for further development. The linkage program has helped local enterprises to supply goods and services in areas such as signage, air conditioners, cleaning chemicals, pumps, mosquito nets, landscaping, and protective clothing.
<i>Example 3:</i> Liquefied natural gas (LNG) production in Mozambique (Beira and Nacala Corridors)	Natural gas discoveries offshore in Mozambique (including the Rovuma Offshore Area) are large and world class, with potential for more to be discovered. The country is well situated relative to other potential LNG developments in the world.
<i>Example 4:</i> Heavy chemical industries in Mozambique (Nacala Corridor)	The Nacala Special Economic Zone, established in 2008 in the Nacala-Velha and port districts, has transformed into a large-scale petrochemical industry base, exhibiting synergy with other heavy industries including an oil refinery as well as steel and cement factories. Other downstream industries such as fertilizers and plastics have developed and have produced important inputs for the agricultural sector and agro-processing firms in Mozambique and landlocked countries along the corridor.
<i>Example 5:</i> Heavy chemical industries in Tanzania (Dar es Salaam Corridor)	A new port has been constructed at Bagamoyo (Tanzania), about 60 km north of Dar es Salaam, to respond to the increasing international trade of the country, and a large-scale industrial park has been developed in the port area where a heavy chemical industrial complex as well as other industries have located.

Source: JICA Study Team



Note: The size of the cylinders provides an “image” of the scale of production for the purpose of clearly conceptualizing the envisioned future, but does not precisely represent the estimated or projected quantity of production.
 Source: JICA Study Team

Figure 2.3: Envisioned Future of the Secondary Sector in Southern Africa

(2) Development of Downstream Manufacturing Industries

The development of basic materials industries has fostered related industries (i.e., intermediate products manufacturing and finished products manufacturing) in many parts of the region, and has also generated related business activities including research and development for high quality, high value-added production, especially in South Africa. Such interdependent business activities have led to industrial accumulation and innovation within the region.

Utilizing input from basic materials industries in the region, rapid development in various manufacturing industries has taken place in South Africa. For example, automobile and other

major machinery industries have developed further, and diversification to the electric and electronics industries is on the way.

In areas surrounding South Africa, supporting industries have developed in addition to basic materials industries, and have created a seamless synergy with manufacturing industries in South Africa. Neighboring countries/areas within the region have established their own strengths and thus have developed effective value chains within the region taking advantage of the strength of each country/area. Special Economic Zones near border areas have been established to promote border industries together with the development of commercial zones.

Countries other than South Africa have made use of cheaper labor costs than in South Africa, thereby developing manufacturing industries including consumer goods production over which South Africa used to have a comparative advantage. Table 2.2 provides examples of the envisioned development of manufacturing industries outside of South Africa. On the other hand, South Africa has shifted its industrial structures to higher value-added industries such as the electric and electronics industries, which have developed as one of the major contributors to the region's economic growth.

Table 2.2: Examples of the Envisioned Development of Manufacturing Industries Outside of South Africa

Example	Description
<i>Example 1:</i> Supporting industry, including light manufacturing industries in Botswana and Namibia (North-South and Trans-Kalahari Corridors)	Supporting industry such as manufacturing of automotive parts has developed in the suburbs of Gaborone (Botswana) and the Walvis Bay Export Processing Zone (Namibia). Intermediate goods produced will be exported to South Africa and the European Union. Textiles, furniture, leather, shoes, and other value accessories including bags, wallets, and belts have been produced in and around Gaborone to be exported to South Africa as well as to the global market.
<i>Example 2:</i> Light manufacturing industries in Zimbabwe (North-South Corridor)	Clusters of cotton farms and light manufacturing industries (including the clothing, textile, and apparel industries) have developed in the Midlands Province and the area around Bulawayo in Zimbabwe. In addition, the development of pharmaceuticals in Harare and Bulawayo has created value chains both upstream (packaging manufacturing industry) and downstream (retail pharmacies and pharmaceutical wholesalers).

Source: JICA Study Team

2.2.2 Agricultural Development – Another Driving Force

Agriculture and agro-processing industries have dramatically increased their competitiveness and have become another important pillar of industrial development. The countries with large agricultural potential in the region (e.g., Mozambique, Zambia) have substantially improved their agricultural productivity and diversification through various factors, including a rapid increase in fertilizer production, infrastructure development, research and development breeders, and abundant supply of labor (see Figure 2.3 for the envisioned growth in cereal yields in Southern Africa compared with the current yield).

Figure 2.4 illustrates the importance and impact of leveraging agricultural development in Southern Africa. “Agripowers” have emerged in the African Continent and have become large supply bases not only within their countries but also within the region. Reliance on imports for food supply has been reduced successfully, which has significant implications in terms of strengthened food security in the region. Increased food production and diversification including production of higher value-added products as well as the promotion of price reduction

and stability have led to enhanced regional competitiveness. These developments have also facilitated agro-industry production, which has resulted in export growth of the products. In countries with relatively higher income levels, perishable and high value-added crops for consumption have been produced in suburban areas and a variety of commercial crops suitable for the natural conditions have been grown for exports in the region.

Through the advancement of value chains in agriculture-related industries, alternative job opportunities have been created for the poor in rural villages who were employed in informal sectors and household enterprises in the past. The increased demand for labor has contributed not only to employment growth, but also to substantially increasing real wage levels.

Figures 2.5 and 2.6 summarize the envisioned development of agriculture and agro-industry in Southern Africa, which is characterized by growth/diversification along the following four dimensions: (i) productivity growth, (ii) increased product values, (iii) diversification toward downstream industries (e.g., agro-industry), and (iv) geographical diversification and expansion for agricultural and agro-industry production. Table 2.3 provides examples of the envisioned development of agriculture and agro-industry in the region. To provide background on agricultural productivity in Southern Africa, Box 2.2 presents the long-term trend of cereal production and the use of fertilizer in the region as well as some indication of potential agricultural growth in the region. In addition, Box 2.3 presents examples of initiatives assisted by development partners to build agricultural value chains in the region, which are essential for the development of agriculture and agro-industry.

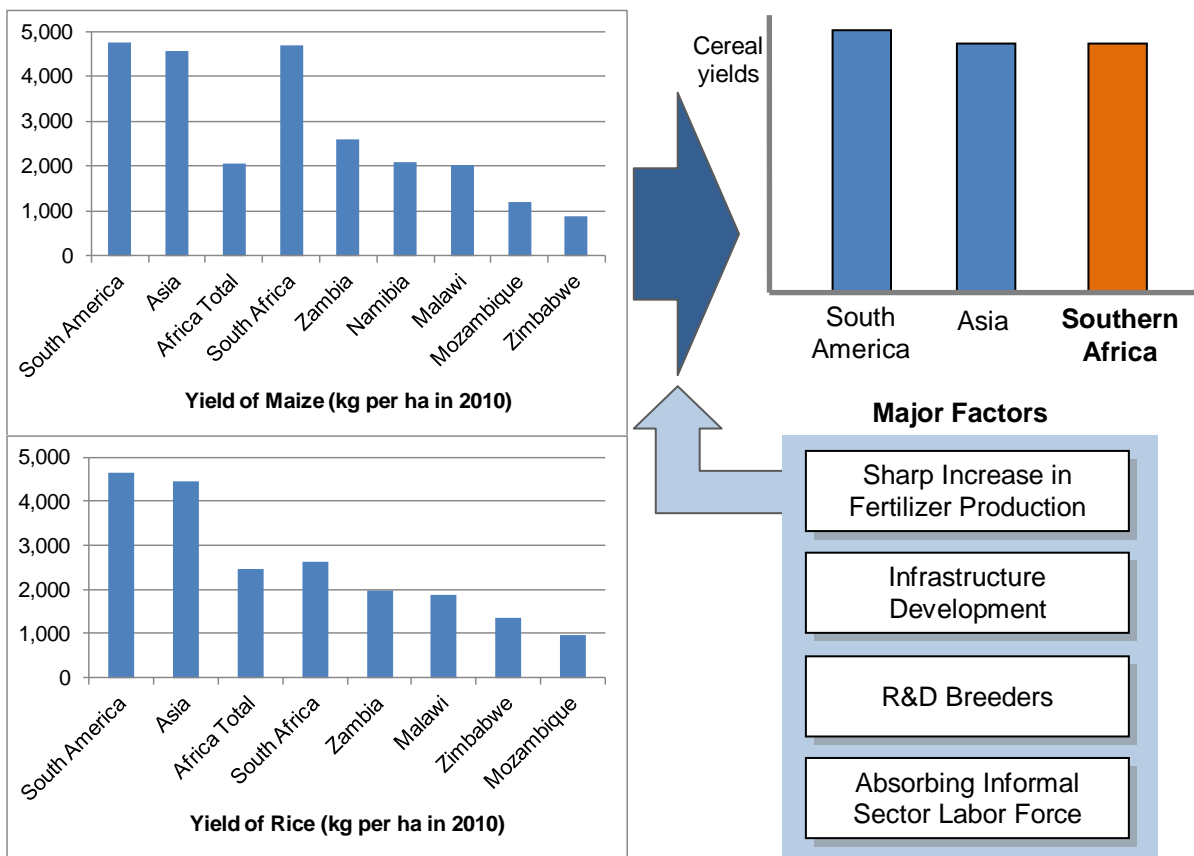
Table 2.3: Examples of the Envisioned Development of Agriculture and Agro-Industry in Southern Africa

Example	Description
<i>Example 1:</i> Agricultural Growth Corridors in Mozambique (Beira and Nacala Corridors)	Clusters of commercial farms and agribusiness enterprises have developed along the Beira and Nacala Corridors through outgrower schemes (contract farming operations). Large storage facilities/packing houses and processing facilities/mills have been established at/near the major cities along the corridors. Along the Beira Corridor, significant volumes of horticultural products and ethanol made from sugarcane and jatropha have been exported to the Southern African region and to the rest of the world via the Port of Beira. Crops such as rice, wheat, maize, and soya, as well as livestock, have been sold in major domestic markets in Tete and Beira, which have become the largest production and consumption bases in this area. Along the Nacala Corridor, cash crops such as oilseeds, cashews, coconuts, and fruits have been produced and large-scale plantations of eucalyptus and jatropha, as well as nut processing, has developed. Many of these venues are in the area developed by the (joint Japan–Brazil–Mozambique) Pro-Savana project in the second decade of the century.
<i>Example 2:</i> Agriculture and agro-processing industries in Zimbabwe (North-South Corridor)	Commodity crops (coffee, tobacco, sugar, cotton, and tea) and non-traditional agricultural products (horticultural and floricultural exports) have become of Zimbabwe’s the major income-generation sources. Soybeans grown mainly in eastern Zimbabwe are delivered along the corridor to the Multi-Facility Economic Zones in Zambia in order to manufacture processed foods, which will create soybean value chains across the border. Such progress was realized in tandem with significant developments in the fertilizer and chemical manufacturing industries in Harare and Bulawayo, which has greatly contributed to the development of agriculture and agro-industry in the country.

Source: JICA Study Team

Currently, cereal yields are significantly behind the world standard

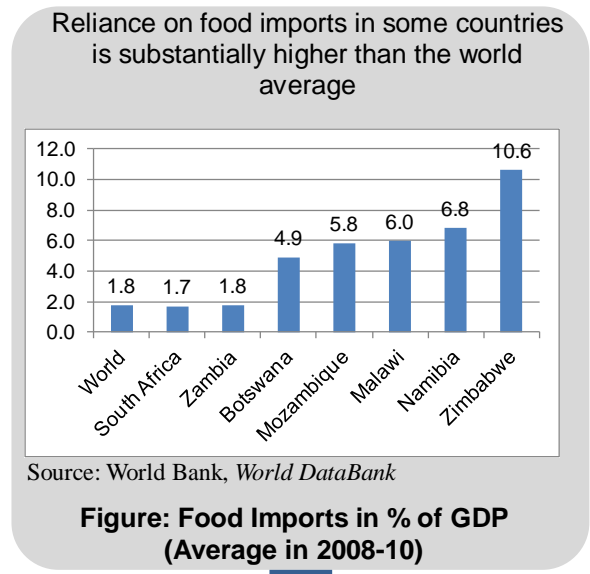
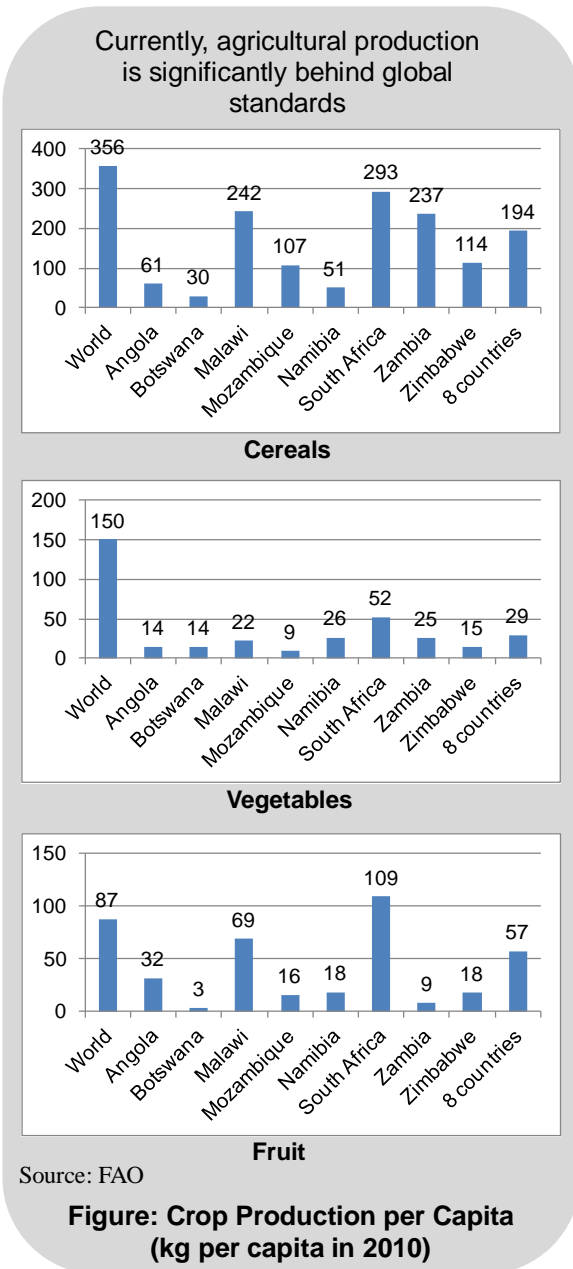
Cereal yields become comparable to those in Asia and South America, more than doubling the current yields



Based on FAO data

Source: JICA Study Team

Figure 2.4: Envisioned Growth of Cereal Yields in Southern Africa



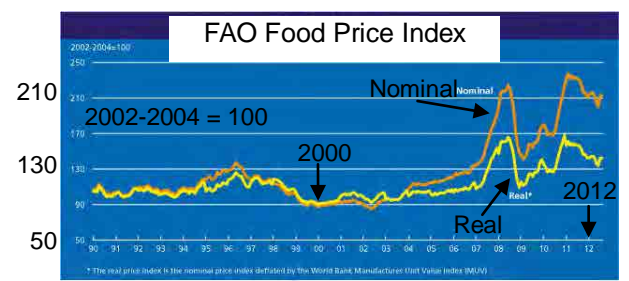
Significant Scope for Improvement

Share of Workforce Engaged in Agriculture (%):
Major Potential Provider for Employment

Angola:	NA
Botswana:	30% (2006)
Malawi:	80%
Mozambique:	81% (2003)
Namibia:	16% (2008)
South Africa:	5% (2009)
Zambia:	72% (2005)
Zimbabwe:	65% (2004)

Sources: World Bank, World DataBank; and African Economic Outlook 2012 for Malawi

External Environment: Increasing World Food Prices

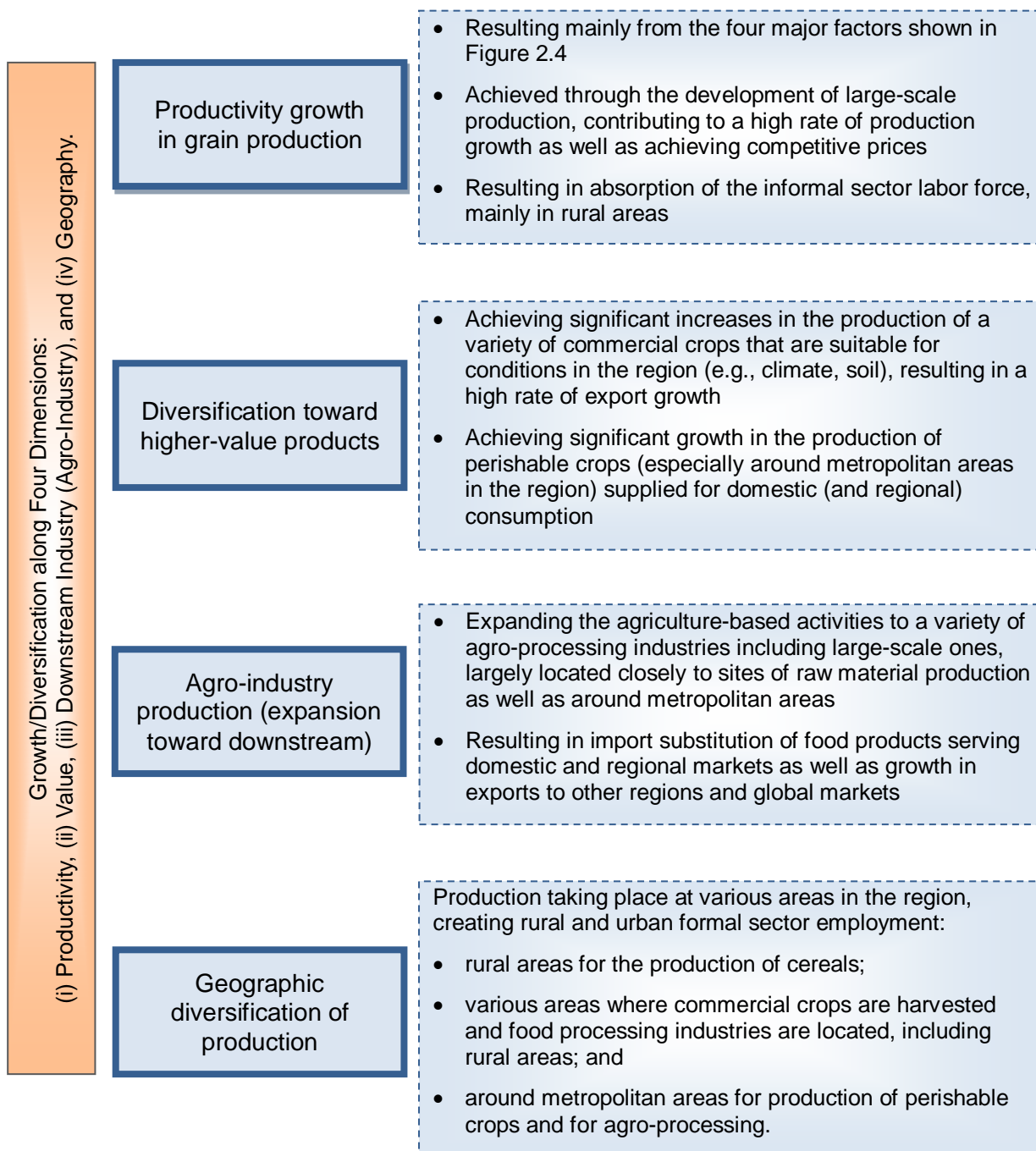


The increase in production leads to:

- a large impact on employment;
- price reductions and stability through productivity gains and import substitution; and
- a structural change from importing to exporting.

Figure 2.5: Importance of Leveraging Agricultural Development in Southern Africa

Achieving Global Standards in Production and Productivity with the Emergence of Regional Agripowers

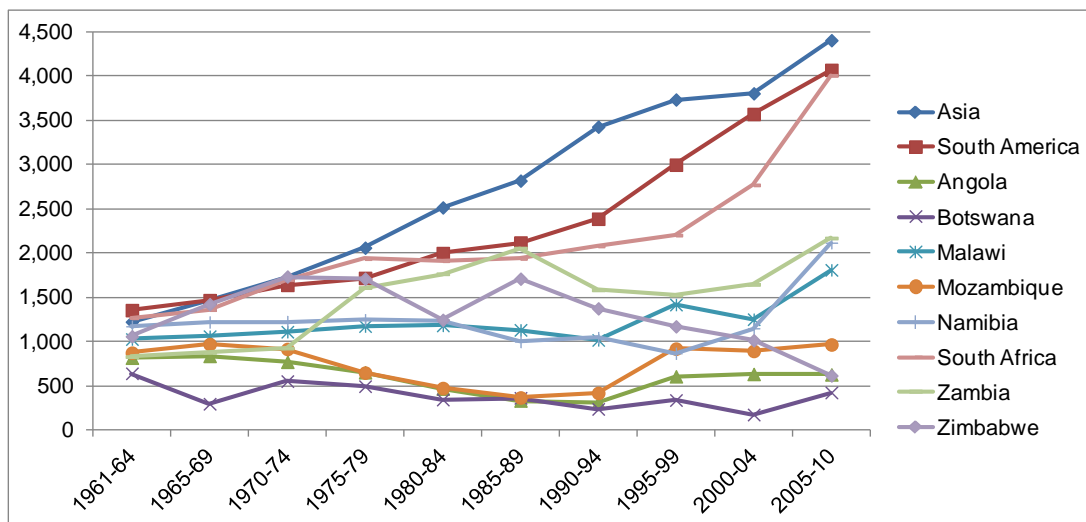


Source: JICA Study Team

Figure 2.6: Envisioned Development of the Agriculture and Agro-Industry Sectors in Southern Africa

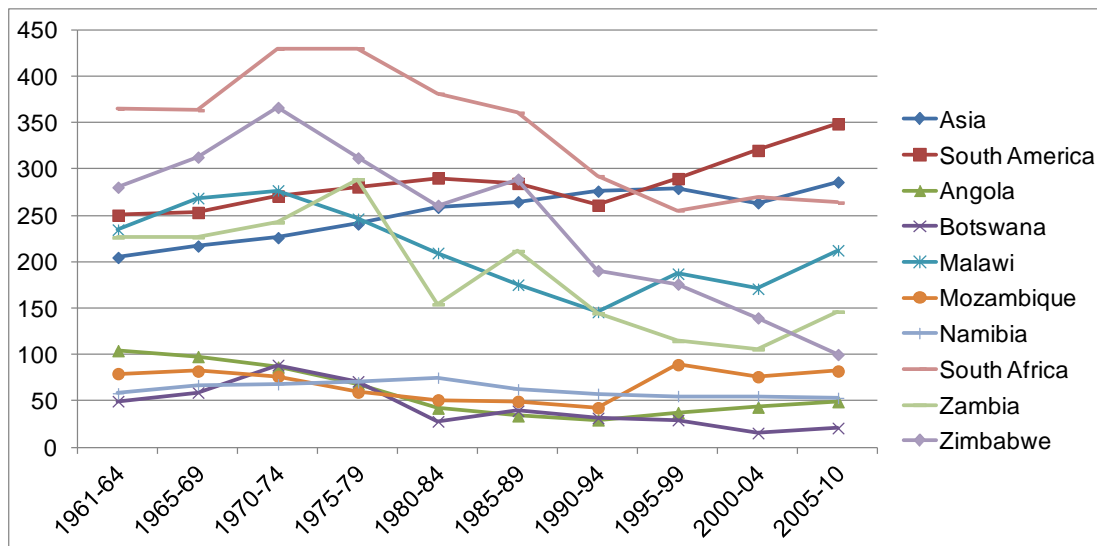
Box 2.2: Long-Term Trends in of Agricultural Productivity in Southern Africa

The figures below show long-term trends in maize yield and cereals production per capita in the focus countries over the past 50 years. Productivity in Malawi, South Africa, Zambia, and Zimbabwe was comparable to or even higher in terms of cereals production per capita than the average in Asia and South America, but began to move downward in late 1970s to early 1980s except in South Africa. On the other hand, Angola, Botswana, Mozambique, and Namibia have been consistently lagging.



Source: Statistics Division, Food and Agricultural Organization (FAOSTAT)

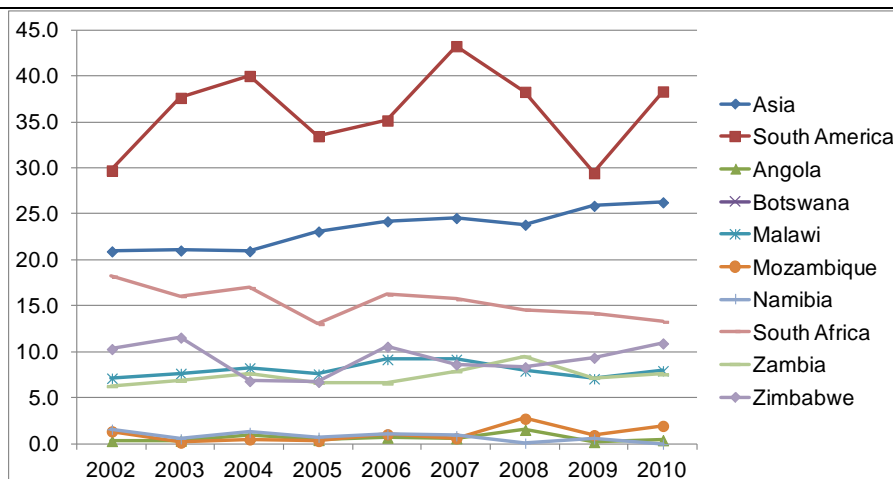
Average Annual Yield of Maize in the Focus Countries (kg per ha) Compared with Asia and South America, 1961 – 2010



Source: Statistics Division, Food and Agricultural Organization (FAOSTAT)

Average Annual Cereals Production per Capita in the Focus Countries (kg per capita) Compared with Asia and South America, 1961 – 2010

Low fertilizer use as shown in the figure below is a major factor explaining the stagnant agricultural productivity in the region. Productivity is likely to increase substantially once fertilizer is produced in the region and is made available at a reasonable cost.

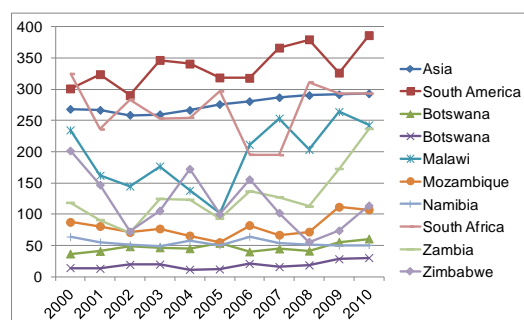


Note: Consumption was calculated as the sum of nitrogen fertilizers, phosphate fertilizers, and potash fertilizers consumed (all in kilograms of nutrients).

Source: Statistics Division, Food and Agricultural Organization (FAOSTAT)

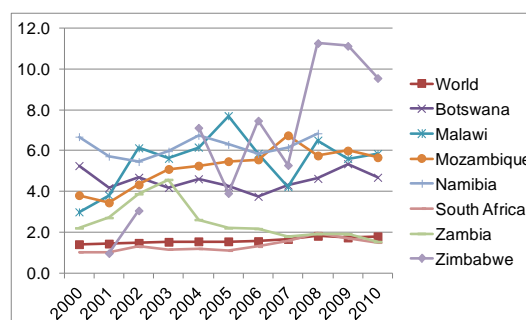
Consumption of Fertilizer per Capita (kg of nutrients per capita) in the Focus Countries Compared with Asia and South America, 2002 – 2010

One promising sign for potential agricultural growth in the region is the recent sharp increase in cereals production in Malawi and Zambia (especially the increase in maize production) as indicated in the figure below. Zambia's food imports in percent of GDP have also decreased since the mid-2000s.



Source: Statistics Division, Food and Agricultural Organization (FAOSTAT)

Cereals Production per Capita in the Focus Countries (kg per capita) Compared with Asia and South America, 2000 – 2010



Source: World Bank, World DataBank

Food Imports in Percent of GDP (%) Compared with World Average, 2000 – 2010

The recent increase in maize production in Zambia may be attributed to: (i) favorable weather conditions, (ii) increased fertilizer use, (iii) harvest area expansion, and (iv) increased use of hybrid maize seed. It is also estimated that small- and medium-scale farm households in Zambia increased by more than 40% from 2001 to 2011.

In fact, Zambia's agricultural sector has significant potential for growth due to its abundant land and water resources as well as its location "landlinked" to the other Southern African countries, providing huge potential for accessing regional markets. However, the maize purchase by the Food Revenue Agency of Zambia has been affected by the high purchase price, which tends to lower the incentive for the government to export surplus maize since the market price is lower than the government's purchase price. Also, limited transport capacity (especially of railways) is a major constraint impeding a substantial increase in maize exports to neighboring countries. Importantly, Zambia signed the Comprehensive African Agriculture Development Programme (CAADP) Compact in January 2011

(see Box 2.1 on CAADP), which is expected to pave the way for a harmonized approach of supporting the agricultural sector in closer coordination with neighboring countries and international development partners.

Also, the factors contributing to production growth in Zambia are and have been present in Malawi. The Government of Malawi and development partners have implemented a number of programs to provide fertilizer and hybrid seed for smallholders to increase agricultural productivity and food security (e.g., the Starter Pack Programme and Targeted Inputs Programme to distribute free fertilizer and hybrid seed to smallholders, the Agricultural Productivity Investment Project involving credit subsidization for fertilizer and seed,^b the Inputs Subsidy Programme distributing fertilizer vouchers).

Since rainfed land for further expansion is limited due to the population pressures, fertilizer is critical for enhancing agricultural productivity and reducing poverty in Malawi. For this reason, the Government of Malawi is seeking to improve the effectiveness and efficiency of targeting and fertilizer delivery, and reduce diversion and fraud.^c

Note: ^a See, e.g., ACF/FSRP [Agricultural Consultative Forum/Food Security Research Project] Research, "Factors Contributing to Zambia's 2010 Maize Bumper Harvest," presented to the Economics Association of Zambia, Pamodzi Hotel, Lusaka, Zambia, 23 September 2010; and T.S. Jayne, et al., "Zambia's Maize Policy Challenges: Issues and Options for CAADP," presented at ACF-FSRP-MACO [Ministry of Agriculture and Cooperatives] Maize Policy Workshop, Lusaka, Zambia, 16 August 2011. ^b A.J.E Charman, *Agricultural Development and Food Security in Sub-Saharan Africa (SSA), Building a case for more Support*, The Case of Malawi, 2006, pp. 39-40. ^c Edward F. Buffile and Manoj Atolia, *Agricultural Input Subsidies in Malawi: Good, Bad or Hard to Tell?*, 2009, p. 1; and Andrew Dorward, Ephraim Chirwa, and T.S. Jayne, *The Malawi Agricultural Inputs Subsidy Programme, 2005/6 to 2008/9*, 2010.
Source: Compiled by the JICA Study Team

Box 2.3: Examples of Initiatives Building Agricultural Value Chains in Southern Africa Assisted by Development Partners

Organization	Project/Initiative	Overview
Food and Agriculture Organization	Botswana Agriculture Value Chain Project	The Botswana Ministry of Agriculture, in collaboration with the Agricultural Hub, is conducting an Agriculture Value Chain Project with support from FAO. The study, launched in May 2011, aims to promote the competitiveness of the country's agro-food subsectors in national, regional, and international markets by following a value chain paradigm. Technical support is provided for the design and execution of value chain studies for selected agricultural products including the beef value chain. The study is expected to strengthen local capacity for value chain analysis as an instrument to better inform policymakers and guide development strategies in the agricultural sector.
AfDB, FAO, IFAD, UNIDO	Accelerated Agribusiness and Agro-industries Development Initiative	In the partnership with AFD, MASHAV, and other organizations, the 3ADI project takes three steps to formulate agribusiness value chains: (i) assessment of key constraints faced by agro-industries that limit their ability to add value to agricultural production; (ii) development and validation of concrete interventions that promote agro-industry development; and (iii) assisting beneficiaries and countries in mobilizing resources from international financing institutions and a range of private partners, research institutions and NGOs. The project is conducted in 18 countries including 14 in Africa.
USAID	Agribusiness in Sustainable Natural Plant Products	ASNAPP is a nonprofit organization that aims to create and develop African agribusiness in the natural plant products sector. It was formed in 1999 with the funding by USAID. It operates in eight countries in East, West, and Southern Africa. In Zambia, in collaboration with Sun International Hotel in

		Livingstone, it initiated a greenhouse project in 2005, which has produced high-quality vegetable through training and capacity development of local farmers, and the marketing of products to hotels and large retail chains.
USAID	Feed the Future Initiative in Malawi, Mozambique, Tanzania, and Zambia	The FTF initiative was launched in 2009 as part of the United States Government’s global commitment to tackle global food security challenges. Specifically, it aims to harness the power of the private sector and research to transform agricultural development by enhancing agricultural productivity, expanding markets and trade, and increasing the economic resilience of vulnerable rural communities. Malawi, Mozambique, Tanzania, and Zambia were selected among 20 FTF countries worldwide for focused investment. Transformation of food crop value chains is a core investment area, i.e., selection of value chains is based on analysis of the potential to improve incomes and nutrition, prioritization by country, and complementary interventions by other actors. Key crops of focus in each country include dairy and legumes in Malawi; oilseeds, cashews, and fruit in Mozambique; rice, maize, and horticulture in Tanzania; and oilseeds, legumes, maize, and horticulture in Zambia.
Abbreviations: 3ADI = Accelerated Agribusiness and Agro-industries Development Initiative, AFD = French Development Agency (Agence Française de Développement), AfDB = African Development Bank, ASNAPP = Agribusiness in Sustainable Natural Plant Products, FAO = Food and Agricultural Organization, FTF = Feed the Future, MASHAV = Israel’s Agency for International Development, Cooperation, IFAD = International Fund for Agricultural Development, NGO = nongovernmental organization, UNIDO = United Nations Industrial Development Organization, USAID = United States Agency for International Development Source: Compiled by JICA Study Team		

2.2.3 Development of Labor-Intensive Industries to Create Urban Employment

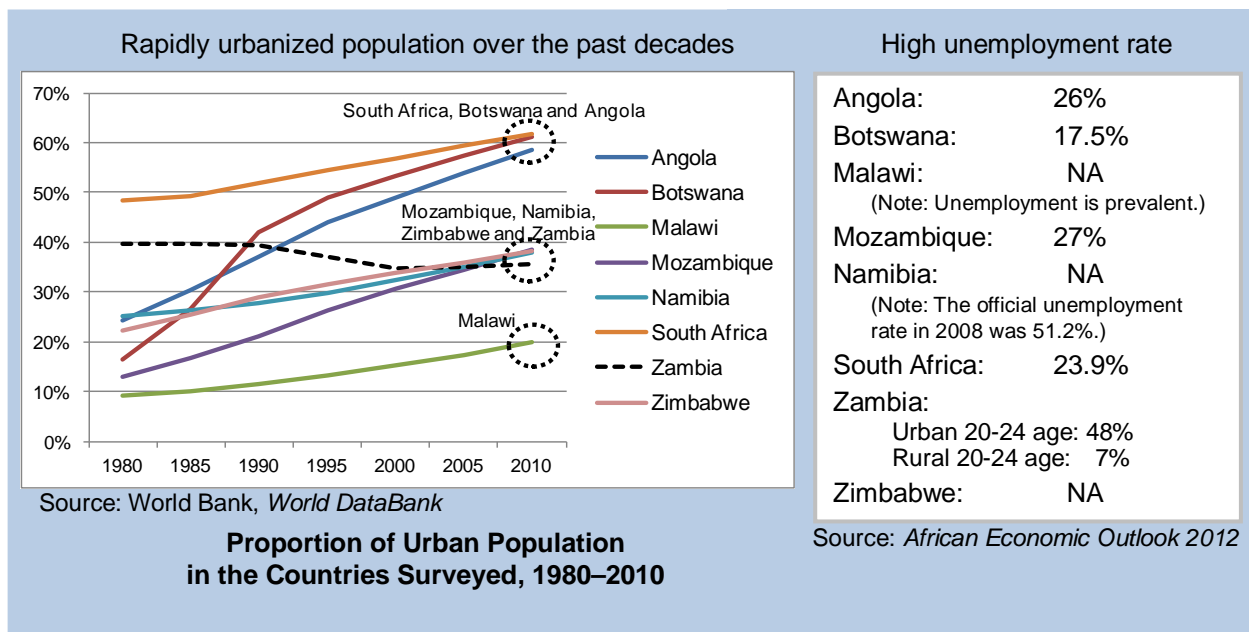
Development of labor-intensive consumer goods manufacturing industries contributes to economic growth through various channels including (i) import substitution, (ii) expansion of domestic demand, (iii) creation of local employment opportunities, and (iv) diversification of trade, by linking with global and regional markets. In light of the ever-increasing attention placed on the importance of employment generation in achieving economic transformation, the perspective of job creation has been a focus of this study, as indicated in the following discussion.

In parallel with the development of agro-processing industries and large-scale basic materials industries, labor-intensive consumer goods manufacturing industries (e.g., footwear, textiles, garment) have developed in areas in the capital district of each country. This has facilitated industrial structural change and the transformation of labor absorption from the informal sector to the formal sector. With an increasing urban population and a high unemployment rate in the region, such a change in industrial structure has created new job opportunities for unskilled workers especially for the youth. Unemployment was and (to some extent) still is a major socioeconomic problem but it has provided inexpensive labor for these industries, thereby making it possible for these changes to happen. Figure 2.7 shows the increased urban population and the state of unemployment in 2010 and the creation of new industries partly resulting from these socioeconomic issues.

These industries have begun to supply cheaper goods within and outside of the region by making use of their unique ethnic designs/features, and have developed to replace supply sources from Asian countries where labor costs had rapidly increased and began to lose price competitiveness (see Figure 2.8 for a comparison of labor costs between Africa and Asia, increases in wages in both regions in the past decade, and an indication for a potential sharp

increase in labor costs in East Asia; see also Box 2.4 for some evidence of the labor cost advantage of Sub-Saharan Africa).

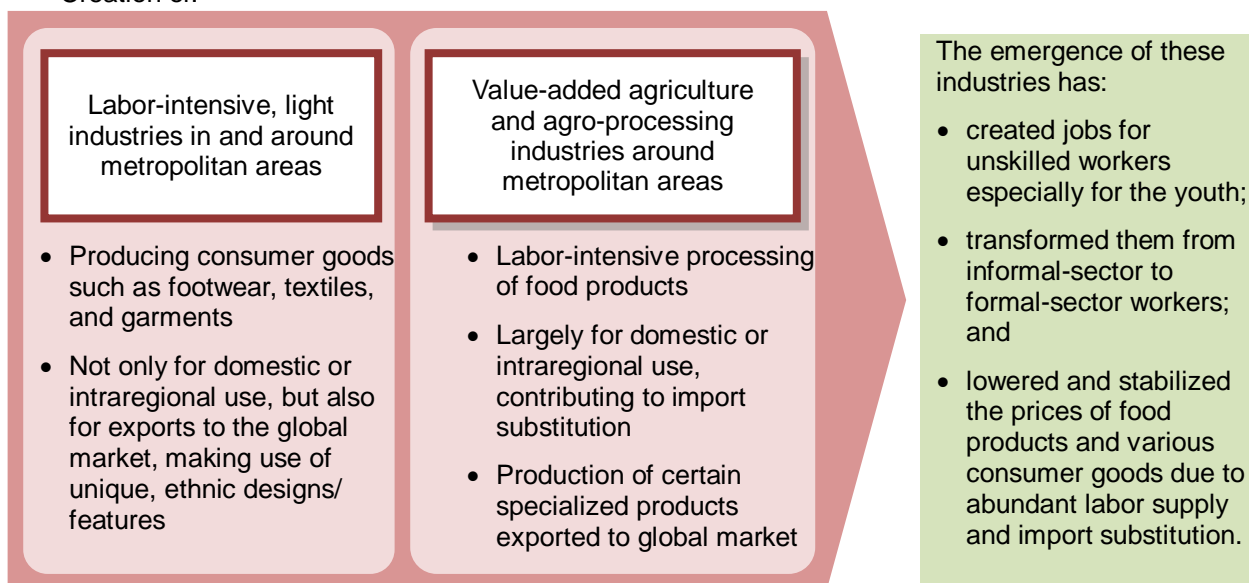
It should be stressed that although labor-intensive consumer goods manufacturing is at present significantly underdeveloped in the region (except in South Africa) due partly to comparatively high labor costs, developing this industry with great potential for job creation should not be neglected in pursuing economic transformation of the region. It is essential to continue to provide support for the development of this sector (e.g., provision of technical training and education, support for local firms) as has for example the World Bank Group provided (see Box 2.5 on World Bank support for small- and medium-scale enterprises in Southern Africa).



Proportion of Urban Population in the Countries Surveyed, 1980–2010

Labor Supply. Unemployment was a major socioeconomic problem but it provided opportunities for the following structural changes to take place.

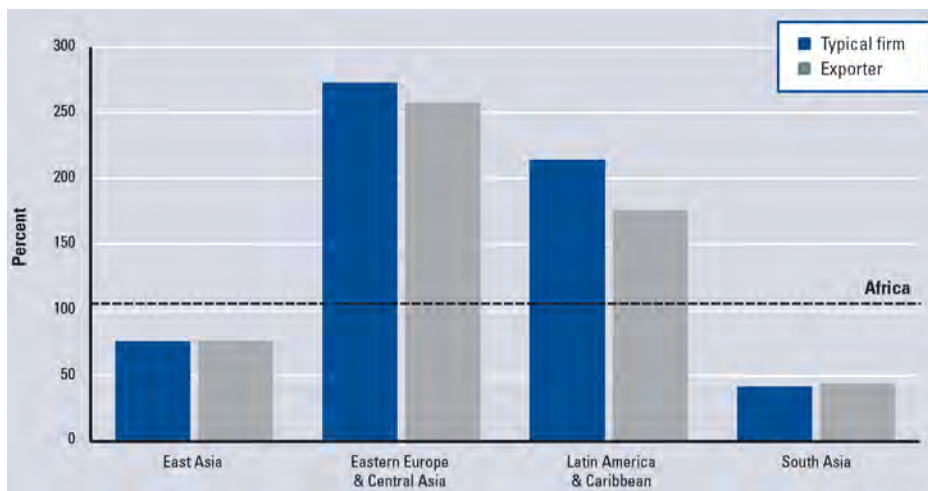
Creation of:



Source: JICA Study Team

Figure 2.7: Urbanized Population and Unemployment as Opportunity for Creating New Industries around Metropolitan Areas

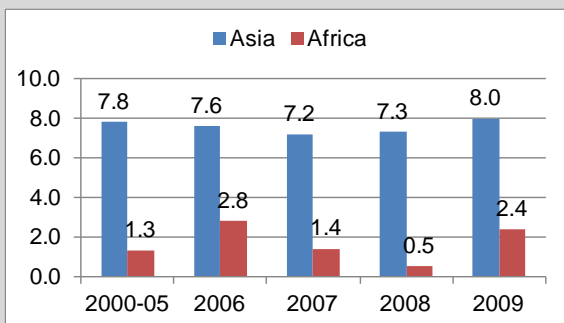
Labor Cost Disadvantage of Africa



Source: World Economic Forum, *The Africa Competitiveness Report 2009*

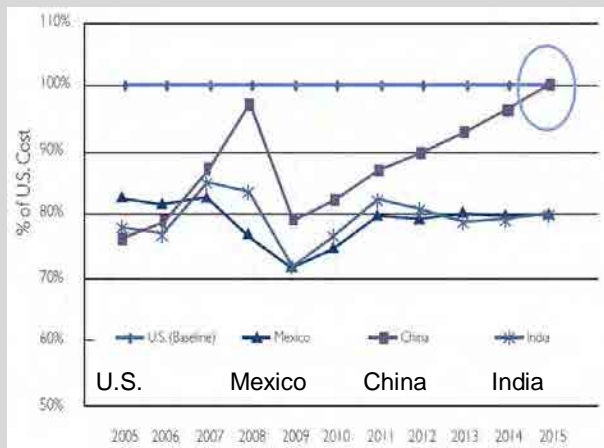


Selected Data on Increasing Labor Costs in Asia (especially in the PRC)



Source: ILO, *Global Wage Report 2010/11*

**Regional Wage Growth, 2000-09:
 Africa vs. Asia (% per year)**



Source: Alix Partners, *2011 U.S. Manufacturing-Outsourcing Cost Index*

Scenario of US Manufacturing-Outsourcing Cost Index (US=100%)

Source: JICA Study Team

Figure 2.8: Labor Cost Comparison between Africa and Asia

Box 2.4: Comparative Advantage of Sub-Saharan Africa in Light Manufacturing

The table below provides some evidence for a labor cost advantage of Sub-Saharan Africa relative to the PRC, comparing average monthly cash wages in certain light manufacturing industries in the PRC, Ethiopia, Tanzania, Vietnam, and Zambia.

Average Monthly Wages in Selected Light Manufacturing Industries (in USD)

	PRC	Ethiopia	Tanzania	Vietnam	Zambia
Skilled	305–399	77–131	153–233	154–235	284–364
Unskilled	197–278	35–53	80–130	78–131	157–208

Note: These are average monthly wages for the production of polo shirts, dairy milk, wooden chairs, crown cork, leather loafers, and milled wheat.

Source: World Bank, *Light Manufacturing in Africa: Targeted Policies to Enhance Private Investment and Create Jobs*, 2012

While these data refer to the cash wages paid to factory workers, labor costs are not limited to cash wages; they also include employer contributions to pension plans, health and unemployment insurance, and other fringe benefits, as well as employer outlays on training, housing, recreation, and the like. Nonwage labor costs in the PRC are often high and seem to increase rapidly, perhaps more rapidly than cash wages. On the other hand, nonwage labor costs in many Sub-Saharan African countries seem to remain low, potentially increasing the labor cost advantage of light manufacturing in Sub-Saharan Africa.

Source: World Bank, *Light Manufacturing in Africa: Targeted Policies to Enhance Private Investment and Create Jobs*, 2012

Box 2.5: Support for Small- and Medium-Scale Enterprises (SMEs) by the World Bank Group in Southern Africa

In its latest country assistance/partnership strategy, the World Bank Group (including the International Finance Corporation, IFC) has identified support of SMEs as a focus area for a number of Southern African countries as shown below.

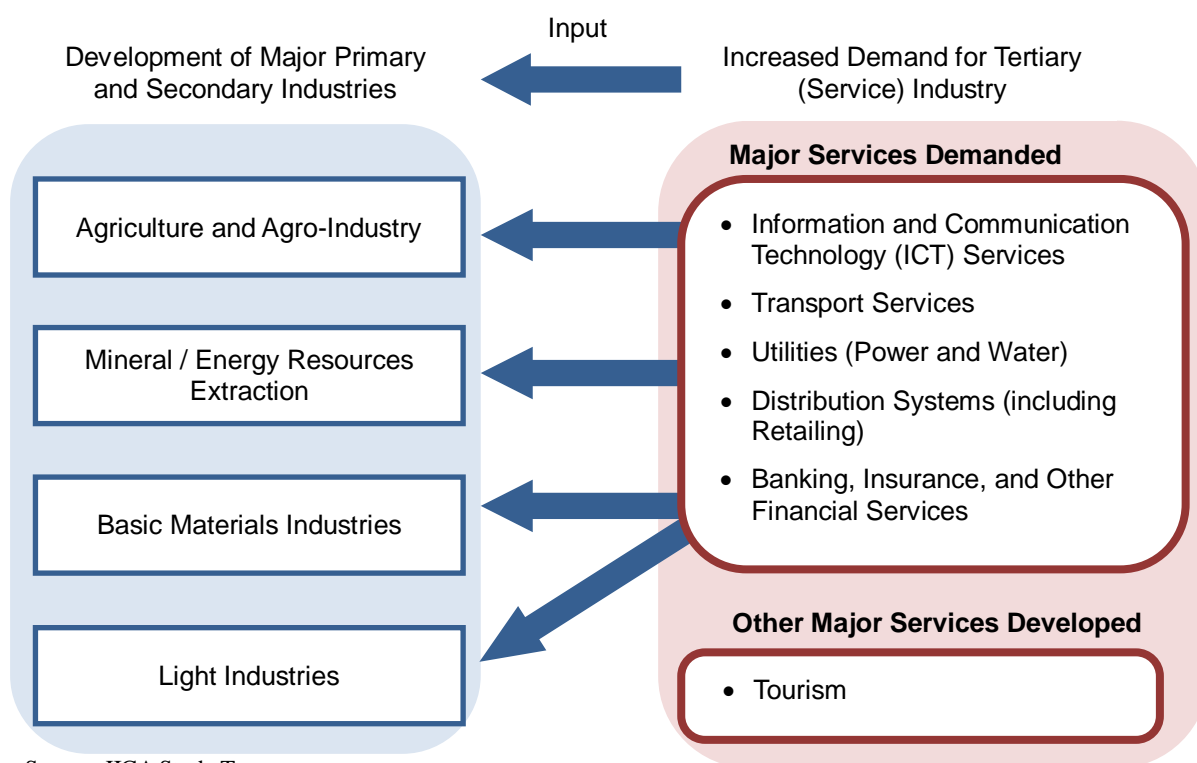
Proposed Support for SMEs in World Bank Country Assistance Strategy for Selected Focus Countries

Country	Proposed Support for SMEs by the World Bank Group
Mozambique	Supporting high growth SMEs is a key focus of IFC's strategy in Mozambique, through expansion of its established SME capacity building programs and support to banks extending financing to SMEs, among other initiatives.
Tanzania	As part of the expected Country Assistance Strategy Outcome 1.1 (improved business environment and financial intermediation), the IFC will strengthen financial markets, particularly in terms of access to finance for micro-, small-, and medium-scale enterprises (MSMEs).
Zambia	A focus of the IFC in Zambia is expanding its technical assistance program for SMEs that supply mining companies. IFC has also been seeking to provide investment support to improve the access of SMEs to finance via partner banks.

Sources: (i) World Bank, *Country Partnership Strategy FY 2012–2015 for the Republic of Mozambique*, 8 February 2012; (ii) *Country Assistance Strategy FY 2012–2015 for the United Republic of Tanzania*, 9 May 2011; and (iii) *Country Assistance Strategy for the Republic of Zambia*, 8 April 2008.

2.2.4 Envisioned Development of the Tertiary (Service) Sector

The tertiary or service sector including information and communication technology (ICT) services has contributed to the development of industries mentioned above by bringing down the cost of doing business, facilitating service innovation, and enhancing productivity. Particularly, ICT has enabled structural changes in the region while various other services such as transport, utilities, distribution systems, and banking, insurance, and other finance services have contributed importantly to the growth of key industries. Figure 2.9 illustrates the envisioned development of ICT and other services in the region.



Source: JICA Study Team

Figure 2.9: Envisioned Development of ICT and Other Services in Southern Africa

In terms of job creation, ICT has had a great impact since it has accommodated a broad range of labor from unskilled workers (e.g., those engaged in relatively simple work such as data input, operators in call centers) to knowledge workers at managerial levels. One example of the envisioned development of ICT services is shown in Table 2.4 below.

Table 2.4: Example of Envisioned ICT Development in Southern Africa

Example	Description
ICT development in Botswana utilizing the Innovation Hub (North-South Corridor and Trans-Kalahari Corridor)	Taking advantage of the Innovation Hub, Botswana has attracted pioneering foreign firms and has supplied international level ICT goods and services to consumers within the region. Also, by connecting industrial bases through a fiber optic/advanced communications network along economic corridors utilizing the Innovation Hub as a nodal point, the efficiency and productivity of manufacturing and distribution activities as a whole has increased.

Source: JICA Study Team

2.3 Measures to Address the Assumptions

While the aforementioned assumptions include issues concerned with the much broader domain of public administration than this study addresses or entirely domestic issues (e.g., political will for the envisioned development), other issues are addressed in this study, as shown in Table 2.5.

Table 2.5: Measures Proposed in This Study to Address the Assumptions Underlying the Overall Development Scenarios

Assumption	Measures Proposed in This Study
The political will necessary for the envisioned development is in place.	This is entirely a domestic issue within the respective countries that goes beyond the scope of this study.
Adequate institutional mechanisms and capacity are also in place.	While this assumption is concerned with the much broader domain of public administration than can be addressed in this study, the need for capacity development directly related to the development of economic corridors in the region is addressed partly with potential technical assistance programs proposed in the study.
The required physical infrastructure will be developed without delay under the initiative of the governments in the region.	This study addresses major issues related to physical infrastructure along the eight priority corridors. Also, the study proposes infrastructure development initiatives critically needed for the development of the potential JICA Focus Economic Corridors, taking into account infrastructure projects in relevant studies and plans.
Development leads to “win-win” outcomes within the region.	This study puts forward various proposals from a regional perspective including measures for regional economic integration, development of regional infrastructure, and measures for agricultural development in the region that are consistent with the Comprehensive African Agriculture Development Programme (CAADP), a continent-wide initiative including Southern Africa.
The private sector will play a vital role in transforming the region’s industrial structure. Rather than discouraging the private sector, the governments will provide an environment conducive to private sector initiative.	The proposals made for the potential JICA Focus Economic Corridors including those for physical infrastructure development and technical assistance programs are aimed at improving the investment and business environment along the corridors as well as achieving other objectives.
Particular attention should be paid to the impact of industrial development on job creation especially for youth.	The development scenarios proposed in this chapter and Chapter 4 and subsequent proposals for the potential JICA Focus Economic Corridors including proposed technical assistance programs all take into account the importance of job creation. Industrial clusters especially of labor-intensive manufacturing/processing sectors need to be developed from the survival and subsistence level to a more dynamic, innovative state in order to overcome severe competition from Asian manufacturers.

Abbreviations: CAADP = Comprehensive African Agriculture Development Programme, JICA = Japan International Cooperation Agency

Source: JICA Study Team

2.4 Comparison with the East Asian Development Path

While there is an argument that the East Asian experience may be applicable to Southern Africa, the development path set out in this chapter (which differs from that of East Asia) is considered more appropriate and thus is proposed for the region.

East Asian economies were originally based on agriculture and rural development, powered by the “green revolution”, which was promoted *before* industrialization was initiated. The introduction of high-yield rice and other primary crops, subsidies for fertilizer and other agricultural inputs, and the expansion of investment in irrigation contribute substantially to an improvement in agricultural productivity and increased food production. The resulting decrease in the price of cereal crops contributed to improvements in economic welfare for urban workers. In addition, improvements in agricultural efficiency allowed “excess” rural workers to migrate to urban areas, which in turn further drove industrialization and the expansion of employment. Rapid economic growth was brought about by the export of manufactured goods – this development path was realized through the export of labor-intensive manufacturing goods including electric and electronic products by utilizing a relatively abundant and cheap labor force. In essence, as has commonly been observed, the realization of a virtuous cycle of employment expansion and growth based on a core policy to pursue export-oriented industrialization was the key to Asian economic growth. Associated with rapid growth sustained over a long period of time were a high savings rate through increased employment and an accumulation of capital that satisfied domestic investment needs. Appendix D provides relevant statistics for ASEAN countries as well as for Southern Africa.⁸

In Africa, on the other hand, apart from South Africa with its relatively well-developed supply chain linking producers to consumers offering market opportunities for many entrepreneurial smallholding farmers, agricultural productivity improvement and rural development still need to be actively pursued to make agriculture a basis for industrial development. The lack of agricultural inputs, particularly irrigation systems and fertilizers, has been pronounced, and agricultural and rural development should be promoted *in parallel with* industrial development.

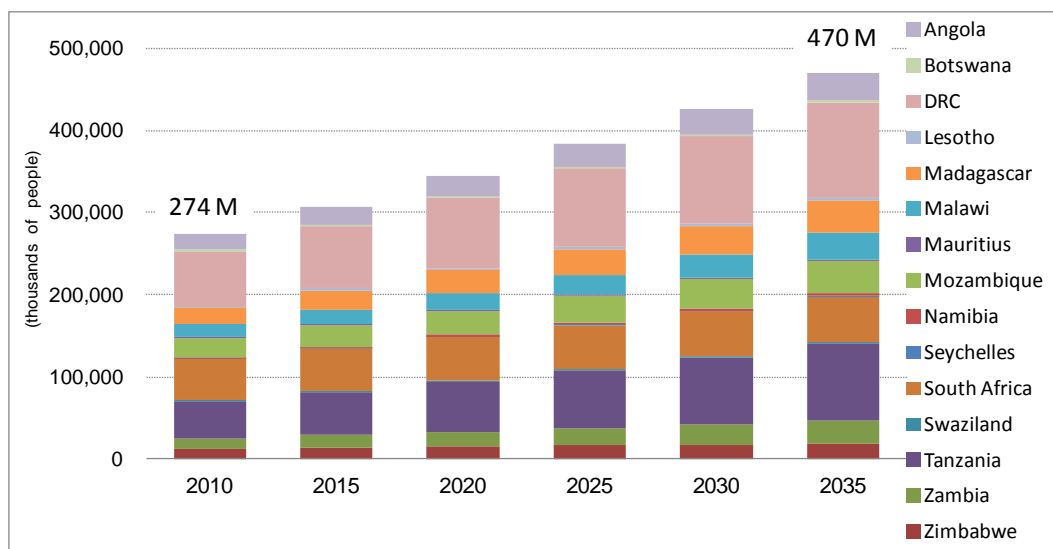
Another difference between the East Asian experience and the development scenarios proposed for Southern Africa is the area of focus in manufacturing industries. While East Asian countries pursued export-oriented industrialization with particular emphasis on finished goods production utilizing cheap labor, the greatest driving force of the proposed scenarios for Southern Africa is rapid development of basic materials industries. This approach is believed to be sensible given the abundant natural resources available in the region as well as current labor costs, which may not be low enough to actively pursue export-oriented industrialization.

2.5 Economic Prospects of Southern Africa

2.5.1 Projections of Population Growth

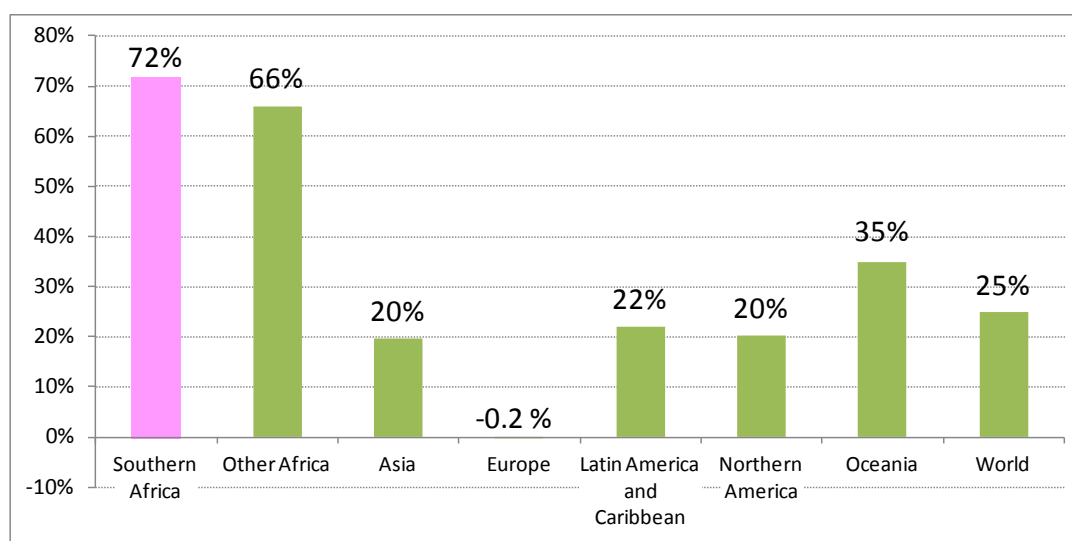
The United Nations projects that by 2035 the aggregate population of Southern Africa will be 470 million as shown in Figure 2.10, which presents the medium-fertility projections for the SADC countries in 2010–2035. This is an increase by nearly 200 million people from the level in 2010, indicating growth of 72% during 2010–2035 as shown in Figure 2.11. This rate of growth is even higher than that for all of Africa, and Africa’s population is projected to grow considerably faster than that of any other continent.

⁸ The East Asian experience described in this section is largely drawn from JICA, *Report of the Stocktaking Work on the Economic Development in Africa and the Asian Growth Experience*, May 2008.



Source: United Nations Population Division, *World Population Prospects: The 2010 Revision*

Figure 2.10: Projections of Population Growth in Southern Africa, 2010–2035 (Medium-Fertility Variant)



Note: According to the scheme of geographic regions and subregions used by the United Nations, Northern America is the northernmost region of the Americas and is part of the North American continent. Northern America consists of mainly of Canada and the United States.

Source: United Nations Population Division, *World Population Prospects: The 2010 Revision*

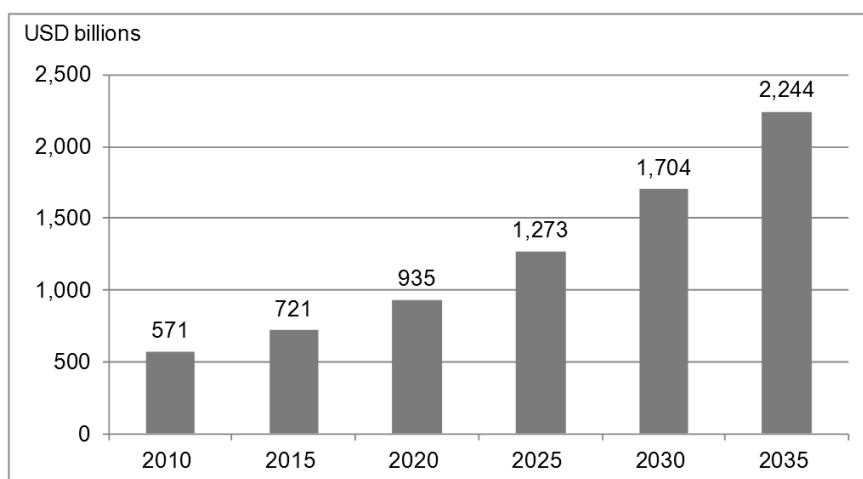
Figure 2.11: Projections of Population Growth Rate by Region from 2010 to 2035 (Medium-Fertility Variant)

The high rate of population growth in Southern Africa provides important implications as follows:

- The regional market will grow fast, making the region more attractive as a destination of investment for foreign enterprises including those from Japan.
- It is necessary to accelerate the pace of job creation for this growing population and assure the future development of the region and the continent.
- It is critical to increase agricultural productivity in the region and improve food security.

2.5.2 Projections of GDP Growth

While most African countries face difficulties, their gross domestic product (GDP) is expected to increase steadily in the coming decades. The Programme for Infrastructure Development in Africa (PIDA) estimated that the average annual GDP growth rate for the continent will be 5.2% between 2010 and 2040. Among the countries traversed by the priority corridors, Angola, Malawi, Mozambique, and Tanzania are forecast to have average annual growth rates greater than 7% over the period. Figure 2.12 presents projections of GDP for the SADC countries (in 2010 prices). It is projected that by 2035 the GDP for the entire region will be nearly four times as high as it was in 2010.

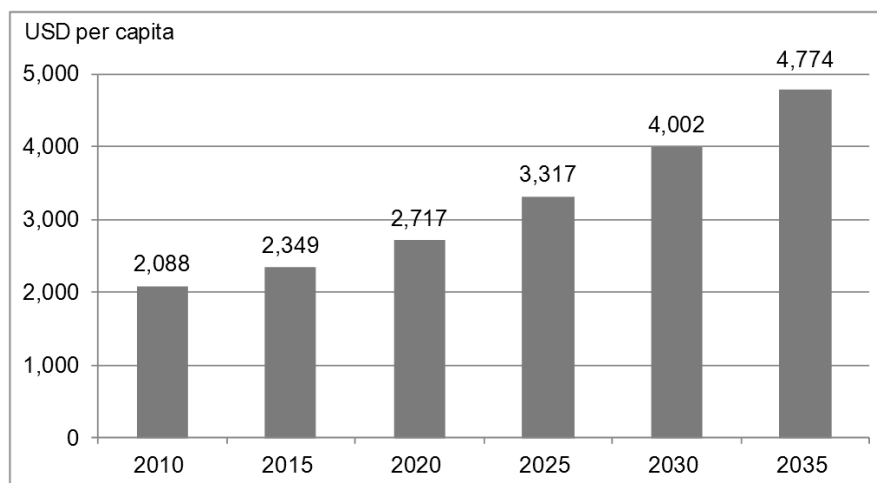


Abbreviations: GDP = gross domestic product, IMF = International Monetary Fund, PIDA = Programme for Infrastructure Development in Africa
 Note: Projected GDP was calculated using the GDP figures in 2010 by the IMF and the annual GDP growth rates based on PIDA projections.
 Sources: (i) IMF, *World Economic Outlook October 2012*; and (ii) PIDA, *Draft Africa Macroeconomic Outlook 2040*, July 2011.

Figure 2.12: GDP Projections for the SADC Countries, 2010–2035 (in 2010 Prices)

The average GDP per capita for Southern African countries is forecast to increase from USD 2,088 in 2010 to USD 4,774 in 2035 as shown in Figure 2.13. The projected figure in 2035 is equivalent to the level of GDP per capita in Thailand as of 2010.

These projections indicate that the purchasing power in the region will increase substantially in the coming decades.



Abbreviations: GDP = gross domestic product, IMF = International Monetary Fund, PIDA = Programme for Infrastructure Development in Africa

Note: Projected GDP per capita was calculated using the projections of population and GDP in Figures 2.10 and 2.12.

Sources: (i) IMF, *World Economic Outlook October 2012*; (ii) PIDA, *Draft Africa Macroeconomic Outlook 2040*, July 2011; and (iii) United Nations Population Division, *World Population Prospects: The 2010 Revision*.

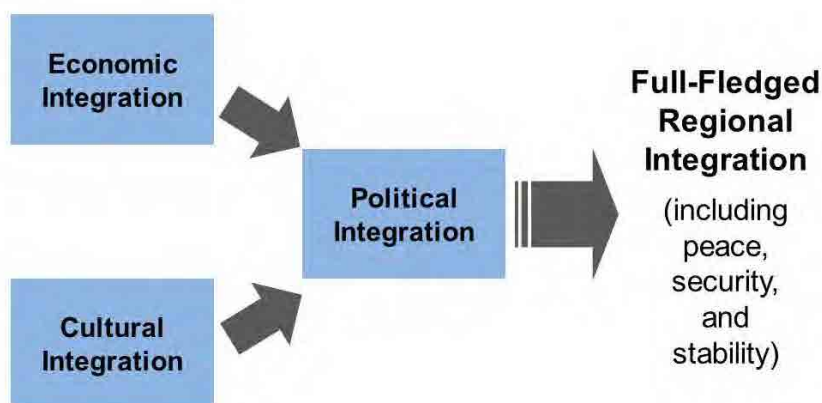
Figure 2.13: Projections of GDP Per Capita in the SADC Countries, 2010–2035 (in 2010 Prices)

3. Progress in Regional Integration

3.1 Introduction

The rationale underlying regional integration assumes that neighboring countries can benefit from integrating their economies, thereby creating larger economic spaces allowing for economies of scale, which may increase efficiency, competitiveness, and growth. The idea is that there is “strength in numbers” and this strength may accelerate the pace of development and enhance security.¹ There have been success stories in other parts of the world, most notably in Europe, where regional integration has successfully promoted prosperity, peace, and security over the several decades since the end of World War II.²

Regional integration in Southern Africa and elsewhere is multifaceted, including political and cultural integration as well as economic integration, leading to the ultimate objective of full-fledged regional integration and peace building (see Figure 3-1). Thus, for example, political integration entails promoting common political values and systems, strengthening legitimate, democratic institutions, and consolidating peace, security, and stability. Integration in the socio-cultural sector entails development cooperation in which different cultures and societies meet and interact. Economic integration is the process by which economic barriers against the exchange of goods, services, capital, and people between/among two or more countries are eliminated or reduced; it usually progresses with a preferential free trade area, progresses to a free trade area, and then to a customs union and common market, ending with economic and political union.³



Source: JICA Study Team

Figure 3.1: Image of Multifaceted Regional Integration

¹ Mark Chingono and Steve Nakana, “The Challenges of Regional Integration in Southern Africa”, *African Journal of Political Science and International Relations*, Vol. 3(10), October 2009, p. 397, 400.

² The European Union (EU) is now an economic and political union of 27 member states. It operates through a system of supranational independent institutions and intergovernmental decisions negotiated by the member states. The process has included the establishment of the European Coal and Steel Community and the European Economic Community, formed by the so-called Inner Six countries in 1951 and 1958, respectively; the Schengen Agreement of 1985, which led the way toward open borders without passport controls between most member states and some non-member states; the establishment of the EU under its current name in 1993, under the Maastricht Treaty; and the establishment of a monetary union composed of 17 member states, the eurozone, in 1999. While the current crisis has affected the European Union as a model for regional integration, the fallout may be temporary when viewed over the longer term. See, e.g., Fraser Cameron, *The European Union as a Model Regional Economic Integration*, Council on Foreign Relations, 2012. The EU received the Nobel Peace Prize in 2012.

³ See, e.g.: (i) Mark Chingono and Steve Nakana, “The Challenges of Regional Integration in Southern Africa”, *African Journal of Political Science and International Relations*, Vol. 3(10), October 2009, p. 400; and (ii) Khabele Matlosa and Kebapetse Lotshwao, Political integration and Democratisation in Southern Africa: Progress, Problems and Prospects, Electoral Institute of Southern Africa [EISA] Research Report No. 47, 2010, p. 7.

Considering that economic integration has received most emphasis to date in the region, and since it relates most directly to corridor development (the focus of this study), it is the main subject of this chapter. In the context of this report, the chapter provides the overall regional integration framework and specific integration initiatives related to corridor development.

Against this background, Section 3.2 presents an overview of the integration activities of the existing regional economic communities (RECs)/regional integration blocs (the Southern African Development Community, SADC, the Common Market for Eastern and Southern Africa, COMESA, and the Southern African Customs Union, SACU), as well as of the Tripartite⁴ comprising COMESA, the East African Community (EAC), and SADC. Section 3.3 then presents integration initiatives specifically related to corridor development, the main focus of this study. Appendix E presents background on market integration in Southern Africa. Box 3.1 summarizes initiatives for transport/trade facilitation pursued by other development partners in Southern Africa, which are taken into account in this chapter. While a number of different initiatives are ongoing, these are only steps toward the final goal, since over time the countries expect to achieve a full customs union, common market, and a single currency.

Box 3.1: Initiatives for Transport/Trade Facilitation Pursued by Other Development Partners in Southern Africa

The World Bank has assisted transport/trade facilitation in the region through a variety of initiatives, e.g., the Washington-based Southern Africa Trade and Transport Facilitation Program, which covers both the administrative aspects of corridor movement (border posts and customs reform components) and infrastructure, with a priority on Tanzania, Malawi, and Zambia.

The **African Development Bank** is pursuing a regional integration agenda in Southern Africa to create a fully integrated and internationally competitive region with the overarching objective of poverty reduction. Support for the COMESA-EAC-SADC Tripartite Agreement is a key feature of the strategy. Accordingly, support for the North-South Corridor and its link corridors (Beira, Lobito, Maputo, Mtwara, and Nacala) has been prioritized, and trade facilitation infrastructure (notably one-stop border posts, e.g., at Kazungula, Mandimba–Chiponde, Mchinji–Chiponde) will be constructed along the transport corridors (with AfDB assistance) to reduce transit time and transport costs. Also, support is provided for soft infrastructure aspects, e.g., customs reform, modernization, policy harmonization.

TradeMark Southern Africa aims to improve trade performance and competitiveness of the Eastern and Southern Africa regions, thereby contributing to sustainable, rapid and inclusive growth, and poverty reduction. As such, TMSA supports the work of the COMESA-EAC-SADC Tripartite. The GBP 100 million, five-year program is funded by the UK's Department for International Development (DFID). In the field of transport/trade facilitation, TMSA has supported the following projects of the Comprehensive Trade and Transport Facilitation Programme of the Tripartite: (i) development of regional bond guarantee scheme and transit information system, (ii) harmonizing third-party motor vehicle insurance, (iii) harmonizing road user charges, (iv) improving customs legislation and procedures, (v) integrated border management, (vi) promotion of self-regulation through a regional transporter accreditation system, (vii) road transport market liberalization, and (viii) vehicle overload control. In addition, TMSA has been supporting regional trade liberalization through the implementation of preferential trading arrangements such as the Tripartite Free Trade Area. Also, in the field of infrastructure, TMSA has been supporting the development of one-stop border posts (at Beitbridge, Chirundu, Kasumbalesa, and Nakonde-Tunduma).

Apart from TMSA, the **Department for International Development** has been supporting other transport/trade facilitation initiatives in the region (e.g., the **Mozambique Regional Gateway Programme**, funded jointly by DFID Mozambique and DFID Southern Africa, aiming to ensure

⁴ Although in common parlance “tripartite” is an adjective, in Southern Africa it is used as a term of art as a noun with a capital “T”.

that transport corridor developments in Mozambique translate into trade benefits for the landlocked neighboring countries through reduced transport costs, border crossing delays, and better regional transport grid planning and development coordination).

USAID’s Southern Africa Trade Hub aims to increase international competitiveness, intraregional trade, and food security in Southern Africa. Among other objectives, it seeks to reduce the time and costs of transporting goods across borders by deploying modern trade facilitation tools such as coordinated border management, customs connectivity, and national single windows along key transport corridors, including the Beira, Coast to Coast [Walvis Bay to Maputo], and Dar es Salaam Corridors. It also seeks to improve the regional trade, investment and integration enabling environment through legal and regulatory reform. Specific initiatives include coordinated border management in three “feature countries” (Mozambique, Zambia, and Zimbabwe); assistance for the Dar es Salaam Corridor Coordinating Committee; the adoption of adoption of NSWs in Malawi, Zambia, Botswana, South Africa, Namibia and Swaziland; and adoption of a “cloud approach” to customs connectivity, starting with a pilot project involving Botswana and Namibia.

Abbreviations: AfDB = African Development Bank, DFID = Department for International Development, COMESA = Common Market for Eastern and Southern Africa, EAC = East African Community, SADC = Southern African Development Community, TradeMark Southern Africa = TMSA
Source: Compiled by the JICA Study Team

3.2 Integration Activities of Existing Regional Economic Communities/ Regional Integration Blocs

3.2.1 Introduction

Table 3.1 lists the membership(s) of the SADC countries in each of the three RECs/regional integration blocs in Southern Africa as well as the Tripartite.⁵ The overall aims and progress toward integration of each grouping is described in the following subsections.

Table 3.1: Memberships of the SADC Countries in Regional Integration Bodies

Country	Focus Country	SADC	COMESA	SACU	Tripartite
Angola	x	x			x
Botswana	x	x		x	x
DRC		x	x		x
Lesotho		x		x	x
Madagascar		x	x	x	x
Malawi	x	x	x		x
Mauritius		x	x		x
Mozambique	x	x			x
Namibia	x	x		x	x
Seychelles		x	x		x
South Africa	x	x		x	x
Swaziland		x	x	x	x
Tanzania		x			x
Zambia	x	x	x		x
Zimbabwe	x	x	x		x

Abbreviations: COMESA = Common Market for Eastern and Southern Africa, DRC = Democratic Republic of Congo, SADC = Southern African Development Community, SACU = Southern African Customs Union

Notes: (i) “Focus country” refers to focus countries of this study. (ii) Angola suspended its COMESA membership in 2007. (iii) The membership of Madagascar has been suspended. (iv) Mozambique left COMESA in 1997.

Source: JICA Study Team

⁵ Borrowing the colorful phrase of Professor Jagdish Bhagwati of Columbia University, there is a “spaghetti bowl” of overlapping agreements with widely distinct features that impose undue transaction costs on traders, investors, and governments.

3.2.2 Southern African Development Community

SADC was formed on 17 August 1992 with the adoption of the Declaration and Treaty of Windhoek by the founding members of the Southern African Development Coordination Conference (SADCC, the predecessor of SADC) and Namibia. There are 15 member states of SADC including all eight focus countries as shown in Table 3.2. The headquarters of the SADC Secretariat is in Gaborone, Botswana.

The Southern African Development Community (SADC) Common Agenda refers to a set of key principles and values that guide the regional integration agenda. It is set out in Article 5 of the SADC Treaty (as amended, 2009), as well as in the Review of Operations of SADC Institutions, and consists of the policies and strategies of the REC:

SADC Policies

- (i) promote sustainable and equitable economic growth and socio-economic development that will ensure poverty alleviation with the ultimate objective of its eradication, enhance the standard and quality of life of the people of Southern Africa, and support the socially disadvantaged through regional integration
- (ii) promote common political values, systems and other shared values transmitted through institutions that are democratic, legitimate, and effective
- (iii) consolidate, defend, and maintain democracy, peace, security, and stability
- (iv) promote self-sustaining development on the basis of collective self-reliance, and the interdependence of member states
- (v) achieve complementarities between national and regional strategies and programs
- (vi) promote and maximize productive employment and utilization of the resources of the region
- (vii) achieve sustainable utilization of natural resources and effective protection of the environment
- (viii) strengthen and consolidate the longstanding historical, social, and cultural affinities and links among the people of the region
- (ix) combat HIV/AIDS and other deadly and/or communicable diseases
- (x) ensure that poverty eradication is addressed in all SADC activities and programs
- (xi) mainstream gender in the process of community building

SADC Strategies

- (i) harmonize political and socio-economic policies and plans of member states
- (ii) encourage the peoples of the region and their institutions to take initiatives to develop economic, social, and cultural ties across the region, and to participate fully in the implementation of the program and projects of SADC
- (iii) create appropriate institutions and mechanisms for the mobilization of requisite resources for the implementation of programs and operations of SADC and its institutions
- (iv) develop policies aimed at the progressive elimination of obstacles to the free movement of capital and labor, goods, and services, and of the peoples of the region generally, among member states
- (v) promote the development, transfer, and mastery of technology
- (vi) improve economic management and performance through regional cooperation
- (vii) promote the coordination and harmonization of the international relations of member states
- (viii) secure international understanding, cooperation, and support, and mobilize the inflow of public and private resources into the region⁶

⁶ <http://www.sadc.int/about-sadc/overview/sadc-common-agenda/>.

Specific milestones and progress towards regional economic integration in SADC include the following:

- (i) Through its Regional Indicative Strategic Development Plan (RISDP, 2003), SADC has adopted a number of regional integration milestones, and formally launched a Free Trade Area (FTA) in August 2008 (all but Angola, the DRC, and the Seychelles are participating), and was/is to launch a Customs Union by 2010, a Common Market by 2015, a Monetary Union by 2016, and a Single Currency by 2018.⁷
- (ii) Based on the implementation of tariff phase down commitments under the SADC Protocol on Trade, 85% of intra-SADC merchandise trade flows are now duty-free with most of the remaining 15% consisting of sensitive products⁸ were scheduled to be liberalized in 2012 (and 2015 for Mozambique). However, several member states have applied for derogations⁹ from their negotiated tariff phase downs, and there is currently less emphasis on the proposed SADC Customs Union.¹⁰
- (iii) In addition to the progressive elimination of tariffs, the SADC Protocol on Trade targets “deep integration issues”, which include the elimination of non-tariff barriers (NTBs, i.e., any barrier to trade other than import or export duties).¹¹
- (iv) The Indicative Strategic Plan of the Subcommittee on Customs Cooperation (July 2011) covers, among other things, modernized and harmonized customs procedures and processes, including automation of key customs processes and implementation of a SADC transit management system. Twelve one-stop border posts (OSBPs) with joint controls/systems/procedures and shared infrastructure are planned along key regional development corridors, with the first one (at Chirundu) opened in December 2009.
- (v) SADC is also pursuing a number of transport facilitation programs, covering vehicle overload control, road user charges, third-party motor liability insurance, a SADC driving license (with a harmonized format, standards, and procedures), vehicle standards and dimensions, and corridor management.
- (vi) Infrastructure is another priority area of integration within SADC, covering energy, information and communication technology (ICT), tourism, meteorology, transport, and water.¹²

⁷ The policy integration plan set out in the RISDP “has overtones of the European Union,” with the surrender of national sovereignty in certain areas. Paul Kalenga, *Regional Integration in SADC: Retreating or Forging Ahead?*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. S12WP08/2012, September 2012, section 1.

⁸ The remaining sensitive products are mainly in the following categories: cereals, cotton, dairy products, motor vehicles, and textiles/clothing.

⁹ In this context a derogation is a provision that allows for all or part of a legal measure to be applied differently, or not at all.

¹⁰ In addition to the delays in phasing down tariffs for the FTA, the complexity created by overlapping memberships of SADC member states in various regional blocs with similar regional integration ambitions made it difficult to reach the target date. A particular issue is that agreeing on a single external tariff regime means relinquishing control of an important element of a nation’s domestic policy and therefore its sovereignty. Trade Law Centre, *The Regional Indicative Strategic Development Plan: SADC’s Trade-Led Integration Agenda: How Is SADC Doing?*, TRLAC Trade Brief No. S12TB02/2012, April 2012, pp. 11–12. In this sense, SADC is not yet an FTA in which substantially all trade between member countries is liberalized. See Gerhard Erasmus, *What Role for National Planning Commissions in the Promotion of Deeper Regional Integration in SADC?*, Trade Brief No. S12TB03/2012, September 2012 [“The formation of FTAs and CUs requires technical and legal capacity beyond the reach of many of its members. Some of them still rely on income from tariffs as a source of public revenue. For regional integration plans of this kind to succeed there must, in addition, be serious political commitment...”]

¹¹ See, e.g.: (i) Trade Law Centre, *Monitoring Regional Integration in Southern Africa Yearbook 2011*, “Monitoring the Process of Regional Integration in Southern Africa”, 2012; (ii) World Bank, *Harnessing Regional Integration for Trade and Growth in Southern Africa*, March 2011, pp. 17–18; and (iii) International Trade Centre, *ITC Business Briefing, Trade Policy*, Private Sector Reviews of the Implementation of the SADC FTA, Part II, p. 1, downloaded from http://www.saiia.org.za/images/stories/research/dtp/20120305_trade_newsletter/edip_itc_business_briefing_vol_13_part2_16_jan2012.pdf and <http://www.intracen.org/BB-2012-01-16-Private-sector-views-of-the-implementation-of-the-SADC-FTA-Part-II/>, 16 January 2012.

- (vii) Finally, SADC implements a number of special programs (e.g., addressing HIV/AIDS, food security, climate change, and transfrontier conservation areas).¹³

In summary, while SADC has made significant progress towards regional integration, including achievement of a Free Trade Area, much more remains to be done (e.g., achievement of a Customs Union, Common Market, Monetary Union, and Single Currency) for the REC to increase its intraregional trade (which comprises only 10% of total trade in the region), and move away from a focus on South Africa for this intraregional trade (see Appendix E).

3.2.3 Common Market for East and Southern Africa

COMESA was established in 1994 replacing a Preferential Trade Area that was formed in 1981. Its 19 members from Libya in the north to Zimbabwe in the south include the three focus countries in Southern Africa shown in Table 3.1. The headquarters of the COMESA Secretariat is in Lusaka, Zambia.

COMESA (as defined by its Treaty) was established “as an organisation of free independent sovereign states which have agreed to co-operate in developing their natural and human resources for the good of all their people” and as such it has a wide-ranging series of objectives. However, due to COMESA's economic history and background, its main focus is on the formation of a large economic and trading unit to overcome some of the barriers that are faced by individual states. COMESA's current strategy can thus be summed up with the phrase “economic prosperity through regional integration”.¹⁴

Specific milestones and progress towards regional economic integration in COMESA include the following:

- (i) COMESA has had a Free Trade Area since 2000 with members including Malawi, Zambia, and Zimbabwe (and ten others).¹⁵ Trade between FTA and non-FTA COMESA member states is undertaken on reciprocal terms under the Preferential Trade Agreement.
- (ii) COMESA member states agreed on a common external tariff (CET) in May 2007 with four bands, for raw materials (0%), capital goods (0%), intermediate goods (10%), and final goods (25%).
- (iii) The COMESA Customs Union was formally launched in June 2009 at Victoria Falls, Zimbabwe. Tariff lines above or below these rates were placed on a sensitive list, and all adjustments to the CET were to be made within five years.¹⁶
- (iv) A full monetary union with one currency issued by a common central bank is targeted for 2018.
- (v) The treaty establishing COMESA (1993) notably includes a number of provisions that impose penalties and sanctions against countries implementing NTBs (e.g., transit traffic and trucking issues) and a number of other provisions on trade facilitation.¹⁷

¹² See, e.g., SADC, *Regional Infrastructure Development Master Plan, Executive Summary*, August 2012.

¹³ Eng. João Samuel Caholo, Deputy Executive Secretary (Regional Integration), *Status of Regional Integration in the SADC Region*, 18 October 2010.

¹⁴ <http://about.comesa.int/>.

¹⁵ The COMESA FTA has taken a variable speed and geometry approach by allowing nonparticipants to join when they are ready.

¹⁶ (i) Francis Mangeni and Tasara Muzorori, “Introduction to the COMESA Customs Union”, *COMESA – Key Issues for Integration*, edited by Francis Mangeni, 2011, pp. 1–4; and (ii) World Bank, *Harnessing Regional Integration for Trade and Growth in Southern Africa*, March 2011, p. 18.

¹⁷ COMESA, *Trade Facilitation Study in COMESA*, 2010, pp. 11–19.

- (vi) Progress by COMESA in trade/transport facilitation includes harmonization and cooperation in customs procedures and documentation, including a customs management act and a regional customs bond guarantee, as well as a “yellow card” third-party motor liability insurance scheme.
- (vii) Infrastructure is another priority area of integration within COMESA, covering energy, ICT, meteorology, and water.
- (viii) Finally, COMESA implements a number of other initiatives/programs (e.g., addressing climate change, agriculture, aid for trade).

3.2.4 Southern African Customs Union

The focus countries of Botswana, Namibia, and South Africa, as well as Lesotho and Swaziland, have a customs union that was established in 1910,¹⁸ the agreement of which was modified in 1969 and 2002. The 2002 SACU Agreement provides for the duty-free movement of goods between member states, a common external tariff vis-à-vis the rest of the world, and a revenue sharing formula that results in a substantial redistribution of revenue from South Africa to the other member states.¹⁹ Other areas of work for developing common frameworks include the coordination of customs procedures (including one-stop border posts), competition policy, and trade remedies.²⁰

3.2.5 EAC-COMESA-SADC Tripartite

The COMESA-EAC-SADC Tripartite was established in 2006 to assist in the harmonization of programs and policies within and between/among the three RECs and advance the creation of the African Economic Community.²¹ The Tripartite’s 26 member states account for half of the African Union in terms of membership and 58% of its gross domestic product (about USD 1 trillion). The Tripartite Coordination Mechanisms include a Summit of Heads of State, a Tripartite Council of Ministers and Tripartite Sectoral Committees, Tripartite Committees of Senior Officials, and Tripartite Task Forces.²²

The main pillars of the Tripartite, derived from the Second Tripartite Summit held on 12 June 2011 in Johannesburg (Sandton), are:

- (i) *market integration*, which entails (a) the design, negotiation, and implementation of a “Grand” Tripartite Free Trade Area, for which a roadmap and a draft agreement has been prepared, and (b) the removal of non-tariff barriers and trade and transport

¹⁸ Between the Union of South Africa and three British protectorates.

¹⁹ South Africa contributes about 98% of the payments to the revenue pool but receives only half of the allocations made from it. World Bank, *Harnessing Regional Integration for Trade and Growth in Southern Africa*, March 2011, p. 18.

²⁰ (i) Peter Draper, Durrell Halleon, and Philip Alves, SACU, *Regional Integration and the Overlap Issue in Southern Africa: From Spaghetti to Cannelloni?*, South African Institute of International Affairs, Trade Policy Report No. 15, 2007; and (ii) Richard Gibb, *Rationalisation or Redundancy? Making Eastern and Southern Africa’s Regional Trade Units Relevant*, Brenthurst Discussion Paper 3/2006.

²¹ The African Economic Community was envisaged in the Lagos Plan of Action and the Final Act of Lagos of 1980, the Abuja Treaty of 1991, and the resolution of the African Union Summit held in Banjul, The Gambia in 2006. While there may be a “spaghetti bowl” of overlapping agreements, the ultimate aim is to move toward convergence of regional agreements, i.e., “lasagna”, to use the colorful term of Richard Baldwin and Phil Thornton (ed.), *Multilateralizing Regionalism: Challenges for the Global Trading System*, Cambridge University Press, 2009.

²² (i) Memorandum of Understanding on Inter Regional Cooperation and Integration amongst Common Market for Eastern and Southern Africa (COMESA), East African Community (EAC) and Southern African Development Community (SADC), 19 January 2011; (ii) Mark Pearson, *Trade Facilitation in the COMESA-EAC-SADC Tripartite Free Trade Area*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. SIIWPIL, September 2011, pp. 2–3; and (iii) Mark Pearson and Charles Chaitezvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, p. 2.

- facilitation measures (see Box 3.2 on the Tripartite's NTB monitoring, reporting, and removal system);
- (ii) *infrastructure development*, focusing on improving the region's transport, energy, and ICT infrastructure to improve the efficiency of internal trade and transport; and
 - (iii) *industrial development*, with programs to be developed²³ to take advantage of improvements in market integration and infrastructure development.²⁴

A Tripartite Trade Negotiation Forum has been established, technical working groups have been set up,²⁵ and negotiations are proceeding.

Box 3.2: The Tripartite's NTB Monitoring, Reporting, and Removal System

Article 1(I) of the Tripartite Agreement calls on members states to eliminate non-tariff barriers (NTBs) and not impose new ones. Similar provisions are found in legal instruments of the respective, RECs, i.e., Articles 49 and 50 of the COMESA Treaty, Article 75(5) of the EAC Treaty, and Article 6 of the SADC Protocol on Trade. In order to effectively implement these legal provisions, the Tripartite with the assistance of TradeMark Southern Africa has established an NTB monitoring, reporting, and removal system that aims to remove NTBs through a "name and shame" approach. The system provides for a trilingual (English–French–Portuguese) repository of all reported NTBs, allowing for an interactive process for monitoring resolution of NTBs. These include NTBs related to: (i) customs documentation and administrative issues (e.g., limited and uncoordinated border working hours, non-standardized for import declarations and payment of duties), (ii) immigration procedures (e.g., non-standardized visa fees), (iii) quality inspection procedures (e.g., delays in the inspection of commercial vehicles), (iv) transport procedures (e.g., road user charges, third-party motor liability insurance, vehicle overload control), and (v) road blocks/checkpoints. Public-private national monitoring committees have been established to facilitate the process of eliminating these NTBs. The responsible agencies report that a substantial share of the complaints have been addressed, although independent observers have challenged this reported success rate.

Sources: (i) www.tradebarriers.org; (ii) Mark Pearson, *Trade Facilitation in the COMESA-EAC-SADC Tripartite Free Trade Area*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. SIIWP/II, September 2011, pp. 5–8; (iii) Mark Pearson and Charles Chaitezvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, pp. 4–6; and (iv) Michael F. Jensen and Wusheng Yu, *Regional Trade Integration in Africa: Status and Prospects*, commissioned by the Ministry of Foreign Affairs of Denmark, September 2012.

²³ A draft Tripartite Industrial Development Work Plan was prepared by the Subcommittee on Industrial Development in February 2012.

²⁴ (i) Communiqué of the Second COMESA-EAC-SADC Tripartite Summit, Vision: Towards a Single Market, and Theme: COMESA-EAC-SADC Integration, 12 June 2011, Article 1(iii); (ii) Mark Pearson, *Trade Facilitation in the COMESA-EAC-SADC Tripartite Free Trade Area*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. SIIWP/II /2011, September 2011, pp. 2–3; and (iii) Mark Pearson and Charles Chaitezvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, pp. 2–3.

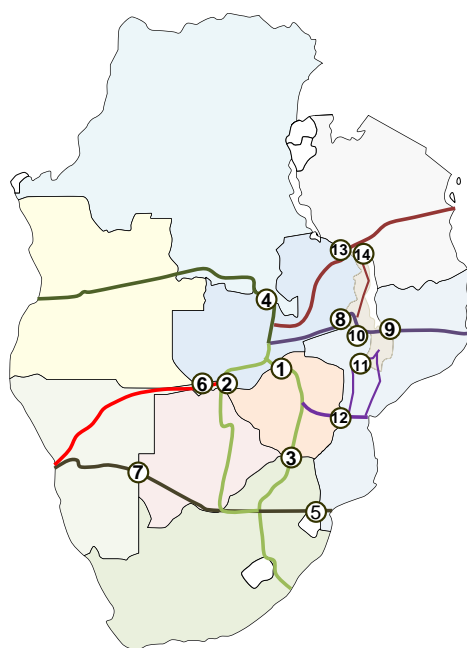
²⁵ (i) Customs Cooperation, Documentation, Procedures and Transit Instruments; (ii) Technical Barriers to Trade, Sanitary and Phytosanitary Measures and Non-Tariff barriers, and (iii) Rules of Origin.

3.3 Specific Integration Initiatives Related to Corridor Development

3.3.1 Border and Customs Procedures

(1) One-Stop Border Posts²⁶

One-stop border posts (OSBPs) – border posts that combine two stops for national border processing into one and consolidate border control functions in a shared space for exiting one country and entering another²⁷ – are planned or are ongoing at a number of border crossing points in the Southern African region (see, e.g., Figure 3.2). The objective of a OSBP is to reduce transit time at borders by reducing the number of stops in a cross-border movement by combining the activities of both countries’ border authorities at a single location. Specifically, a OSBP involves a legal framework (which may be involve national laws and a bilateral or multilateral agreement), design of procedures and traffic flows in the common control area, information and communication technologies, and integrated design of physical facilities.



No.	Major Border Crossings Points	Traffic Volume (trucks/day)	Delay Time (hours)
1	Chirundu	High (350)	High (23 southbound, 26 northbound, although some “a few hours”)
2	Kazungula	Medium (115)	High (48)
3	Beitbridge	High (470–570)	High (22.6 southbound, 41.3 northbound)
4	Kasumabalesa	High (400–450)	Low northbound (5.5), high southbound (24)
5	Lebombo–Ressano Garcia	Medium-High (150–300)	Medium (6–8)
6	Wenela–Katima Mulilo	Low (50)	Low (0.6 northbound, and 2.9 southbound)
7	Trans Kalahari–Mamuno	Medium (100)	Low (1.0 eastbound and 3.3 westbound)
8	Mwami–Mchinji	Low-Medium (25–80)	Low (2.0, westbound, 5.3 eastbound)
9	Mandimba–Chiponde	Low (6–48)	Low (0.5)
10	Dedza–Calomue	Medium (80)	Low-medium (2–8)
11	Zobue–Mwanza	Medium (150)	Low westbound (4) and moderate eastbound (6.5)
12	Forbes–Machipanda	Medium (150)	Low eastbound (1.3), high westbound (16.7)
13	Nakonde–Tunduma	High (180–350)	High (91 northbound); 89 southbound)
14	Songwe–Kasumulo	Low (30)	Medium (6.5 northbound) to High (18.7 southbound)

Notes: (i) The one-stop border posts shown are not necessarily exhaustive. (ii) Traffic: below 50 =low, 51–199 = medium, and 200+ = high. (iii) Delay time: less than 6 hours = low, 6–12 hours = medium, more than 12 hours = high. (iv) Traffic data was drawn from various sources, including *The SADC Regional Infrastructure Development Master Plan, Sub-Sector Plan, Border Posts*, 2012.

Source: JICA Study Team

Figure 3.2: Planned/Ongoing One-Stop Border Posts in Southern Africa

²⁶ This section draws on: (i) JICA and TradeMark Southern Africa, *Tripartite (COMESA, EAC and SADC) Regional OSBP Workshop*, 26–27 October 2011; (ii) JICA and the East African Community, *One Stop Border Post Source Book*, September 2011; (iii) TradeMark Southern Africa, *Chirundu One Stop Border Post Case Study*, The TradeMark Southern Africa Case Study Series in partnership with the COMESA-EAC-SADC Tripartite, 2011; (iv) Mark Pearson, *Trade Facilitation in the COMESA-EAC-SADC Tripartite Free Trade Area*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. SIIWP/2011, September 2011; (v) Mark Pearson and Charles Chaitezvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, pp. 6-11; and (vi) PADECO, *West Africa Regional Road Transport and Transit Facilitation Programme – Joint Border Posts*, June 2007, prepared for ECOWAS and the World Bank [including preparation of a regional framework convention and a bilateral agreement].

²⁷ Japan International Cooperation Agency and the East African Community, *One Stop Border Post Source Book*, September 2011, p. 2.

Spearheaded by COMESA²⁸ and SADC, and assisted by JICA and TradeMark Southern Africa, the first OSBP in the region (and the continent) was opened at Chirundu along the North-South Corridor between Zambia and Zimbabwe in December 2009. A July 2011 evaluation of the Chirundu OSBP found that waiting time for commercial traffic was reduced from “about 4–5 days to a maximum of two days and often to a few hours”.²⁹ On the other hand, there has been some anecdotal evidence indicating that the Chirundu OSBP is at best a work in process (“a OSBP in name only”).³⁰

Lessons learned from OSBP implementation in the region (mainly from Chirundu)³¹ include the following:

- (i) It is better that a OSBP be designed before the facilities are built rather than after, so that it is not necessary to design suboptimal procedures to take into account the facilities.
- (ii) Political support at the highest level is necessary. A bilateral (or multilateral) agreement permitting extraterritorial performance of duties is required. Ideally, the OSBP procedures will also be specified in the agreement.
- (iii) Introduction of a OSBP requires a change management process.
- (iv) Implementation of an effective ICT system is essential (e.g., for customs automation, cargo tracking, pre-arrival clearance, risk analysis, electronic submission of documents, electronic single windows, immigration clearance).
- (v) It is important to involve the private sector in OSBP design, but the concessioning of border post infrastructure has tended to have negative trade facilitation impacts.³²
- (vi) Knowledge products derived from ex ante and post construction evaluations will be important to guide future implementation.³³

²⁸ The COMESA Council of Ministers decided to pilot a OSBP at Chirundu in 2005 due to the construction of a new bridge assisted by JICA.

²⁹ TradeMark Southern Africa, *Chirundu One Stop Border Post Case Study*, The TradeMark Southern Africa Case Study Series in partnership with the COMESA-EAC-SADC Tripartite, 2011, p. 11. Also, “illustrative results” for January 2012 based on GPS monitoring found average crossing times of 26 hours from Zimbabwe to Zambia and 23 hours from Zambia to Zimbabwe. TradeMark Southern Africa, *North-South Corridor Performance Monitoring*, Truckers’ Forum 2012, 14–16 March 2012.

³⁰ E.g., interview with Shipping and Forwarding Agents Association of Zimbabwe (Mr. Joseph Musariri, Chief Executive Officer; Mr. Juren C. Mtemeli, Managing Director, Cilo Freight Private Limited; and Mr. Stephen Mafarachisi, Managing Director, Customs Services; Mr. Lovemore Zimuto Bhande, Operations Manager-Freight), 9 August 2012.

³¹ There has been concessioning of border posts at Kasumbalesa (DRC and Zambia), Nakonde (Zambia), and Beitbridge (Zimbabwe side).

³² While private investment entails a need to recover investment from the funded facilities at a profit, trade facilitation aims at reducing the costs associated with crossing borders. An optimum balance could be achieved if the charge levied for utilization of the private sector facilities is lower than the benefits to users from efficiencies and time reduction resulting from the use of the facilities. Infrastructure alone will not bring significant benefits to users unless efficiency-enhancing procedures and process flows are also implemented. JICA and TradeMark Southern Africa, *Tripartite (COMESA, EAC and SADC) Regional OSBP Workshop*, 26–27 October 2011, pp. 14–15.

³³ See (i) TradeMark Southern Africa, *Chirundu One Stop Border Post Case Study*, The TradeMark Southern Africa Case Study Series in partnership with the COMESA-EAC-SADC Tripartite, 2011, p. 11; (ii) Mark Pearson, *Trade Facilitation in the COMESA-EAC-SADC Tripartite Free Trade Area*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. SIIWP11, September 2011, pp. 11–14; (iii) Mark Pearson and Charles Chaitezvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, p. 7-8; (iv) JICA and TradeMark Southern Africa, *Tripartite (COMESA, EAC and SADC) Regional OSBP Workshop*, 26–27 October 2011; and (v) The AfDB’s Experience in Trade Facilitation and OSBPs, presented at USAID/World Customs Organization Trade Facilitation Conference, Johannesburg, 11 September 2012.

Also, as noted by a delegate from Zimbabwe at the seminar for this study held in Johannesburg on 21 February 2013, it is important that gender issues with respect to females involved in cross-border trade be taken into account.

While OSBPs are not the entire solution (e.g., they need to be implemented with coordinated border management, discussed below), they have a role to play, particularly considering the long waiting times along the region's major corridors (e.g., it is estimated that about half of travel time along the North-South Corridor is spent at borders),³⁴ an estimated 25% of which may be improved through better bilateral cooperation.³⁵ But coordinated border management (CBM) may provide greater benefits, considering that an estimated 58% of efficiency improvements can be achieved through better local interagency cooperation³⁶; also, CBM may be more realistic to achieve in the shorter term and as a "stepping stone" to OSBP implementation over the longer term.³⁷

(2) Coordinated Border Management

The Global Facilitation Partnership for Transport and Trade has defined coordinated³⁸ border management as "the organization and supervision of border agency activities to meet the common challenge of facilitating the movement of legitimate people and goods while maintaining secure borders and meeting national legal requirements". Alternatively, the European Union and SADC have defined CBM as entailing "national and international coordination among all of the relevant authorities involved in border security and trade facilitation to establish effective, efficient, and integrated border management systems, in order to reach the objective of open, but well controlled borders".³⁹ CBM occurs in two dimensions: (i) a domestic border management system that involves domestic coordination within and between agencies of one country, and (ii) an international border management system involving collaboration between neighboring countries and trading partners (e.g., as found in a OSBP).⁴⁰ Broadly speaking, CBM may be implemented in connection with related policy and regulatory

³⁴ TradeMark Southern Africa, *North-South Corridor Performance Monitoring*, Truckers' Forum 2012, 14–16 March 2012. A somewhat lower percentage was found in *The Definition and Investment Strategy for a Core Strategic Transport Network for Eastern and Southern African Study*. SADC, *The SADC Regional Infrastructure Development Master Plan, Sub-Sector Plan, Border Posts*, 2012, pp. 3–4.

³⁵ Godwin Punungwe, Senior Transport and Trade Facilitation Advisor, Trade Hub Approach to Coordinated Border Management, presented at USAID/World Customs Organization Trade Facilitation Conference, Johannesburg, 11 September 2012.

³⁶ See source in previous footnote (the remaining 17% of the potential efficiency improvement could be generated by regional collaboration, according to the estimate). Consider, for example, that Chirundu there are 15 agencies on the Zambia side and 9 on the Zimbabwe side.

³⁷ Willie Shumba, SADC Coordinated Business Management (CBM), presented at USAID/World Customs Organization Trade Facilitation Conference, Johannesburg, 10 September, 2012. But again, as noted, it should be understood that neither CBM nor OSBPs are the final goal, as over time the countries expect to achieve deeper integration (e.g., a full customs union, common market, and single currency).

³⁸ While the terms "integrated" or "collaborative" border management are sometimes used (the latter by the World Bank), the World Customs Organization prefers use of the term "coordinated" border management since it accords preference to the principle of coordinating policies, programs, and delivery outcomes, while avoiding a perception of favoring a single solution. Stefan Aniszewski, *Coordinated Border Management – A Concept Paper*, WCO Research Paper No. 2, World Customs Organization, June 2009, p. 2. On the other hand, it has been suggested that "coordinated border management" may imply a lower level of systems integration than "integrated border management". Mark Pearson and Charles Chaitezvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, p. 13.

³⁹ See Stefan Aniszewski, *Coordinated Border Management – A Concept Paper*, WCO Research Paper No. 2, World Customs Organization, June 2009, p. 8; and SADC, *Draft Guideline on the Coordinated Border Management*, August 2011, p. 11.

⁴⁰ Stefan Aniszewski, *Coordinated Border Management – A Concept Paper*, WCO Research Paper No. 2, World Customs Organization, June 2009, pp. 2–3, 11.

framework interventions, e.g., preclearance and prepayment,⁴¹ an authorized economic operator scheme, full application of risk management, single window applications.⁴²

Since the Tripartite has not had a strategic vision to implement CBM, it has established a technical subcommittee to develop a strategy to implement CBM (calling it “integrated” border management, IBM) policy and implementation strategy. The process pursued by the Tripartite at the regional level includes the following: (i) preparing a policy statement for consideration by the Tripartite Sectoral Committee of Ministers of Trade; (ii) developing guidelines to be applied in the region; (iii) promoting implementation by holding sensitization workshops on the concept, facilitating establishment of implementation structures, and undertaking initial scoping and gap assessments to facilitate the development of national programs; (iv) assisting the countries in obtaining technical assistance in implementation and capacity building at the national level and coordinating this capacity building at the regional level; and (v) monitoring and issuing periodic progress reports on implementation. Specific tasks at the national level include: (i) issuance of a policy statement briefly describing the concept and its importance; (ii) implementation of a situational or gap analysis; (iii) designation of a national coordinator or coordinating ministry/agency; (iv) establishment of a national steering committee and national strategy implementation committee; (v) development of a national strategy to act on the recommendations of the situational/gap analysis; and (vi) implementation of the strategy by all border agencies.⁴³

The Southern Africa Trade Hub (SATH) of the United States Agency for International Development (USAID) has commenced implementation of a CBM program in its three “feature countries” (Mozambique, Zambia, and Zimbabwe). In particular, they have been/will be focusing on Nakonde (in Zambia, opposite Tunduma in Tanzania), Kasumabelesa (in Zambia, opposite the DRC), Songwe (in Malawi, opposite Kasumulo in Tanzania), Mwanza (in Malawi, opposite Zobue in Mozambique), Ressano Garcia (in Mozambique, opposite Lebombo in South Africa), and Forbes (in Zimbabwe, opposite Machipanda in Mozambique). In line with a “paradigm shift” in the region, SATH has engaged trade (as opposed to transport) ministries as key partners in implementing CBM. The specific approach taken by SATH has been to (i) consult with ministries of trade and other key national stakeholders to secure CBM “buy-in”; (ii) consult with trade ministries and corridor management institutions to undertake border operations assessments (BOAs) at selected borders to recommend actions to reduce border crossing costs and time; (iii) conduct national- and border-level workshops to disseminate BOA findings and formalize commitment to the CBM program; (iv) establish joint border committees (JBCs) and action plans to reduce delays at the borders; (v) work with stakeholders and other development partners to implement JBC Action Plans (incorporating recommendations of the BOAs); and (vi) establishing a system to regularly collect information to monitor border performance.⁴⁴

⁴¹ Increasingly customs clearances can and are being undertaken “behind-the-border”, thereby reducing border processing times. Mark Pearson, *Infrastructure and Multi-Modal Transport, Challenges in Improving Regional Multi-Modal Transport*, presentation at launch of the Regional Integration Research Network, 18 September 2012; and Mark Pearson and Charles Chaitezvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, p. 13.

⁴² A three-phase program for implementation of single-window systems in the region has been proposed, based first on implementation of a pilot system and later scaling up to a system in (about) four additional countries. SADC, *The SADC Regional Infrastructure Development Master Plan, Sub-Sector Plan, Border Posts*, 2012, pp. 48–49.

⁴³ (i) Report of the Meeting of COMESA-EAC-SADC Technical Experts on IBM/CBM, 1–2 September 2011; (ii) Mark Pearson, *Trade Facilitation in the COMESA-EAC-SADC Tripartite Free Trade Area*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. SIIWP11, September 2011, pp. 18–19; and (iii) Mark Pearson and Charles Chaitezvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, p. 15.

⁴⁴ (i) USAID, *Coordinated Border Management*, posted on www.satradehub.org, 2012; and (ii) Interview with Mr. Godwin Punungwe, Senior Transport and Trade Facilitation Advisor, SATH, 2 August 2012.

In addition, TradeMark Southern Africa in association with the Tripartite Task Force has been assisting the Government of Zimbabwe on development of a CBM/IBM program. Specific tasks have included: (i) assessing the consistency of the country's laws and operational systems with the principles of CBM/IBM, (ii) assessing measures required to bring these laws and operational systems in conformance with the principles of CBM/IBM, (iii) assessing a broad CBM/IBM strategy, and (iv) assessing the feasibility of streamlining the number and role of border agencies, taking into account simplification of systems, procedures, and processes.⁴⁵

(3) Regional Customs Bond Guarantee Scheme(s)

A regional customs bond guarantee scheme would reduce or eliminate the administrative and financial costs associated with nationally executed customs bond guarantees for transit traffic. Within a nationally executed bond system, transporters transiting one country en route to another need to take out a customs bond at least equal to the duty that would be payable on their cargo; when they prove that the cargo has left the customs territory, the bond is released. However, the processing of the release of bonds takes time (sometimes as long as 60 days), and the issuance of bonds comes at a cost, estimated at about 4% of the cost of an import or export commodity. In the Tripartite region hundreds of millions of USD equivalent in business capital is used to bond goods, which ties up working capital of mainly small firms already short of cash. The problem is compounded by delays in bond cancellation, due to manual rather than electronic processing.

Both SADC and COMESA with private sector stakeholders have piloted the development of a regional customs bond to address this problem, the former with assistance from TradeMark Southern Africa and the latter having received assistance from USAID.⁴⁶ The benefits of a regional customs transit guarantee scheme may ultimately include: (i) faster clearance of vehicles; (ii) a resulting increase in ton-kilometers with a lowering of freight rates; (iii) release of a large sum of money for clearing and forwarding agents, which is tied up as a guarantee and/or collateral in commercial banks and insurance companies; (iv) provision of customs authorities with reliable security and an improved system of collecting duties and taxes; (v) provision of a simple, economical administrative system for carriers/transporters; and (vi) provision of a simple and economical mechanism for sureties (financial institutions to issue and manage customs bonds. However, challenges include convincing smaller transporters and freight forwarders in the smaller countries that a regional bond system will benefit them, and to harmonize the SADC and COMESA systems to form a single regional customs bond guarantee system. If one country along a corridor applies a different customs transit regime from the others, the benefits of a regional system along that corridor will be significantly reduced.⁴⁷

In 2011 the Tripartite Task Force completed a study evaluating the SADC and COMESA bond schemes with the aim of specifying the most appropriate customs bond on a regional basis. The study found that the two systems are similar in some respects (e.g., basic customs documentation, application and use of ICT in the exchange of customs data, and risk management tools), but differ in other respects (e.g., the COMESA system follows a well-

⁴⁵ See, e.g.: (i) Mark Pearson, *Trade Facilitation in the COMESA-EAC-SADC Tripartite Free Trade Area*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. SIIWP11, September 2011, p. 20; and (ii) Mark Pearson and Charles Chaitzvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, p. 15.

⁴⁶ The COMESA scheme is based on the TIR principle of using a carnet as evidence of a bond and a network of sureties across participating countries, while SADC system is a bond taken by the principal bondholder who creates his/her own network of designated representatives through an interagency agreement across the transit chain and who are collaterally party to the bond guarantee in each transit country. <http://www.trademarksa.org/publications/final-report-evaluation-comesasadc-transit-management-system>.

⁴⁷ In the longer run, a more comprehensive solution could involve the countries acceding to the Customs Convention on the International Transport of Goods under Cover of TIR Carnets (TIR Convention) (Geneva, 14 November 1975).

structured organization of sureties, but with unclear financial costs of running the structures; the SADC scheme has practical problems in terms of extraterritorial liability between a bondholder and his/her designated representatives). The study recommended jointly proceeding with implementation of the respective systems⁴⁸ with a joint COMESA/SADC project manager, with the aim of developing an integrated system.⁴⁹ At present, the COMESA scheme is being implemented (although in a limited way) along the Northern Corridor, while SADC is in the final stages of updating its scheme for implementation along the North-South Corridor.⁵⁰

3.3.2 Transport Procedures

(1) Road Transport Market Liberalization

A recent review of road transport liberalization in the region found an urgent need to move toward quality regulation based on standards of safety and professionalism while repealing quantity regulation (permits) in order to increase efficiency.⁵¹ The Tripartite has been engaged in the following three-phase process to address these issues (the first two phases have been completed):

- (i) an assessment of the current regime of bilateral transport agreements;
- (ii) the development of the national and regional legal and institutional arrangements necessary for harmonization;
- (iii) the development of the quality control framework, including specification of the operator registration system, multilateral agreement, and implementation plan.⁵²

(2) Harmonization of Vehicle Dimensions Standards (and Regulations)

Harmonization of vehicle dimensions standards is important because if such standards differ across countries, road transport operators must use different configurations for different markets, with consequent adverse impact on efficiency and costs. While the three RECs have generally agreed on the maximum vehicle dimensions,⁵³ laws have generally not been enacted to provide the legal basis for enforcement of these standards. In some cases these agreed standards may be unrealistic for certain countries (e.g., the vehicle length of 22 m may not be reasonable on mountainous roads, suggesting the need for some revision of the current standards). Also, an issue relates to seven-axle interlinks, which are prohibited in Mozambique (and Tanzania). Finally, the Tripartite Task Force and member states have been developing harmonized standards for the fitness of vehicles; for this purpose, in 2011 and 2012 a number of small studies have been undertaken (e.g., related to smoke emissions, vehicle registration standards).⁵⁴

⁴⁸ The two systems have not been adequately tested in the field yet.

⁴⁹ Stallard Mpata in association with Puseletso Mwakalombe, *Evaluation of the COMESA/SADC Transit Management Systems, Final Report*, September 2011.

⁵⁰ Mark Pearson and Charles Chaitezvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, pp. 16-18.

⁵¹ Nick Porée & Associates (Pty) Ltd., *Road Market Liberalisation in the WSA [East and Southern Africa] Region, Phase 2 – Development of Harmonization Proposals for Road Transport Market Access*, prepared for COMESA, funded by TradeMark Southern Africa, November 2011, p. iv.

⁵² Mark Pearson and Charles Chaitezvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, pp. 20–21.

⁵³ 12.5 m for rigid chassis single vehicles or trailers; 18.5 m for articulated vehicles (although some countries have a standard of 17.0 m); 22 m for trucks and draw-bar trailers; 2.65 m maximum width; and 4.30–4.60 m maximum height.

⁵⁴ Mark Pearson, *Trade Facilitation in the COMESA-EAC-SADC Tripartite Free Trade Area*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. SIIWP/II, September 2011, p. 27.

(3) Harmonization and Enforcement of Axle Load Limits

Axle load limits are established and enforced to assure that vehicles operate within the pavement design parameters of the road network and therefore they reduce road deterioration and contribute to road traffic safety. The harmonization of axle load limits promotes the efficiency of cross-border road transport operations since if there are differences in axle load limits, road transporters must transship cargo at borders or risk fines, which will decrease the profitability of their operations. With harmonized axle load limits, a truck that meets the axle load standard in one country would meet the axle load standard in the other countries traversed. At the same time, properly specified axle load limits help preserve the road and bridge infrastructure.

A major development in addressing this issue in the Tripartite was the JICA/EAC study of vehicle overload control, which was presented to a meeting of permanent secretaries, officials, and technical experts in Nairobi on 17–19 August 2011, and which led to the meeting agreeing on the major outstanding issues (e.g., a 56-ton gross combination mass standard on seven axles, decriminalization of overload fines/fees/charges, promotion of self regulation, use of interlinks interlinks as determined by designated routes and length of 22 m).⁵⁵ This issue is now on the “fast track” for resolution in the Tripartite region.

(4) Harmonization of Third-Party Motor Liability Insurance Regimes⁵⁶

Transporters and drivers engaged in cross-border transport are generally required to obtain third-party motor liability insurance to cover the costs of accidents that may occur in foreign countries. If there are different third-party motor liability insurance regimes between/among countries in a region, transporters and motorists will need to buy separate insurance coverage for each country they traverse. Additional costs relate to the time required to purchase the duplicate cover, increased paperwork, and the need for drivers to carry additional cash with associated risks.

There are currently three systems of third-party motor liability insurance for cross-border transport in the Tripartite region:

- (i) cash payments at the border, which are country-based and follow the laws of the country of entry (e.g., in Mozambique payments are required of foreign vehicles only and cover third-party vehicle and property damage);
- (ii) a fuel levy system, in which indirect payments for third-party motor insurance are included in the fuel price (applied in the SACU countries, i.e., Botswana, Lesotho, Namibia, South Africa, and Swaziland); and
- (iii) the (COMESA) yellow card system, established in 1985 under COMESA’s predecessor (the Preferential Trade Area), applying in the DRC, Malawi, and Zambia (among the focus countries of this study), and which allows for pre-purchase of motor insurance in local currency at the origin with the insurance honored by all participating countries,

⁵⁵ JICA and PADECO Co., Ltd., *Study for the Harmonization of Vehicle Overload Control in the East African Community, Final Report*, East African Trade and Transport facilitation Project, September 2011.

⁵⁶ This section draws on: (i) *Harmonization of Third Party Motor Vehicle Insurance Scheme for the COMESA, SADC/EAC Region, Record of Kick-off Meeting of the Tripartite Steering Committee*, 23 August 2011; (ii) Rayfact Investments (Pty.) Limited, *Harmonization of Third Party Motor Vehicle Insurance Scheme for the COMESA/SADC/EAC Region, Consultancy Project Preliminary Report*, August 2011; (iii) Interview with Mr. Berhane Giday, Chief Programme Officer, Trade Facilitation (Yellow Card and Regional Customs Transit Guarantee Unit), COMESA, 10 August 2012; and (iv) Mark Pearson and Charles Chaitezvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, pp. 21–22.

and which covers third-party property liability and medical expenses of the driver and passengers.⁵⁷

A COMESA-SADC working group/task team dating back to 2002 has recommended harmonization of the respective systems as follows:

The Tripartite Task Force is implementing a work plan to interface the three systems through (i) a framework for harmonization of third-party motor liability insurance including the legal and institutional reforms necessary for the implementation of regionally harmonized arrangements, (ii) a system for interfacing the existing third-party motor liability insurance and the yellow card system, and (iii) a plan to implement a harmonized framework with responsibilities and timelines. Based on a comprehensive study in the fuel levy countries of SACU, Angola, and Mozambique, agreement was reached to adopt the yellow card system as a regional cross-border third-party motor liability insurance scheme to operate along with the fuel levy system.⁵⁸

(5) Harmonization of Road User Charges for Foreign Vehicles

Differences in the road user charges levied on vehicles registered in foreign countries across the region (see Table 3.2) constitute a barrier to the creation of a unified transport market. Current road financing arrangements in the region include: (i) road or bridge tolls (Mozambique, South Africa, Zimbabwe), (ii) fuel levies (all countries), (iii) fixed charges per unit of weight and distance (e.g., Zambia), and (iv) other fees.

Table 3.2: Different Road User Charges in Southern Africa

USD per 100 km Country of entry:	Country of destination					
	Malawi	Mozambique	Zambia	Zimbabwe	South Africa	Botswana
Malawi		50	10	10	No user fees: road tolls	User fees, no distance related except for Trans-Kalahari (about USD16/100 km)
Mozambique	50		50	50		
Zambia	10	50		10		
Zimbabwe	10	50	10			

Source: World Bank, *Harnessing Regional Integration for Trade and Growth in Southern Africa*, March 2011, Table 6, p. 29

These differences in road user charges have had a negative impact on certain countries, with Mozambique cited as an example. If foreign trucks entering a country are assessed high road user charges, trucking companies may avoid the countries, even if the high road user charges amount to only about 5–10% of costs. The World Bank has noted that the Beira Corridor is often avoided for this reason (as well as because Mozambique does not allow seven-axle interlinks and it is not a member of the yellow card system for third-party motor liability insurance).

The COMESA countries (nominally) agreed to road user charges of USD 10 equivalent per km, and SADC conducted a Road Users Charges Study in 2007. COMESA and the EAC were to review the 2007 study to determine whether its findings and recommendations could be applied throughout the Tripartite region.

⁵⁷ The concept is that when a visiting driver is legally liable for an accident, the local bureau in the host country (handling bureau) deals with the claim and seeks reimbursement from the bureau in the home country of the driver (paying bureau). While the COMESA yellow card facilitates cross-border transport since transporters and motorists do not need to buy separate insurance coverage for each country they traverse, there have been some problems with implementation of the scheme (e.g., the insurance coverage varies between/among countries, at some borders there are no insurance companies to issue the cards).

⁵⁸ Mark Pearson and Charles Chaitezvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, pp. 21–22.

The target date for harmonization of road user charges within the Tripartite region was 2010, but the task has proven difficult, and road user charges are likely to remain a matter of negotiation/reciprocal action between/among countries. While there have been initiatives to harmonize charges, most countries have either continued with their existing arrangements or introduced new charges that have not been fully consistent with regionally agreed charges.⁵⁹

(6) Self-Regulation of Transporters

Self-regulation of transporters is an approach to reduce checks on compliance (e.g., customs inspections, weighing of trucks) and associated delays by introducing a transporter accreditation system in which selected transporters that undertake to comply with a specified set of regulations are exempt from usual compliance checks, but are subject to a system of spot checks and severe penalties and loss of accredited status if found to have violated the regulations. The usual success story cited is the Road Transport Management System (RTMS) of South Africa, an industry-led, government-supported voluntary self-regulation system that encourages consignees, consignors, and road transport operators to implement a vehicle management system that preserves road infrastructure, improves road safety, and increases the productivity of the logistics value chain.

The Tripartite has planned a demonstration project to be led by SADC to roll out a cross-border version of the RTMS accreditation scheme along the Durban-Lusaka section of the North-South Corridor. The RTMS standards developed in South Africa will be reviewed and expanded to suit the needs of a regional transport corridor environment involving three national jurisdictions and a regional transport market; this will include interfacing the RTMS with the authorized economic operator (AEO) schemes implemented by the respective customs authorities. A small number of transport operators from each country will be approached to participate in the demonstration project. An introductory workshop and pre-accreditation audits will be undertaken as part of the project.⁶⁰

3.3.3 Regional Corridor Management

A few of the focus corridors of this study already have management structures established through a legal instrument signed by the countries traversed by the corridor. These structures are described below:

⁵⁹ See, e.g.: (i) Africon, *Implementation of Harmonised Road User Charges System in the SADC Region*, prepared for the SADC Secretariat, June 2007; (ii) Gael Raballand, Charles Kunanka, and Bo Giersing, *The Impact of Regional Liberalization and Harmonization in Road Transport Services: A Focus on Zambia and Lessons from Landlocked Countries*, World Bank, 2008, pp. 19-21; (iii) World Bank, *Harnessing Regional Integration for Trade and Growth in Southern Africa*, March 2011, pp. 29, 43; (iv) Mark Pearson, *Trade Facilitation in the COMESA-EAC-SADC Tripartite Free Trade Area*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. SIIWP/II, September 2011, p. 30; and (v) Mark Pearson and Charles Chaitezvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, pp. 24-25.

⁶⁰ See, e.g.: (i) Proposal for a Demonstration Project to Implement the Cross Border version of the Road Transport Management System (RTMS) Self-Regulation Accreditation Scheme on the North-South Corridor, 2011; (ii) JICA and PADECO Co., Ltd., *Study for the Harmonization of Vehicle Overload Control in the East African Community, Final Report*, East African Trade and Transport facilitation Project, September 2011, pp. 6–19 to 6–21 and 8–19; (iii) Interview with Mr. Barney Curtis, Federation of East and Southern African Road Transport Associations (FESRATA), 16 August 2012; (iv) Mark Pearson, *Trade Facilitation in the COMESA-EAC-SADC Tripartite Free Trade Area*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. SIIWP/II, September 2011, p. 27; (v) Mark Pearson and Charles Chaitezvi, *Trade Facilitation in the COMESA-EAC-SADC Region*, Regional Integration Research Network, Discussion Paper RIRN/DP/12/02, September 2012, p. 22; and (vi) Kick-off Meeting on the Pilot Project to Implement the Road Transport Management System (RTMS) Self-Regulation Accreditation Scheme on the North-South Corridor, Harare, 6-7 November 2012. The name of the RTMS scheme itself is expected to be changed to make it suitable for not only South Africa, but for the rest of Southern (and East) Africa.

- (i) The Walvis Bay Corridor Group (WBCG) was founded in 2000 as public-private partnership body to coordinate and integrate development efforts along the Walvis Bay Corridor, which includes the Trans-Kalahari, the Trans-Caprivi, and Trans-Cunene Corridors. Under the WBCG there are substructures dealing with specific routes. One is the **Trans-Kalahari Corridor Management Committee (TKCMC)**, which was established in 2003 by an agreement signed by Namibia, Botswana, and South Africa. There is a memorandum of understanding under this agreement that accords the TKCMC legal status. The WBCG serves as the secretariat of the TKCMC. The TKCMC include representatives of transport operators, infrastructure and transport authorities, port and customs authorities, and freight forwarders from the partner countries. Specific objectives include developing strategic partnerships with the private sector, simplifying and harmonizing customs procedures (including joint customs control), ensuring that revenue from road user charges is earmarked for road maintenance, and harmonizing vehicle standards (e.g., regarding axle loads). Similarly, a **Trans-Caprivi Corridor Management Committee** (also known as the Walvis Bay-Ndola-Lubumbashi Corridor Committee) was established by Namibia, Zambia, and the DRC in partnership with the private sector. The UN Conference on Trade and Development (UNCTAD) initially (2005) assisted the development of the Corridor's Cluster Committee (2005), with subsequent support from the Swedish International Development Cooperation Agency (SIDA, 2008) and the African Development Bank (2010–13).⁶¹
- (ii) The **Maputo Corridor Logistics Initiative (MCLI)** was launched in 2004 as a public-private partnership organization with members from Mozambique and South Africa and is considered a good-practice example in SADC. The underlying legal instrument establishing MCLI is a Memorandum and Articles of Association corresponding to a company without share capital, while further practical governance is driven by the MCLI Constitution. Through a memorandum of understanding, the South African Department of Transport provides support for MCLI, which is also funded through annual membership fees paid by stakeholders from Mozambique, South Africa, and Swaziland. MCLI works toward achieving a logistics corridor based on a reliable, cost-effective logistics route with positive returns for all stakeholders. Key areas of focus have included the lack of rail sufficient capacity and border post constraints. MCLI's governing structure includes a board of directors and an executive committee.
- (iii) The **Dar es Salaam Corridor Coordinating Committee** brings together stakeholders from Tanzania and Zambia, as well as from the DRC and Malawi. It was founded on the basis of a constitution formulated in 2003 and eventually agreed by all parties about five years later. "Seed" money was provided by the USAID Southern Africa Trade Hub and the possible use of a tonnage levy has been considered. According to the constitution, there is a corridor coordinating committee and a full-time secretariat, which is executing a work plan and lobbying for reforms to increase the efficiency of corridor operations.

In addition, a meeting of North-South Corridor Legal and Technical Officials in June 2011 in Maputo agreed on a draft Memorandum of Understanding among the Governments of the Republic of Botswana, the Democratic Republic of Congo, the Republic of Malawi, the Republic of Mozambique, the Republic of South Africa, the Republic of Zambia, and the Republic of Zimbabwe on the Establishment of a Corridor Management Institution of the North-South Corridor except for one sub-article (regarding a "user pay" system as one source of funding).⁶² The **North-South Corridor Management Institution (NSCMI)** would be an

⁶¹ In its current form, this committee dates back to 2009.

⁶² COMESA EAC SADC North South Corridor Senior Officials Meeting, Johannesburg, Record, 7–8 May 2012, Section 6, pp. 6–7.

international organization with legal personality. The institutional arrangements would include a committee of ministers, an executive committee, and a secretariat at the regional level, as well as national corridor committees.⁶³ Unfortunately, however, further progress on this issue could not be achieved at a Senior Officials and Legal Experts Meeting at Harare on 5-6 November 2012.

Finally, launched in 2009 at the World Economic Forum, the **Beira Agricultural Growth Corridor (BAGC)**⁶⁴ was established by the Government of Mozambique, private investors, farmer organizations, and international agencies to increase agricultural productivity and competitiveness along the corridor. Among other aims, it seeks to ensure that public and private investments along the agricultural value chain are well coordinated, leveraging existing “anchor” investments (e.g., in the mining sector and railways) to benefit agriculture, and develop new infrastructure and agricultural projects as commercially viable business opportunities that drive growth and benefit local communities.⁶⁵ However, the BAGC is not strictly speaking a corridor management structure and has involved only one country (Mozambique).

Since not all corridors have management structures, existing management structures differ, and there are no formal linkages between the existing corridor management structures and the RECs, the Tripartite with the assistance of TradeMark Southern Africa is now planning to develop a regional corridor management system that will cluster corridors geographically in order to reduce redundancy and increase efficiency (i.e., into Eastern, Western, North-South, and EAC Clusters).⁶⁶ Alternatively, it has been suggested that corridor management is “idiosyncratic”, depending on the historical development of the corridors and their objectives in terms of cooperation and integration, and therefore may not be amenable to a blanket approach or approaches.⁶⁷

⁶³ Further, the creation of a **Nacala Corridor Logistics Group** has been recommended to promote and coordinate issues relating to user charges, corridor logistics, operational efficiency, and policy development; it would be modeled on MCLI USAID and Agrifuturo, *Nacala Corridor Strategy-Based Transport Logistics and Supply Chain Efficiency, Final Report*, 30 April 2010, pp. 9, 33. Similarly, the creation of a **Nacala Corridor Agency** has been proposed. Mozambique Regional Gateway Programme, *Situation Analysis and Roadmap*, May 2012, pp. 10, 44–45. Vale (the Brazilian mining company) has reached agreements with authorities in Mozambique and Malawi defining the operational model used for new railway construction and the fee schedule for concessionaires taking out leases on part of the logistics corridor. See, e.g., Agencia de Informaçao de Moçambique, Vale and CFM Sign Agreement on the Nacala Corridor, 7 February 2013.

⁶⁴ A Beira Corridor Authority was established in 1985 to promote rehabilitation of the port, and a Beira Corridor Group was later established in Harare, but both closed in the 1990s. A new Beira Corridor Agency has recently been proposed. Mozambique Regional Gateway Programme, *Situation Analysis and Roadmap*, May 2012, pp. 10, 48–49.

⁶⁵ See, e.g., (i) Yao Adzigbey, Charles Kunaka, and Tesfamichael Nahusenay Mitiku, *Institutional Arrangements for Transport Corridor Management in Sub-Saharan Africa*, Sub-Saharan Africa Transport Policy Program, SSATP Working Paper No. 86, October 2007, pp. 8–20; (ii) Economic Commission for Africa, African Union, and African Development Bank, *Assessing Regional Integration in Africa IV, Enhancing Intra-African Trade*, Section 7, 2010; (iii) Southern Africa Global Competitiveness Hub (Mr. Godwin Punungwe, Transport Advisor), *Technical Report: Study in Sustainable Funding of Corridor Management Institutions: The Case of the Trans Kalahari Corridor Management Committee Secretariat*, June 2009; (iv) <http://www.beiracorridor.com>; and (v) Cayley Bowland and Lisa Otto, *Implementing Development Corridors: Lessons from the Maputo Corridor*, South African Foreign Policy and African Drivers Programme, South African Institute of International Affairs, August 2012.

⁶⁶ Mark Pearson, *Trade Facilitation in the COMESA-EAC-SADC Tripartite Free Trade Area*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. SIIWP11, September 2011, p. 31.

⁶⁷ Jean-François Arvis, Robin Carruthers, Graham Smith, and Christopher Willoughby, *Connecting Landlocked Developing Countries to Markets: Trade Corridors in the 21st Century*, 2011, p. 180. Consider, for example, it has been suggested that the Sena and Nacala Corridors may require different organizations. Mozambique Regional Gateway Programme, *Situation Analysis and Roadmap*, May 2012, p. 48.

4. Regional Development Scenarios for Priority Economic Corridors

This chapter presents regional development scenarios for the eight priority economic corridors, considering them in alphabetical order.¹ For each, an industrial development scenario is first set out, based on strengths and potentials, priority industries/products in relevant policies and strategies, and potentials indicated by other sources. Next, transport, water, and power sector issues and development scenarios are presented. Finally, transport/trade facilitation (soft) issues are assessed.

4.1 Beira Corridor (including the Sena and Tete Corridors)²

4.1.1 Industrial Development Scenario

(1) Strengths and Potentials

Strengths of the Beira Corridor (including the Sena and Tete Corridors) are indicated by the industries and products already present along the corridor. These industries or products along with their primary locations are listed in Table 4.1.

Table 4.1: Industries and Products along the Beira Corridor

Country	Industries/Products
Mozambique	<ul style="list-style-type: none"> • agricultural products including shrimp and other seafood, sugar, and cotton in Sofala Province located along the Sena Corridor • agricultural products including horticultural crops, grains, and livestock in Manica Province located along the Beira Corridor • tobacco production in Tete Province located around the eastern end of the Tete Corridor • development of coal mines in Tete Province (including mines already in operation as well as several planned mines)
Zimbabwe	<ul style="list-style-type: none"> • mineral resources including platinum, nickel, and gold extracted in various locations along the corridor • pharmaceuticals produced in and around Harare

Source: JICA Study Team

Major recent or planned investments along the corridor have been or will be concentrated in agribusiness and mining, which is consistent with the strengths described above. In addition, while major production has not yet begun, the area has huge potential for coal production, especially in Tete Province. Table 4.2 provides examples of major recent and planned investments along the corridor, indicating that agriculture, agribusiness, and mining are the areas with greatest potential.

¹ Readers of this chapter would also find it useful to refer to relevant chapters of the JICA-sponsored *Preparatory Survey for Southern Africa Integrated Regional Transport Program*, Final Report, March 2010, which was one of the bases for this study and describes broad-based growth scenarios for Southern Africa as well as a preliminary assessment of transport development issues along major economic corridors in the region.

² See subsection 4.1.2 for the definition of the Beira Corridor used in this study. The Sena Corridor is defined as a route from Beira toward the north including Blantyre/Tete, and the Tete Corridor as a route from Chimoio to Tete, a branch route from the Beira Corridor.

Table 4.2: Examples of Major Investments along the Beira Corridor

Project/Enterprise	Description	Industry/Sector
Mafambisse Sugar Mill	The enterprise, 75% of the shares of which are held by the South African Tongaat Hulett Group, invested USD 20 million to expand the plantation (including sugarcane) and modernize the irrigation system in the area.	Agriculture (e.g., sugarcane), agribusiness
Principle Energy	This UK-based company is expected to invest USD 400 million in ethanol production from sugarcane on 20,000 irrigated hectares. The site is located in Dombe, Manica Province (Mozambique) and the biofuel is expected to be exported via the Port of Beira.	Agribusiness using sugarcane
Agriterra Group	The group, listed on AIM (formerly the Alternative Investment Market, a submarket of the London Stock Exchange), operates three companies in Mozambique including Mozbife, a vertically integrated cattle ranching and feedlot production business; DECA (Desenvolvimento e Comercialização Agrícola, Agricultural Development and Marketing Ltd.), which processes maize purchased from thousands of local smallholder farmers around Chimoio; and Compagri, a second agricultural buying and processing facility established in Tete.	Agriculture (e.g., livestock farming), agribusiness (e.g., food processing)
Vale	In 2004, the Brazilian mining company paid USD 123 million for a coal prospecting concession in Moatize (Mozambique), which is expected to become the largest coal production plant in the world.	Mining (coal production)
Rio Tinto	The Australian mining company holds a 65% share of the Benga coal mine in Tete Province, with a 35% share held by Tata Steel of India.	Mining (coal production)
Riversdale Mining	This Australian mining company established itself in Mozambique in 2006 and obtained 26 exploration licenses, including a 2,500 km ² mining concession in Benga.	Mining (coal production)
Revubõe Mine Project	The project is a joint venture of the London-based Anglo American (which agreed to buy a majority stake in the project from the Australian Talbot Group in 2012), Nippon Steel Group, and POSCO (the largest Korean steel manufacturer, formerly Pohang Iron and Steel Company), and has been identified as a strategic opportunity for the production of coking and thermal coal for the export market.	Mining (coal production)

Source: Compiled by the JICA Study Team, various sources on the internet

(2) Priority Industries/Products in Relevant Policies and Strategies

Priority industries and products that are specified in relevant policies and strategies can also suggest sectors with development potential along the corridor. As shown in Table 4.3, priority sectors along the corridor include mining, agriculture, agribusiness, fisheries, mining, iron and steel production, and agribusiness.

Table 4.3: Examples of Policies and Strategies Related to the Beira Corridor

Country	Relevant Policies and Strategies
Mozambique	<ul style="list-style-type: none"> • Agriculture Sector Development Strategic Plan (PEDSA, Plano Estratégico de Desenvolvimento do Sector Agrário), 2011-2019. The Government of Mozambique developed the PEDSA as a guiding framework to promote agricultural development with a target of achieving average annual agriculture growth of 7%. The strategic objectives (pillars) of the PEDSA include: (i) an

Country	Relevant Policies and Strategies
	<p>increase in productivity and production, and competitiveness, contributing to food security and nutrition; (ii) improvement of the guiding framework and services for more market access; (iii) sustainable use of resources land, water, forests, and fauna; and (iv) strengthening of institutions and organizations for agricultural development.</p> <ul style="list-style-type: none"> • The Green Revolution Strategy, 2007. This strategy of the government aims at transforming subsistence farming into commercial agriculture with the main focus placed on food production including cereals, oil crops, tubers, and to a lesser extent, poultry production. • Industrial policy of the government, 2007–11. The national industrial policy also focuses on food processing and agro-industries. • Beira Agricultural Growth Corridor. The Governments of Mozambique and Norway, along with private investors and donors, are supporting an initiative known as Beira Agricultural Growth Corridor (BAGC), launched in 2010 and promoting increased investments in commercial agriculture and agribusiness within the Beira Corridor (Tete, Sofala, and Manica Provinces). The BAGC blueprint presents a roadmap for bringing 190,000 ha of food and other crops under commercial irrigation, incorporating smallholders.
Zimbabwe	<ul style="list-style-type: none"> • Industrial Development Policy, 2012–16. The priority sectors of this policy include: (i) agribusiness, (ii) the fertilizer and chemical industry, (iii) pharmaceuticals, and (iv) metals and electronics. The Government also intends to promote “clustering”, e.g., establishing factories for clothing and textiles in cotton-growing areas such as Gokwe, for engineering and steel production in the Midlands and Bulawayo Provinces, and for cutting, polishing, and value addition of diamonds in Manicaland Province.

Source: Various sources on the internet

(3) Potentials Indicated by Other Sources

There are other potential areas for industrial development along the corridor identified by potential investors and donor-assisted studies. Table 4.4 provides examples of such potentials, including fertilizer production using the natural gas to be extracted offshore and various mineral resources in Malawi and Zimbabwe.

Table 4.4: Examples of Other Development Potentials along the Beira Corridor

Potential	Description
Fertilizer production in the Beira area	In the 2011 fiscal year, Sumitomo Corporation and Toyo Engineering Corporation conducted a project formulation study (sponsored by the Ministry of Economy, Trade and Industry of Japan) on fertilizer production at the Beira new industrial area using the natural gas produced in Pande/Temane gas field.
Mining (magnetite and apatite) in Tete Province	At Mont Muande, about 25 km northwest of Tete, there is a large magmatic iron skarn. The resource estimate is 220 Mt of magnetite and 75 Mt of apatite. Dependent on analysis of the ore, the Mont Muande and its adjacent Massamba-Singore ores could be used to produce iron and steel, together with ilmenite from the Massamba-Singore project or other areas.
Mining in Malawi and Zimbabwe	Deposits of mineral resources are identified as follows: bauxite (at Mulanje), heavy mineral sands (at Tengani, near Nsanje) in Malawi; and platinum (at Hartley and Unki), nickel (at Unki), chrome (Great Dyke), iron ore (Greenstone belts), and coal (Mid-Zambezi basin and Save-Limpopo basin)

Sources: (i) Trade Mark Southern Africa, *Mozambique Mineral Scan Report*, November 2011; (ii) JICA, *Southern Africa Integrated Regional Program Formulation Study*, March 2010; (iii) Forbes Mugumbate (Zimbabwe Geological Survey), *Exploration Opportunities in Zimbabwe*, September 2010; and (iv) various news sources on the internet

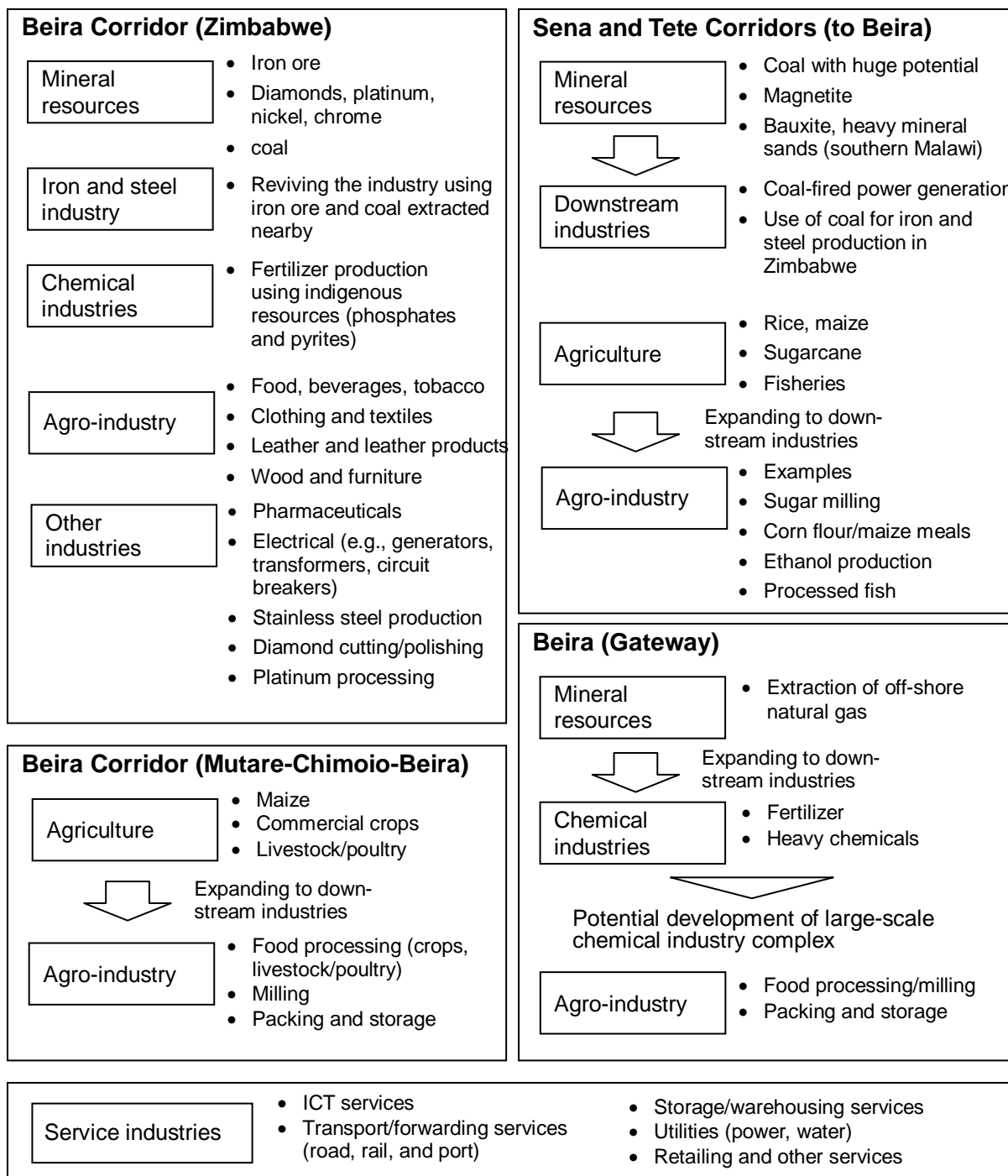
(4) Industrial Development Scenario

An industrial development scenario for the corridor was prepared (as summarized in Figure 4.1) based on (i) the strengths and potentials summarized above; (ii) detailed analysis of investment projects, policies, strategies, and plans related to the development of the corridor; and (iii) the overarching development scenarios proposed in Chapter 2. The scenario has the following major features:

- development of agriculture and agro-industry along the Beira Agricultural Growth Corridor (BAGC), and
- development of the mining industry in Tete Province in Mozambique, the southern region of Malawi, and the central region of Zimbabwe (along the Great Dyke southwest of Harare, including Hartley and Unki geological complexes/mines) together with the development of downstream industries using the produced minerals including natural gas extracted offshore.

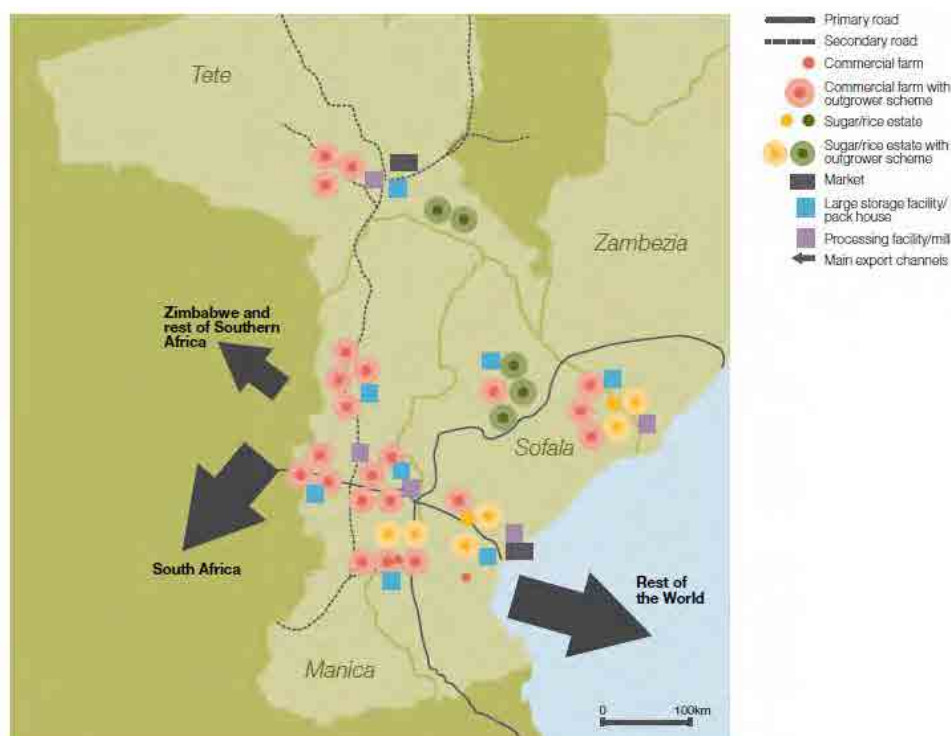
According to BAGC's investment blueprint, by 2030, there will be clusters of commercial farms and agribusinesses situated along the corridor, with strong links to smallholder farmers through outgrower schemes (contract farming operations). Large storage facilities/packing houses and processing facilities/mills will be located at/near the major cities (e.g., Tete, Moatize, Catandica, Manica, Chimoio, Dombe, and Beira). Significant volumes of products such as horticultural crops (babycorn, chilies, and mangoes) and ethanol made from sugarcane and jatropha will be exported to the Southern African region and to the rest of the world via the Port of Beira. Staple crops including rice, wheat, maize, and soya, and livestock, will be sold in major domestic markets in Tete and Beira, which will be the largest production and consumption bases in this area. Figure 4.2 illustrates the vision for development of the BAGC toward 2030.

In addition to the BAGC plan, fertilizer plants are expected to locate at Beira and Harare or in the eastern region (e.g., in Manicaland province) in Zimbabwe. As noted, urea fertilizer production in Beira is expected using the natural gas to be extracted offshore. Zimbabwe also has several well-developed fertilizer plants utilizing indigenous mineral resources such as phosphates and pyrites, with their capacity expected to be enhanced as the development of agriculture and agribusiness along the corridor is undertaken on a large scale.



Source: JICA Study Team

Figure 4.1: Industrial Development Scenario for the Beira Corridor



Source: *Beira Agricultural Growth Corridor: Delivering the Potential*, 2010, p. 46

Figure 4.2: “Vision of Success 2030” in the BAGC Investment Blueprint

Mineral resources extracted in the area will be exported from the Ports of Beira and Nacala as well as processed in industrial bases along the corridor in Mozambique and Zimbabwe. Part of the coal produced in Tete Province of Mozambique will be used at thermal power plants to be developed in the Moatize Basin, which will supply electricity to Malawi and Zimbabwe as well as in Mozambique. The coal will also be used for iron and steel production at Mount Maude. Depending on the quality, the Mont Muande and Massamba-Singore ores and ilmenite from the Massamba-Singore project or other areas could be used to produce iron and steel along the corridor. The steel products will be transported to the Port of Beira and delivered within Mozambique or exported. Successful construction and operation of iron and steel plants to treat Mont Muande and Massamba-Singore ores will generate significant economic benefits in the area, contributing to the realization of unprecedented growth in the national economy.³

In Zimbabwe, various mineral resources located in the central part of the country (Great Dyke and the Greenstone Belts) as well as mineral resources scattered around the northwest and the southeast have not been fully exploited. Currently, these resources are mostly exported in the raw state although some processing plants including smelting and refining facilities have been developed in the country. Exploiting these resources, it is likely that several processing plants will be developed along the corridor, including plants for diamond cutting and polishing, stainless steel production using locally processed chrome ore (carbon ferrochrome and ferrosilicon), platinum processing, and fertilizer production.

³ See TradeMark Southern Africa, *Mozambique Mineral Scan Report*, November 2011.

4.1.2 Transport Development Issues⁴ and Infrastructure Development Scenario(s)

(1) Transport Development Issues

Figure 4.3 presents a map of the Beira corridor, which is generally south of the Nacala Corridor, although the two corridors intersect in Malawi. As defined here, the Beira Corridor includes the following sections: (i) Beira–border (Machipanda/Mutare)–Harare; (ii) Beira–Vanduzi–Tete (Tete Corridor) towards Malawi; and (iii) Beira–Mutarara (Sena Corridor)–Blantyre.



Legend: blue=roads, purple=railways

Source: <http://www.tmsagis.co.za/>

Figure 4.3: The Beira Corridor

Bottlenecks along the corridor's roads include: (i) Tete–Vanzuzi–Beira, the condition of which is now fair, but may be damaged with increased coal transport; and (ii) Dondo–Caia towards Malawi, the condition of which is very poor, and on which bridges over the Zambezi and Shire Rivers are needed (e.g., Mutarara is a missing link, with no bridge over the Zambezi River). Development issues regarding the corridor's roads include: (i) rehabilitation of Beira–Machipanda (Zimbabwe border), of which rehabilitation of Mutare (Machipanda)–Harare is ongoing, financed by the African Development Bank (AfDB) and the Development Bank for Southern Africa (DBSA); (ii) Beira–Vanduzi–Tete; and (iii) dry ports (e.g., at Inchope, Mutarara).

Bottlenecks along the corridor's railways include: (i) the Sena railway line, which has been rehabilitated, but current line capacity (for coal) of 6 Mtpa is insufficient for Tete coal; and (ii) a missing link at Chiromo, Malawi (where the bridge washed away). Development issues regarding the corridor's railways include: (i) upgrading of the Sena railway line upgrading to 18 Mtpa, and (ii) rehabilitation of the railway line linking Beira–Machipanda–Harare to serve increasing demand.

Bottlenecks at the Port of Beira relate to (i) capacity for coal handling and (ii) the shallow depth due to siltation. Major development issues at the port include (i) expansion of capacity for coal handling to 18 Mtpa, and (ii) development of the Zambezi River for waterborne export of Tete coal.

⁴ Appendix F profiles transport infrastructure conditions in each of the eight priority corridors.

(2) Transport Infrastructure Development Scenario(s)

The Beira Corridor (along with the Nacala Corridor) is located in the Southern Africa's largest-producing agricultural region and second-largest producing mining region. Key aspects concerning corridor transport infrastructure scenarios follow:

- (i) Regarding mining, railway upgrading and port expansion has been ongoing to prepare the export of Tete (Mozambique) coal via both corridors. Therefore, in the short term, it is necessary to harmonize Tete coal transport with other transport, especially that of agricultural products, via road, railway, and the respective ports. It is also necessary to upgrade roads to support the transport of cargo other than coal related to the mining projects in the Tete region, including the transport of equipment, machinery, and consumer goods.
- (ii) Regarding agriculture, the region between the two corridors is expected to produce an abundance of agricultural products in the future. Therefore, in the mid- to long-term in both corridors, it is necessary to improve the road network, and develop collection and distribution centers and intermodal terminals, including warehouses, silos, and cold storage facilities.
- (iii) Other infrastructure development issues to be considered in the short- to mid-term include: (a) the need to improve roads/railways and waterways on Lake Malawi to accommodate successful mineral exploration initiatives; (b) the need to accommodate significant increases in mining and agricultural traffic to/from Zimbabwe with continuing economic development of the country; and (c) improvement of the city of Tete as a hub city to serve the rapidly developing mineral sector.

4.1.3 Water Sector Development Issues and Infrastructure Development Scenario(s)⁵

(1) Water Sector Development Issues

The Beira Corridor connects the Port of Beira in Mozambique with Zimbabwe through Beira–Mutare–Harare route, which intersects with the North-South Corridor at Harare. Harare (population: 1.6 million, 2009) – the capital city and commercial center of Zimbabwe – is the hub of both corridors. The Beira Corridor as defined here also includes the Sena and Tete Corridors.

Notably, there was an outbreak of cholera in Harare in 2008 due to poor water supply and sanitation service.⁶ Such outbreaks are more likely to occur in cases like Harare in which water supply and sanitation infrastructure has not been maintained in good condition. If a disease outbreak occurs along a corridor, the economic corridor function will be lost. The Firtle and Crowborough sewage treatment plants have been discharging raw sewage into the Mukuvisi and Marinda Rivers over the last five years. The water intake of Harare is located downstream of discharge points of sewage plants. Therefore, the selection of infrastructure projects should take into account the need for safe water.

Most irrigation utilities in Zimbabwe have deteriorated. It is difficult to maintain good operation and maintenance because there has not been any investment for a long time. The main objective of the national irrigation development strategy is to exploit the agricultural production potential of the country to achieve food self sufficiency at the national level. While there have been many

⁵ More details on the water sector are presented by country in Appendix H.

⁶ In Zimbabwe, provision of raw water to water supply authorities in urban and rural areas is the responsibility of Ministry of Water Resources Development and Management (MWRDM). The water sales price is USD 12/1,000 m³ at present.

irrigation development feasibility studies in the last decade, most projects have not yet been implemented due to financial constraints.

The urban area of Beira is located on the sea coast. Raw water is taken 75 km upstream of the mouth of the Pungwe River due to seawater intrusion problems. Mutare is a city located outside of the Pungwe River Basin, but which is supplied by the Pungwe River through a transfer facility. Both water supply systems require investment in infrastructure.

Major water sector development issues for the Beira Corridor in the priority subsectors (water supply and sanitation) may be summarized as follows:

- (i) high non-revenue water and water losses in municipal water supply, which are among the major issues in water supply in the region as described in Appendix H, resulting mainly from inadequate operation and maintenance of water supply systems causing the deterioration of water supply facilities⁷;
- (ii) a shortage of water supply (with water available for less than 24 hours);
- (iii) inadequate water quality in municipal water supply;
- (iv) the discharge of raw sewage from the Firlle and Crowborough sewage treatment plants into the Mukuvisi and Marinda Rivers over the past five years; and
- (v) the location of the water intake of Harare downstream of discharge points of sewage plants.

(2) Water Sector Infrastructure Development Scenario(s)

A key reference for preparation of the infrastructure development scenarios and plans for all corridors in the region is the SADC Regional Infrastructure Development Master Plan (RIDMP), published in August 2012. Box 4.1 presents major considerations in the RIDMP for the water sector. For the transport and power sectors, findings of the RIDMP are referred to in Appendices F and G, respectively.

Development directions for the Beira Corridor in the priority subsectors (water supply and sanitation) over the short term include implementation of a project to reduce non-revenue water and water losses in the capital city through the introduction of district metered areas (DMAs) for the water supply areas, detailed investigations of current conditions and problems, and the preparation of an investment program for facility improvement (a capacity development project).⁸ Development directions for the Beira Corridor over the long term include construction of a water supply dam to meet increasing demand in Harare (an investment project).

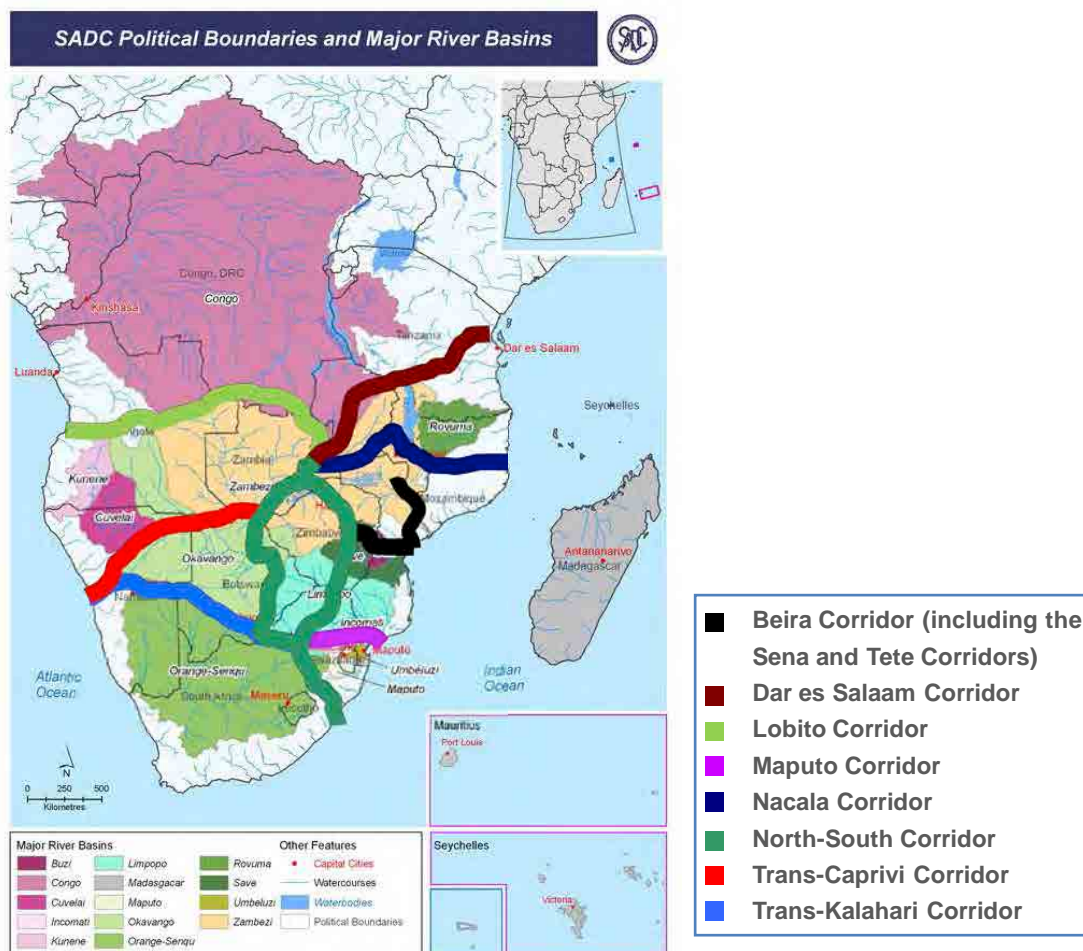
⁷ Addressing the issue of high non-revenue water and water losses will contribute not only to increasing water supply cost effectively but also to the effective and efficient development of water resources to meet water demand over the longer term.

⁸ In implementing the initiatives to improve water supply, it is also important to take appropriate actions to improve sewerage systems in major cities along the corridor.

Box 4.1: An Overview of the SADC Water Sector Based on the SADC Regional Infrastructure Development Master Plan

The SADC Regional Infrastructure Development Master Plan (RIDMP), published in August 2012, addresses regional/trans-boundary infrastructure development requirements until 2027, targeting better livelihoods and quality of life for SADC citizens. Vision 2027 water sector targets have been set for a period of 15 years planned over the short term (2012–2017), medium term (2017–2022), and long term (2022 to 2027).

In SADC, the water sector is organized by river basin. The figure below illustrates the river basins in the region along with the location of the priority corridors.



Source: SADC, *Regional Infrastructure Development Master Plan, Water Sector Plan*, August 2012

SADC Political Boundaries and Major River Basins

Table 4.5 shows the current status of water resource and related infrastructure development in the SADC region as summarized by SADC. Table 4.6 presents the gap between the current situation and Vision 2007 targets.

Table 4.5: Comparison of SADC Water Sector Status with other World Benchmarks and Indicators

Sector	SADC Status	World Averages	Developed World Status
Water Abstraction (Extraction)	170 m ³ /capita/year	570 m ³ /capita/year	1,330 m ³ /capita/year
Water Storage	14% of ARWR stored	25% of ARWR stored	70% to 90% of ARWR stored
Irrigated Land	7% irrigated of available irrigable land	20% irrigated of available irrigable land	70% irrigated of available irrigable land
Water Supply	61% of the SADC population has access to an adequate and safe water supply	87% of the world's population (2006) has access to an adequate and safe water supply	100% of the population has access to an adequate and safe water supply
Sanitation	39% of the SADC population has access to an adequate sanitation service	62% of the world's population (2006) has access to adequate sanitation service	100% of the population has access to an adequate sanitation service

Abbreviation: ARWR = actual renewable water resources

Source: SADC, *Regional Infrastructure Development Master Plan, Water Sector Plan*, August 2012

Table 4.6: Gap between Current Situation and Vision 2027 Targets

Sector	Current Status	Vision 2027 Targets	Gap
Surface Water Storage	14% of ARWR stored (including the Kariba and Cahora Bassa dams)	25% of ARWR stored. To meet SADC regional demand, the eventual target is 75% stored (best practice is 70%–90% of ARWR stored)	An additional 11% of ARWR to be stored
Agriculture	3.4 million ha (7% of potential) irrigated	10 million (20% potential) ha irrigated; the world average is 20%.	An additional 6.6 million ha to be irrigated
Hydropower	12 GW (8% of potential) installed	75 GW (50% of potential) installed, to meet SAPP targets and exports to other RECs	An additional 63 GW to be installed
Water Supply	61% of 260 million people served	75% of 350 million people served; the eventual target is 100% served	An additional 14% of 350 million people to be served
Sanitation	39% of 260 million people served	75% of 350 million people served; the eventual target is 100% served	An additional 36% of 350 million people to be served
Water Abstraction (Extraction)	44 km ³ /year abstracted	264 km ³ /year abstracted to meet expected increase in water demand	An increase to 220 m ³ /year abstracted

Abbreviations: ARWR = actual renewable water resources, REC = regional economic community, SAPP = Southern African Power Pool

Source: SADC, *Regional Infrastructure Development Master Plan, Water Sector Plan*, August 2012

The water sector component of the RIDMP included 34 projects prioritized for implementation from 2013 to 2021, which is designated as Phase 1. The projects included three facilitation projects, four capacity building projects, six studies, and 21 investment projects. Since Phase 1 will not fully meet the requirements of Vision 2027, a Phase 2 and Phase 3 will be required.

As noted by the delegate from the Zambezi Watercourse Commission (ZAMCOM) at the seminar for this study held in Johannesburg on 21 February 2013, it may be desirable to undertake a strengths, weaknesses, opportunities, and threats (SWOT) analysis to assess the existing conditions of the water sector in the region comprehensively. That said, the objective of this study was to propose potential JICA assistance for the development of major economic corridors in the region. Accordingly, the water sector survey in this study (as well as the survey of the transport and power sectors) focused on identifying major development issues along the priority corridors and proposing scenarios or measures to address those issues. For such a survey, a SWOT analysis is not necessary, and thus was not undertaken in this study.

Source: SADC, *Regional Infrastructure Development Master Plan, Water Sector Plan*, August 2012

4.1.4 Power Development Issues and Development Scenario(s)⁹

(1) Mozambique

Power Supply Capability

Mozambique has sufficient power supply capacity with Hidroeléctrica de Cahora Bassa (HCB) (2,075 MW) in Tete Province mainly exporting to South Africa through high-voltage direct current (HVDC). The grid of the country is divided into two, one in the northern and central regions and connected to HCB, and the other in the southern region, where power is mainly imported from South Africa. Over the medium term, large-scale hydropower and coal thermal generation plants are planned (e.g., HCB North Bank Hydropower Plant, 1,245 MW); Mphanda Nkuwa Hydropower Plant, 1,500 MW); Benga Coal Thermal Power Plant, 600 MW); Moatize Coal Thermal Power Plant, 300 MW). All power generation is located in the central Zambezi Basin. To transmit the generated power to the southern region and export it to South Africa, a Mozambique backbone transmission line connecting the power generation areas with the Maputo area is planned. When both the planned generation plants and transmission lines are realized, sufficient power will be available in both the central region and the Maputo area.

Grid Accessibility

A 1 cct, 220 kV transmission line from HCB ends at Chibata on the corridor. The power reliability is relatively high, and sufficient supply capacity can be secured.

(2) Zimbabwe

Power Supply Capability

Zimbabwe is facing a chronic power shortfall. In 2011, peak demand and available generating capacity were 2,230 MW and 1,320 MW, respectively. Power sources include the Kariba North Hydropower Plant (49%) the Hwange Thermal Power Plant (32%), small thermal (4%), and imports (15%). A Kariba South Hydropower Plant extension (300 MW) and a Hwange Thermal Power Plant extension (600 MW) are being procured. Only after those power stations commence generation in 3–5 years can domestic power supply and demand be balanced. To supply power to meet future increased domestic and industrial demand, the development of the Batoka Gorge Hydropower Plant (1,600 MW, to be jointly developed with Zambia) and the Gokwe North Thermal Power Plant (1,400 MW) will be indispensable.

Grid Accessibility

The 330 kV transmission line runs along the corridor, while two 330 kV substations are located near Harare and the Mutare border crossing to Mozambique. Also, 132 kV substations are located in Marondera and Rusape between Harare and Mutare. Therefore, it is easy to access highly reliable power in the Harare and Mutare areas and easy to access less reliable power in the Marondera and Rusape areas.

4.1.5 Transport/Trade Facilitation (Soft Issues)

While there has not been much movement toward the implementation of soft initiatives along the Beira Corridor, the development of the following one-stop border posts (OSBPs) has been proposed:

- (i) A OSBP at **Forbes–Machipanda** (and Nyamapanda–Chuchimano) between Zimbabwe and Mozambique was first proposed in 2005,¹⁰ but there has not been much movement

⁹ More details on the power sector are presented in Appendix G.

toward implementation.¹¹ Traffic at Forbes–Machipanda is about 150 trucks per day (2012).¹² Border crossing time is reported as 1.3 hours eastbound and 16.7 hours westbound. The building at the Forbes border crossing point (BCP) was recently renovated and expanded to accommodate commercial office spaces and to increase space in the travelers' clearance hall. A dryport is being constructed on the Mozambique side between Machipanda and Manica. In August 2012 a Forbes–Machipanda OSBP project was included in the SADC Regional Infrastructure Master Plan (TR/MSP¹³ 13) at an estimated total cost of USD 6 million.¹⁴ Items requiring improvement include: (i) the ICT interface and systems interface (Mozambique uses the Integrated Customs Management System [Sistema Integrado de Gestion Aduanera, SIGA, developed by CrimsonLogic], while Zimbabwe uses ASYCUDA World), (ii) water and sanitation, (iii) staff accommodation, (iv) parking, and (v) construction of a bypass road to link the Forbes BCP and Feruka to avoid the Christmas pass near Mutare.¹⁵

- (ii) **Zobue–Mwanza** between Mozambique and Malawi serves traffic from Beira port as well as from Durban port and Zimbabwe. Traffic is moderate (about 100 vehicles per day) while delays are low to moderate (about 4 hours westbound from Malawi to Mozambique and about 6.5 hours eastbound from Mozambique to Malawi). In August 2012 a Forbes–Machipanda OSBP project was included in the SADC Regional Infrastructure Master Plan (TR/MSP 16) at an estimated total cost of USD 5 million. Considering the 3–6 km no-man's land separating the two current border posts, a OSBP would be difficult to implement unless one country's control authorities operate on the territory of the other, or if a new (perhaps) straddling facility were constructed in the no-man's land, although there may be resettlement impacts with this latter option. While Malawi may be more interested than Mozambique in implementing a OSBP at Zobue–Mwanza (and at Calomue–Dedza), Mozambique may be more interested than Malawi in implementing one at Chiponde–Mandimba along the Nacala Corridor, suggesting scope for a “win-win” deal between the two countries. In August 2011, the Southern Africa Trade Hub of the United States Agency for International Development (USAID) assessed operations at this border crossing and called for the establishment of a joint border committee and action plan for coordinated (integrated) border management (CBM).¹⁶

¹⁰ Zimbabwe and Mozambique signed a letter of intent to establish a OSBP at Forbes–Machipanda in 2005 and Zimbabwe prepared improvement plans for both Forbes and Machipanda in that year. The two countries signed a Beira Corridor Development Agreement in 2007. The Agreed Minutes for a Meeting on the Development of Beira and Nacala Corridors, Beira, 16 December 2008, stated in paragraph 12 that the parties would facilitate development of OSBPs at various locations, including Forbes–Machipanda, applying the Chirundu model. Three working groups were established to move toward implementation of a OSBP at Forbes/Machipanda: (i) customs and trade facilitation, working on the harmonization of laws related to goods movement; (ii) immigration and law enforcement, dealing with security issues; and (iii) information technology, dealing with cross-border electronic data interchange. “Zimbabwe: One Stop Border Post for Forbes”, *The Herald*, 14 February 2008.

¹¹ A statement in a 2012 World Bank report on Mozambique that Forbes–Machipanda is an example of an existing OSBP does not appear correct. See World Bank, *Mozambique: Reshaping Growth and Creating Jobs through Trade and Regional Integration, Country Economic Memorandum*, March 2012, pp. 57–58.

¹² Traffic data in this section is for both directions.

¹³ TR = transport and MSP = member states project.

¹⁴ A Nymamapanda–Chuchimano OSBP project, TR_017, was also included at an estimated cost of USD 5 million.

¹⁵ (i) Ministry of Industry and Commerce, Zimbabwe, Spatial Development Initiatives (SDI), presentation to JICA Study Team, 8 August 2012; (ii) COMESA, EAC, SADC, and TradeMark Southern Africa, *Infrastructure Components of the North-South Corridor*, 2010, pp. 12, 15; (iii) “Zimbabwe: One Stop Border Post for Forbes”, *The Herald*, 14 February 2008.

¹⁶ AECOM International Development, *Integrated Border Management (IBM) – BOA [Border Operations Assessment] Mwanza/Zobue*, submitted to the USAID/Southern Africa and Southern Africa Trade Hub, October 2011, pp. 4, 23. Also worth noting, Mozambique is implementing phased implementation of an electronic single window countrywide.

Regarding corridor port operations, the USAID Southern Africa Trade Hub recently assessed the performance of the Port of Beira and found high dwell times due to draught restrictions and other physical issues, as well as due to: (i) insufficient customs bonded facilities/inland container depots (ICDs), (ii) obsolete laws and regulations that do not reflect containerization, and (iii) the long duration of the customs clearance process.¹⁷

Other soft issues concerning the use of the Beira Corridor relate to road transport. The World Bank has noted that the corridor is avoided because of high road user charges in Mozambique (which may increase trucking costs by 5%–10%), as well Mozambique's ban on seven-axle interlinks, and the system of third-party motor liability insurance in Mozambique, which requires cash payments (of foreign vehicles) at the border.¹⁸

An institutional development involving the Beira Corridor (although not one mainly focused on trade/transport facilitation and involving only one country) was the launching in 2009 of the Beira Agricultural Growth Corridor (BAGC),¹⁹ which was established by the Government of Mozambique, private investors, farmer organizations, and international agencies to increase agricultural productivity and competitiveness along the corridor. Among other aims, it seeks to ensure that public and private investments along the agricultural value chain are well coordinated, leveraging existing “anchor” investments (e.g., in the mining sector and railways) to benefit agriculture, and develop new infrastructure and agricultural projects as commercially viable business opportunities that drive growth and benefit local communities.

Going forward, efforts at transport/trade facilitation along the Beira Corridor may include the following:

- (i) implementation of CBM (and related policy and regulatory framework interventions)²⁰ at Forbes–Machipanda and Zobue–Mwanza in the short term, building upon the initial work funded by USAID's Southern Africa Trade Hub, followed by implementation of OSBPs at these BCPs over the medium term;
- (ii) solutions to trade facilitation bottlenecks at Beira port, e.g. pre-arrival clearance, development of ICDs, training of clearing and forwarding agents, as called for by USAID's Southern African Trade Hub²¹;
- (iii) strengthening of the Beira Agricultural Growth Corridor organization to (better) address trade/transport facilitation issues, or more likely establishment of a Beira Corridor Authority for this purpose; and
- (iv) formulation of an international railway joint operating agreement and development of railway OSBPs on the railway lines along this corridor over the longer term, following the example of the Malaba railway OSBP between Kenya and Uganda in East Africa.

Other soft sector issues affecting this corridor (e.g., related to road user charges, vehicle restrictions, third-party motor liability insurance) may be better addressed at the regional (e.g., Tripartite) level.

¹⁷ AECOM International Development (Thys Cronje, Consultant Ports Specialist), *Trade Facilitation Interventions: Port of Beira*, August 2011.

¹⁸ Gael Raballand, Charles Kunanka, and Bo Giersing, *The Impact of Regional Liberalization and Harmonization in Road Transport Services: A Focus on Zambia and Lessons from Landlocked Countries*, World Bank, 2008, pp. 19–21.

¹⁹ A Beira Corridor Authority was established in 1985 to promote rehabilitation of the port, and a Beira Corridor Group was later established in Harare, but both closed in the 1990s. A new Beira Corridor Agency has recently been proposed. Mozambique Regional Gateway Programme, *Situation Analysis and Roadmap*, May 2012, pp. 10, 48–49.

²⁰ E.g., preclearance and prepayment, an authorized economic operator scheme, full application of risk management, single window applications.

²¹ AECOM International Development (Thys Cronje, Consultant Ports Specialist), *Trade Facilitation Interventions: Port of Beira*, August 2011.

4.2 Dar es Salaam (TAZARA) Corridor²²

4.2.1 Industrial Development Scenario

(1) Strengths and Potentials

Strengths of the Dar es Salaam Corridor are indicated by the industries and products already present along the corridor. These industries or products along with their primary locations are listed in Table 4.7.

Table 4.7: Industries and Products along the Dar es Salaam Corridor

Country	Industries/Products
Tanzania	<ul style="list-style-type: none"> • manufacturing including cigarettes, textiles, and cement • agricultural products including maize and paddy in Morogoro, Iringa, and Mbeya Provinces along the corridor
Zambia	<ul style="list-style-type: none"> • agricultural products including cassava, coffee, paddy rice, mixed beans, and millet, in the Northern Province • agricultural products including maize, soya beans, sweet potatoes, and wheat in the Central Province

Source: JICA Study Team

The major investments along the Dar es Salaam Corridor are concentrated in mining and downstream businesses in Tanzania. Table 4.8 provides examples of major recent and planned investments. Among them, Liganga iron ore and Mchuchuma coal exploration are expected to become the centerpiece of infrastructure development in the area, which has remained as one of the least developed areas in Tanzania. Although these mining-related investments are near the Mtwara Corridor, they have the potential to promote agriculture-based industrial development along the Dar es Salaam Corridor, as discussed later.

Table 4.8: Examples of Major Investments along the Dar es Salaam Corridor

Project/ Enterprise	Description	Industry/Sector
Bagamoyo Waterfront SEZ	The project site is located about 50 km from the city of Dar es Salaam, and 10 km from Bagamoyo town. The Bagamoyo SEZ will serve have multipurpose functions including serving as (i) a platform for export processing and assembly; (ii) a logistics center for import distribution, storage, and exhibition; and (iii) a free trade zone.	Services in logistics and trade, manufacturing
Liganga Iron Ore Project	Located in Ludewa District, Njoloma Region, about 850 km southwest of Dar es Salaam, the Liganga iron ore deposit is one of the largest iron ore resources identified in the country; it is estimated to contain reserves over 1.2 billion tons. Sichuan Hongda Corporation Limited (SHCL) of the PRC plans to invest USD 1.7 billion to establish an iron ore mine and iron and steel complex.	Mining, iron and steel production
Mchuchuma Coal to Electricity Project	Located in Ludewa District, it has a reserve of 536 million tons of coal with proven reserves of 159 million tons. SHCL plans to invest USD 1.3 billion to establish a coal mine and a 600-MW thermal power station. The power generated will serve the Liganga project, with the remainder be connected to the national grid.	Mining and energy
Sponge Iron Plant	This plant will be established in Amani area, within Ludewa District, utilizing iron ore from Maganga Matitu, which is part of the Liganga project, and coal from Katewaka, to produce sponge iron (direct-reduced iron). The project is being	Iron production

²² See subsection 4.2.2 for the definition of the Dar es Salaam Corridor used in this study.

Project/ Enterprise	Description	Industry/Sector
	implemented by Maganga Matitu Resource Development Limited; shareholders also include National Development Corporation of Tanzania and MM Steel Resources Public Limited Company (MMSR PLC).	
Northern Coffee Corporation	In 2011, the Zambia Development Agency invested USD 4 million to revive the Kasama Coffee Company. The company is to be relaunched as Northern Coffee Corporation Limited, which produced one-third of Zambia's 6,000 ton of coffee at its peak in 2004.	Agribusiness (coffee plantation)

Abbreviations: PRC = People's Republic of China, SEZ = special economic zone, SHCL = Sichuan Hongda Corporation Limited

Source: Compiled by the JICA Study Team from various sources on the internet

(2) Priority Industries/Products in Relevant Policies and Strategies

Priority industries and products that are specified in relevant policies and strategies can also suggest sectors with development potential along the corridor. As shown in Table 4.9, priority sectors along the corridor include agriculture, agribusiness, manufacturing, and the service industry.

Table 4.9: Examples of Policies and Strategies Related to the Beira Corridor

Country	Relevant Policies and Strategies
Tanzania	<ul style="list-style-type: none"> • Integrated Industrial Development Strategy 2025. The IIDS recommends several clusters in accordance with the natural and geographical advantages of respective locations, among which, the waterfront SEZ at Bagamoyo and the Agribusiness SEZs along the Southern Agricultural Growth Corridor of Tanzania are featured as major clusters relating to the Dar es Salaam Corridor. • Kilimo Kwanza (Agriculture First). This is a national resolution to initiate a green revolution in Tanzania and introduce large-scale commercial agriculture in the sector. Kilimo Kwanza serves as the central pillar in achieving the country's Vision 2025 and sets the direction of socio-economic development during the intervening period.
Zambia	<ul style="list-style-type: none"> • Six National Development Plan, 2011–15. The SNDP identifies agriculture, tourism, manufacturing, mining, and energy as growth sectors. In particular, the plan identifies the industrial potentials along the Dar es Salaam Corridor as (i) sugar, tea and fish production, and tourism, in the Northern Province; and (ii) maize, sweet potatoes, and wheat production in the Central Province, due to its fertile soil and favorable climate. • Multi-Facility Economic Zones. An MFEZ is an industrial area for both export-oriented and domestic-oriented industries, with the necessary infrastructure provided. The Government has to date declared six areas as MFEZs and /or industrial parks, among which priority has been put on Mpulungu, Chembe, Nakonde, Kasumabalesa, and Mwinilunga. • Farm (or Farming) Blocks. The Government has embarked on a land development program that opens up new farm blocks for commercial development. Currently, the government has identified nine farm blocks, including the Manshya farm block in Mpika Ddistrict in the Northern Province, and the Nasanga farm block in Serenje District in the Central Province.

Abbreviations: IIDS = Integrated Industrial Development Strategy, MFEZ = multi-facility economic zone, SEZ = special economic zone, SNDP = Sixth National Development Plan

Sources: (i) Ministry of Industry and Trade, United Republic of Tanzania, *Integrated Industrial Development Strategy 2025*, August 2011; (ii) Ministry of Finance and National Planning, Republic of Zambia, *Sixth National Development Plan 2011–2015*, January 2011.; (iii) Zambia Development Agency and JICA, *Zambia: Africa's New Frontier for Investments and Profits*, fourth edition, 2012; and (iv) various news sources on the internet

(3) Potentials Indicated by Other Sources

Table 4.10 shows the potential for agriculture development identified by the private sector in Tanzania and the tourism industry potential in Zambia.

Table 4.10: Examples of Other Development Potentials along the Dar es Salaam Corridor

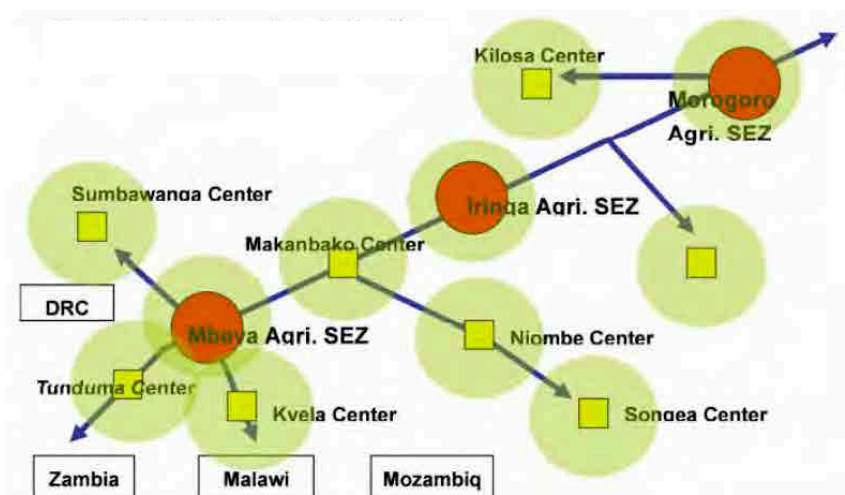
Potential	Description
Agriculture in Tanzania	The Southern Agricultural Growth Corridor of Tanzania is a private sector initiative responding to the Kilimo Kwanza (Agriculture First) initiative; initially it is to improve transport infrastructure (both road and rail) between Dar es Salaam and Morogoro, Iringa, Mbeya, and Sumbawanga. It has invited USD 3.4 billion in investment from the public and private sectors to bring 350,000 ha of farmland into commercial agricultural production.
Tourism in Zambia	The Government of Zambia has formulated an integrated development plan for the tourism resorts in the Northern Circuit of Zambia, including Nsumbu and Lusenga National Parks as well as Lumangwe and Kabwelume Waterfalls (under the Kasaba Bay Tourism Resort Development Project), and the Greater Livingstone Area (near Victoria Falls).

Sources: (i) Ministry of Industry and Trade, United Republic of Tanzania, "Integrated Industrial Development Strategy 2025", August 2011; (ii) Ministry of Finance and National Planning, Republic of Zambia, *Sixth National Development Plan 2011–2015*, January 2011.; (iii) Zambia Development Agency and JICA, "ZAMBIA: Africa's new frontier for investments and profits", fourth edition, 2012; and (iv) various news sources on the internet

(4) Industrial Development Scenario

The industrial development scenario along the Dar es Salaam Corridor is summarized in Figure 4.4. The scenario focuses on the Southern Agricultural Growth Corridor (SAGCOT) of Tanzania and its extension to the Northern and Central Provinces of Zambia.

In Tanzania, as illustrated by the Integrated Industrial Development Strategy, agribusiness special economic zones (SEZs) are to be deployed at key cities along the corridor (i.e., Iringa, Mbeya). Parks for small and medium enterprises (SMEs) and micro manufacturing enterprises (MMEs) will be deployed at regional/district centers around agribusiness SEZs, including cities such as Kiroso, Makanboko, Niombe, Tunduma, Tukuyu, Kyela, and Sambwanga. These SME and MME parks will include supporting businesses for agribusiness SEZs and their workers, e.g., textiles and apparel; blacksmiths, tinsmiths, and metal processing; machinery mechanics and automobile repairs; electricians, plumbers, and home appliance repairs; carpenters, wood producers, and furniture makers; shoemakers and leather processors; food processors, millers, and seed oil expellers. Iron and steel products from Liganga and sponge iron (direct-reduced iron) will be utilized by these SME/MME parks, as well as exported via the Port of Mtwara.

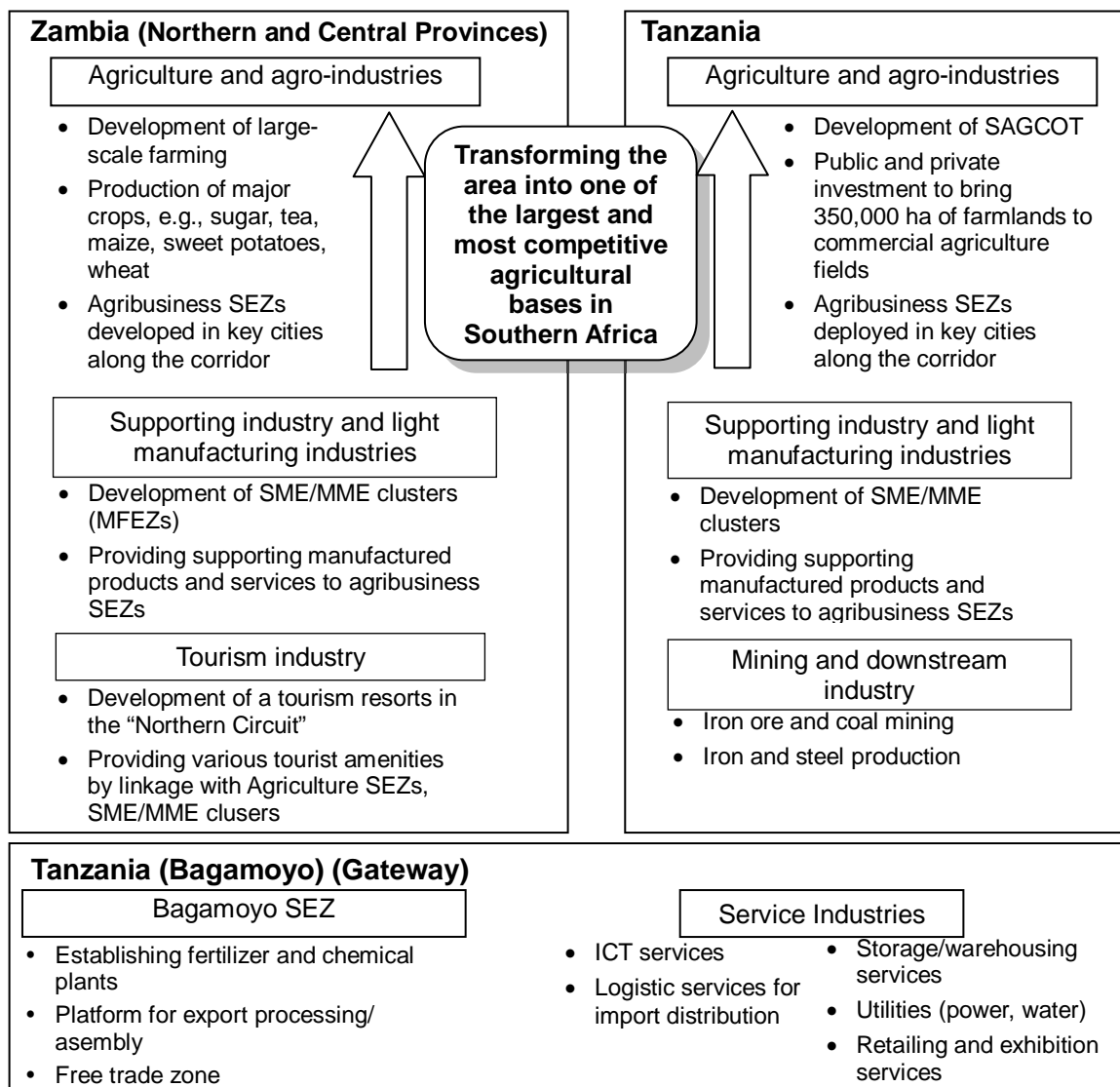


Source: Ministry of Industry and Trade, United Republic of Tanzania, Integrated Industrial Development Strategy 2025, December 2011

Figure 4.4: Agricultural Growth Corridor in Tanzania

In Zambia, key cities along the corridor – Nakonde, Mpika, Sejenje, and Kapri Mposhi – will have agribusiness SEZs, as with the SAGCOT. Some areas including these cities have Multi-Facility Economic Zones (MFEZs) and farm blocks, which will be organically linked with the SEZs and SME/MME clusters. Tourism resorts in the Northern Circuit will be a major market for agro and manufactured products of the SEZs and SME/MME clusters

Fertilizer and chemical plants will be established at the Bagamoyo Waterfront SEZ utilizing natural gas from southern coastal gas reserves. The fertilizers and chemical products will be consumed in the farms, agribusiness SEZs, and SME/MME clusters along the corridor. The Bagamoyo SEZ will also serve as a platform for (i) export processing and assembly; (ii) a logistics center for import distribution, storage, and exhibition; and (iii) a free trade zone.



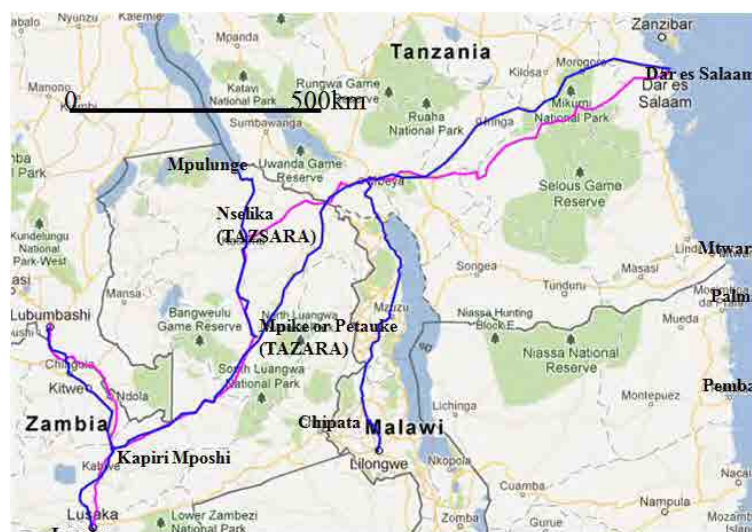
Abbreviations: MFEZ = multi-facility economic zone, MME = micro manufacturing enterprise, SAGCOT = Southern Agricultural Growth Corridor of Tanzania, SEZ = special economic zone, SME = small and medium enterprise
 Note: The Dar es Salaam Corridor extends to Tanzania (of course) and therefore is covered here although it is not one of the focus countries of this study.
 Source: JICA Study Team

Figure 4.5: Industrial Development Scenario for the Dar es Salaam Corridor

4.2.2 Major Transport Development Issues and Infrastructure Development Scenario(s)

(1) Transport Development Issues

Figure 4.6 presents a map of the Dar es Salaam Corridor, which is defined here as Dar es Salaam–Border (Tunduma/Nakonde)–Kapiri Mposhi.



Legend: blue = roads, pink = railways;

Source: <http://www.tmsagis.co.za/>

Figure 4.6: The Dar es Salaam Corridor

Bottlenecks along the corridor's roads include: (i) the western section in Tanzania (which is not one of the focus countries of this study) and the northern section in Zambia, which are in poor condition; and (ii) long border crossing times. Development issues regarding the corridor's roads include: (i) rehabilitation and upgrading of the sections in poor condition, and (ii) upgrading of Calinzez–Dar es Salaam.

Although the corridor railway line remains in operation, TAZARA is now in a state of near collapse due to mismanagement, financial difficulties, and inadequate maintenance. Currently, about 80 PRC technical personnel are conducting a feasibility study of rehabilitation of the TAZARA line. The PRC has proposed two TAZARA extensions: (i) Chipata–Mpikwe or Petauke, and (ii) Mpulunge–Nselika.

Bottlenecks at the Port of Dar es Salaam relate to capacity and waiting time. Development issues relate to (i) construction of two new berths (13 and 14), which will have a major effect on port performance; (ii) construction of a new port at Bagamoyo; and (iii) upgrading of the Port of Mpulunge.

(2) Transport Infrastructure Development Scenario(s)

The Dar es Salaam Corridor is expected to become more active over the mid to long term, with development of the Mtwara Corridor in southern Tanzania and Palma and Pemba in northern Mozambique. Offshore gas reserves in Tanzania amount to 10 trillion cubic feet off and those in Mozambique reach 170 trillion cubic feet off in 2012. Also, there has been active exploration of mineral resources in Malawi. Development of the Dar es Salaam Corridor, the Mtwara Corridor, and Lake Malawi waterways will be necessary to accommodate successful mineral development initiatives.

4.2.3 Water Sector Development Issues and Infrastructure Development Scenario(s)

(1) Water Sector Development Issues

The Dar es Salaam Corridor connects the Port of Dar es Salaam in Tanzania (which again is not one of the focus countries of this study) with Zambia via railway and road links; the corridor connects with the North-South Corridor at Lusaka, which is a hub of both corridors. Water supply infrastructure is old and malfunctioning in urban water supply areas because of a lack of investment in distribution networks over the past 30 years. However, water demand in cities and towns along the corridor has increased. The service ratio of water supply is low even in Lusaka, which has a population of 1.5–3.0 million (estimates vary) but a service population of only 480,000.

The 2000 Census Report of Zambia estimated average water supply at 49.1% and access has not increased significantly from this level. According to the National Irrigation Strategy and Plan, the potential area for irrigation is about 400,000 ha, but total irrigated area is estimated at about only 100,000 ha. It is necessary to extend the irrigated to reduce poverty in the agricultural sector.

Major water sector development issues along the Dar es Salaam Corridor in the priority subsectors (water supply and irrigation) may be summarized as follows:

- (i) high non-revenue water and water losses in municipal water supply, which are among the major issues in water supply in the region as described in Appendix H, resulting mainly from inadequate operation and maintenance of water supply systems causing the deterioration of water supply facilities²³;
- (ii) a shortage of water supply (with water available for less than 24 hours); and
- (iii) limited irrigated area compared with the potential irrigated area in Zambia.

(2) Water Sector Infrastructure Development Scenario(s)

Development directions for the Dar es Salaam Corridor in the priority subsectors over the short term include implementation of a project to reduce non-revenue water and water losses in the capital city through the introduction of district metered areas (DMAs) for the water supply areas, detailed investigations of current conditions and problems, and the preparation of an investment program for facility improvement (a capacity development project).²⁴

Development directions for the Dar es Salaam Corridor over the long term include:

- (i) reducing the vulnerability of persons dependent on rainfed agricultural practices in Zambia by anticipating rainfall shortages and increased variability in the face of climate change (an investment project); and
- (ii) extending the irrigation area to reduce poverty among farm populations (an investment project).

²³ As noted, addressing the issue of high non-revenue water and water losses will contribute not only to increasing water supply cost effectively but also to the effective and efficient development of water resources to meet water demand over the a longer term.

²⁴ In implementing the initiatives to improve water supply, it is also important to take appropriate actions to improve sewerage systems in major cities along the corridor.

4.2.4 Power Development Issues and Development Scenario(s)

(1) Zambia

Power Supply Capability

In 2011, peak demand and available generation capacity were 1,660 MW and 1,215 MW, respectively. The shortfall was mainly because two units (180 MW × 2) of the Kariba North Hydropower Plant (180 MW × 4 in total) were under rehabilitation. The rehabilitation of the first unit will be completed by the end of 2012 and the rehabilitation of the second unit will be completed by the end of 2013.

Plans for power generation by Independent Power Producers (IPPs) are being realized. Construction of the Maamba coal Thermal Power Plant (300 MW) has been started, and the negotiation of a power purchase agreement is ongoing on the Emco (India) coal Thermal Power Plant (300 MW), the Ndola Heavy Fuel Oil Thermal Power Plant (50 MW) is under construction, and the Kabompo Hydropower Plant is planned to be constructed by Copperbelt Energy Corporation.

Zambia has sufficient hydropower potential, and is developing hydropower plants on the Zambezi River and its tributaries. The Kariba North extension (360 MW) will be completed in 2013, the construction of Itzhi–Tezhi Hydropower Plant (120 MW) will start soon via a special purpose vehicle (SPV), construction of the Kafue Lower Hydropower Plant (750 MW) has started, and the Batka Hydropower Plant (1,600 MW, jointly developed with Zimbabwe) is listed for future priority generation development. Therefore, when the IPP power plants and large-scale hydropower plants are realized, Zambia will have sufficient power supply capacity.

Grid Accessibility

As only a 1 cct, 66 kV transmission line runs along most of the corridor between Kapiri Mposhi (branch point) and Nakonde (on the border with Tanzania, across from Tunduma), the power supply reliability is low. A 1 cct, 220 kV transmission line crosses the corridor at Pensulo, where there is a 220/110 kV substation. Reliable power can be supplied only in the area around Pensulo (eastern Serenje).

4.2.5 Transport/Trade Facilitation (Soft Issues)

OSBPs have been discussed in relation to the following BCPs along the Dar es Salaam (TAZARA) Corridor (in addition to Kasumabalesa, covered under the North-South Corridor, below):

- (i) A OSBP at **Nakonde–Tunduma** between Zambia and Tanzania has been discussed for several years.²⁵ Border crossing traffic at Nakonde–Tunduma has been among the highest in the Southern African study region, with a range of 180–350 trucks per day (2011–12). Delays of 3.8 days northbound and 3.7 days southbound have been reported. New, integrated office facilities were under construction on the Zambia side at congested Nakonde, but these works were stopped and handed over to the same concessionaire developing facilities on the Tanzania side (Tunduma).²⁶ Unfortunately, however, it does not appear that the design and construction of this concessioned

²⁵ Nakonde/Tunduma is a road and rail border crossing, with the border rail station at Tunduma about 1 km from the Tunduma road border and the rail border at Nakonde about 1.5 km from the Nakonde road border.

²⁶ In December 2011, the Report of the Commission of Inquiry into Operations of the Zambia Revenue Authority recommended that the concession for the Nakonde BCP be cancelled immediately. <http://trademarksa.org/sites/default/files/publications/Report%20%20Zambia%20Revenue%20Authority%20Commission%20of%20Enquiry.pdf>, p. 64.

infrastructure was done as part of a plan to develop a OSBP.²⁷ In August 2011 USAID's Southern Africa Trade Hub assessed operations at this border crossing and called for the establishment of a joint border committee and action plan. In August 2012 a Nakonde–Tunduma OSBP project was included in the SADC Regional Infrastructure Master Plan (TR/MSP 19) at an estimated total cost of USD 8 million.²⁸

- (ii) A OSBP at **Songwe–Kasumulo** between Malawi and Tanzania has also been discussed for several years. Traffic consists of about 30 trucks per day, and average crossing times are about 6.5 hours northbound and 18.7 hours southbound. Electronic data interchange is ongoing via the Revenue Authorities Digital Data Exchange (RADDEX) program developed with USAID assistance and used in East Africa. In August 2011 USAID's Southern Africa Trade Hub assessed operations at this border crossing and called for the establishment of a joint border committee and action plan.²⁹

The Dar es Salaam Corridor Coordinating Committee brings together stakeholders from Tanzania and Zambia, as well as from Democratic Republic of Congo (DRC) and Malawi. It was founded on the basis of a constitution formulated in 2003 and eventually agreed by all parties about five years later. “Seed” money was provided by the USAID Southern Africa Trade Hub and the possible use of a tonnage levy has been considered. The corridor coordinating committee's full-time secretariat is executing a work plan and lobbying for reforms to increase the efficiency of corridor operations.

Going forward, efforts at transport/trade facilitation along the Dar es Salaam Corridor may include the following:

- (i) implementation of CBM (and related policy and regulatory framework interventions)³⁰ at Nakonde–Tunduma and Songwe–Kasumulo in the short term, building upon the initial work funded by USAID's Southern Africa TradeHub, followed by implementation of OSBPs at these BCPs over the medium to long term; and
- (ii) provision of technical support to the Dar es Salaam Corridor Coordinating Committee.

²⁷ The building is currently unoccupied since it is not located on a site on which it can be efficiently utilized.

²⁸ See: (i) SADC, *The SADC Regional Infrastructure Development Master Plan, Sub-Sector Plan, Border Posts*, 2012, pp. 15, 17; (ii) COMESA, EAC, SADC, and TradeMark Southern Africa, *Infrastructure Components of the North-South Corridor*, 2010, pp. 14, 16; (iii) AECOM International Development, *Integrated Border Management (IBM) – BOA [Border Operations Assessment] Tunduma/Nakonde*, submitted to the USAID/Southern Africa and Southern Africa Trade Hub, August 2011, pp. 4, 26–27; and (iv) Mark Pearson, *Trade Facilitation in the COMESA–EAC–SADC Tripartite Free Trade Area*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. SIIWP11, September 2011, p. 13.

²⁹ (i) SADC, *The SADC Regional Infrastructure Development Master Plan, Sub-Sector Plan, Border Posts*, 2012, pp. 15, 17; (ii) AECOM International Development, *Integrated Border Management (IBM) – BOA [Border Operations Assessment] Kasumulu/Songwe*, submitted to the USAID/Southern Africa and Southern Africa Trade Hub, August 2011, pp. 39–43; and (iii) interview with various staff of the Malawi Revenue Authority (e.g., Mr. Steven Kaploma, Manager, Public Relations and Communication Division; Mr. Leckson Kachala, Head of Technical and Customs Division; Mr. Chimwemwe Kawalewale, Manager, Customs Systems and Procedures; Mr. Timothy Makamba, Deputy Head, Policy, Planning and Research Division), 23 August 2012.

³⁰ E.g., preclearance and prepayment, an authorized economic operator scheme, full application of risk management, single window applications.

4.3 Lobito Corridor³¹

4.3.1 Industrial Development Scenario

(1) Strengths and Potentials

Strengths of the Lobito Corridor are indicated by the industries and products already present along the corridor, which are listed along with their primary locations in Table 4.11.

Table 4.11: Industries and Products along the Lobito Corridor

Country	Industries/Products
Zambia	• mining, wood, and wood products in Copperbelt Province
DRC	• mining (copper and cobalt) in Katanga Province
Angola	• mining (diamond) and agricultural products including cassava, corn, sweet potatoes, and yam in Lunda South Province. • tourism and handicraft manufacturing in Malange Province.

Source: JICA Study Team

Table 4.12 provides examples of major recent and planned investments along the corridor. These include the advantageous industries and products described above, and other potential areas and industries such as steel products, sugar, and textiles.

Table 4.12: Examples of Major Investments along the Lobito Corridor

Project/ Enterprise	Description	Industry/Sector
Lumwana Copper Mine	See the comparable table in the Nacala Corridor section.	Copper mining
Universal Mining and Chemical Industries Ltd. (UMCIL)	See the comparable table in the Nacala Corridor section.	Manufacturing (steel products)
Tenke Fungurume Mine	The Tenke Fungurume copper/cobalt deposits, located in Katanga Province, DRC, comprise one of the world's largest known copper/cobalt resources. The mining project is a partnership led by Freeport-McMoran Copper and Gold, the Lundin Mining Corporation, and the government of the DRC, through Gécamines. It entails the development of open pit copper/cobalt ore mines and the construction and operation of an ore processing plant with a production capacity of 115,000 tons per annum of copper cathode and 8,000 tons per annum of cobalt metal. Production of copper cathode commenced in March 2009.	Copper/cobalt Mining and processing
Sugarcane processing plant	Marubeni Corporation of Japan received an order from the Government of Angola to build a sugar and ethanol production unit, valued at USD 650 million. The Marubeni Group will build a turnkey factory and be responsible for the factory design, procurement of materials, civil engineering, procurement and installation of equipment, and operation trials.	Agro-processing (sugarcane)
Refriango group	The Refriango Group of Angola is to establish a sugar plant in Ebo municipality in Cuanza Sul Province in an area of 10,000 ha. The project is valued at USD 82.3 million.	Agro-processing (sugar)

³¹ See subsection 4.3.2 for the definition of the Lobito Corridor used in this study.

Project/ Enterprise	Description	Industry/Sector
Reestablishment of the textile industry	Marubeni Corporation has been contracted to carry out this project, with financing of USD 1.15 billion dollars for the rehabilitation and upgrade of three textile plants in Luanda, Benguera, and Dondo.	Manufacturing (textiles)
Exploration for ornamental stone	More than 5,000 m ³ of black granite were extracted in Huíla Province. The companies involved included Rodang, Metarrochas, Agostone, Galiangol, Marsec Angola, Angola Stone, Extrom, and Maril.	Mining (ornamental stone)

Sources: (i) Freeport-McMoran Copper and Gold; (ii) European Investment Bank; (iii) Infrastructure Partnerships for African Development (iPAD) Angola; and (iv) various sources on the internet

(2) Priority Industries/Products in Relevant Policies and Strategies

Priority industries and products specified in relevant policies and strategies along the Lobito corridor are shown in Table 4.13. The three countries have been trying to diversify their industrial structure from one that is mineral resource dependent to one that is more agriculture based.

Table 4.13: Examples of Policies and Strategies Related to the Lobito Corridor

Country	Relevant Policies and Strategies
Zambia	<ul style="list-style-type: none"> • Sixth National Development Plan, 2011–2015. The SNDP identifies industrial potentials in the regions along the Lobito Corridor, including the Copperbelt Province, which remains highly dependent on the mining sector. The goal is to diversify the economic base from mining to agriculture, forestry, and manufacturing. • Multi-Facility Economic Zones. One MFEZ is under construction in the Copperbelt Province, where an industrial park will also be established.
DRC	<ul style="list-style-type: none"> • Medium-Term Programme 2007–2011. The programme recognizes the comparative advantage of the DRC in terms of (i) macroeconomic situation, (ii) abundance of natural resources, and (iii) size of territory. Based on this comparative advantage, it defines the main areas for private sector growth, including: (i) the agro-food sector (e.g., dairy and fish products, sugar, rice, flour, fruit, juice), for which domestic demand is high; (ii) the processing of wood (e.g., plywood); (iii) industrial products (e.g., building materials, metallurgy); and (iv) exploitation of natural resources (e.g., potash, diamonds).
Angola	<ul style="list-style-type: none"> • Plan for Sustainable Development 2009–2013. This is the national development plan of Angola, which includes the acceleration of industrial development as one of its main objectives. The plan identifies the following priority sectors and includes specific targets for each: agriculture, animal breeding and forestry, fishing, the minerals sector, petroleum and gas, tourism, commerce, processing industries and civil construction and related services. • Industrial Development Hubs. The Government of Angola plans to establish industrial development hubs in all 18 provinces of the country, and the 11 sites have already been identified for the creation of such hubs. Along with this plan, there are projects for the creation of infrastructure to set up industrial plans, with the construction of roads, sidewalks, sewerage systems, electricity, and telecommunications in the six industrial hubs (Bom Jesus, Catumbela, Caala Futila, Lucala, and Viana), as well as projects to construct industrial condominiums in the other five industrial hubs (Dondo, Kunje, Matala, Soyo, and Uige).

Abbreviations: MFEZ = multi-facility economic zone, SNDP = Sixth National Development Plan
Sources: (i) AfDB; (ii) SADC; (iii) ANIP (National Agency of Private Investment), “How to Investment in Angola”, May 2012; (iv) various news sources on the internet

(3) Potentials Indicated by Other Sources

A prefeasibility study of on the Lobito Corridor conducted by the International Conference on the Great Lakes Region suggests a huge potential for agricultural development along the Lobito Corridor.³² In Zambia, potential in “engineering products” (copper fabrication and iron/steel) has been identified by JICA.

Table 4.14: Examples of Other Development Potentials along the Lobito Corridor

Potential	Description
Agriculture in Angola, the DRC, and Zambia	As the corridor passes through one of the most agriculturally rich areas of the country, the land has the potential for commercial farming and cattle ranching. The Corridor still has huge plantations of eucalyptus and pine. These natural resources wait to be exploited to further promote crop production and development of agro-industries in the area. Both the Katanga Province and the Zambia Copperbelt also have potential for agriculture.
Engineering products in Zambia	As a part of “Zambia Investment Promotion Project- Triangle of Hope (ZIP-ToH)” conducted by JICA since 2006, “Industrial Strategy for Engineering Products” was formulated for value addition of mining industry and diversification of economy.

Sources: (i) International Conference on the Great Lakes Region, *Regional Programme of Action for Economic Development and Regional Integration: Project No. 3.3.3: Lobito Corridor Project (Prefeasibility Study)*, March 2006, amended in August 2006; and (ii) field survey by the JICA Study Team

(4) Industrial Development Scenario

Industrial development along the Lobito Corridor is considered from the following three aspects:

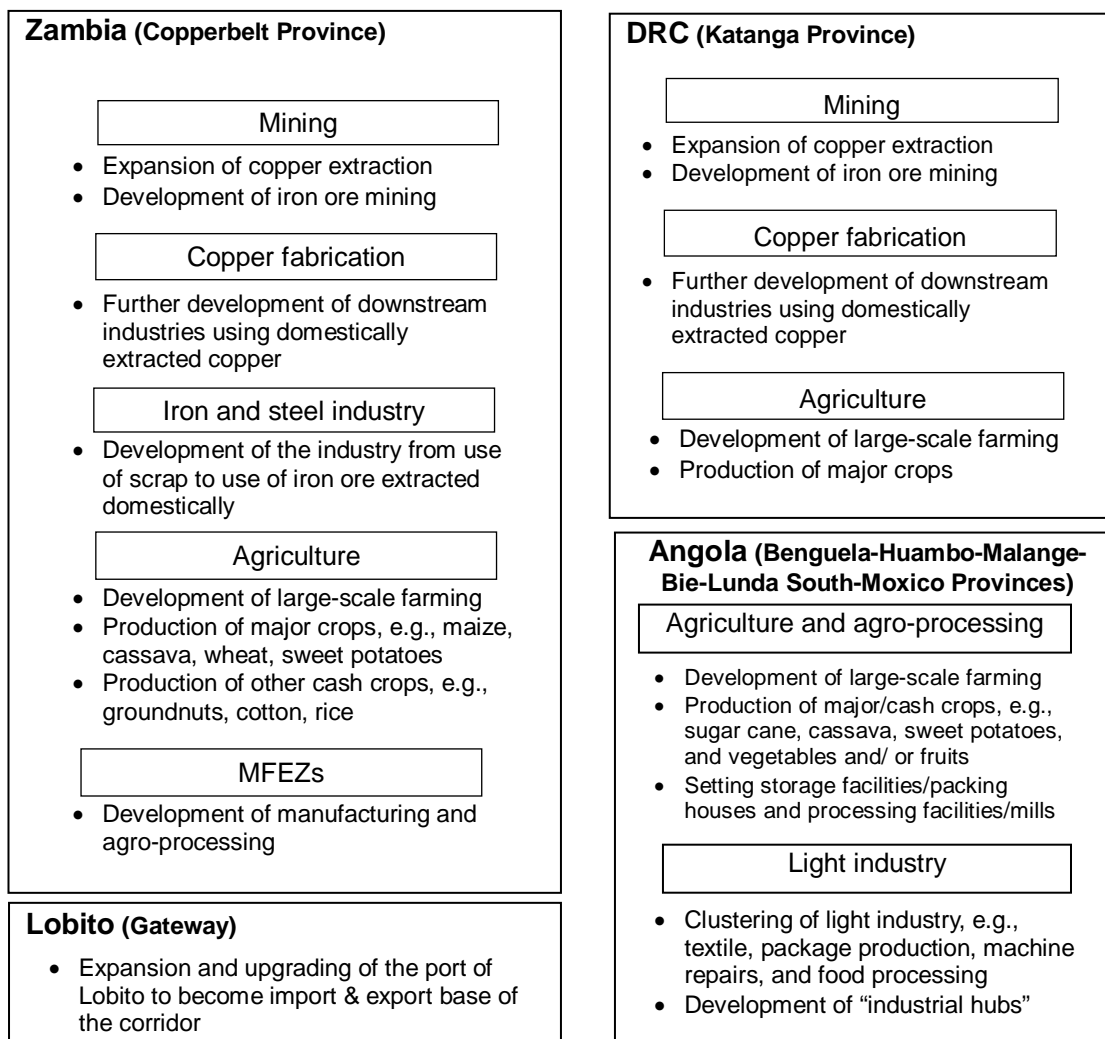
- development of “engineering products” production in the Copperbelt and Katanga area;
- development of agriculture and agro-processing industry along the corridor, particularly in Angola; and
- clustering of light industries in the industrial hubs in Angola.

In the Copperbelt Province in Zambia and Katanga Province in the DRC, which are the copper/cobalt production areas, copper fabrication and iron/steel products (“engineering products”) will be manufactured in MFEZ, industrial park or plants within the area, and the products will be consumed along the industrial hubs in Angola, as well as exported from the Lobito port. For this purpose, the port needs to be expanded and upgraded.

In the industrial hubs in Angola, e.g., Catumbela, Caala, and Kunje, which are located along the Lobito Corridor, light industries including textiles, package production, machine repairs, and food processing, will form clusters and provide products and services mainly for domestic consumption.

The provinces along the corridor in Angola, such as Malanje and Lunda South, or Moxico, which has one of the largest land areas in Angola, will have large-scale commercial farming of sugarcane, cassava, sweet potatoes, and vegetables and/or fruits, with links to smallholder farmers through outgrower (contract farming) schemes. Storage facilities/packing houses and processing facilities/mills will be located near the farms or industrial hubs. The products will be consumed within the country and exported to DRC, as well as from the Port of Lobito.

³² International Conference on the Great Lakes Region, *Regional Programme of Action for Economic Development and Regional Integration: Project No. 3.3.3: Lobito Corridor Project (Prefeasibility Study)*, March 2006, amended in August 2006.



Abbreviation: MFEZ = multi-facility economic zone
Source: JICA Study Team

Figure 4.7: Industrial Development Scenario for the Lobito Corridor

4.3.2 Major Transport Development Issues and Infrastructure Development Scenario(s)

(1) Transport Development Issues

Figure 4.8 presents a map of the Lobito Corridor. As defined here, the Lobito Corridor traverses Kasumbulesa–Kolwesi–Dilolo/Luau–Luena–Lobito.



Legend: blue = roads, purple = railways

Source: <http://www.tmsagis.co.za/>

Figure 4.8: The Lobito Corridor

Bottlenecks along the corridor’s roads include: (i) Kasumbulesa–Kolwesi (poor/potholed – very poor), (ii) Kolwesi–Dilolo/Luau (poor), (iii) Dilolo/Luau–Luena–Kuito (very poor), (iv) Kuito–Lobito (poor), and (v) the long border crossing times (at Kasumabalesa between Zambia and the DRC). Development issues regarding the corridor’s roads include (i) Lobito–Diloli (DRC)–Northern Zambia rehabilitation, and (ii) Kitwe–Jimbe (Angola border) rehabilitation.

Bottlenecks along the corridor’s railways include: (i) Lobito–Luau, which is under rehabilitation with PRC assistance, and (ii) the Dilolo/Luau–Zambia/DRC border section, which is not operational. Development issues regarding the corridor’s railways include (i) construction of a new railway line to connect to the Benguela Railway, and (ii) the ongoing Dilolo (Angola)–Jimbe (Zambia)–Lumwana–Solwezi–Chingola rail link (the North-Western Railway).

Bottlenecks at the Port of Lobito include minimal exports (90% of the traffic consists of imports) and the missing road and railway links inland. There is a large-scale master plan for development of the port.

(2) Transport Infrastructure Development Scenario(s)

With minimal exports and a number of missing road and railway links, a “wait and see” approach may be suitable for the Lobito Corridor. Over the mid-term, it is envisaged that exports via this corridor will increase, including mineral resources from the Copperbelt in the DRC and Zambia, and products from southern DRC and the region along the corridor in Angola.

4.3.3 Power Development Issues and Development Scenario(s)

(1) Zambia

Power Supply Capability

Please refer to the description for Dar es Salaam Corridor above.

Grid Accessibility

The corridor is traversed by 3 cct 300 kV, 4 cct, and 2 cct transmission lines through Lusaka, Kabwe, Kitwe, and Chingla (on the border with the DRC).

Since there are 300 kV substations at Lusaka, Kabwe, Kitwe, and Chingla, reliable power can be secured in the area.

(2) Angola

Power Supply Capability

In 2011, peak demand and available generation capacity were 990 MW and 870 MW, respectively. Committed additional power generation accounts for 260 MW. However, there is no additional initiative in the list of SADC priority projects. Power supply capability is insufficient for the medium to long term.

Grid Accessibility

While there is a grid between Lobito and Huambo along the corridor, it is not operated at present. Grid accessibility is available only in the Lobito area.

4.3.4 Water Sector Development Issues and Infrastructure Development Scenario(s)

(1) Water Sector Development Issues

The Lobito Corridor connects the Port of Lobito in Angola with the DRC/Zambian Copperbelt; the corridor connects with the Dar es Salaam and North-South Corridors at Kabwe and Lusaka. Water supply and sanitation infrastructure in Zambia (and Angola, which was not visited during the first field survey for this study) is old and malfunctioning because of a lack of investment over a long period. Ndola, located in the Copperbelt, is Zambia's third-largest city with a population of 483,000.

The Sixth National Development Programme of Zambia (2011–2015) identified safe water development and sustainable water supply in urban and peri-urban areas as an important strategy. It proposed water supply rehabilitation projects in 10 cities. In response to a request by the Government of Zambia, the Government of Japan has provided grant aid to implement a Project for the Improvement of Water Supply Condition in Ndola City.³³ The exchange of notes for the project between the two governments was signed in June 2011, and the project is scheduled to be completed in 2015.

Major development issues for the Lobito Corridor in the water sector include: (i) high non-revenue water and water losses in municipal water supply, which are among the major issues in water supply in the region as described in Appendix H, resulting mainly from inadequate operation and maintenance of water supply systems causing the deterioration of water supply facilities³⁴; and (ii) a shortage of water supply (with water available for less than 24 hours).

³³ The grant for this project is JPY 2,116 million, with implementation from June 2011 to June 2015. With the Kafubu Water Supply and Sewerage Company as executing agency, the project aims to facilitate the repair and expansion of water supply facilities in Ndola City in Copperbelt Province, involving: rehabilitation of the Kafubu water treatment plant.; repair of the main transmission/distribution pipelines, construction of water kiosks in residential areas with inadequate access to water, installation of water quality analysis equipment, and implementation of a "soft component" for operation and maintenance of these facilities.

³⁴ Addressing the issue of high non-revenue water and water losses will contribute not only to increasing water supply cost effectively but also to the effective and efficient development of water resources to meet water demand in the longer term.

(2) Water Sector Infrastructure Development Scenario(s)

Development directions for the Lobito Corridor in the priority subsector (water supply) over the short term include formulation of a project for improvement of the Ndola city water supply system.³⁵

4.3.5 Transport/Trade Facilitation (Soft Issues)

There has been little discussion of soft issues along the Lobito Corridor in the literature and Angola was not visited during the first field survey during this study.

The main border crossing along the Lobito Corridor is **Luau–Dilolo** between Angola and the DRC. There is an opportunity for an alternative crossing between these countries at **Jimbe**, and there is a border crossing between Angola and Zambia at **Caripande–Chavuma**. There may be scope for designing OSBPs at one or more of these BCPs because they have not been fully functional since the road and rail networks have not been operational.³⁶ Also, introduction of CBM would provide benefits when traffic along the corridor materializes.

4.4 Maputo Corridor³⁷

4.4.1 Industrial Development Scenario

(1) Strengths and Potentials

Strengths of the Maputo Corridor are indicated by the industries and products already present along the corridor, which are listed along with their primary locations in Table 4.15.

Table 4.15: Industries and Products along the Maputo Corridor

Country	Industries/Products
Mozambique	<ul style="list-style-type: none"> aluminum production in Maputo
South Africa	<ul style="list-style-type: none"> automobile production in Durban and Gauteng Provinces agriculture products including citrus and tropical fruits in Limpopo Province precious metals including diamonds, gold, and platinum in Limpopo Province coal, ferrochrome, and nickel mining in Mpumalanga Province

Source: JICA Study Team

The major investments along the Maputo Corridor are so-called megaprojects, which relate to mineral resources along the corridor. Table 4.16 provides examples of major recent and well-known investments along the corridor.

Table 4.16: Examples of Major Investments along the Maputo Corridor

Project/ Enterprise	Description	Industry/ Sector
Mozar Aluminum Smelter	The USD 2.8 billion aluminum smelter projects Mozal I and II are in the Matola District in Mozambique. The firm is a joint venture of the Australian-British BHP Billiton mining company, Mitsubishi Corporation of Japan, the Industrial Development Corporation of South Africa, and the Government of Mozambique. The smelters produce about 506,000 tons of aluminum ingots per year.	Aluminum production

³⁵ In implementing the initiatives to improve water supply, it is also important to take appropriate actions to improve sewerage systems in major cities along the corridor.

³⁶ SADC, *The SADC Regional Infrastructure Development Master Plan, Sub-Sector Plan, Border Posts*, 2012, p. 20.

³⁷ See subsection 4.4.2 for the definition of the Maputo Corridor used in this study.

Project/ Enterprise	Description	Industry/ Sector
Beluluane Industrial Park/Matola Industrial Zone	This industrial park/zone is located across from Mozal, It has attracted 22 businesses employing some 1,000 workers and has generated USD 20 million in investment. More recently, a USD 50 million steel tube factory – a joint venture of South African, Chinese, and Mozambican companies – was established.	Manufacturing (including steel production) and manufacturing related services
Sasol Natural Gas Pipeline Project	This USD 2.1 billion project was undertaken by Sasol of South Africa, in a joint venture with Empresa Nacional de Hidrocarbonetos (ENH), a wholly owned company of the Government of Mozambique and the Government of South Africa. It extracts natural gas from the Temeane and Pande gas fields in Mozambique and transport the gas via a pipeline to Sasol's facilities in Secunda. The natural gas production started in 2004.	Natural gas and chemicals
Nkomati Nickel Project.	The Russian company Norilsk Nickel acquired a 50% interest in the Nkomati joint venture in 2007. Nkomati is located in Mpumalanga Province and is the only primary nickel producer in South Africa. The extracted ore is processed at its own concentrator using the traditional sulfide flotation technology.	Nickel production

Sources: (i) World Bank, *Prospects for Growth Poles in Mozambique*, August 2010; and (ii) various sources on the internet

(2) Priority Industries/Products in Relevant Policies and Strategies

Although there are no specific policies and strategies that directly focus on the Maputo Corridor, the general industrial policy and policy frameworks of Mozambique and South Africa suggest sectors with development potential along the corridor. As shown in Table 4.17, these include: (i) food processing and agro-industries; (ii) import substitution for metals, chemicals, and construction material (Mozambique); (iii) downstream mineral beneficiation; (iv) agriculture and agro-processing; and (v) ICT services, engineering, construction, and mining services.

Table 4.17: Examples of Policies and Strategies Related to the Maputo Corridor

Country	Relevant Policies and Strategies
Mozambique	Industrial policy of the government, 2007–11. The national industrial policy focuses on food processing and agro-industries and identifies salt, sugar, copra, processed fish, processed fruit, and cashew nuts as key manufacturing priorities. The policy also recommends several selective industrial policy measures, including the promotion of import substitution for the metals, chemicals, and construction materials industries, as well as the development and the strengthening of free zones.
South Africa	National Industrial Policy Framework, 2007. The NIPF indicates five sectoral groupings in which it is anticipated that many industrial growth and employment opportunities lie. These include: (i) natural resource based sectors; (ii) medium technology sectors (including downstream mineral beneficiation); (iii) advanced manufacturing sectors (automotives, aerospace, electronics, and nuclear energy); (iv) labor-intensive sectors (agriculture and agro-processing); and (v) trade service sectors (e.g., business process outsourcing, ICT services, engineering, construction and mining services and film)

Abbreviations: ICT = information and communication technologies, NIPF = National Industrial Policy Framework
Sources: (i) World Bank, "Prospects for Growth Poles in Mozambique", August 2010; (ii) Matthias Krause and Friedrich Kaufmann, "Industrial Policy in Mozambique", 2011; and (iii) Department of Trade and Industry, Republic of South Africa, *National Industrial Policy Framework*, 2007.

(3) Potentials Indicated by Other Sources

The World Bank has observed that the Maputo Corridor in South Africa traverses many areas with industries and primary production that may be effectively promoted by development of the corridor (e.g., Nkangala District Municipality, which is an important center for South Africa’s coal, vanadium, and stainless steel mining and production, as well as for maize production). The World Bank also noted that capital-intensive or megaprojects along the corridor have not yet realized their full potential.³⁸

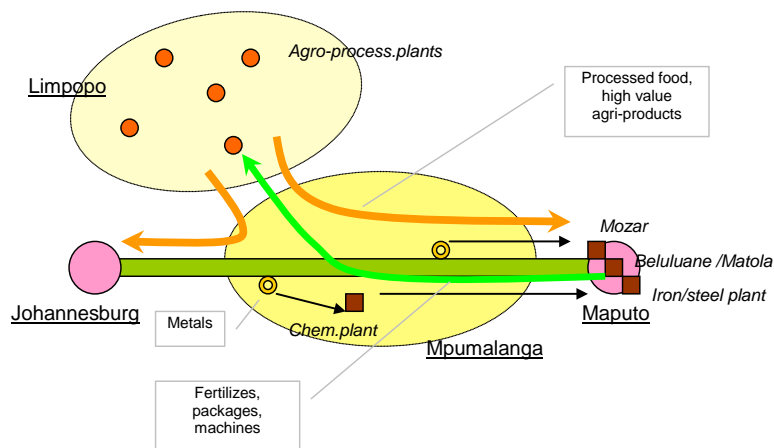
(4) Industrial Development Scenario

The industrial development scenario along the Maputo Corridor (summarized in Figure 4.9 and 4.10) will need to focus on the following two aspects:

- development of potential industries in three areas (provinces): Limpopo (South Africa), Mpumalanga (South Africa), and Maputo; and
- realization of the full potential of megaprojects (Mozar, the Matola Industrial Zone / Beluluane Industrial Park, and Sasol).

The main industries in the two provinces in South Africa (mining, agriculture) need to be developed with a linkage with processing industries. Mining has the vast potential to create jobs when the platinum group metals are actively utilized. These and other metals produced in Limpopo and Mpumalanga Provinces would be utilized and/or processed in the chemical plants and/or iron and steel plants along the corridor. The current plants of the megaprojects and newly established plants besides the megaproject sites³⁹ will be he linked with those mining sites via roads and railways along the corridor.

In the same way, agricultural production needs to put weight on high-value horticultural crops (fruits and vegetables) and to be linked with processing, but processing plants will be placed by “cluster” within districts. On the other hand, fertilizers, package materials, agricultural machinery, and other relevant inputs will be provided from the industrial zone/park in Maputo, where other light industrial plants will be located (e.g., textiles and garments, footwear, and plastics).

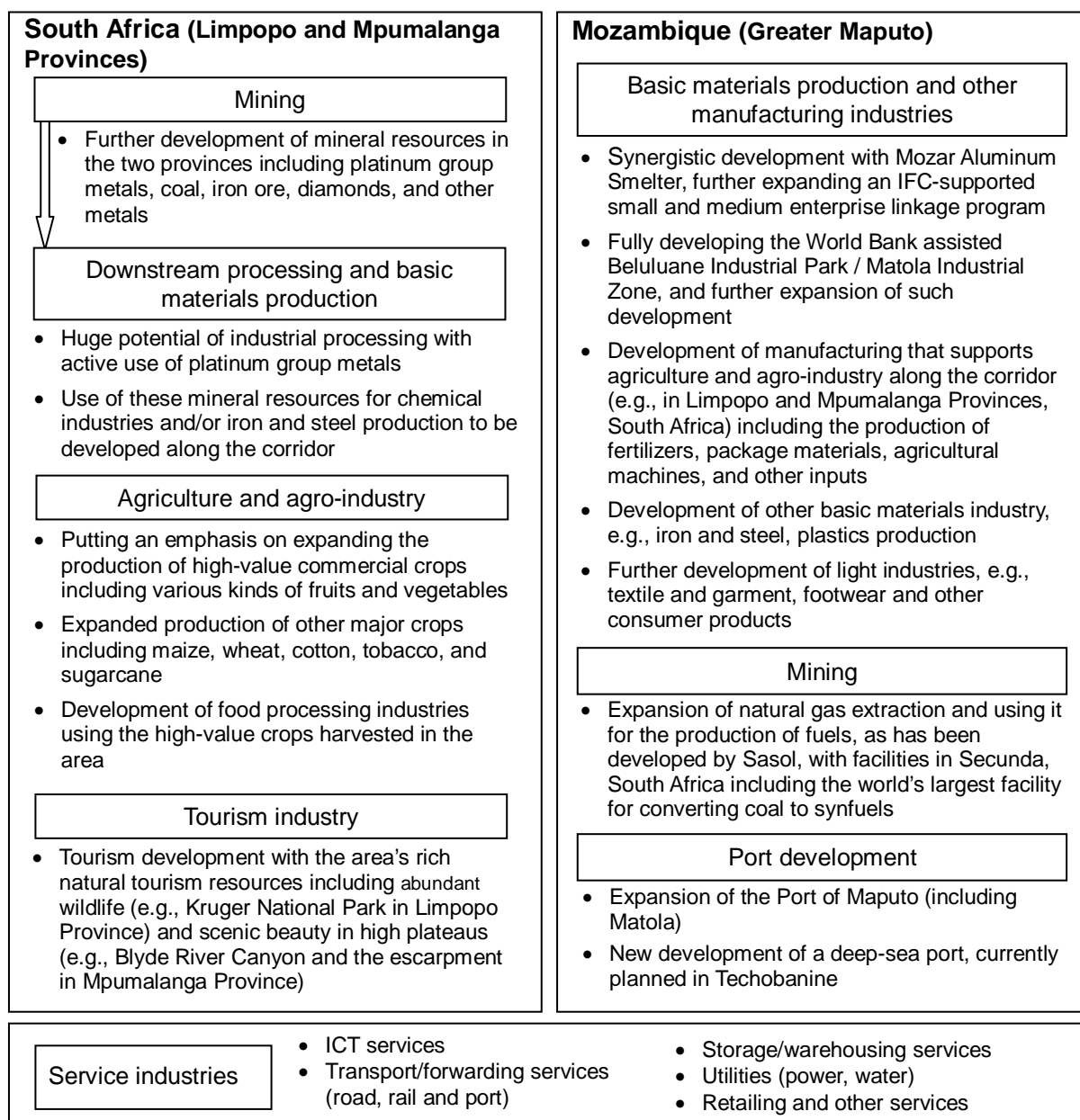


Source: JICA Study Team

Figure 4.9: Spatial Concept of Industrial Development for the Maputo Corridor

³⁸ World Bank, *Prospects for Growth Poles in Mozambique*, August 2010;

³⁹ The Motola–Phalborwa Iron and Steel Initiative envisages establishment of one or more iron and steel plants in Maputo.



Source: JICA Study Team

Figure 4.10: Industrial Development Scenario for the Maputo Corridor

4.4.2 Major Transport Development Issues and Infrastructure Development Scenario(s)

(1) Transport Development Issues

Figure 4.11 presents a map of the Maputo Corridor railway and roads, respectively. As defined here, the corridor links (i) Pretoria/Johannesburg–Maputo, (ii) Swaziland–Maputo, and (iii) the Limpopo Corridor (Zimbabwe–Maputo).



Figure 4.11: The Maputo Corridor

Bottlenecks along the corridor’s roads include congestion in the sections between Johannesburg and Pretoria, and between Maputo and Matola during the morning and evening peaks (a JICA study of the latter section is ongoing). Development issues regarding the corridor’s roads include: (i) countermeasures for the congestion; and (ii) development of a dry port at the Lebombo–Ressano Garcia border crossing (a medium-term project in the SADC regional infrastructure master plan).

Concerning the Port of Maputo, congestion of the access road to the port is a bottleneck. Development issues include (i) a port master plan for expansion to maintain competitiveness vis-à-vis the Port of Richards Bay, and (ii) development of a new port at Techobanine.

(2) Transport Infrastructure Development Scenario(s)

In the short term, the Port of Maputo will handle more freight to/from South Africa, due to: (i) the introduction of Panamax (i.e., more than 50,000 dwt) vessels at the port, (ii) ongoing expansion of port facilities, and (iii) (already) increasing demand from the Limpopo Corridor.

Over the mid to long term, the Maputo Corridor is expected to become more active, due to (i) recovery of the economy of Zimbabwe, (ii) the recovery of agricultural products in the Limpopo region, which has historically been a “breadbasket”, and (iii) an increase in mineral production, including coal from Botswana and Zimbabwe, and ferrochrome from northern Southern Africa.

4.4.3 Water Sector Development Issues and Infrastructure Development Scenario(s)

(1) Water Sector Development Issues

The Maputo Corridor connects the Port of Maputo in Mozambique and Johannesburg in South Africa through the Lebombo–Ressano Garcia border crossing; it intersects with the North-South Corridor at Johannesburg.

The Department of Water Affairs (DWA) of South Africa leads and regulates the country's water sector; its Directorate of Planning and Information oversees and regulates 166 water service authorities in the country. DWA plans and reviews the project of each water service.

Non-revenue water in South Africa is estimated at 36.8%, varying from 20% to more than 50% depending on the operation and management conditions of the municipality.

Irrigation is the largest water use in South Africa (60%), followed by domestic use (27%); industry use accounts for only 3%, with mining and nature conservation use at 2.5%, and power generation at 2.0%. Water is a scarce resource in South Africa and many of the country's water resources are over or fully allocated. It is estimated that water availability will only cover an estimated 200,000 ha for expansion of irrigation schemes.

According to DWA, total available water resources are larger than total water requirements at the national level. However, available water resources do not reach the water requirements in half of the country's water basins. Water requirements are influenced by population and economic activities. The Government of South Africa has proposed a water demand management project in 62 urban centers as its member state priority number one project for SADC water sector infrastructure development.

Although water resources in Mozambique are relatively plentiful, water resources development in the country does not meet requirements. Therefore, the Government of Mozambique proposed a Movene Dam construction project as its member state priority number one project for SADC water sector infrastructure development to store water for human consumption and food security. Maputo Water Supply serves the Greater Maputo area of 1.7 million inhabitants, of which only 40% have access to adequate drinking water. Also, currently the system does not provide a 24-hour supply.

Major water sector development issues for the Maputo Corridor in the priority subsectors (water supply, irrigation, and water resources) may be summarized as follows:

- (i) high non-revenue water and water losses in municipal water supply, which are among the major issues in water supply in the region as described in Appendix H, resulting mainly from inadequate operation and maintenance of water supply systems causing the deterioration of water supply facilities⁴⁰;
- (ii) a shortage of water supply (with water available for less than 24 hours);
- (iii) insufficient available water resources to reach the water requirements in half of South Africa's water basins; and
- (iv) insufficient water resources development to meet the water requirements of Mozambique, even though such resources are relatively available.

⁴⁰ As noted, addressing the issue of high non-revenue water and water losses will contribute not only to increasing water supply cost effectively but also to the effective and efficient development of water resources to meet water demand over the longer term.

(2) Water Sector Infrastructure Development Scenario(s)

Development directions for the Maputo Corridor in the priority subsectors over the short term include implementation of a project to reduce non-revenue water and water losses in the capital city through the introduction of district metered areas (DMAs) for the water supply areas, detailed investigations of current conditions and problems, and the preparation of an investment program for facility improvement (a capacity development project).⁴¹

Development directions for the Maputo Corridor over the long term include:

- (i) storing water for water supply, irrigation, and livestock use, contributing to socioeconomic development, poverty reduction, and food security in Mozambique (an investment project);
- (ii) monitoring of cross-border flows of the Incomi River (an investment project); and
- (iii) increasing crop productivity, reducing water losses, and increasing the efficiency and productivity of existing small-scale irrigation and rainfed systems (an investment project).

4.4.4 Power Development Issues and Development Scenario(s)

(1) Mozambique

Power Supply Capability

Since the power grid of Maputo is not connected to HCB, the power supply is insufficient even with imports from South Africa. Mozambique has applied for the official development assistance (ODA) loan from Japan for the Maputo 110 MW Combined Cycle Gas Turbine (CCGT), with completion expected by 2018.

IPPs are planning to proceed with gas turbine plants, including a 140 MW by a joint venture of Electricidade de Mozambique (EdM) and Sasol, a 100 MW plant by a joint venture of Gigawatt and private companies in Mozambique, and a 107 MW plant by Aggreko Plc to serve peak demand. When these projects are completed, power supply capability will be sufficient for the medium term.

A Mozambique regional transmission backbone (AC 400 kV and DC 500 kV having transmitting capacity of 900 MW and 2,650 MW, respectively) is planned to transmit the power to be generated in Tete Province. The HCB North Bank Hydropower Plant (1,245 MW), the Mphanda Nkuwa Hydropower Plant (1,500 MW), the Benga Coal Thermal Power Plant (600 MW initially), and the Moatize Coal Thermal Power Plant (300 MW initially) are planned, to serve the Maputo area and South Africa. After completion of these projects, the Maputo area will have sufficient power supply capacity.

Grid Accessibility

Since there are 220 kV transmission lines and substations along the corridor, it is easy to access power everywhere along the corridor at present.

⁴¹ In implementing the initiatives to improve water supply, it is also important to take appropriate actions to improve sewerage systems in major cities along the corridor.

(2) South Africa

Power Supply Capability

In 2011, peak demand and available generation capacity were 36,444 MW and 41,074 MW, respectively, which means that the power supply capability was almost balanced with the peak demand plus required capacity for stable power system operation, taking a 10% margin into account ($36,444 \text{ MW} \times 110\% = 40,088 \text{ MW}$). At present, Eskom is constructing the Kusile coal Thermal Power Plant ($800 \text{ MW} \times 6 \text{ units} = 4,800 \text{ MW}$) to be commissioned in 2014 to 2018 unit by unit, the Medupi coal Thermal Power Plant ($800 \text{ MW} \times 6 \text{ units} = 4,800 \text{ MW}$) to be commissioned in 2013 to 2017 unit by unit, the Ingula Pumped Storage Hydropower Plant (1,332 MW) to be commissioned in 2014), and an additional 100 MW.

Grid Accessibility

Since almost all existing coal thermal power stations are located near the Maputo Corridor, strength grids are established. It is easy to access to reliable grids along the corridor.

4.4.5 Transport/Trade Facilitation (Soft Issues)

Implementation of the long-planned⁴² OSBP at **Lebombo–Ressano Garcia** between South Africa and Mozambique is considered of the highest priority to catalyze private investment and develop a sound logistics base for exports.⁴³ The total number of trucks crossing per day is in the range of 150–300, while average border crossing times for freight traffic are about 6–8 hours. This border is also a busy crossing for passengers, with traffic estimated at 1,000 persons per day, but with peaks over 120,000 persons per day (around Christmas and Easter); the movement of passengers was facilitated by the implementation in 2005 of visa-free travel by nationals of the two countries. The governments signed an agreement on a “combined border control post” in September 2007. An initial plan for a ZAR 1.9 billion (about USD 230 million or JPY 1.8 billion equivalent) upgrade was shelved, but a freight bypass road has been developed, allowing for freight to be cleared in a one-stop operation at a freight clearance center at Km 7 on the South African side (thus only a handover of documents is necessary at the border), and the process is replicated at a freight facility at Km 4 on the Mozambique side. In addition, a separate passenger facility has been constructed. In August 2012 the Lebombo–Ressano Garcia OSBP project was included in the SADC Regional Infrastructure Master Plan (TR/MSP 20) at an estimated total cost of USD 8 million. Also at about that time (July 2012), USAID’s Southern Africa Trade Hub conducted a border operations assessment at Ressano Garcia.⁴⁴ Full implementation of the OSBP is now expected by mid-2013. Mozambique has already ratified the bilateral agreement for OSBP operation, while the agreement (and its three annexes)⁴⁵ await ratification by the South African Parliament and incorporation into the country’s domestic laws, as required by Section 231(2) of the country’s constitution.⁴⁶ Another outstanding issue is the extension of the border operating hours from 18 to 24 hours per day (to match the round-the-

⁴² Lebombo–Ressano Garcia was designed as a OSBP more than 15 years ago. The Maputo Corridor Logistics Initiative (MCLI) was launched in 2004 as a public-private partnership organization with members from Mozambique and South Africa and is considered a good-practice example in SADC.

⁴³ See, e.g., World Bank, *Mozambique: Reshaping Growth and Creating Jobs through Trade and Regional Integration, Country Economic Memorandum*, March 2012, pp. 23, 58.

⁴⁴ AECOM International Development, *Technical Report: Ressano Garcia Border Operations Assessment Report*, submitted to the USAID/Southern Africa and Southern Africa Trade Hub, September 2012.

⁴⁵ The annexes (i) provide a methodology for designating and delimiting all areas; (ii) allow for the joint control and management of border activities; and (iii) clarify the exercise of authority and power within these areas, and address ownership, management, and maintenance of shared infrastructure.

⁴⁶ Once incorporated into South African law, it is envisaged that the legal framework will serve as the model for OSBPs with Botswana, Lesotho, Namibia, Swaziland, and Zimbabwe.

clock operations at the port of Maputo), which also requires approval by the South African Parliament and is being addressed separately.⁴⁷

A related development is the implementation of an electronic single window in Mozambique, in the port of Maputo in April 2012, and at Ressano Garcia in September 2012, and eventually countrywide.⁴⁸

Going forward, efforts at transport/trade facilitation along the Maputo Corridor may include implementation of CBM (and related policy and regulatory framework interventions)⁴⁹ at Lebombo-Ressano Garcia,⁵⁰ building upon the assistance provided by the USAID Southern African Trade Hub, to complement implementation of the OSBP at this BCP.

4.5 Nacala Corridor⁵¹

In examining the development potentials for the Nacala Corridor, much information was drawn from preliminary output of the JICA-assisted Project for Nacala Corridor Economic Development Strategies, which was undertaken concurrently with this study.⁵² Readers of this report are advised to refer to the final output of the Nacala Corridor project once it is available, especially for more detailed development strategies proposed for the corridor within Mozambique.

4.5.1 Industrial Development Scenario

(1) Strengths and Potentials

Strengths of the Nacala Corridor are indicated by the industries and products already present along the corridor, which are listed with their primary locations in Table 4.18.

⁴⁷ See, e.g.: (i) Briefing by Commissioner of the South African Revenue Service on behalf of the Border Control Operational Coordinating Committee to the Standing Committee on Finance on the Bilateral Legal Framework between South Africa and Mozambique, 13 June 2012; and (ii) Cayley Bowland and Lisa Otto, *Implementing Development Corridors: Lessons from the Maputo Corridor*, South African Foreign Policy and African Drivers Programme, South African Institute of International Affairs, August 2012; (iii) COMESA, EAC, SADC, and TradeMark Southern Africa, *Infrastructure Components of the North-South Corridor*, 2010, pp. 13–14; and (iv) *Legal Issues Related to the Operationalization of the Lebombo-Ressano Garcia One-Stop Border Post*, prepared for the Regional Trade Facilitation Programme (RTFP), UK Department for International Development, October 2009.

⁴⁸ See, e.g., Mozambique Community Network, S.A., *Mozambique's Experience in Establishing a National Single Window*, presented at USAID/World Customs Organization Trade Facilitation Conference, Johannesburg, 10 September, 2012.

⁴⁹ E.g., preclearance and prepayment, an authorized economic operator scheme, full application of risk management, single window applications. Upscaling of the Mozambique single window system to a regional system is another possible area of assistance.

⁵⁰ While the USAID/Southern Africa assessment found that there is already a high level of coordination and teamwork at the Ressano Garcia border crossing point, there remains scope for improved coordinated border management, e.g., focusing on process flows. See, e.g., Interview with Ms. Barbara Mommen, Chief Executive Officer, Maputo Corridor Logistics Initiative, 9 November 2012.

⁵¹ See subsection 4.5.2 for the definition of the Nacala Corridor used in this study, which includes the Tete area in Mozambique (though the area is also defined as part of the Beira Corridor) considering that some of the (potential) industries in Tete Province are related to the development of the Nacala Corridor (e.g., one major commodity to be transported along the corridor will be the coal produced in Tete Province). The ongoing JICA-assisted Project for Nacala Corridor Development Strategies also includes Tete Province (in addition to the provinces along the corridor) as part of the study area.

⁵² Specifically, the JICA Study Team referred to a progress report of this JICA-assisted Nacala Corridor project; it was first issued in September 2012 and revised in November 2012.

Table 4.18: Industries and Products along the Nacala Corridor

Country	Industries/Products
Mozambique	<ul style="list-style-type: none"> • agricultural products including cassava, maize, sorghum, cashews, sesame, and cotton in Nampula Province • sisal and sisal processing in Nampula Province • agricultural products including sunflowers, soybeans, cotton, and jatropha (for biofuel) in Zambezia Province, which was once known as the “breadbasket” of Mozambique • industrial tree planting in Niassa Province
Malawi	<ul style="list-style-type: none"> • agricultural products including potato, cassava, maize, tobacco, and sugarcane
Zambia	<ul style="list-style-type: none"> • agricultural products including maize, soya beans, sweet potatoes, and wheat in the Central Province • agricultural products including groundnuts, tobacco, and sunflowers in the Eastern Province • manufacturing and agro-processing in Lusaka Province • mining, wood, and wood products in Copperbelt Province

Source: JICA Study Team

Table 4.19 summarizes investments along the Nacala Corridor. In Mozambique, in addition to the large mining projects in Tete Province (including those of Vale, Riversdale, and Revuboè), investments have been made in agriculture and agro-processing, forestry and wood processing, mining, oil refining, and various manufacturing and service businesses in the Nacala SEZ. In Zambia, major investments have been made in mining and related industries.

Table 4.19: Examples of Major Investments along the Nacala Corridor

(i) Agriculture Sector Investments along the Nacala Corridor in Mozambique

Category	Province	Number of Projects	Investment (USD)	Employment	Area (ha)	Development (District)
Agriculture	Niassa	1	4,050,000	100	14	Cotton industry
	Zambézia	1	1,000,000	179	5,000	Cotton
	Sub-total	2	5,050,000	279	5,014	
Agriculture-Food	Nampula	2	500,000	126	4,300	
	Niassa	1	331,195	114	650	
	Tete	4	210,400,000	1,305	36,000	Sugarcane, cotton (Mutarara)
	Sub-total	7	211,231,195	1,545	40,950	
Agriculture-Livestock	Cabo Delgado	3	2,180,250	313	15,414	
	Nampula	1	2,816,487	265	580	
	Niassa	2	7,496,200	116	8,015	(Mandimba)
	Sub-total	6	12,492,937	694	24,009	
Biofuel	Cabo Delgado	5	11,490,000	210	23,821	Palm oil (Nangade)
	Nampula	2	20,191,369	405	250,050	Jatropha (Nacala Velha)
	Niassa	1	400,000	384	8,789	Jatropha (Majune)
	Zambezia	4	42,059,296	8,503	36,000	Jatropha (Lugela)
	Sub-total	12	74,140,665	9,502	93,660	
Industry	Nampula	1	-	-	5,000	Sisal and sisal processing (Mecuri, Monapo)
	Sub-total	1	-	-	5,000	
Oil	Nampula	2	65,850,000	674	35,000	Castor, soybeans, sunflowers, sesame, etc. (Ribaue, Malema, Murrupula, Muecate, Meconta)
	Zambezia	1	17,439,440	1,148	23,000	Sunflowers, soybeans, etc. (Gurue)
	Sub-total	3	83,289,440	1,822	58,000	
	Sericulture	Zambézia	1			500
	Sub-total	1			500	
Total		29	386,204,237	13,842	227,133	

Source: JICA, *Project for Nacala Corridor Economic Development Strategies in the Republic of Mozambique, Progress Report (Revised Edition)*, November 2012, Table 4.1.8, p. 4-9

(ii) Investments in Industrial Tree Planting along the Nacala Corridor in Mozambique

Province	Company	Area (ha)	Tree Species	Investors
Cabo Delgado	MedEnergy	10,000	Palm	MedEnergy of Italy
	Sub-total	10,000		
Nampula	Lurio Green Resource	126,000	Eucalyptus, pine, acacia	Green Resources (Norway) and Norwegian Fund
	Sub-total	126,000		
Niassa	Chikweti	140,000	Eucalyptus, indigenous species	DITH (USA), GSFF (Sweden), Fundação Universitária, Sociedade de Móveis de Licungo, Diocese de Niassa.
	Florestas de Niassa	210,000	Eucalyptus, pine	Rift Valley Forestry, Malonda Foundation
	Florestal de Messangulo	100,000	Eucalyptus, pine	GSFF
	New Forests	87,000	Eucalyptus, pine	New Forests Company (UK)
	Green Resources Niassa	42,330	Eucalyptus, pine	Green Resources (Norway)
	Florestas do Planalto	165,700	Eucalyptus, pine	UPM (Finland)
	Malonda Foundation	80,000	Eucalyptus, pine	Sweden and Mozambique
	Sub-total	825,030		
Zambezia	Portucel	173,327	Eucalyptus	Grupo Portocel/Soporcel (Portugal)
	Ntacua Florestas	57,485	Eucalyptus, pine	GSFF, DITH, Diocese de Niassa, other small-scale investors
	Tectona Forests	117,874	Teak	GSFF, DITH, Diocese de Niassa, other small-scale investors
	Winnua, Lda	1,000	NA	NA
	A.T.F.C. Madeiras e Agricultura	116,074	NA	NA
	Sub-total	465,760		
Total		1,426,790		

Abbreviations: DITH = Diversified International Timber Holdings, GSFF = Global Solidarity Forest Fund

Source: JICA, *Project for Nacala Corridor Economic Development Strategies in the Republic of Mozambique, Progress Report (Revised Edition)*, November 2012, Table 4.1.13, p. 4-15

(iii) Examples of Major Investments in Mining (Except for Coal Mining in Tete Province), Manufacturing, and Other Sectors along the Nacala Corridor

Project/ Enterprise	Description	Industry/ Sector
Moma Sands	This project in Mozambique was approved in 2004 and has been operated by the Irish company Kenmare Resources. The investment is expected to total of USD 450 million, with annual production of 612,000 tons of ilmenite, 24,000 tons of zircon, and 12,500 tons of rutile.	Mining (rare metals)
Ary-Petro Nacala	The largest investment megaproject in Nampula (about USD 5 billion) by Ayr Logistics (United States) and Ayr Logistica Limitada. The project plans to establish a refinery plant in Nacala, which is expected to produce over 300,000 barrels of fuel a day.	Oil refinery
Nacala Special Economic Zone	The Nacala Special Economic Zone covers an area of 1,300 km ² and a population of 0.3 million in the Nacala-Velha and port districts. Since its establishment, 44 projects have been approved, totaling USD 400 million, from which about 8,000 jobs are expected to be created.	Service in logistics and trade, and manufacturing (e.g., steel production)
Lumwana Copper Mine	This mine is owned by Barrick Gold of Canada and is the largest copper mine in Zambia. Barrick bought the mine for CAD 7.26 billion and is building new roads, supporting infrastructure, and utilities.	Copper mining
Universal Mining and Chemical Industries Ltd	UMCIL in Kafue is the largest steel maker in Zambia. Since its operations started in 2008, it has been producing long steel products such as deformed bars and round bars and exporting to regional markets.	Manufacturing (steel products)

Project/ Enterprise	Description	Industry/ Sector
Hitachi Construction Machinery Zambia	The company invested USD 15 million to construct and operate a remanufacturing factory near the Lusaka International Airport. The principal aim of the project was to remanufacture (recondition) used parts and components from heavy duty earth moving machineries.	Mining related services
Gezhouba Group Corporation	The PRC state-owned Gezhouba Group Corporation is planning to invest USD 500 million in the construction of a 1,000 MW thermal power plant in the Mwanza district of Malawi near a railway line being constructed by Vale to transport coal from Mozambique via Malawi to ports in Mozambique.	Energy

Sources: (i) World Bank, *Prospects for Growth Poles in Mozambique*, August 2010; (ii) Zambia Development Agency and JICA, *Zambia: Africa's New Frontier for Investments and Profits*, fourth edition, 2012; (iii) Zambia Development Agency, *Sub-Sector Profile: Iron and Steel*, August 2012; and (iv) various sources on the internet

(2) Priority Industries/Products in Relevant Policies and Strategies

Industrial potentials in the regions along the corridor are indicated in the national and provincial plans/strategies of Mozambique and Zambia (see Table 4.20). They include agriculture and agribusiness, tourism, manufacturing, agro-processing, and downstream industries of mining. The Malawi, national export strategy suggests development potential in agro-processing, which may diversify the existing industrial cluster.

Table 4.20: Examples of Policies and Strategies Related to the Nacala Corridor

Country	Relevant Policies and Strategies
Mozambique	<ul style="list-style-type: none"> • Agriculture Sector Development Strategic Plan (PEDSA, Plano Estratégico de Desenvolvimento do Sector Agrário), 2011-2019. The Government of Mozambique developed the PEDSA as a guiding framework to promote agricultural development with a target of achieving average annual agriculture growth of 7%. The strategic objectives (pillars) of the PEDSA include: (i) an increase in productivity and production, and competitiveness, contributing to food security and nutrition; (ii) improvement of the guiding framework and services for more market access; (iii) sustainable use of resources land, water, forests, and fauna; and (iv) strengthening of institutions and organizations for agricultural development. • The Green Revolution Strategy, 2007. This strategy of the government aims at transforming subsistence farming into commercial agriculture with the main focus placed on food production including cereals, oil crops, tubers, and to a lesser extent, poultry production. • Industrial policy of the government, 2007–11. The national industrial policy also focuses on food processing and agro-industries. • Strategic Plan for the Development of the Cabo Delgado Province. The potential industries/products specified in the plan include various agricultural products, livestock, fisheries, forestry, agro-processing, and tourism. • Nampula Provincial Strategy for Development. This provincial strategy includes support programs in specific sectors, including a Program for Agricultural Productivity, a Program for the Expansion of Base Businesses, a Program for Tourism Development, and a Program for Rural Markets. • Strategic Development Plan for the Niassa Province. This plan stresses the importance of developing the Lichinga-Cuamba-Marrupa triangle with an emphasis on forestry and agro-processing industries. • Strategic Plan for the Development of the Zambezia Province. One major focus for economic growth and development stipulated in the plan is to increase production and productivity, particularly in the agricultural sector. • Plan of the Tete provincial government. This plan addresses the reliance of the provincial economy on basic agriculture and limited access to irrigation. In its sector initiatives, strengthening of the minerals, agriculture, fisheries, and tourism sectors are highlighted.

Country	Relevant Policies and Strategies
Malawi	<ul style="list-style-type: none"> • Malawi Growth and Development Strategy II, 2011–2016. MGDSII emphasizes maximizing the contribution of potential growth sectors such as agriculture, mining, and tourism. • National Export Strategy, 2013–2018. As a component of the MGDS II, NES sets two priority areas, including three priority export-oriented clusters for diversification (oil seed products, sugarcane products, and manufacturing), and existing clusters (tobacco, mining, tea, tourism, and services).
Zambia	<ul style="list-style-type: none"> • The Sixth National Development Plan, 2011–2015. SNDP identifies industrial potentials in the regions along the Nacala Corridor as follows: (i) Eastern Province: potential for groundnuts, tobacco, cotton, and rice production; (ii) Central Province: potential for maize, sweet potatoes, and wheat production; (iii) Lusaka Province: comparative advantage in manufacturing and agro-processing; and (iv) Copperbelt Province: diversification of the economic base from mining to agriculture, forestry, and manufacturing. • Multi-Facility Economic Zones. Two MFEZs are planned in Lusaka Province, and one is under construction in the Copperbelt Province, where an industrial park will be also established. • Farm (Farming) block. The Nasanga farm block in the Central Province in one of three farm blocks for which the government is providing and installing basic infrastructure and facilities.

Abbreviations: MFEZ = multi-facility economic zone, MGDSII = Malawi Growth and Development Strategy II, NES = National Export Strategy, SNDP = Sixth National Development Plan

Sources: (i) World Bank, *Prospects for Growth Poles in Mozambique*, August 2010; (ii) Ministry of Economic Planning and Development, Republic of Malawi, *Malawi Growth and Development Strategy II, 2011–2016*, 2012; (iii) Ministry of Industry and Trade, Republic of Malawi, *National Export Strategy 2013–2018*, 2012 (draft); (iv) Ministry of Finance and National Planning, Republic of Zambia, *Sixth National Development Plan 2011–2015*, January 2011; and (v) Zambia Development Agency and JICA, *Zambia: Africa’s New Frontier for Investments and Profits*, fourth edition, 2012.

(3) Potentials Indicated by Other Sources

The agriculture and food sector along the Nacala Corridor in Mozambique has been actively supported by a number of international development partners as shown in Table 4.21. The potential of tourism development in Nampula Province has also been identified in studies sponsored by the World Bank and USAID. Furthermore, noteworthy potential in “engineering products”, i.e. copper fabrication and iron/steel products in Zambia has been presented by the JICA project.

Table 4.21: Examples of International Cooperation Projects for Industrial Development along the Nacala Corridor

(i) Ongoing Agricultural Projects along the Nacala Corridor in Mozambique

Province	Partner	Name of Project	Period
Cabo Delgado	Canada	Enhancing Food Security and Increasing Incomes in Northern Mozambique	2010 – 2016
Cabo Delgado	Ireland	National Land Registration	1997 – 2016
Cabo Delgado	Japan	Sustainable Production of Biodiesel from <i>Jatropha</i> in Mozambique	2011 – 2016
Cabo Delgado	Spain	Increased and Improved Sustainable and Diversified Production System in Cabo Delgado, Phase II	2012 – 2013
Cabo Delgado	United Kingdom	Community Land Use Fund	2012 – 2013
Cabo Delgado, Nampula	Switzerland	Private Sector-led Rural Growth in Northern Mozambique	2010 – 2013

Province	Partner	Name of Project	Period
Nampula	Switzerland	Orica Mahi: Rural Income Increase and Diversification through Micro Irrigation in Northern Mozambique	2011 – 2012
Nampula	Italy	Development of Family Agricultural in Nacala District and Experimental Cultivation of <i>Artemisia annua</i> in Mozambique, Malawi, and Madagascar	2011 – 2013
Nampula	UNDP	Millennium Villages Alto Molocue	2009 – 2012
Nampula	MCC	Farmer Income Support Project	2008 – 2013
Nampula, Niassa, Zambezia	Japan	Project for Improving Research and Technology Transfer Capacity for Nacala Corridor Agriculture Development	2011 – 2016
Niassa	Ireland	Natural Resources Agriculture Niassa	2012 – 2016
Niassa, Cabo Delgado	IFAD	Rural Markets Promotion Program (PROMER)	2009 – 2015
Tete, Zambezia	EC	Biomass Production Projects	2009 – 2013
Tete, Zambezia	World Bank	Market-led Smallholder Development in the Zambezi Valley	2006 – 2013
Zambezia	Finland	Project for Rural Development	2010 – 2014
Zambezia	Italy	Socio-economic Development of Gilé District, Zambesia Province	2007 – 2013
Zambezia	Italy	Community Management and Conservation of Natural Resources in Gilé and Pebane Districts (COSV)	2008 – 2012
Zambezia	World Bank	PROIRRI Sustainable Irrigation Development	2011 – 2017

Abbreviations: EC = European Commission, IFAD = International Fund for Agricultural Development, JICA = Japan International Cooperation Agency, MCC – Millennium Challenge Corporation, UNDP = United Nations Development Programme

Source: JICA, *Project for Nacala Corridor Economic Development Strategies in the Republic of Mozambique, Progress Report (Revised Edition)*, November 2012, Table 4.1.7, p. 4-8

(ii) Other Development Potentials along the Nacala Corridor Identified with International Cooperation

Potential	Description
Tourism in Nampula Province, Mozambique	A World Bank study identifies the priority sectors in Nampula Province as agriculture/agribusiness and tourism. USAID is supporting tourism development in Nampula through promotion of investments in “destination” tourism. It estimates that 141,000 direct and indirect tourism-related jobs will be created.
Engineering products in Zambia	As a part of the Zambia Investment Promotion Project – Triangle of Hope (ZIP-ToH) conducted by JICA since 2006, an Industrial Strategy for Engineering Products was formulated for value addition of the mining industry and diversification of the economy.
Coal cogeneration in Malawi	The regional Spatial Development Initiative program of the Department of Trade and Industry of South Africa is promoting a coal cogeneration project in Malawi and Tanzania. The project aims to produce electric power as well as diesel and chemical products from coal, utilizing the so-called XTL platform coal liquefaction technology. In Malawi, the electric power to be produced is expected to be utilized for exploitation, separation, and smelting of heavy mineral sands along Lake Malawi.

Sources: (i) World Bank, *Prospects for Growth Poles in Mozambique*, August 2010; and (ii) field survey interviews of the JICA Study Team in August 2012.

(4) Industrial Development Scenario

The industrial development scenario for the Nacala Corridor will be in the following four geographic areas (summarized in Figure 4.12):

- Zambia: Copperbelt–Central–Lusaka–Eastern Province;
- Malawi: central and southern region as well as other areas;
- Mozambique: Nampula, Niassa, and Zambezia; and
- Mozambique: Port of Nacala and the Nacala SEZ.

In the Zambia part, copper fabrication and iron/steel products (“engineering products”) and processed foods will be manufactured in MFEZs and individual plants along the corridor in and around the Lusaka and the Copperbelt. Also, major crops such as maize, cassava, and wheat, as well as other cash crops including groundnuts, cotton, and rice, will be produced in the farm blocks in the Central, Eastern and Copperbelt provinces. These products (both manufacturing and agricultural) will be distributed to neighboring countries along the corridor (including the Democratic Republic of Congo, DRC) and exported via the Port of Nacala. The transport of goods across the borders between Zambia and Malawi and between Malawi and Mozambique will be facilitated, thereby establishing a reliable, cost-effective logistics route along the corridor.

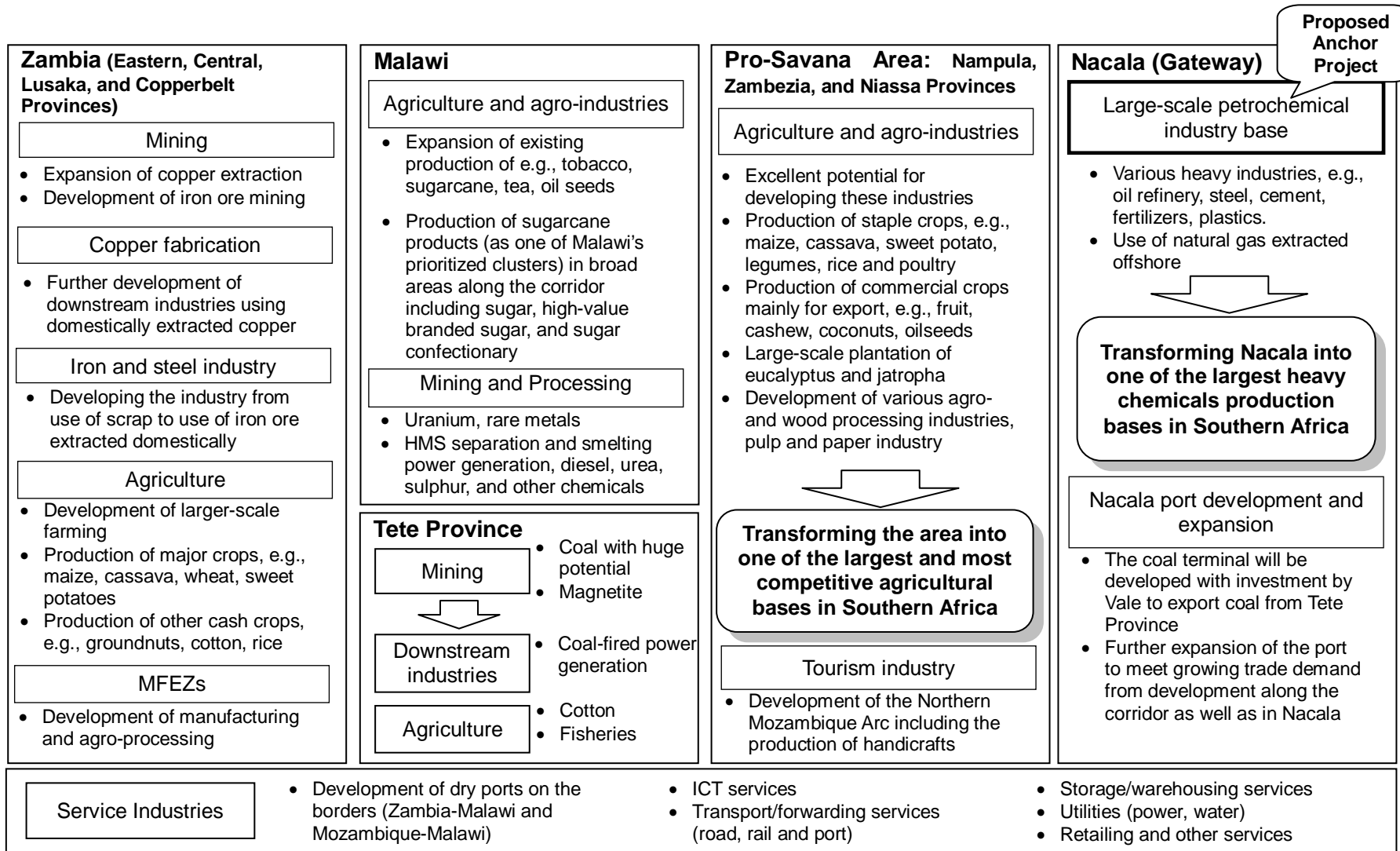
For the Malawi part, the Nacala Corridor is the most important distribution route for the sugar industry. With the development of this corridor, sugarcane products (sugar, high-value branded sugar, sugar confectionary, sweetener, ethanol, spirits, cane juice, fertilizer, animal feed, electricity, carbon dioxide, cosmetics), as one of the Government of Malawi’s priority clusters, will be widely manufactured along the corridor and distributed to the neighboring countries and exported via the Port of Nacala. A coal cogeneration plant will be established along the corridor to utilize coal from Tete, and produce electric power, diesel, and chemical products (mainly fertilizer). The electric power will be utilized for the exploitation, separation, and smelting of heavy mineral sands (HMS) along Lake Malawi and some other areas in Malawi to produce ilmenite, rutile, zircon, titanium dioxide, and other minerals. These products are to be exported to neighboring countries, Europe, and Asia, as well as domestically consumed. As with Zambia, dry ports need to be established at the border with Mozambique. When the routes to Tete and Sena are developed, the function of dry ports along the border including Nsanje will become more important, and thus logistics-related service industries (e.g., transport, storage, insurance) need to be developed.

In the Nampula, Niassa, and Zambezia parts, based on the excellent potential of agriculture and agribusiness, there will be multiple venues with outgrower (contract farming) schemes to produce cash crops such as oilseed, cashew, coconut, sunflower, soybean, and fruits, as well as large-scale plantation of eucalyptus and jatropha, and nut processing. In Niassa, forestry and related processing will be among the core industries, making use of the vast areas of forestry plantation in the province. Many of these venues are expected to overlap the area of Pro-Savana project involving cooperation among Japan, Brazil, and Mozambique. In addition, tourism and ecotourism will be developed at several sites along the coast (e.g., Mozambique Island) and in inland areas (e.g., Ribau Malema), where tourism-linked small and medium enterprises including handicrafts, tour operators, tourist activities, and restaurants will form clusters.

The current industrial composition of the Nacala SEZ is rather varied, including heavy industries such as steel and cement, as well as fishing and tourism operators. However, the SEZ should be established as a petrochemical industry base, considering the expected establishment

of a oil refinery,⁵³ which will act as an anchor project, facilitating the emergence of other downstream industries, such as fertilizers and plastics. These products will be delivered to the farms and agro-processing firms in Mozambique and landlocked countries along the Nacala Corridor. At the same time, the Port of Nacala be the export gate for the products of these countries, and the alternative gate for mineral resources (coal) from Tete Province.

⁵³ Website of GAZEDA (Gabinete das Zonas Economicas de Desenvolvimento Acelerado, Office for Economic Areas with Accelerated Development): <http://www.gazeda.gov.mz/>.



Abbreviations: HMS = heavy mineral sands, ICT = information and communication technology, MFEZ = multi-facility economic zone
 Source: JICA Study Team

Figure 4.12: Industrial Development Scenario for the Nacala Corridor

4.5.2 Major Transport Development Issues and Infrastructure Development Scenario(s)

(1) Transport Development Issues

Figure 4.13 presents a map of the Nacala Corridor. The main route of the corridor links Nacala–Border (Chiponde/Mandimba)–Lilongwe–Border (Mchinji/Chipata) towards Lusaka and the Copperbelt. Including other routes, the Nacala Corridor is defined here as linking: (i) Nacala–Border (Chiponde/Mandimba)–Lilongwe–Border (Mchinji/Chipata)–Lusaka, (ii) Cuamba–Lichinga, and (iii) Nampula–Mocuba–Milange/Muloza–Blantyre–Mwanza–Tete.



Legend: blue = roads, purple = railways
Source: <http://www.tmsagis.co.za/>

Figure 4.13: The Nacala Corridor

Some road sections along the corridor are in poor condition: (i) Nampula–Lilongwe–Northern Zambia, including the bridges and drainage system (construction is ongoing, with financing by AfDB and others); (ii) sections in Malawi: Chiponde–Mangochi (51 km, under construction), Mangochi–Liwonde (70 km, under construction), Liwonde–Nsipe (64 km, under construction), Nsipe–Lilongwe (163 km, under construction, financed by the European Development Fund, EDF, and the Government of Malawi), the Lilongwe western bypass (13 km, under construction, AfDB Nacala Corridor Project, Phase 1), and Lilongwe–Mchinji (118 km, funds not yet identified); (iii) sections in Mozambique: Nampula–Cuamba (348 km, under construction, financed by AfDB [57%], JICA [23%], the Government of Mozambique [12%], and the Korean Export-Import Bank [8%], for a total of USD 264 million), and Cuamba–Mandimba–Lichinga (350 km, under design), and (iv) sections in Zambia, including Lusaka–Malawi border, 360 km) and Luangwa Bridge–Malawi border (126 km, under construction). Major development issues with respect to corridor roads include: (i) rehabilitation of the poor sections that are not committed, (ii) Lilongwe–Mchinji, and (iii) dry port development (e.g., at Chipata in Zambia).

Regarding the corridor's railways, the Cuamba–Nayuchi/Entre Lagos section is in very bad condition. Major development issues include: (i) extensions and rehabilitation undertaken by Vale: a new rail line between Moatize and Nkaya (201 km) and rehabilitation of the existing line between Nkaya and Nacala (682 km) + a connection of the existing line to the new coal terminal (36 km; the total capacity will be 18–30 Mtpa); and (ii) review/revision of the concession conditions between the Government of Malawi and Central East African Railways (CEAR) to assure proper maintenance.

Existing capacity of the Port of Nacala in relation to envisaged future demand is a major bottleneck. Major development issues relate to (i) expansion of the existing port, (ii)

construction of a new port for coal and other fuel, at the western part of the bay; (iii) special economic zone (SEZ) development, and (iv) waterborne transport on Lake Malawi.

(2) Transport Infrastructure Development Scenario(s)

The discussion of transport infrastructure development scenario(s) related to the Beira Corridor above also relates to the Nacala Corridor.

4.5.3 Water Sector Development Issues and Infrastructure Development Scenario(s)

(1) Water Sector Development Issues

The Nacala Corridor connects the Port of Nacala in Mozambique with Lusaka in Zambia through Lilongwe in Malawi; it intersects with the North-South Corridor at the Lusaka.

As noted, although water resources in Mozambique are relatively plentiful, water resources development in the country does not meet requirements. The Nacala water supply system does not provide a 24-hour supply, although this is to be addressed by a USD 30 million water supply project financed by the United States' Millennium Challenge Account (MCA) to increase the water supply capacity of Nacala City and improve of living conditions of the city's population of about 220,000. The work should be completed by April 2013.

The total population of Lilongwe is about 900,000, but the service population is only about 600,000, implying a current service population rate of about 67%. A service rate of 100% is targeted by 2035 with investment in infrastructure. The water board has low operating tariffs compared with its operating costs, which limits its capacity to rehabilitate and extend plant and network systems. Also, increased vandalism has led to a loss of water and non-revenue use. Consequences of the lack of an adequate investment budget include physical leakage from the distribution network and limited water sources compared with demand.

In Malawi, recent data showed a total irrigated area of 93,000 ha, including 43,000 ha in smallholder farmers and 50,000 ha in estates. This area was to increase to 200,000 ha with implementation of a greenbelt initiative. Smallholder farmers have land of 0.3–0.5 ha, with rice as the main crop. Commercial holders (estates and individual farmers) have an average of 1,200 ha and 1 ha (respectively), and the main crop is sugarcane. Insufficient water resources in most bodies of water due to effects of climate change and environmental degradation has led to underutilization of the irrigated area.

According to the monitoring data collected by the Department of Water Resources of Malawi, the water level of Lake Malawi has decreased continuously in recent years (i.e., down about 1 m during the high water season [April] and down 60 cm down during the low water level season [December] over the past decade). The Shire River, the main outflow of Lake Malawi, is the most important watercourse in Malawi. Control of the water level of Lake Malawi is the most effective means of promoting Shire River development. Groundwater in the alluvial aquifer in the lower Shire Valley has high salinity.

As noted, the water supply service ratio of Lusaka is low. Also, there are many illegal connections to the system, with unaccounted for water estimated at about 50%. Also as noted, according to the National Irrigation Strategy and Plan of Zambia, the potential irrigable area is about 400,000 ha, but total irrigated area is estimated at about only 100,000 ha. The National Water Policy 2010 estimated that Zambia's annual renewable surface water to be 100 km³ per year and annual renewable groundwater potential of 49.6 km³.

Major water sector development issues for the Nacala Corridor in the priority subsectors (water supply, irrigation, and water resources management) may be summarized as follows:

- (i) high non-revenue water and water losses in municipal water supply, which are among the major issues in water supply in the region as described in Appendix H, resulting mainly from inadequate operation and maintenance of water supply systems causing the deterioration of water supply facilities⁵⁴;
- (ii) a shortage of water supply (with water available for less than 24 hours);
- (iii) the low water supply service ratio in Lusaka;
- (iv) insufficient water development potential in Malawi to meet demand;
- (v) undertutilized irrigated area in Malawi due to inadequate availability of water resources;
- (vi) continuous decrease in the water level of Lake Malawi;
- (vii) insufficient water resources development to meet the water requirements of Mozambique, even though such resources are relatively available; and
- (viii) the limited irrigated area compared with irrigation potential area in Zambia.

(2) Water Sector Infrastructure Development Scenario(s)

Development directions for the Nacala Corridor in the priority subsectors over the short term include implementation of a project to reduce non-revenue water and water losses in major cities along the corridor through the introduction of district metered areas (DMAs) for the water supply areas, detailed investigations of current conditions and problems, and the preparation of an investment program for facility improvement (a capacity development project).⁵⁵

Development directions for the Nacala Corridor over the long term include:

- (i) constructing a multi-purpose dam is to provide raw water supply for Lilongwe and the surrounding area (an investment project);
- (ii) reducing the vulnerability of persons dependent on rainfed agricultural practices in Zambia by anticipating rainfall shortages and increased variability in the face of climate change (an investment project); and
- (iii) increasing crop productivity, reducing water losses, and increasing the efficiency and productivity of existing small-scale irrigation and rainfed systems (an investment project).

4.5.4 Power Development Issues and Development Scenario(s)

(1) Mozambique

Power Supply Capability

Please refer to the description for the Beira Corridor above.

Grid Accessibility (to Nampula, the Port of Nacala, and the Nacala Special Economic Zone)

Since a 1 cct, 220 kV transmission line comes to Nampula from HCB, the reliability of power is relatively high. The power flow is forecast to be full along the 110 kV transmission line

⁵⁴ As noted, addressing the issue of high non-revenue water and water losses will contribute not only to increasing water supply cost effectively but also to the effective and efficient development of water resources to meet water demand over the longer term.

⁵⁵ In implementing the initiatives to improve water supply, it is also important to take appropriate actions to improve sewerage systems in major cities along the corridor.

between Nampula and Nacala. Mozambique has applied for a Japanese ODA loan for a project titled Reconfiguration of the Nampula–Monapo–Nacala and Nampula–Metoro–Pemba at Namialo and Building of a New 40 MVA, 110/33 kV at Namialo. The reliability of power and supply capacity between Nampula and Nacala will increase when the project is completed.

(2) Malawi

Power Supply Capability

Installed generation capacity (278 MW) is much less than the demand (300 MW)⁵⁶ during the peak season (2011–12). Since Malawi is one of the three countries in the SAPP that are not connected to the SAPP grid, it cannot import power from its neighboring countries. Kapichira Phase II (64 MW) will commence operation in 2013, but power supply capacity will still be short of the demand. An update of the feasibility study for a 400 kV, 300 MW grid interconnecting the concentrated power generation in Mozambique (i.e., between Phombeya Substation (S/S) in Malawi and Matambo S/S in Mozambique) is planned with funds to be provided by the World Bank; this project will enable Malawi to import power from northern Mozambique.

Mpatamanga Hydropower Plant (260 MW), Kholombizo Hydropower Plant (240 MW), Lower FuFu Hydropower Plant (100 MW), and Songwe Hydropower Plant (300 MW, jointly developed with Tanzania) are planned in the medium term, but since these are only at the feasibility stage or the stage of seeking investors, it will take at least five years before these become operational. Some mining companies have applied for power supply, about 100 MW in total, but due to the shortage of generating power, the mining operations have not commenced. Urgent development of hydropower or coal thermal generation is required to begin such mining, with envisaged job creation of at least 1,000 jobs per mine.

Grid Accessibility

Since a 1 cct, 132 kV transmission line runs north to south along the corridor, grid accessibility is not difficult. However, line reliability is low since it is 132 kV. A feasibility study for a 220 kV transmission line, the so-called Malawi Backbone, between northern Blantyre (Nkula B Hydropower Plant) and Lilongwe has been completed and financing is sought. When the backbone transmission line is completed, the reliability of the power will increase.

(3) Zambia

Power Supply Capability

In 2011, installed power generation capacity, available generation capacity, and demand were 1,812 MW, 1,215 MW, and 1,660 MW. Due to rehabilitation and upgrading of two 600 MW (150 MW × 4 units) units of Kariba North Hydropower Plant (the second largest in the country), to be upgraded to 720 MW (180 MW × 4 units), power will be in short supply for a few years.

As noted regarding the Dar es Salaam Corridor, Zambia has sufficient hydropower potential, and is developing hydropower plants on the Zambezi River and its tributaries. The Kariba North extension (360 MW) will be completed in 2013, the construction of Itezhi–Tezhi Hydropower Plant (120 MW) will start soon via a special purpose vehicle (SPV), loan negotiations for construction of the Kafue Lower Hydropower Plant (750 MW) have started, and the Batoka Gorge Hydropower Plant (1,600 MW, jointly developed with Zimbabwe) is listed for future priority generation development. Therefore, over the medium to longer term sufficient power in Zambia is envisaged.

⁵⁶ Said actually to be 350 MW.

Private sector development of power plants via IPP schemes is ongoing, e.g., the Ndola Heavy Fuel Oil thermal power plant (50 MW) is under construction, construction of the Maamba coal thermal power plant (300 MW) has started, a power purchase agreement for the Emco coal thermal power plant is under negotiation, and the Kabompo Hydropowerplant (40 MW) is planned by Copperbelt Energy Corporation). After realization of these planned projects, Zambia will have sufficient power supply capacity to serve increased domestic and industrial demand.

Grid Accessibility

There is no trunk transmission line along the road between Lusaka and Chipata (near the border with Malawi at Mchinji) at present. A 330 kV transmission line is being constructed between Lusaka and Pensulo (northeast of Lusaka and Chipata) to interconnect Malawi in the future. At present, only the Lusaka and Chipata areas can easily access reliable power.

4.5.5 Transport/Trade Facilitation (Soft Issues)

The development of the following one-stop border posts have been proposed along the Nacala Corridor:

- (i) AfDB as part of Phase III of the Nacala Corridor Project is to develop the **Mwami–Mchinji** OSBP (close to Chipata) between Zambia and Malawi (as well as the Chiponde–Mandimba OSBP between Malawi and Mozambique, described below). Traffic is light to moderate at this BCP, with 25–80 trucks per day. Time spent at the border is relatively low, an average of 2.0 hours westbound and 5.3 hours eastbound. The Government of Zambia is planning an integrated, medium-sized office building at Mwami with a combined passenger and freight terminal taking the OSBP operational requirements into account. While the size of the office proposed is smaller than the current one, its design will accommodate all border control agencies to work together in the same building. The office buildings on the Mozambique side (Mchinji) were constructed in 2005 with assistance from the EU, but available space is considered insufficient for OSBP operation. It is envisaged that the BCP will serve traffic that may use the railway line from Chipata to the Port of Nacala (or Beira after eventual reopening of the Southern Malawi railway link). In August 2012 the Mwami–Mchinji OSBP project was included in the SADC Regional Infrastructure Master Plan (TR/MSP 14) at an estimated total cost of USD 5 million. SADC is currently procuring consultancy services for the Feasibility, Design, and Development of Legal Frameworks for the Malawi/Zambia and Mozambique/Malawi One-Stop Border Posts along the Nacala Corridor, with assistance from the AfDB/NEPAD [New Partnership for Africa’s Development] Infrastructure Project Preparation Facility (IPPF).⁵⁷
- (ii) Also as part of the Phase III of the Nacala Corridor Project, AfDB is to develop the **Chiponde–Mandimba** OSBP between Malawi and Mozambique. Cross-border traffic is light at Chiponde–Mandimba, with the 2009–10 JICA Cuamba–Mandimba–Lichinga road feasibility study finding an average of less 6–7 trucks crossing the border per day in 2008, while a 2012 study reported this traffic at 48 trucks per day. The average border crossing time has been reported to be only 30 minutes. A distance of 1.8 km separates the two border posts, with Malawi nationals (although not Mozambique nationals) residing within the “no-man’s land”. The 2009–10 JICA road feasibility study concluded that

⁵⁷ See: (i) SADC, *The SADC Regional Infrastructure Development Master Plan, Sub-Sector Plan, Border Posts*, 2012, pp. 15, 17; (ii) COMESA, EAC, SADC, and TradeMark Southern Africa, *Infrastructure Components of the North-South Corridor*, 2010, pp. 13, 16; (iii) JICA, *The Preparatory Study on Road Development Plan in Nacala Development Corridor (N13: Cuamba–Mandimba–Lichinga) in the Republic of Mozambique, Final Report*, 2010, p. 222; and (iv) *Study on Situational Analysis of Border Facilities*, prepared for the Regional Trade Facilitation Programme, U.K. Department for International Development, 2009, pp. 78–94.

while there is no urgency for an OSBP at Chiponde–Mandimba in view of the low present cross-border traffic volumes, two-phased development of juxtaposed OBSP facilities at Chiponde–Mandimba was justifiable, with the first phase in 2014 and the second phase in 2024. Operations may be split either based on traffic direction (with inspection in the country of entry) or based on traffic type. (e.g., with commercial traffic processed at Mandimba and non-commercial traffic processed at Chiponde).⁵⁸ In 2011 Malawi drafted a memorandum of understanding and legal framework for a Chiponde–Mandimba OSBP, but they are awaiting the reply from their counterparts in Mozambique. In August 2012 the Mwami–Mchinji OSBP project was included in the SADC Regional Infrastructure Master Plan (TR/MSP 15) at an estimated total cost of USD 5 million. As noted above, SADC is currently procuring consultancy services for the Feasibility, Design, and Development of Legal Frameworks for the Malawi/Zambia and Mozambique/Malawi One-Stop Border Posts along the Nacala Corridor, with assistance from IPPF.⁵⁹

- (iii) A **Calomue–Dedza** OSBP has also been proposed between Mozambique and Malawi.⁶⁰ Traffic at the Calomue–Dedza BCP is moderate, with about 80 trucks per day, although there is potential for increased traffic with improvement of the road and bridge in Tete Province in Mozambique. Clearance times are of the order of 2–8 hours. Malawi and Mozambique’s Customs authorities signed an agreement in February 2009 committing to establishment of a OSBP at Calomue–Dedza, with a budget of USD 10 million, half of each to be paid by each country, but there has been little progress since then. As was noted, while Malawi may be more interested than Mozambique in implementing a OSBP at Calomue–Dedza (and at Zobue–Mwanza, discussed above), Mozambique may be more interested than Malawi in implementing one at Chiponde–Mandimba, suggesting scope for a “win-win” deal between the two countries. In August 2012 a Calomue–Dedza OSBP project was included in the SADC Regional Infrastructure Master Plan (TR/MSP 24) at an estimated total cost of USD 4 million.

Regarding corridor port operations, the USAID Southern Africa Trade Hub assessed the performance of the Port of Nacala and found high dwell times due to: (i) insufficient customs bonded facilities/inland container depots (ICDs), (ii) obsolete laws and regulations that do not reflect containerization, and (iii) the long duration of the customs clearance process.⁶¹

Further, as with the Beira Corridor, there are a number of other soft issues concerning road transport along the Nacala Corridor (e.g., Mozambique’s high road users charges, the country’s ban on seven-axle interlinks, and the cash payments system of third-party motor liability insurance in the country).⁶²

⁵⁸ This was the example provided in the road feasibility study, but considering the larger existing structure on the Malawi side and the greater space requirements for commercial processing, the reverse may make more sense.

⁵⁹ See: (i) SADC, *The SADC Regional Infrastructure Development Master Plan, Sub-Sector Plan, Border Posts*, 2012, pp. 15, 17; (ii) JICA, *The Preparatory Study on Road Development Plan in Nacala Development Corridor (N13: Cuamba-Mandimba-Lichinga) in the Republic of Mozambique, Final Report*, 2010, p. 222; (iii) *Study on Situational Analysis of Border Facilities*, prepared for the Regional Trade Facilitation Programme, U.K. Department for International Development, 2009, pp. 78–94; and (iv) interview with various staff of the Malawi Revenue Authority (e.g., Mr. Steven Kaploma, Manager, Public Relations and Communication Division; Mr. Leckson Kachala, Head of Technical and Customs Division; Mr. Chimwemwe Kawalewale, Manager, Customs Systems and Procedures; Mr. Timothy Makamba, Deputy Head, Policy, Planning and Research Division), 23 August 2012.

⁶⁰ This OSBP project has alternately been discussed in connection with the Beira and Nacala Corridors. Consistent with the Phase I study, it is considered here in connection with the Nacala Corridor. It is only 150–200 km from Mwanza-Mchinji, although at present at least most of the traffic is to/from Beira port and to/from Durban port, with some small portion to/from Zimbabwe.

⁶¹ AECOM International Development (Thys Cronje, Consultant Ports Specialist), *Trade Facilitation Interventions: Port of Nacala*, August 2011.

⁶² See Gael Raballand, Charles Kunanka, and Bo Giersing, *The Impact of Regional Liberalization and Harmonization in Road Transport Services: A Focus on Zambia and Lessons from Landlocked Countries*, World Bank, 2008, pp. 19–21.

An institutional development regarding the Nacala Corridor has been a proposal to establish a corridor management group. One study recommended the creation of a Nacala Corridor Logistics Group to promote and coordinate issues relating to user charges, corridor logistics, operational efficiency, and policy development; it would be modeled on the Maputo Corridor Logistics Initiative.⁶³ Similarly, the creation of a Nacala Corridor Agency has been proposed.⁶⁴

Going forward, efforts at transport/trade facilitation along the Nacala Corridor may include the following:

- (i) implementation of CBM (and related policy and regulatory framework interventions)⁶⁵ at Mwami–Mchinji, Chiponde–Mandimba, and Calomue–Dedza in the short term, to pave the way for OSBPs at these BCPs over the medium term;
- (ii) solutions to trade facilitation bottlenecks at the Port of Nacala, e.g. pre-arrival clearance, development of ICDs, training of clearing and forwarding agents, as called for by USAID’s Southern African Trade Hub⁶⁶;
- (iii) establishment of a Nacala Corridor management group; and
- (iv) formulation of an international railway joint operating agreement and development of railway OSBPs along the railway lines in this corridor over the longer term, following the example of the Malaba railway OSBP between Kenya and Uganda in East Africa.

As noted regarding the Beira Corridor, other soft sector issues affecting the Nacala Corridor (e.g., related to road user charges, vehicle restrictions, third-party motor liability insurance) may be better addressed at the regional (e.g., Tripartite) level.

4.6 North-South Corridor⁶⁷

4.6.1 Industrial Development Scenario

(1) Strengths and Potentials

Strengths of the North-South Corridor are indicated by the industries and products already present along the corridor. These industries or products along with their primary locations are listed in Table 4.22.

⁶³ MCLI. USAID and Agrifuturo, *Nacala Corridor Strategy-Based Transport Logistics and Supply Chain Efficiency, Final Report*, 30 April 2010, pp. 9, 33

⁶⁴ Mozambique Regional Gateway Programme, *Situation Analysis and Roadmap*, May 2012, pp. 10, 44–45.

⁶⁵ E.g., preclearance and prepayment, an authorized economic operator scheme, full application of risk management, single window applications.

⁶⁶ AECOM International Development (Thys Cronje, Consultant Ports Specialist), *Trade Facilitation Interventions: Port of Nacala*, August 2011.

⁶⁷ See subsection 4.6.2 for the definition of the North-South Corridor used in this study.

Table 4.22: Industries and Products along the North-South Corridor

Country	Industries/Products
Zambia	<ul style="list-style-type: none"> • mineral resources including copper extracted in various locations along the corridor • agricultural products including grains, coffee, sugar, and tobacco in the Copperbelt, Central, and South Provinces • manufacturing and agro-processing in Lusaka Province
Botswana	<ul style="list-style-type: none"> • mineral resources including copper and nickel extracted in various locations along the corridor • livestock and meat (beef) industry in northeastern Botswana
Zimbabwe	<ul style="list-style-type: none"> • agricultural products including soybeans, coffee, tobacco, and cotton in central and eastern Zimbabwe • fertilizer and chemical manufacturing industry in Harare and Bulawayo • pharmaceuticals produced in and around Harare
South Africa	<ul style="list-style-type: none"> • mineral resources including platinum, chrome, and iron in various locations along the corridor • manufacturing including automobile and general machinery near Durban and along the corridor • agricultural products including horticultural and floricultural products in the Free State and in Mpumalanga and Gauteng Provinces

Source: JICA Study Team

Major recent investments along the corridor have been concentrated in mining, agriculture, and manufacturing, which is consistent with the strengths described above. Table 4.23 provides examples of major recent and planned investments along the corridor, indicating that mining, agriculture, and manufacturing are the areas with greatest potential.

Table 4.23: Examples of Major Investments along the North-South Corridor

Project/Enterprise	Description	Industry/Sector
Lumwana Copper Mine (Zambia)	See the comparable table in the Nacala Corridor section	See Nacala Corridor section
Nchanga and Konkola Copper Mine (Zambia)	Konkola Copper Mines (KCM) Plc, a leading integrated copper producer in Zambia, owns the mine. KCM is primarily engaged in exploration, mining, production, and sale of copper and copper byproducts. KCM directly employs 8,671 and indirectly contracts 13,087.	Mining (mining, production and sale of copper and copper byproducts)
Universal Mining and Chemical Industries Ltd. (Zambia)	See the comparable table in the Nacala Corridor section	See Nacala Corridor section
Hitachi Construction Machinery (Zambia)	See the comparable table in the Nacala Corridor section	See Nacala Corridor section
Dukwe Copper Project (Botswana)	African Copper Plc through its subsidiary, Messina Copper (Botswana), is implementing the Dukwe Copper Project. There are two mines: the Mowana open pit mine (located 120 km northwest of Francistown) and the Thakadu mine (located about 80 km from its Mowana mine).	Mining (copper production)
Selebi-Phikwe Copper and Nickel Project (Botswana)	Bamangwato Concessions Ltd. (BCL) is the main employer at the Selebi-Phikwe mine. BCL is a major producer of copper and nickel, and provides jobs for over 4,000.	Mining (copper and nickel production)
Dikoloti Nickel Project (Botswana)	Discovery Metals Ltd. is involved in nickel exploration in northeastern Botswana through its Dikoloti Nickel Project. The enterprise entered into	Mining (nickel production)

Project/Enterprise	Description	Industry/Sector
	a joint venture exploration program with Japan Oil, Gas and Metals National Corporation (JOGMEC) in October 2009.	
Tati Nickel Project (Botswana)	A Russian enterprise, Norilsk Nickel, has become a major player in the Botswana nickel-copper market through the Tati Nickel Project.	Mining (nickel production)
Debswana Diamonds (Botswana)	The enterprise, a joint venture between De Beers and the Government of Botswana, is a key player in the national economy of Botswana, producing in excess of 70% of Botswana's export earnings, 30% of GDP, and 50% of government revenue.	Mining (diamond production)
Chemplex Corporation Ltd. (Zimbabwe)	Chemplex Corporation is the largest fertilizer and chemical manufacturing company in Zimbabwe. It employs over 1,000 including more than 100 engineers, chemists, technicians, and other highly skilled professionals.	Manufacturing (fertilizer and chemical manufacturing)
BiZright Technology (Zimbabwe)	BiZright Technology in Japan was commissioned by the Government of Zimbabwe to establish e-Government in September 2010, with delivery by the end of March 2011. The enterprise intends to provide continued support to the government as a strategic partner in the ICT sector.	Service (ICT)
Willowvale Mazda Motor Industries (PVT) Ltd. (Zimbabwe)	Willowvale Mazda Motor Industries is an automobile assembler and distributor under the direction of the Government of Zimbabwe. Mazda Motor Corporation and Itochu Corporation of Japan are the shareholders of the company (25% and 8%, respectively); the company has concentrated on the Mazda brand in Zimbabwe.	Manufacturing (automobile assembly and distribution)
Itochu Corporation's participation in the exploration and development of Platinum Group Metals (South Africa)	Itochu Corporation participated in the exploration and development of Platinum Group Metals. Itochu Corporation established a 100%-owned subsidiary, Itochu Mineral Resources Development Corporation, in May 2011, with the intention to undertake exploration and development projects in the mineral resources sector.	Mining (platinum)
Sumitomo Corporation's acquisition of equity stakes in mining company, Assmang Ltd. (South Africa)	Sumitomo Corporation acquired equity stakes in mining company, Assmang Ltd., a mining company that produces iron ore, manganese ore, chrome ore, manganese ferroalloys, and chrome ferroalloys. Starting with iron ore trade to Japan in the early 1970's, the business relationship between Sumitomo Corporation and Assmang expanded to manganese ore trading and ferroalloy trading.	Mining (chrome, iron, and manganese)
Mistubishi Corporation's acquisition of shares of Heric Ferrochrome Pty Ltd. (South Africa)	Mistubishi Corporation acquired shares of Heric Ferrochrome Pty Ltd., the world's 4th largest integrated ferrochrome producer based in the North West Province, South Africa. Ferrochrome is exported mainly to Asian and European markets in association with Mitsubishi Corporation and ELG Haniel GmbH.	Mining (ferrochrome)
Komatsu Southern Africa Pty Ltd. (South Africa)	Komatsu Southern Africa Pty Ltd. is a supplier of earthmoving, surface mining, process, utility, and forest equipment. Demand has advanced especially for the use in mines, and Komatsu envisages future market growth.	Equipment supplier

Source: Compiled by the JICA Study Team from various sources on the internet

(2) Priority Industries/Products in Relevant Policies and Strategies

Priority industries and products that are specified in relevant policies and strategies can also suggest sectors with development potential along the corridor. As shown in Table 4.24, priority sectors along the corridor include mining, agriculture, agribusiness and manufacturing.

Table 4.24: Examples of Policies and Strategies Related to the North-South Corridor

Country	Relevant Policies and Strategies
Zambia	See the comparable table in the Dar es Salaam Corridor and Nacala Corridor sections
Botswana	Botswana's National Development Plan 10 (NDP10) (2009–2016) . This plan identifies the following sectors as having potential for economic diversification to new value chains: (i) tourism, (ii) international financial services, (iii) energy, (iv) agriculture, and (v) manufacturing. Diversification away from diamonds remains critical for the country, both to lessen economic vulnerability and to promote employment. The government is currently promoting an Economic Diversification Drive initiative as a paradigm shift in the economic diversification effort.
Zimbabwe	See the comparable table in the Beira Corridor section
South Africa	See the comparable table in the Maputo Corridor section

Source: Various sources on the internet

(3) Potentials Indicated by Other Sources

There are other potential areas for industrial development along the corridor. Table 4.25 provides examples of such potentials, in the area of tourism industry, which is labor-intensive with the capacity to create jobs, and contributes significantly to national accounts.

Table 4.25: Examples of Other Development Potentials along the North-South Corridor

Potential	Description
Tourism industry in Zambia	See the comparable table in the Dar es Salaam Corridor section
Tourism industry in Botswana	Botswana has comparative advantage for nature-based tourism in the northern part of the country (e.g., the Okavango Delta) and eastern part (e.g., Northern Tuli Game Reserve). The World Bank's Country Partnership Strategy 2009–2013 indicates that Botswana's tourism industry in 2007 generated USD 1.1 billion of economic activity – tourism directly contributed 4% of total employment and 4.3% of total GDP in Botswana. Adding the direct and indirect impacts of the tourism sector on the economy brings the contribution to 10.6% of total employment, 9.7% of total GDP, and about 16% of non-mining GDP.
Tourism industry in South Africa	South Africa's New Growth Path (issued in November 2010) identifies tourism as one of the six core pillars of growth, which support employment creation in the country. The National Tourism Sector Strategy (published in March 2011) sets out a vision for the country to be a top 20 global tourism destination by 2020, and puts a renewed focus in stimulating regional and domestic tourism, and development of business and events tourism, among others.

Source: Various sources on the internet

(4) Industrial Development Scenario

An industrial development scenario for the corridor was prepared (as summarized in Figure 4.14) based on (i) the strengths and potentials summarized above; (ii) detailed analysis of investment projects, policies, strategies, and plans related to the development of the corridor;

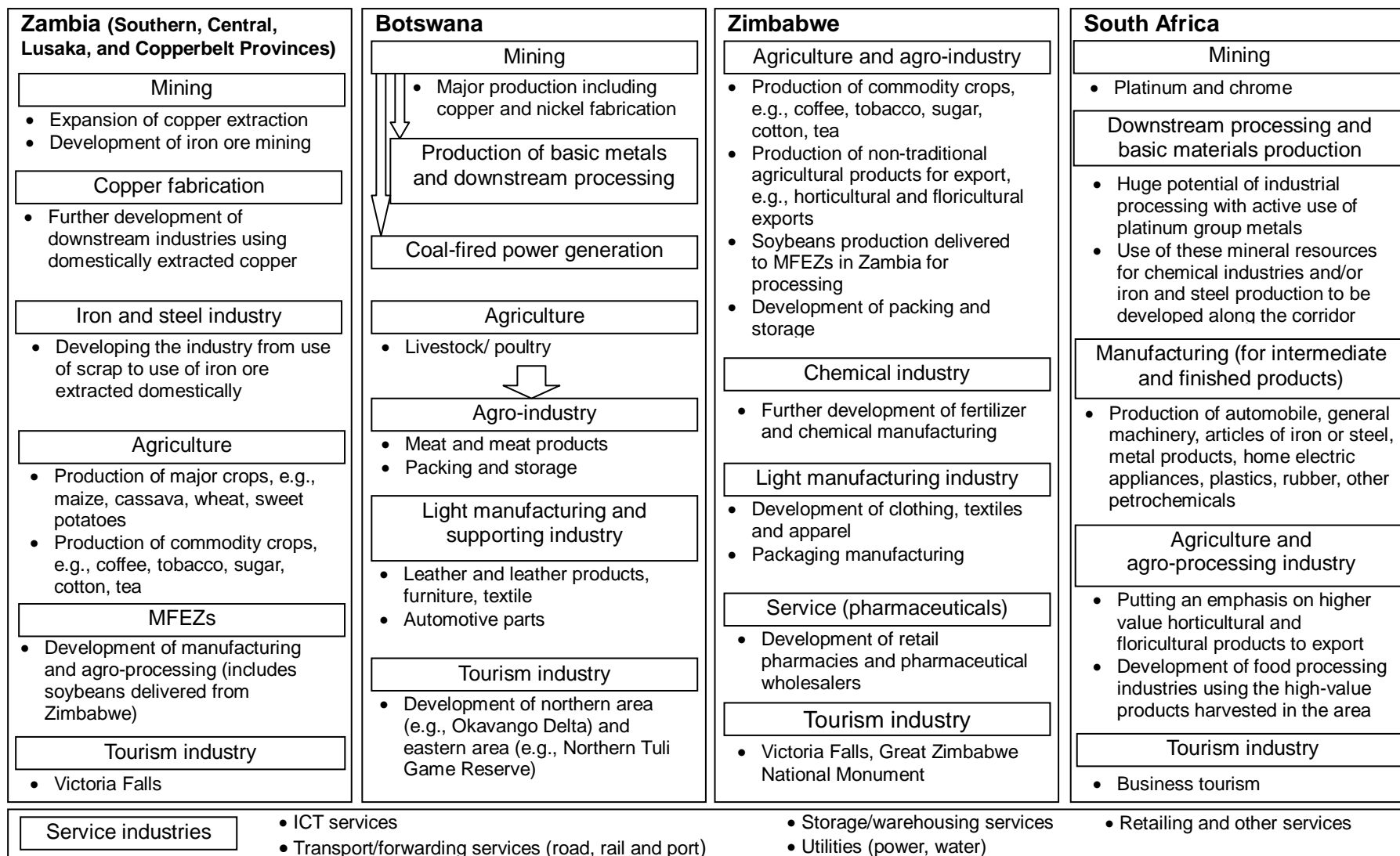
and (iii) the overarching development scenarios proposed in Chapter 2. The scenario has the following major features:

- development of the mining value chain along the corridor across the border of Botswana and South Africa,
- development of agriculture and agro-industry along the corridor across the border of Zambia and Zimbabwe, and
- development of light manufacturing industries and the services sector along the corridor across the border of Botswana/Zimbabwe and South Africa.

Nickel produced and fabricated in Botswana along the corridor in the vicinity of production areas (Dukwe, Selebi-Phikwe, Francistown) will be exported to South Africa where large-scale manufacturing for intermediate and finished products takes place, including automobile manufacturing near Durban and along the corridor. Copper produced and fabricated in Zambia and Botswana will be utilized across the border of Botswana and South Africa for the construction of transmission lines for the expected export of electricity to South Africa, once the Mmamabula Energy Project is in full operation. The project will meet the urgent demand for new base load capacity in South Africa.

There will be clusters of commercial farms and agribusiness situated along the corridor across the border of Zambia and Zimbabwe. Commodity crops (coffee, tobacco, sugar, cotton, and tea) and non-traditional agricultural products (horticultural and floricultural exports) will become one of the major income generation sources of Zimbabwe. Soybeans grown primarily in eastern Zimbabwe will be delivered through the corridor to Multi-Facility Economic Zones (MFEZs) in Zambia in order to manufacture processed foods, which will develop a soybean value chain across the border. Significant progress in fertilizer and chemical manufacturing industry in Harare and Bulawayo in Zimbabwe will make large contribution to the development in agriculture and agro-industry in the region. Packaging, storage/warehousing, and distribution/logistics services will also be developed along the corridor.

The location of light manufacturing industries including leather, furniture, and textile production have shifted from South Africa to Botswana and Zimbabwe where a relatively cheap and young labor force is available and clusters are formulated in the surrounding areas of relevant farms. South Africa, in turn, will become one of primary consumption areas for these manufactured goods. At the same time, South Africa will develop relevant services including storage service and distribution/logistics services within the region as well as shipping/exporting to global market, enjoying the benefit of enhanced ICT.



Abbreviation: MFEZ = multi-facility economic zone

Source: JICA Study Team

Figure 4.14: Industrial Development Scenario for the North-South Corridor

4.6.2 Major Transport Development Issues and Infrastructure Development Scenario(s)

(1) Transport Development Issues

As shown in Figure 4.15, the North-South Corridor is no longer considered a single belt, but rather a regional network between South Africa and the countries north of it. It includes or overlaps with corridors, including the Dar es Salaam, Lobito, and Nacala Corridors. Here, the North-South Corridor is defined as including the following: (i) Durban–Johannesburg–Gaborone–Kazungula–Lusaka–Kasumbalesa, (ii) Johannesburg–Martins Drift–Nata–Kazungula, (iii) Johannesburg–Beitbridge–Harare–Chirundu, (iv) Beitbridge–Bulawayo–Victoria Falls, and (v) Harare–Lilongwe.



Legend: blue = roads, purple = railways
 Source: <http://www.tmsagis.co.za/>

Figure 4.15: The North-South Corridor

A number of corridor road sections are in worse than fair condition, including: (i) Botswana: (Tlokweng Border with South Africa–Kazungula [border with Zambia]), (ii) Zambia: (Kapiri Mposhi–Kasambulesa [border with the DRC]); (iii) Zimbabwe: Beitbridge–Harare–Chirundu and (Bulawayo–Victoria Falls [border with Zambia]); and (iv) Mozambique: Cuchamano (border with Zimbabwe)–Tete–Calomue [border with Malawi]). The section in South Africa between Johannesburg and Pretoria is congested during the morning and evening peaks. Long border crossing times are an issue at Kasambulesa, Kazungula, Chirundu, and Beitbridge.

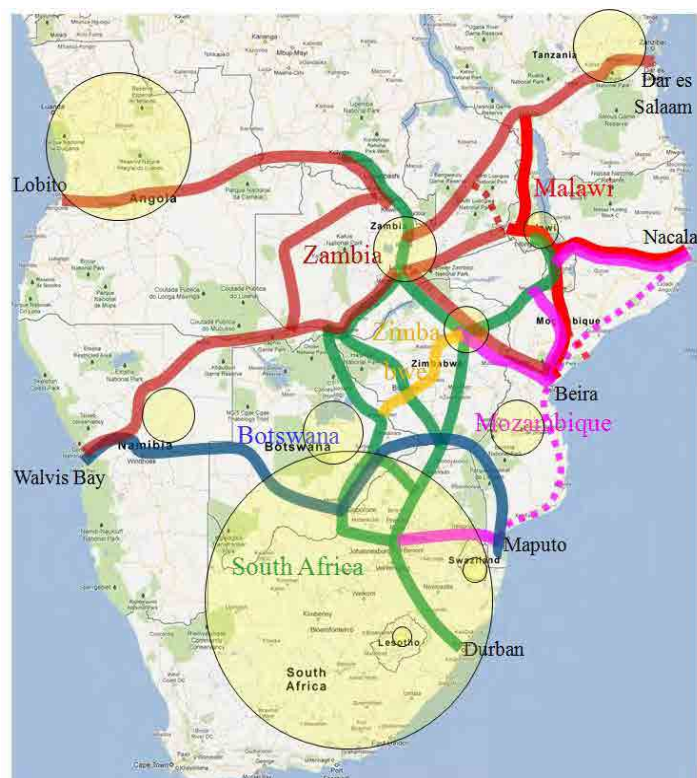
Major development issues concerning corridor roads include: (i) Beitbridge–Chirundu rehabilitation (ii) Chirundu–25 km in Zambia towards Kafue rehabilitation, financed from the Tripartite Trust Account; (iii) Kazungula Bridge, financed by JICA and AfDB, and related roads (e.g., Kazungula–Nata); (iv) rehabilitation of Lusaka–Kafue and Zimba–Livingstone; and (v) Beitbridge–Bulawayo–Victoria Falls.

Major bottlenecks regarding corridor railways include the following: (i) National Railways of Zimbabwe and Zambia Railways Limited are almost not operational due to a lack of maintenance, (ii) there is a missing link between Lion’s Den and Kafue, and (iii) there is a missing link between West Nicholson and Beitbridge. Major development issues with respect to corridor railway development include: (i) an attempt by the Government of Zambia to cancel or at least revise the railway concession to ZRL; (ii) the need for rehabilitation of ZRL as the railway concession to RSZ was canceled in November, 2012; (iii) the construction of Lion’s Den and Kafue missing link; and (iv) construction of the missing link between West Nicholson–Beitbridge.

Congestion at the Port of Durban remains a bottleneck. Major development issues include the expansion of the Port of Durban (included in the SADC Regional Infrastructure Master Plan).

(2) Transport Infrastructure Development Scenario(s)

Due to the relatively larger GDP of South Africa compared to other countries in the region (see Figure 4.16), at present and likely in the future (say to 2020 or 2030), the North-South Corridor is and will continue to serve as the economic backbone of the region. Indeed, the North-South Corridor includes part of the Beira Corridor, the Dar es Salaam Corridor, part of the Lobito Corridor, part of the Nacala Corridor, part of the Trans-Capriivi Corridor, and part of the Trans-Kalahari Corridor. Key issues concerning development of transport infrastructure along the NSC include the need to: (i) maintain sustainable infrastructure in order to support the growing economy and increasing transport demand along the Corridor; (ii) develop some extension of roads and railways that are currently missing links; (iii) improve links with the other seven priority corridors in order to provide seamless transport in the region; and (iv) upgrade the Port of Durban to receive Cape size vessels (about 150,000 dwt, requiring channel depth of 19 m) in order to serve the increasingly larger ships serving hub ports globally.



Source: JICA Study Team

Figure 4.16: GDP and the Corridors

4.6.3 Water Sector Development Issues and Infrastructure Development Scenario(s)

(1) Water Sector Development Issues

The North-South Corridor connects the Port of Durban in South Africa with Lusaka in Zambia (and onwards to the DRC, which is not a focus country of this study), connected through two major routes. One traverses South Africa, Zimbabwe, and Zambia (Durban–Johannesburg–Beitbridge–Harare–Chirundu–Lusaka), while the other traverses South Africa, Botswana, and Zambia (Durban–Johannesburg–Lobatse–Gaborone–Kazungula/Victoria Falls–Livingstone–Lusaka).

Reference may be made to the discussion of the Maputo Corridor concerning the water sector in South Africa and to the discussion of the Beira Corridor concerning the discussion of the sector in Zimbabwe. The water supply and sanitation infrastructure at Beitbridge on the Zimbabwe side of the border with South Africa (not covered in the discussion under the Beira Corridor) is deteriorated.

Botswana is largely a dry country that relies heavily on groundwater for water supplies for domestic, agriculture, and industrial uses. Groundwater supplies an estimated 80% of the country's water supply needs. Most rural villages are wholly dependent on groundwater. Through the development of reservoirs and dams, surface water is also utilized for water supply to cover the increasing water demand. Water demand is projected to increase to 186.5 million m³ per annum by 2035 (compared to about 88.3 million m³ per annum in 2005). Thus, the yields from the existing dams are lower than forecast water requirements.

There are currently 2,000–3,000 ha of irrigated land in Botswana, mostly small-scale irrigated land. Yields are only about 50% of potential, a consequence of unskilled farmers and maintenance personnel. Constraints facing irrigation operation and maintenance include the lack of management and operational skills, and a shortage of spare parts for irrigation systems. Three dams have been designed for multipurpose use: (i) Lotsane, with a capacity to irrigate 350 ha, has been completed; (ii) Thune, with a capacity to irrigate 350 ha, is under construction; and (iii) Moseitse, with a capacity to irrigate 300 ha, is still in the development pipeline.

Reference may be made to the discussion of the Dar es Salaam and Nacala Corridors concerning the water sector in Zambia.

Major water sector development issues for the North-South Corridor in the priority subsectors (water supply, irrigation, and water resources management) may be summarized as follows:

- (i) high non-revenue water and water losses in municipal water supply, which are among the major issues in water supply in the region as described in Appendix H, resulting mainly from inadequate operation and maintenance of water supply systems causing the deterioration of water supply facilities⁶⁸;
- (ii) a shortage of water supply (with water available for less than 24 hours);
- (iii) the discharge of raw sewage from the Firle and Crowborough sewage treatment plants into the Mukuvisi and Marinda Rivers over the past five years (the water intake of Harare is located downstream of the discharge points of the sewage plants);
- (iv) the poor functioning of the water treatment system of Harare, a result of the poor quality of water resources;
- (v) the low water supply service ratio in Lusaka;
- (vi) deteriorated irrigation utilities in Zimbabwe;
- (vii) the limited irrigated area compared with the potential irrigable area in Zambia; and
- (viii) yields from existing dams that are lower than the total required irrigation water in Botswana.

(2) Water Sector Infrastructure Development Scenario(s)

Development directions for the North-South Corridor in the priority sectors over the short term include implementation of a project to reduce non-revenue water and water losses in capital cities along the corridor through the introduction of district metered areas (DMAs) for the water supply areas, detailed investigations of current conditions and problems, and the preparation of an investment program for facility improvement (a capacity development project).⁶⁹

Development directions for the North-South Corridor in the priority sectors over the long term include:

- (i) construction of a water supply dam to meet the increased demand for water in Harare (an investment project);
- (ii) reduction in the vulnerability of persons dependent on rainfed agricultural practices in Zambia by anticipating rainfall shortages and increased variability in the face of climate change (an investment project);

⁶⁸ As noted, addressing the issue of high non-revenue water and water losses will contribute not only to increasing water supply cost effectively but also to the effective and efficient development of water resources to meet water demand over the longer term.

⁶⁹ In implementing the initiatives to improve water supply, it is also important to take appropriate actions to improve sewerage systems in major cities along the corridor.

- (iii) an increase in crop productivity, reduction in water losses, and an increase in the efficiency and productivity of existing small-scale irrigation and rainfed systems (an investment project); and
- (iv) extension of the irrigation area for reducing the poverty of farmers (and investment project).

4.6.4 Power Development Issues and Development Scenario(s)

(1) Zambia

Power Supply Capability

Please refer to the description for the Nacala Corridor above.

Grid Accessibility

Since a 1 cct, 220 kV transmission line runs along the corridor, and there are 220 kV substations at Lusaka, Muzuma (near Choma), and Livingstone, reliable power can be secured around these areas (only). An additional (1 cct, 330 kV) transmission line is proposed along the same route.

(2) Zimbabwe

Power Supply Capability

Please refer to the description for the Nacala Corridor above.

Grid Accessibility

Transmission lines (2 or 3 cct, 330 kV) run along the corridor, and there are 330 kV substations at Alaska (near Chinhoyi, in northern Zimbabwe) and Kariba (on the border with Zambia), around where reliable power can be secured. It is easy to access power only around Harare, Chinhoyi, and Kariba. A 1 cct, 330 kV transmission line crosses only at Tokwe, near Masvingo, where there is a 330 kV substation. Only the Masvingo area can easily access a reliable grid.

(3) Botswana

Botswana is facing huge shortfall of power, as it formerly imported power from South Africa. In June 2012 peak demand was recorded at 578 MW, of which domestic generated power was only 292 MW only, and the rest imported from the Electricity Supply Commission (Eskom) of South Africa. The power purchase contract between the Botswana Power Corporation (BPC) and Eskom will terminate at the end of 2012, at which time all four units of Morupule B Coal Thermal Plant (generating 600 MW in total) will be put into operation. In 2013, the power supply will exceed the peak demand, but after that there will be a power shortfall unless new generating plants are constructed and/or power is imported, from Mozambique or Zambia, via the SAPP. The Government of Botswana is calling for an independent power producer (IPP) to construct two coal thermal plants, 150MW each, on the premises of Morupule B. Sufficient power can be secured only after completion of the Morupule B extension.

Grid Accessibility

A 220 kV line runs between Gaborone to near Francistown along the North-South Corridor. There are 220 kV substations at Gaborone, Panapye, Serule, and Francistown, around which there is easy access to reliable power. With the transmission of power generated at Morupule B 600 MW, 400 kV transmission lines and 400 kV substations are under construction at Isang (30 km north of Gaborone) Palapye, and Pokoje (50 km east of Serule), the 220 kV grid will be more reliable.

(4) South Africa

Power Supply Capability

As noted regarding the Maputo Corridor, in 2011, peak demand and available generation capacity were 36,444 MW and 41,074 MW, respectively, which means that the power supply capability was almost balanced with the peak demand plus required capacity for stable power system operation, taking a 10% margin into account ($36,444 \text{ MW} \times 110\% = 4,009 \text{ MW}$).

At present, Eskom is constructing the Kusile coal Thermal Power Plant ($800 \text{ MW} \times 6 \text{ units} = 4,800 \text{ MW}$) to be commissioned in 2014 to 2018 unit by unit, the Medupi coal Thermal Power Plant ($800 \text{ MW} \times 6 \text{ units} = 4,800 \text{ MW}$) to be commissioned in 2013 to 2017 unit by unit, the Ingula Pumped Storage Hydropower Plant (1,332 MW) to be commissioned in 2014) and an additional 100 MW.

Grid Accessibility

There is no major grid between Pretoria and Musina on the South Africa-Zimbabwe border. Also, there is no major grid between Pretoria and Lobatse on the Botswana-South Africa border. Only in the Johannesburg/Pretoria and Durban areas are there are reliable grids.

4.6.5 Transport/Trade Facilitation (Soft Issues)

Based on GPS and physical monitoring along the North-South Corridor, TradeMark Southern Africa has established that half of the average corridor transit time of 15 days between Kolwezi (DRC) and Durban is spent at border posts.⁷⁰ Developments at the respective border posts along the corridor are summarized below:

- (i) The Tripartite identified reducing congestion at **Chirundu** between Zambia and Zimbabwe as the highest priority,⁷¹ and in December 2009 a OSBP was launched at Chirundu. A July 2011 evaluation of the Chirundu OSBP found that waiting time for commercial traffic was reduced from “about 4–5 days to a maximum of two days and often to a few hours”.⁷² A number of further improvements have been programmed, including the laying of a fiber optic cable between the two sides of the border, computerization of the Zambian immigration department, and improvements in signage.⁷³
- (ii) The Tripartite identified reducing congestion at **Beitbridge** between South Africa and Zimbabwe as the second highest priority (i.e., the highest after Chirundu, on which

⁷⁰ TradeMark Southern Africa, *North-South Corridor Performance Monitoring*, Truckers' Forum 2012, 14–16 March 2012.

⁷¹ TradeMark Southern Africa, *Beit Bridge Border Post, Progress Report*, August 2010.

⁷² TradeMark Southern Africa, *Chirundu One Stop Border Post Case Study*, The TradeMark Southern Africa Case Study Series in partnership with the COMESA–EAC–SADC Tripartite, 2011, p. 11. Also, “illustrative results” for January 2012 based on GPS monitoring found average crossing times of 26 hours from Zimbabwe to Zambia and 23 hours from Zambia to Zimbabwe. TradeMark Southern Africa, *North-South Corridor Performance Monitoring*, Truckers' Forum 2012, 14–16 March 2012. On the other hand, there has been some anecdotal evidence indicating that the Chirundu OSBP is at best a work in process (“a OSBP in name only”). E.g., interview with Shipping and Forwarding Agents Association of Zimbabwe (Mr. Joseph Musariri, Chief Executive Officer; Mr. Juren C. Mtemeli, Managing Director, Cilo Freight Private Limited; and Mr. Stephen Mafarachisi, Managing Director, Customs Services; Mr. Lovemore Zimuto Bhande, Operations Manager-Freight), 9 August 2012.

⁷³ COMESA, EAC, SADC, and TradeMark Southern Africa, *Infrastructure Components of the North-South Corridor*, 2010, pp. 11, 14–15. Measures also called for (on the Zimbabwe side) include: (i) refurbishment of the old terminal building to accommodate clearing agents, (ii) road links in the border area, (iii) offices and office equipment for Interpol agents, (iv) training of border agency staff, (v) development of a communications strategy for the OSBP, and (vi) construction of plant and animal quarantine facilities. Ministry of Industry and Commerce, Zimbabwe, Spatial Development Initiatives (SDI), presentation to JICA Study Team, 8 August 2012.

significant resources have been expended).⁷⁴ It is one of the heaviest trafficked (according to some sources, the most heavily trafficked) border crossing in the Southern Africa region (and busier than any border crossing in East Africa), with estimates of 470–570 trucks per day,⁷⁵ which is far beyond the current capacity of existing infrastructure/facilities. Delays at Beitbridge average 22.6 hours southbound and 41.3 hours northbound due to limitations in border processing capacity. A Beitbridge Border Efficiency Management System (BBEMS) was developed with a work program anchored in the COMESA–EAC–SADC Tripartite, but implementation stalled after committees were established and a draft memorandum of understanding was prepared due to differences in policies and approaches to border management. Zimbabwe has concessioned works on its side of the border to a private sector firm (South African Infrastructure Investment Company) that is to upgrade infrastructure/facilities, including the main border post building, roads, and parking, as well as to expand the existing bridge over the Limpopo River to four lanes or to construct a new bridge; the works are far behind schedule, however. Implementation of a Beitbridge OSBP has been included in the SADC Regional Infrastructure Master Plan (TR/MSP 11) at an estimated total cost of USD 6 million.

- (iii) **Kazungula**, the border crossing point between Botswana and Zambia along the North-South Corridor,⁷⁶ provides an alternative to Chirundu for traffic between the Copperbelt and South Africa. Traffic is about 115 trucks per day, with about two days spent at the border.⁷⁷ While the route through Chirundu is about 300 km longer than the route through Kazungula, the route through Chirundu has a number of drawbacks (e.g., deteriorated road condition, challenging terrain, security, high fuel cost) and a reliable alternative route is required considering the corridor's economic importance. Accordingly, JICA and the AfDB⁷⁸ are proceeding with the Kazungula Bridge Project, including the implementation of trade facilitation and OSBP procedures. In August 2012 the Kazungula OSBP project was included in the SADC Regional Infrastructure Master Plan (TR/MSP 67). Drawing on lessons learned from implementation of the Chirundu OSBP, the Kazungula project aims to develop an efficient infrastructure system to facilitate traffic growth along the route. The border facilities component of the project is to cost UA 25.94 equivalent (USD 41.5 million equivalent).⁷⁹
- (iv) **Kasumabalesa**, the border crossing between Zambia and the DRC along the North-South Corridor, has heavy traffic (400 vehicles per day, 2011) and delay times of 5.5 hours northbound and 24 hours southbound.⁸⁰ An Israeli-controlled company has received concessions (separately) from both countries to develop border post facilities/infrastructure (about 11 km from the border on the DRC side), but there are no immediate plans to operate a OSBP at this crossing (although it had been designated as

⁷⁴ The Federation of East and Southern African Road Transport Associations (FESRATA) considers “unlocking” Beitbridge as the highest priority. Interview with Barney Curtis, Executive Director, FESARTA, 16 August 2012.

⁷⁵ (i) COMESA, EAC, SADC, and TradeMark Southern Africa, *Infrastructure Components of the North-South Corridor*, 2010, pp. 11; and (ii) SADC, *The SADC Regional Infrastructure Development Master Plan, Sub-Sector Plan, Border Posts*, 2012, 16.

⁷⁶ Citing old maps, Zimbabwe does not accept that there is a border between Botswana and Zambia. Interview with Ministry of Regional Integration and International Cooperation (Mr. T. T. Chifamba, Permanent Secretary; and Mr. Peter Chali, Acting Deputy Director, International Cooperation), 8 August 2012.

⁷⁷ SADC, *The SADC Regional Infrastructure Development Master Plan, Sub-Sector Plan, Border Posts*, 2012, 16.

⁷⁸ JICA is the senior partner in the financing of the bridge providing 69% of the required funding.

⁷⁹ African Development Fund, *Kazungula Bridge Project (SADC North-South Corridor Transport Improvement), Project Appraisal Report*, October 2011, Annex 1.

⁸⁰ AECOM International Development, *Integrated Border Management (IBM) – Border Operations Assessment Kasumabalesa*, submitted to the USAID/Southern Africa and Southern Africa Trade Hub, October 2011, pp. 4, 29.

a OSBP site).⁸¹ The concessionaire charges a total of USD 233 for a single crossing of a seven-axle truck loaded or empty.⁸² In October 2011, USAID's Southern Africa Trade Hub assessed operations at this border crossing and called for the establishment of a joint border committee and action plan (on the Zambia side).⁸³ Looking longer term, the SADC Regional Infrastructure Master Plan included the Kasumabalesa OSBP (TR/MSP 23) in its list of projects.

Other soft developments specifically regarding the North-South Corridor include the following:

- (i) assistance by TradeMark Southern Africa to the Government of Zimbabwe on the development of a program for coordinated (integrated) border management (CBM/IBM), e.g., assessing measures required to bring laws and operational systems in conformance with the principles of CBM/IBM, assessing the feasibility of streamlining the number and role of border agencies, taking into account simplification of systems, procedures, and processes⁸⁴;
- (ii) a planned demonstration project to be led by SADC to roll out a cross-border version of South Africa's Road Transport Management System, an industry-led, government-supported voluntary self-regulation system that encourages consignees, consignors, and road transport operators to implement a vehicle management system that preserves road infrastructure, improves road safety, and increases the productivity of the logistics value chain;⁸⁵ and
- (iii) work toward the development of a North-South Corridor Management Institution (NSCMI), which would be an international organization with legal personality.⁸⁶

Going forward, further efforts at transport/trade facilitation along the North-South Corridor may include the following:

- (i) strengthening of the Chirundu OSBP with development of CBM (and related policy and regulatory framework interventions),⁸⁷ building upon the work undertaken by TradeMark Southern Africa in supporting the development of CBM/IBM in Zimbabwe;

⁸¹ Such uncoordinated investments in border infrastructure make implementing OSBPs more difficult because the commitments to the concessionaire may be contrary to OSBP requirements. JICA and TradeMark Southern Africa, *Tripartite (COMESA, EAC and SADC) Regional OSBP Workshop*, 26–27 October 2011, p. 15.

⁸² (i) COMESA, EAC, SADC, and TradeMark Southern Africa, *Infrastructure Components of the North-South Corridor*, 2010, pp. 12, 16; (ii) Mark Pearson, *Trade Facilitation in the COMESA-EAC-SADC Tripartite Free Trade Area*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. SIIWP11, September 2011, p. 13.

⁸³ AECOM International Development, *Integrated Border Management (IBM) – Border Operations Assessment Kasumabalesa*, submitted to the USAID/Southern Africa and Southern Africa Trade Hub, October 2011, pp. 4, 23.

⁸⁴ See, e.g., Mark Pearson, *Trade Facilitation in the COMESA-EAC-SADC Tripartite Free Trade Area*, Trade Law Centre for Southern Africa (Tralac) Working Paper No. SIIWP11, September 2011, p. 20.

⁸⁵ See, e.g.: (i) Proposal for a Demonstration Project to Implement the Cross Border version of the Road Transport Management System (RTMS) Self-Regulation Accreditation Scheme on the North-South Corridor, 2011; and (ii) source in previous footnote, p. 27.

⁸⁶ A draft Memorandum of Understanding among the Governments of the Republic of Botswana, the Democratic Republic of Congo, the Republic of Malawi, the Republic of Mozambique, the Republic of South Africa, the Republic of Zambia, and the Republic of Zimbabwe on the Establishment of a Corridor Management Institution of the North-South Corridor has been agreed except for one sub-article (regarding a “user pay” system as one source of funding). The institutional arrangements would include a committee of ministers, an executive committee, and a secretariat at the regional level, as well as national corridor committees. COMESA EAC SADC North South Corridor Senior Officials Meeting, Johannesburg, Record, 7–8 May 2012, Section 6, pp. 6–7. Unfortunately, however, further progress on this issue could not be achieved at a Senior Officials and Legal Experts Meeting at Harare on 5–6 November 2012.

⁸⁷ E.g., preclearance and prepayment, an authorized economic operator scheme, full application of risk management, single window applications.

- (ii) “unlocking” Beitbridge, by restarting the BBEMS, developing a OSBP, and implementing CBM, again building upon the relevant work undertaken by TradeMark Southern Africa;
- (iii) strengthening of the planned Kazungula OSBP with the development of CBM;
- (iv) facilitating border crossing operations at Kasumabalesa with the development of the CBM, building upon the initial work funded by USAID’s Southern Africa Trade Hub; and
- (v) providing technical support for the NSCMI (if and when established).

4.7 Trans-Caprivi Corridor⁸⁸

4.7.1 Industrial Development Scenario

(1) Strengths and Potentials

Strengths of the Trans-Caprivi Corridor are indicated by the industries and products already present along the corridor, which are listed along with their primary locations are listed in Table 4.26.

Table 4.26: Industries and Products along the Trans-Caprivi Corridor

Country	Industries/Products
Namibia	<ul style="list-style-type: none"> • mineral resources including uranium and copper extracted in various locations along the corridor • manufacturing (e.g., plastic products, automotive parts, clothing) in the Walvis Bay Export Processing Zone
Zambia	<ul style="list-style-type: none"> • agricultural products including grains, soya beans, coffee, sugar, and tobacco in the South Province • coal mine in Maamba in the South Province

Source: JICA Study Team

Major recent investments along the corridor have been concentrated in mining and manufacturing, which is consistent with the strengths described above. Table 4.27 provides examples of major recent and planned investments along the corridor.

Table 4.27: Examples of Major Investments along the Trans-Caprivi Corridor

Project/Enterprise	Description	Industry/Sector
Tsumeb Copper Mine (Namibia)	In March 2010 Dundee Precious Metals Inc. has taken over metals processing and smelting in Tsumeb, located about 430 km north of Windhoek. The smelter, processing concentrate from the Tsumeb copper mine, is linked by rail to the Port of Walvis Bay. The smelter is one of only a few in the world that can treat arsenic and lead-bearing copper concentrates. Half of the smelter’s volume comes from Dundee’s Chelopech mine in Bulgaria.	Mining (copper processing and smelting)
Rössing Uranium Mine (Namibia)	The Rössing uranium mine is located near the town of Arandis, 70 km inland from the coastal town of Swakopmund in the Namib Desert. Rössing’s operations consist of two distinct phases: mining of the uranium-bearing rock, and processing this ore to produce uranium oxide.	Mining (uranium mining and processing)

⁸⁸ See subsection 4.7.2 for the definition of the Trans-Caprivi Corridor used in this study.

Project/Enterprise	Description	Industry/Sector
Walvis Bay Export Processing Zone (Namibia)	Some 20 companies, from Africa, Asia, Europe, and North America, are fully operational and making use of the EPZ incentives in Namibia. The established companies in the Walvis Bay EPZ are involved in the manufacturing of plastic pallets and products, automotive parts for Volkswagen and Audi vehicles, clothing, fishing-related accessories, and diamond cutting and polishing.	Manufacturing
Itochu Corporation's acquisition of a stake in Extract Resources Ltd. (Namibia)	Itochu Corporation has acquired a stake in Extract Resources Ltd. ("Extract") through its wholly owned Australian subsidiary, Nippon Uranium Resources (Australia) Pty Ltd. Extract owns 100% of the Husab (Rössing South) Uranium Project in Namibia.	Mining (uranium)
Maamba Coal Mine (Zambia)	Maamba Collieries Ltd. (MCL) owns Zambia's largest coal mine in Maamba, in the Zambezi Valley in the South Province. MCL has embarked on a business plan covering coal mining operations and establishing a 300 MW, mine-mouth, coal-fired power plant at Maamba which will help the company play a pivotal role in energizing Zambia and the surrounding region.	Mining (coal)

Abbreviations: EPZ = export processing zone, MW = megawatt

Source: Compiled by the JICA Study Team and various sources on the internet

(2) Priority Industries/Products in Relevant Policies and Strategies

Priority industries and products that are specified in relevant policies and strategies can also suggest sectors with development potential along the corridor. As shown in Table 4.28, priority sectors along the corridor include mining and manufacturing.

Table 4.28: Examples of Policies and Strategies Related to the Trans-Caprivi Corridor

Country	Relevant Policies and Strategies
Namibia	Third National Development Plan 2007/2008–2011/12. The plan aims to achieve a competitive economy, one that is knowledge-based and technology-driven. The plan identifies the following subsectors (among others) under the higher GDP growth scenario: agriculture, mining, manufacturing, and tourism.
Zambia	See the comparable tables in the Dar es Salaam and Nacala Corridor sections.

Source: Various sources on the internet

(3) Potentials Indicated by Other Sources

There are other potential areas for industrial development along the corridor identified by potential investors and donor-assisted studies. Table 4.29 shows examples of such potentials, including the tourism industry potential in Zambia, which is labor-intensive with the capacity to create jobs, and contribute significantly to national accounts.

**Table 4.29: Examples of Other Development Potentials
along the Trans-Caprivi Corridor**

Potential	Description
Port of Walvis Bay Expansion	The Preparatory Survey on the Walvis Bay Port Container Terminal Development Project was conducted by JICA/PADECO in 2010, to assess possible expansion and upgrading of the port, which is expected to play a key role as a container transshipment hub on the southwestern coast of Africa as well as a gateway to landlocked countries in the region.
Tourism industry in Zambia	See the comparable table in the Dar es Salaam Corridor section.

Source: Various sources on the internet

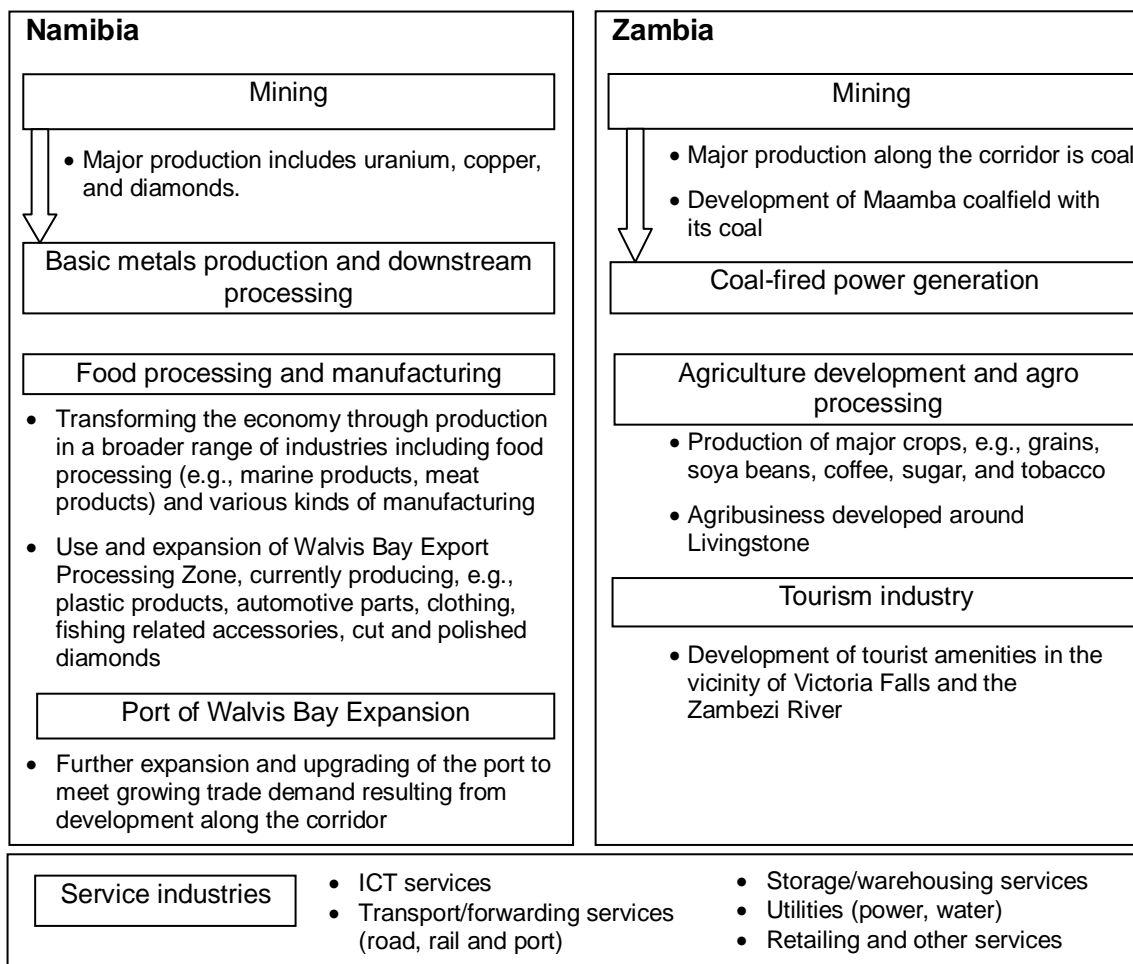
(4) Industrial Development Scenario

An industrial development scenario for the corridor was prepared (as summarized in Figure 4.17) based on (i) the strengths and potentials summarized above; (ii) detailed analysis of investment projects, policies, strategies, and plans related to the development of the corridor; and (iii) the overarching development scenarios proposed in Chapter 2. The scenario has the following major features:

- development of basic materials production and energy:
 - Uranium: the mid-eastern part of Namibia
 - Copper: the northern part of Namibia
 - Coal and energy: the South Province in Zambia
- development of food processing and manufacturing industries:
 - Food processing, automotive parts, and clothing, in the Walvis Bay Export Processing Zone in Namibia
 - Agriculture development and agro processing in the South Province in Zambia.

Development of uranium mining and processing will take place in the mid-eastern part of Namibia for export to Japan and Europe via the Port of Walvis Bay. Copper processing and smelting will take place in the surrounding area of the Tsumeb Copper Mine in Namibia along the corridor. The products will be exported to Europe and various African countries, such as Botswana and the Democratic Republic of Congo. Development of Maamba Coal Mine and a coal-fired power plant in Zambia will facilitate business activities including tourism in the southern Zambia.

Food processing including marine products and meat products will be developed, as well as supporting industries such as the manufacturing of automotive parts and light industries including clothing will further develop in the Walvis Bay Export Processing Zone, utilizing the relatively cheap labor force. Goods produced will be exported to the South African and European Union markets. Agriculture crops including grains, soya beans, coffee, sugar, and tobacco will be produced and agribusiness will be developed in the South Province in Zambia.



Source: JICA Study Team

Figure 4.17: Industrial Development Scenario for the Trans-Caprivi Corridor

4.7.2 Major Transport Development Issues and Infrastructure Development Scenario(s)

(1) Transport Development Issues

Figure 4.18 presents a map of the Trans-Caprivi Corridor, which is defined here as linking Livingstone–Katima Mulilo–Walvis Bay.

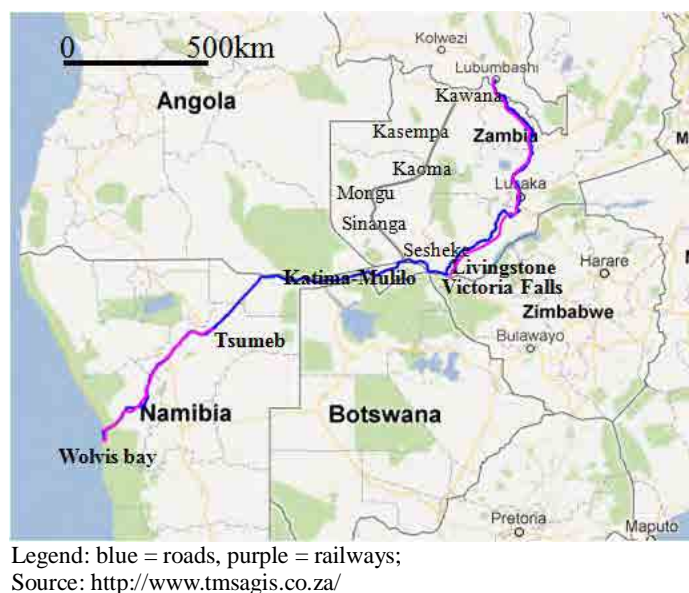


Figure 4.18: The Trans-Caprivi Corridor

According to relevant information on road conditions available in the SADC RIDMP, almost all road sections along the corridor are relatively in good condition. Major development issues include Western Corridor roads in Zambia (Kasempa–Kaoma–Mongu–Senanga–Nangweshi–Sesehe, including a bridge over the Zambezi river), assisted by DBSA.

Based on relevant information available in the SADC RIDMP, the corridor railway network is considered comparatively in better condition than other railways in the region. The Tsumeb–border (Katima Mulilo)–Livingstone section remains as a missing link. Corridor railway development issues include (i) construction of the 700 km Tsumeb–Katima Mulilo section in Zambia, and (ii) construction of the 200 km Katima Mulilo–Livingstone section in Zambia.

Capacity constraints at the Port of Walvis Bay are a bottleneck. The port has several expansion plans: (i) port extension, (ii) bulk and break-bulk handling, (iii) vessel traffic services/port control, (iv) a Botswana dry port at Walvis Bay, and a (v) a New Walvis Bay Container Terminal on reclaimed land. Also, in September 2012 a tender was issued for (i) a new tanker berth, (ii) a ship and rig repair quay, and (iii) a Walvis Bay Marina Development.

(2) Transport Infrastructure Development Scenario(s)

The Trans-Caprivi Corridor is expected to become more active due to (i) economic recovery in Zimbabwe, which has large potential in the minerals and agricultural sectors; and (ii) rapid economic development in Zambia, which has been recovering from financial and institutional difficulties. The most significant issue in this corridor is the missing railway link, since the roads between Zambia and the Port of Walvis Bay are in good condition.

4.7.3 Power Development Issues and Development Scenario(s)

(1) Namibia

Power Supply Capability

In 2011, peak demand and available generation capacity were 611 MW and 360 MW, respectively, which indicates a huge power supply shortage. The committed generation projects, which will be completed within few years, amount to 152 MW in total. Even adding this amount, total generating capacity will only be 512 MW, which is still less than demand in 2011.

The Kudu Gas Combined Cycle Project (800 MW) is listed as a priority SADC project, with completion expected in 2016. When the project is realized, Namibia may have sufficient supply capacity.

Grid Accessibility

The following transmission lines run along the corridor: (i) a 220 kV transmission line between Walvis Bay and Tsumeb, with 220 kV substations in the section; (ii) a 132 kV transmission line runs between Tsumeb and Calai, with substations at both ends; and (iii) a 150 kV DC transmission line between Calai and Katima Mulilo. Therefore, it is easy to access reliable power only between Walvis Bay and Tsumeb.

4.7.4 Water Sector Development Issues and Infrastructure Development Scenario(s)

(1) Water Sector Development Issues

The Trans-Caprivi Corridor connects the Port of Walvis Bay in Namibia and the North-South Corridor at Kazungula/Victoria Falls–Livingstone in Zambia. The corridor route in Namibia runs mainly on dry land with low annual rainfall (as low as less than 200 mm). There are two large river courses in Namibia: (i) the Zambezi River, which flows to the northern border with Zambia; and (ii) the Orange River, which flows to the southern border with of South Africa. Municipal water supplies are mainly abstracted from groundwater. Kazungula/Victoria Falls–Livingstone is located along the Zambezi River, but water supply conditions suffer from operation and maintenance problems.

Major water sector development issues for the Trans-Caprivi Corridor in the priority subsectors (water supply, irrigation, and water resources management) include: (i) high non-revenue water and water losses in municipal water supply, which are among the major issues in water supply in the region as described in Appendix H, resulting mainly from inadequate operation and maintenance of water supply systems causing the deterioration of water supply facilities⁸⁹; and (ii) a shortage of water supply (with water available for less than 24 hours).

(2) Water Sector Infrastructure Development Scenario(s)

Development directions for the Trans-Caprivi Corridor in the priority sectors over the short term include: (i) implementation of a project to reduce non-revenue water and water losses in capital cities along the corridor through the introduction of district metered areas (DMAs) for the water supply areas, detailed investigations of current conditions and problems, and the preparation of an investment program for facility improvement (a capacity development project)⁹⁰; and (ii)

⁸⁹ As noted, addressing the issue of high non-revenue water and water losses will contribute not only to increasing water supply cost effectively but also to the effective and efficient development of water resources to meet water demand over the longer term.

⁹⁰ In implementing the initiatives to improve water supply, it is also important to take appropriate actions to improve sewerage systems in major cities along the corridor.

assessment of the groundwater resources potential to improve groundwater management (a study).

Development directions for the corridor over the long term include increasing crop productivity, reducing water losses, and increasing the efficiency and productivity of existing small-scale irrigation and rainfed systems (an investment project).

4.7.5 Transport/Trade Facilitation (Soft Issues)

The **Wenela (Shesheke)⁹¹–Katima Mulilo BCP⁹²** between Namibia and Zambia has been proposed as a OSBP. Traffic is relatively light (about 50 trucks per day), with average time spent at the border about 0.6 hours northbound and 2.9 hours (southbound). However, traffic has been increasing since opening in 2004 of a German-assisted 877 m bridge on the Zambian side located within 1 km of the border, and there is potential for further traffic growth with the development of the economies of Zambia and eastern DRC. A March 2007 JICA-assisted feasibility study of OSBP implementation at Wenela–Katima Mulilo recommended a model involving juxtaposed facilities based on existing and planned facilities on both sides of the border. All procedures would be conducted in the country of entry, i.e., all procedures for northbound traffic would be conducted in Zambia, and all procedures for southbound traffic would be conducted in Namibia. Implementation of a Wenela–Katima Mulilo OSBP has been included in the SADC Regional Infrastructure Master Plan (TR/MSP 9) at an estimated total cost of USD 5 million.

A Trans-Caprivi Corridor Management Committee (also known as the Walvis Bay–Ndola–Lubumbashi Corridor Committee) was established by Namibia, Zambia, and the DRC in partnership with the private sector. The United Nations Conference on Trade and Development (UNCTAD) initially (2005) assisted the development of the Corridor’s Cluster Committee (2005), with subsequent support from the Swedish International Development Cooperation Agency (SIDA, 2008) and AfDB (2010–13).⁹³

Going forward, efforts at transport/trade facilitation along the Trans-Caprivi Corridor may involve implementation of CBM (and related policy and regulatory framework interventions)⁹⁴ and a OSBP at Wenela–Katima Mulilo, the former in the short to medium term and the latter in the medium to longer term.

4.8 Trans-Kalahari Corridor⁹⁵

4.8.1 Industrial Development Scenario

(1) Strengths and Potentials

Strengths of the Trans-Kalahari Corridor are indicated by the industries and products already present along the corridor. These industries or products along with their primary locations are listed in Table 4.30.

⁹¹ For clarification, Wenela is the border crossing point on the Namibian side, while Katima Mulilo is a Namibian town with a population of about 25,000 located 6 km from the border (Wenela); Zambia refers to their border post as Katima Mulilo; the border crossing is 10 km from the town of Sesheke.

⁹² The Kasumabalesa BCP between Zambia and the DRC, discussed regarding the North-South Corridor, is also along the Trans-Caprivi Corridor.

⁹³ In its current form, this committee dates back to 2009.

⁹⁴ E.g., preclearance and prepayment, an authorized economic operator scheme, full application of risk management, single window applications.

⁹⁵ See subsection 4.8.2 for the definition of the Trans-Kalahari Corridor used in this study.

Table 4.30: Industries and Products along the Trans-Kalahari Corridor

Country	Industries/Products
Namibia	<ul style="list-style-type: none"> • mineral resources including uranium and copper extracted in various locations along the corridor • manufacturing (e.g., plastic products, automotive parts, clothing) in the Walvis Bay Export Processing Zone • agro-processing (e.g., meat products) in Windhoek
Botswana	<ul style="list-style-type: none"> • mineral resources including coal, copper, manganese, and diamonds extracted in various locations along the corridor • ICT in Gaborone (in collaboration with Microsoft)

Abbreviation: ICT = information and communications technology

Source: JICA Study Team

Major recent or planned investments along the corridor have been concentrated in mining and manufacturing, which is consistent with the strengths described above.

Table 4.31 provides examples of major recent investments along the corridor, indicating that mining and manufacturing are the areas with greatest potential.

Table 4.31: Examples of Major Investments along the Trans-Kalahari Corridor

Project/Enterprise	Description	Industry/Sector
Rössing Uranium Mine (Namibia)	The Rössing uranium mine is located near the town of Arandis, 70 km inland from the coastal town of Swakopmund in the Namib Desert. Rössing's operations consist of two distinct phases: mining of the uranium-bearing rock, and processing this ore to produce uranium oxide.	Mining (uranium mining and processing)
Walvis Bay Export Processing Zone (Namibia)	Some 20 companies, from Africa, Asia, Europe, and North America, are fully operational and making use of the EPZ incentives in Namibia. The established companies in the Walvis Bay EPZ are involved in the manufacturing of plastic pallets and products, automotive parts for Volkswagen and Audi vehicles, clothing, fishing-related accessories, and diamond cutting and polishing.	Manufacturing
Itochu Corporation's acquisition of a stake in Extract Resources Ltd. (Namibia)	Itochu Corporation has acquired a stake in Extract Resources Ltd. ("Extract") through its wholly owned Australian subsidiary, Nippon Uranium Resources (Australia) Pty Ltd. Extract owns 100% of the Husab (Rossing South) Uranium Project in Namibia.	Mining (uranium)
Sojitz Corporation's reaching of a agreement for joint development of first the wind power project (Namibia)	Sojitz Corporation (Sōjitsu Kabushiki-gaisha) signed a joint development agreement with United Africa Group Pty Ltd., a Namibian company based in Windhoek, and Korea Midland Power Co., Ltd., to cooperate in the implementation of Namibia's first wind power project. The wind power will be constructed in Luderitz in southwestern Namibia with a generating capacity of 44 MW.	Wind power generation
Boseto Copper Silver Project (Botswana)	Discovery Metals Ltd. is continuing its expansive copper exploration in northwestern Botswana and further exploration in the underexplored Kalahari copper belt where it holds 18 prospecting licenses covering 11,872 km ² of exploration ground.	Mining (copper and silver)

Project/Enterprise	Description	Industry/Sector
Hana's Ghanzi Copper-Silver area (Botswana)	Hana Mining Botswana is continuing its focus on the Banana Zone, which forms part of the 2,200 km ² Ghanzi copper-silver belt in northwestern Botswana.	Mining (copper and silver)
Mmamabula Coal Field (Botswana)	Mmamabula Coal Field, located in the southeast of Botswana, is 100% owned by CIC Energy Corp., a coal-based energy company. CIC is developing the Mmamabula Energy Complex, consisting of the Mmamabula Energy Project, a planned 1,200 MW (net) power station and an integrated coal mine.	Coal mine and coal-fired power generation

Abbreviations: EPZ = export processing zone

Source: Compiled by the JICA Study Team and various sources on the internet

(2) Priority Industries/Products in Relevant Policies and Strategies

Priority industries and products that are specified in relevant policies and strategies can also suggest sectors with development potential along the corridor. As shown in Table 4.32, priority sectors along the corridor include mining and manufacturing.

Table 4.32: Examples of Policies and Strategies Related to the Trans-Kalahari Corridor

Country	Relevant Policies and Strategies
Namibia	Third National Development Plan (NDP3) 2007/2008–2011/12. The plan aims to achieve a competitive economy, one that is knowledge-based and technology-driven. The plan identifies the following subsectors (among others) under the higher GDP growth scenario: agriculture, mining, manufacturing, and tourism.
Botswana	See the comparable table in the North-South corridor section

Source: Various sources on the internet

(3) Potentials Indicated by Other Sources

There are other potential areas for industrial development along the corridor identified by potential investors and donor-assisted studies. Table 4.33 provides examples of such potentials in Namibia.

Table 4.33: Examples of Other Development Potentials along the Trans-Kalahari Corridor

Potential	Description
Development of an industrial and business zone in Namibia	The so-called Sungate project is underway for the development of an industrial and business zone near Hosea Kutako International Airport. In addition to the commercial, retail, residential, leisure and light industrial sectors, Sungate will cater to the increasing demand for the development of airport and transport related services and facilities.
Port of Walvis Bay Expansion	The Preparatory Survey on the Walvis Bay Port Container Terminal Development Project was conducted by JICA/PADECO in 2010, to assess possible expansion and upgrading of the port, which is expected to play a key role as a container transshipment hub on the southwestern coast of Africa as well as a gateway to landlocked countries in the region.

Source: Various sources on the internet

(4) Industrial Development Scenario

An industrial development scenario for the corridor was prepared (as summarized in Figure 4.19) based on (i) the strengths and potentials summarized above; (ii) detailed analysis of investment projects, policies, strategies, and plans related to the development of the corridor;

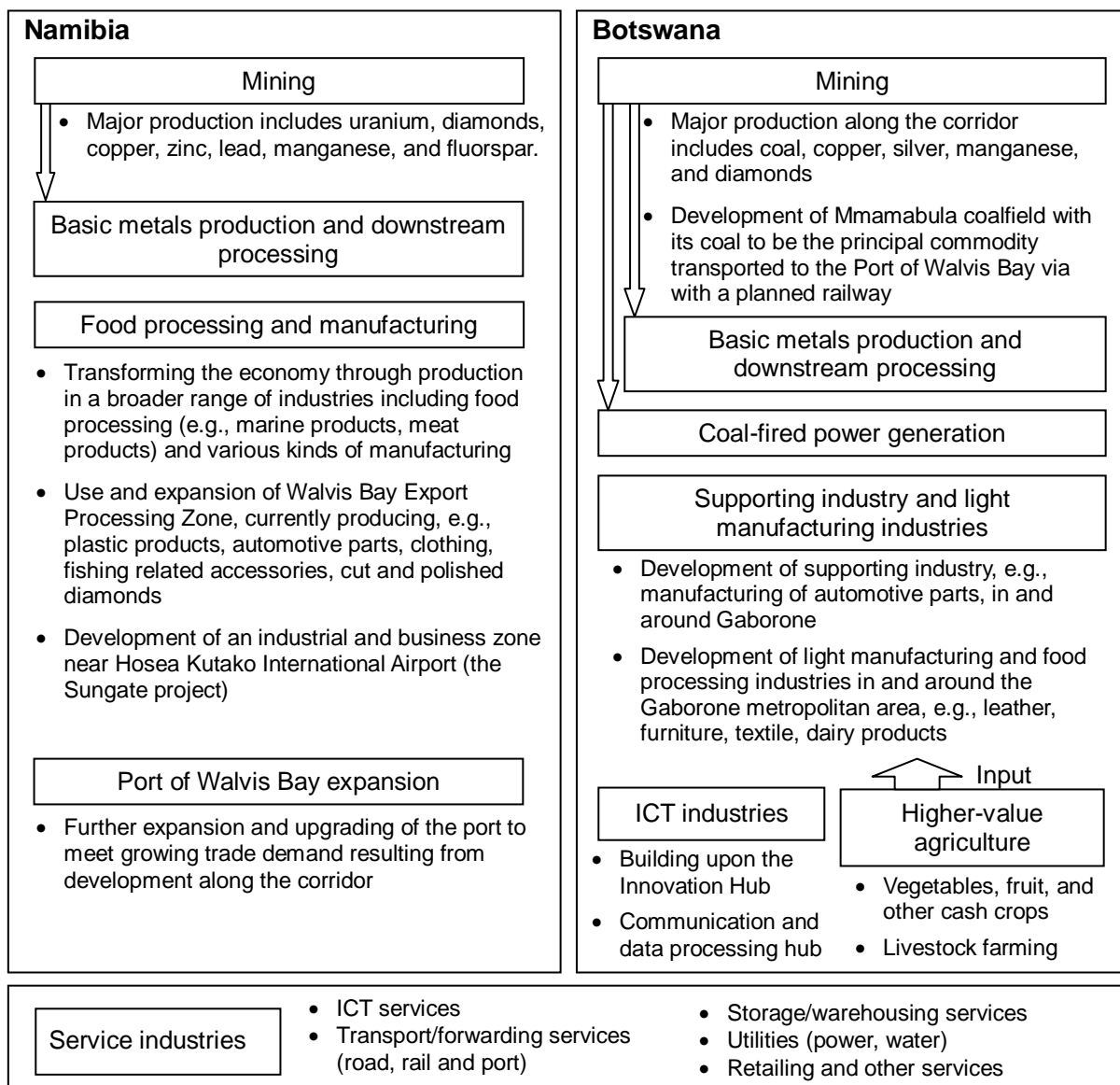
and (iii) the overarching development scenarios proposed in Chapter 2. The scenario has the following major features:

- development of basic materials production and energy
 - Uranium: Midwest of Namibia
 - Copper: Boseto and Ghanzi (Botswana)
 - Mmamabula coal and energy (Botswana)
- development of supporting industry and light manufacturing industries
 - Automotive parts: in the Walvis Bay Export Processing Zone in Namibia, and the suburbs of Gaborone (Botswana)
 - Leather, furniture, textiles: in and around metropolitan Gaborone
- development of ICT in Gaborone

Further development of uranium mining and processing will take place in the midwestern part of Namibia for export to Japan and Europe via the Port of Walvis Bay. Copper fabrication will take place in the vicinity of production areas (Boseto and Ghanzi) along the corridor. The products will be exported to South Africa as well as to the global market. Development of Mmamabula Coal Field will lead to dynamic and comprehensive economic activities along the corridor. Full operation of the Mmamabula Energy Complex will generate power for export to South Africa. Coal will be exported to the global market via Port of Walvis Bay through a fully developed Trans-Kalahari Railway Line.

Supporting industries such as the manufacturing of automotive parts will be developed in the Walvis Bay Export Processing Zone and the suburbs of Gaborone, utilizing relatively cheap labor force of both countries. Intermediary goods produced will be exported to the South African and European Union markets. Leather and leather products manufactured in and around Gaborone will be transported along the corridor and exported to South Africa as well as to the global market. Upholstery leather will create a synergy with domestic furniture industries, and will serve as inputs to the automotive industry in South Africa. Garment leather, shoe upper leather, and other high-value accessories including bags, wallets, and belts will be produced in Botswana for domestic use as well as for export. The furniture and textile production industry in Botswana will serve local demand and export to South Africa and the global market, enjoying preferential market access privileges. Unique, ethnic designs and features of such manufactured goods will be favorably accepted abroad. Due to the labor-intensive nature of these light manufacturing industries, jobs will be generated especially for youth in and around urban areas and facilitate labor transformation from the informal sector to the formal sector.

Gaborone will become an African gateway in ICT – software development, programming, hardware engineering, and robotics – building upon the Innovation Hub, in which strategic collaboration with Microsoft is succeeding. Also, Botswana is regarded as a communication or data processing hub for activities such as call centers, business process outsourcing and off-shoring, including online access databases such as airline reservations systems, shipping lines, and medical records. ICT has accommodated a broad range of labor from unskilled workers (those engaged in relatively simple work such as data input, e.g., call center operators) to knowledge workers at managerial levels.



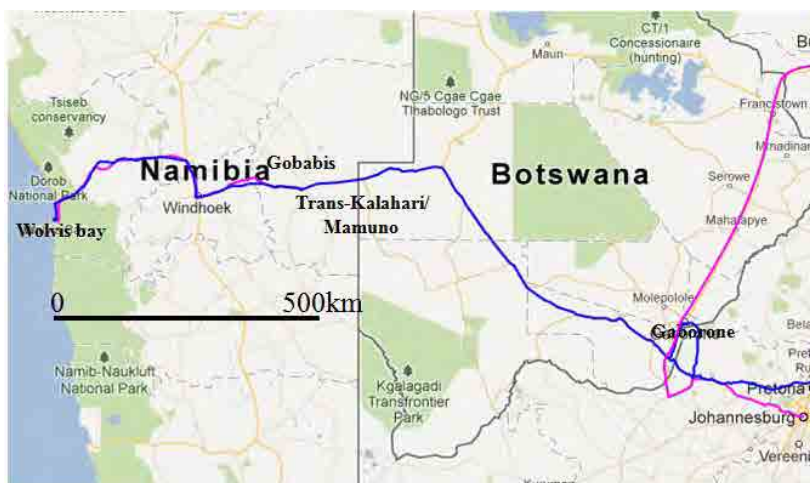
Source: JICA Study Team

Figure 4.19: Industrial Development Scenario for the Trans-Kalahari Corridor

4.8.2 Major Transport Development Issues and Infrastructure Development Scenario(s)

(1) Transport Development Issues

Figure 4.20 presents a map of the Trans-Kalahari Corridor. The corridor is defined here as linking Gaborone-border (Trans-Kalahari–Mamuno)–Walvis Bay.



Legend: blue = roads, purple = railways;
Source: <http://www.tmsagis.co.za/>

Figure 4.20: The Trans-Kalahari Corridor

There are no major road bottlenecks along the corridor. Rehabilitation and widening is ongoing in several phases along the 716 km section in Namibia.

Gaborone–border (Mamuno/Trans-Kalahari)–Gobabis is a missing rail link. It is to be constructed under SADC master plan project 37.

The Port of Walvis Bay – which serves the Trans-Caprivi Corridor as well as this corridor – was discussed above.

(2) Transport Infrastructure Development Scenario(s)

The Trans-Kalahari Corridor is also expected to become more active as Botswana further develops the export of its mineral resources through not only the Maputo Corridor but also this corridor. The Botswana Dry Port Project at Walvis Bay (SADC master plan project 30) is ongoing. As noted, there is a missing railway link, although the roads are in good condition.

4.8.3 Water Sector Development Issues and Infrastructure Development Scenario(s)

(1) Water Sector Development Issues

The Trans-Kalahari Corridor connects the Port of Walvis Bay in Namibia and the North-South Corridor at Gaborone in Botswana through Kalahari Desert. The corridor includes the Orange-Senqu River Basin in Botswana and Namibia. However, Namibia's water supply is mainly abstracted from groundwater. The situation in Botswana was described above under the North-South Corridor.

Water sector development issues for the Trans-Kalahari Corridor in the priority subsectors (water supply, irrigation, and water resources management) include:

- (i) high non-revenue water and water losses in municipal water supply, which are among the major issues in water supply in the region as described in Appendix H, resulting mainly from inadequate operation and maintenance of water supply systems causing the deterioration of water supply facilities⁹⁶;
- (ii) a shortage of water supply (with water available for less than 24 hours); and
- (iii) yields from existing dams that are lower than the total required irrigation water in Botswana.

(2) Water Sector Infrastructure Development Scenario(s)

Development directions for the Trans-Kalahari Corridor in the priority sectors over the short term include:

- (i) implementation of a project to reduce non-revenue water and water losses in capital cities along the corridor through the introduction of district metered areas (DMAs) for the water supply areas, detailed investigations of current conditions and problems, and the preparation of an investment program for facility improvement (a capacity development project)⁹⁷; and
- (ii) assessment of the groundwater resources potential to improve groundwater management (a study).

Development directions for the corridor over the long term include:

- (i) increasing crop productivity, reducing water losses, and increasing the efficiency and productivity of existing small-scale irrigation and rainfed systems (an investment project).

4.8.4 Power Development Issues and Development Scenario(s)

(1) Namibia

Power Supply Capability

Please refer to the description for the Trans-Caprivi Corridor above.

Grid Accessibility

Along the corridor a 220 kV transmission line runs between Walvis Bay and Windhoek via Okahandja; only along this section is it easy to access the grid.

(2) Botswana

Power Supply Capability

Please refer to the description for the North-South Corridor above.

⁹⁶ As noted, addressing the issue of high non-revenue water and water losses will contribute not only to increasing water supply cost effectively but also to the effective and efficient development of water resources to meet water demand over the longer term.

⁹⁷ In implementing the initiatives to improve water supply, it is also important to take appropriate actions to improve sewerage systems in major cities along the corridor.

Grid Accessibility

There is no transmission line and no plan to install a transmission line along the corridor.

4.8.5 Transport/Trade Facilitation (Soft Issues)

A OSBP at **Mamuno-Trans Kalahari**⁹⁸ between Botswana and Namibia was agreed in 2003,⁹⁹ and work is now underway for its development with JICA assistance. Traffic is now about 100 trucks per day, and with recent and forecast high traffic growth rate along the Trans Kalahari Corridor, its importance may increase in the future. Average clearance times are 1.0 hours eastward and 3.3 hours westward. In 2008 the USAID Southern Africa Trade Hub commissioned a OSBP feasibility study that found that the BCP could be converted to OSBP operation with relatively minor adjustments compared to other border crossings although some facilities/infrastructure improvements will be required. As proposed in the feasibility study, the border will be operated with juxtaposed facilities using existing buildings, with the Namibian facility to handle all commercial traffic (in both directions) and the Botswana facility (which is more user friendly for passengers) to handle private cars, buses, and pedestrians (in both directions). JICA has been assisting OSBP implementation (2010–12), with the dispatch of two experts, the provision of machinery and equipment (e.g., forklift, scanner), seminars/workshops, training, development of the OSBP operational model, and preparation of a procedures manual based on the operational model. The bilateral agreement was still under negotiation in 2012, with criminal law jurisdiction issues presenting a challenge. In August 2012 implementation of the Mamuno–Trans Kalahari OSBP was included in the SADC Regional Infrastructure Master Plan (TR/MSP 18) at an estimated total cost of USD 4 million.

Pursuant to the 2007 Memorandum of Understanding among Botswana, Namibia, and South Africa on the Development and Management of the Trans Kalahari Corridor, additional ongoing transport facilitation efforts along the corridor, at various stages of implementation, include: (i) movement toward implementation of an integrated bond guarantee arrangement; (ii) application of risk management techniques for selective inspection of goods; (iii) accreditation/registration of corridor users; (iv) development and implementation of a service charter between Customs and stakeholders; (v) the use of a single administrative document (SAD); (vi) standardization of weighbridge equipment along the corridor; (vii) harmonization of road traffic laws along the corridor; (viii) harmonization of driver training/testing/licensing; (ix) strengthening security of freight along the corridor to comply with international requirements; and (x) establishment of a data and information collection and dissemination system for corridor performance monitoring.¹⁰⁰

In July 2012 the USAID Southern Africa Trade Hub launched a regional customs connectivity project between Botswana and Namibia providing connectivity and data exchange between Namibia Customs and the Botswana Unified Revenue Service, in order to eliminate the need for manual data entry, reduce opportunities for fraud, and reduce the cost and time required for border clearance.¹⁰¹

⁹⁸ The previous name of Trans Kalahari was Buitepos (meaning “outpost” in Afrikaans).

⁹⁹ The reference is Article 2.2 of the Memorandum of Understanding among Botswana, Namibia, and South Africa on the Development and Management of the Trans Kalahari Corridor. Further, Mamuno–Trans Kalahari is one of the eight border crossing pairs identified for OSBP implementation under a SACU initiative.

¹⁰⁰ Related studies sponsored by the USAID Southern Africa Trade Hub included: (i) a TKC Authorized Economic Operators Based Accreditation Scheme (March 2009), (ii) Development of Trans Kalahari Clients Services Charter (May 2009); (iii) a Study on Sustainable Funding of Corridor Management Institutions: The Case of the Trans Kalahari Corridor Management Committee Secretariat (June 2009); and (iv) a Study on Development and Establishment of a Corridor Performance Monitoring System for the Trans Kalahari Corridor (June 2009).

¹⁰¹ See, e.g., Phodiso Valashia and Jacqueline Tjisesta (Botswana Unified Revenue Service), *Customs IT Connectivity: Botswana/Namibia Experience*, presented at USAID/World Customs Organization Trade Facilitation Conference, Johannesburg, 10 September 2012.

Going forward, further efforts at transport/trade facilitation along the Trans-Kalahari Corridor may include refining OSBP implementation by rolling out CBM and related policy and regulatory framework interventions. Looking longer term (i.e., toward 2027), the Trans-Kalahari Corridor may be a candidate to be developed as one of the “smart corridors”¹⁰² envisaged by the SADC Sub-sector Plan for Border Posts and the Programme for Infrastructure Development for Africa.¹⁰³

¹⁰² Over the longer term, SADC has envisaged a consultancy to identify corridors ready for smart corridor implementation (e.g., based on progress in simplification and harmonization of procedures, installation of reliable fiber optic connections along the corridor, degree of ICT use by border agencies and cross-border applications, demonstrated commitment).

¹⁰³ Sources for this section include: (i) Corridor Development Consultants, *Feasibility Study of Establishing One Stop Border Posts on the Trans Kalahari Corridor (Botswana-Namibia)*, funded by the USAID Southern Africa Global Competiveness Hub and commissioned by the Trans Kalahari Corridor Management Committee, 20 August 2008; (ii) SADC, *The SADC Regional Infrastructure Development Master Plan, Sub-Sector Plan, Border Posts*, 2012; (iii) interview with Botswana Unified Revenue Service, BURS (Mr. Phodiso P. Valashia, Commissioner Customs & Excise; Mr. M. Selebatso, Acting General Manager – Technical Services; and Ms. Gaobaone Senatle, Acting Customs General Manager, Regions and Compliance Manager, Compliance and Enforcement), 3 August 2012; and (iv) interview with Mr. Sakae Hamada, Chief Advisor, One Stop Border Post Project, BYRS/JICA, 3 August 2012.

5. Potential JICA Focus Economic Corridors

This chapter assesses the eight priority corridors surveyed in this study to consider potential JICA Focus Economic Corridors. An assessment was made of the regional development potential(s) of the priority corridors, and the suitability of JICA assistance for corridor development. Based on the assessment, the corridors were categorized into four groups, and for the corridors in two of these groups, development programming was undertaken considering the scenarios and findings presented in the previous chapters. For the corridors for which development programming was undertaken, a long list of potential technical assistance projects and infrastructure development initiatives are proposed in the chapter that follows. **It should be stressed that this approach does not imply that assistance for the development of other corridors will not be considered by JICA.**

5.1 Assessment of Priority Economic Corridors

5.1.1 Past Studies

Past relevant studies prioritized regional corridors in Southern Africa based on an assessment of their development potential(s). Table 5.1 shows the results of the corridor analysis undertaken in the JICA-assisted Preparatory Survey for Southern Africa Integrated Regional Transport Program (2010), which identified the eight priority corridors surveyed in the current study. In 2011, the Study on Programme for Infrastructure Development in Africa (PIDA) provided results quite similar to those obtained in the 2010 JICA study (see Table 5.2, presenting the PIDA corridor analysis for the eight priority corridors). Indeed, the top four corridors identified by the two studies were the same (although their order of priority was different).

Table 5.1: Results of Corridor Analysis in the 2010 JICA Study

Rank	Corridor	Score
1	Maputo Corridor	2.50
2	North-South Corridor	1.79
3	Dar es Salaam Corridor	1.15
4	Beira Corridor	0.92
5	Trans-Caprivi Corridor	0.47
6	Trans-Kalahari Corridor	0.32
7	Nacala Corridor	0.25
8	Lobito Corridor	0.18

Note: These top-ranked eight corridors are the ones surveyed in the current study.

Source: *Preparatory Survey for Southern Africa Integrated Regional Transport Program, Final Report*, March 2010

Table 5.2: Results of PIDA Corridor Priority Analysis

Rank	Corridor	Score
1	Maputo Corridor	80
2	Beira Corridor	73
3	North-South Corridor	66
4	Dar es Salaam Corridor	61
5	Trans-Caprivi Corridor	56
6	Nacala Corridor	53
7	Trans-Kalahari Corridor	49
8	Lobito Corridor	NA

Note: Only the eight corridors surveyed in the current study are presented.

Source: *Study on Programme for Infrastructure Development in Africa (PIDA), Final Phase III Report – Transport*, September 2011

Similarly, a corridor priority analysis was conducted in the SADC Regional Infrastructure Development Master Plan (RIDMP, August 2012), resulting in the prioritization of the eight corridors as shown in Table 5.3. The top three corridors in the SADC RIDMP were the same as those identified by the 2010 JICA Study.

Table 5.3: Priority of Corridors in SADC Regional Infrastructure Development Master Plan (RIDMP)

Priority	Corridor
High	North-South Corridor
High	Maputo Corridor
High	Dar es Salaam Corridor
Medium	Trans-Kalahari Corridor
Medium	Beira Corridor
Medium	Nacala Corridor
Medium	Trans-Caprivi Corridor
Medium	Lobito Corridor

Note: Only the eight corridors surveyed in the current study are presented.

Source: SADC, *Regional Infrastructure Development Master Plan – Transport Sector Plan*, August 2012

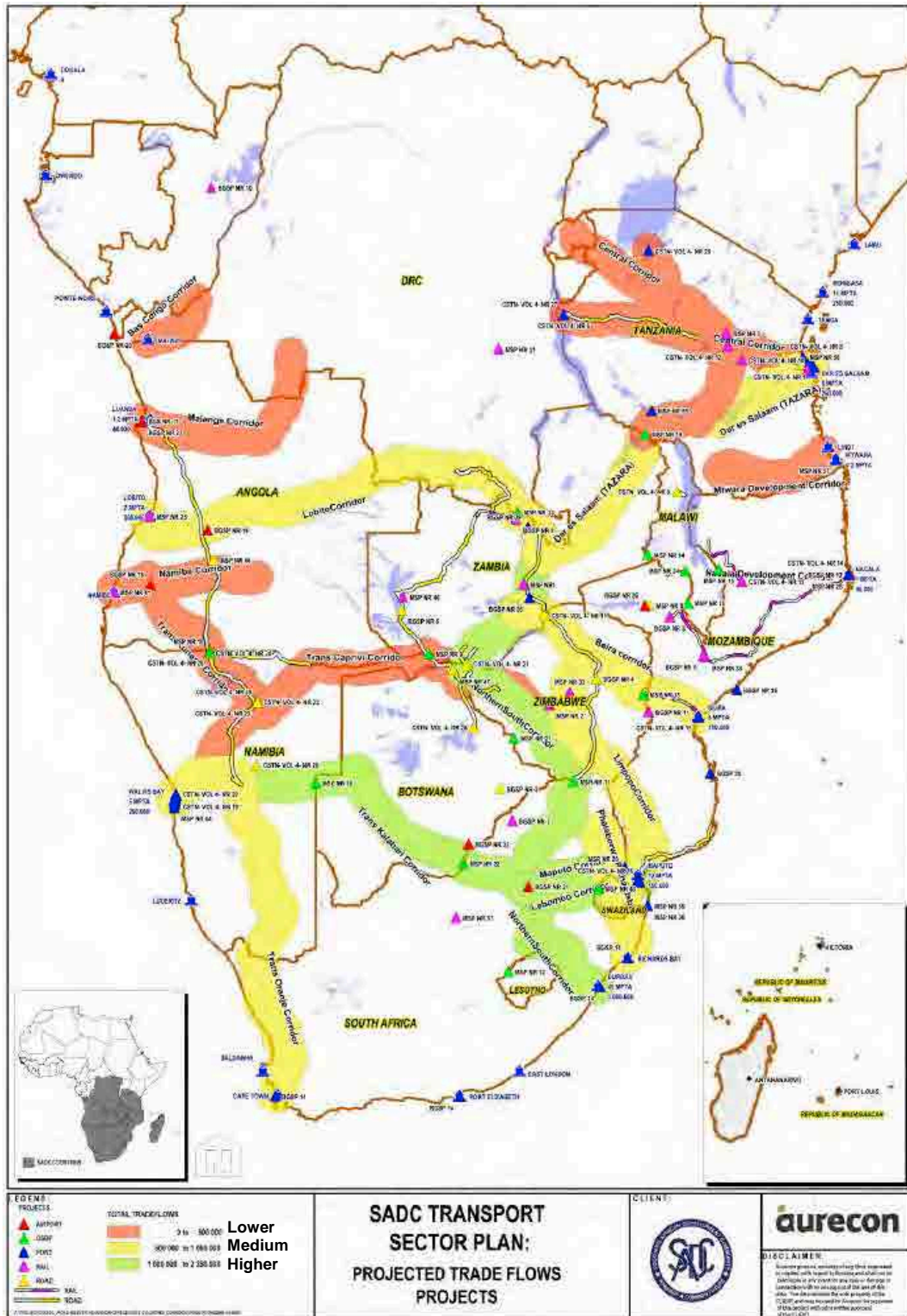
The priorities in the PIDA and RIDMP studies reflect the projections of trade flows by corridor prepared by the respective studies, as shown in Figures 5.1 and 5.2.



Note: The width of the corridors represents the projected trade volume. The gray areas are landlocked countries and regions.

Source: *PIDA Phase I – Africa Transport Outlook 2040*, April 2010

Figure 5.1: Corridor Demand Forecast for 2040 in PIDA



Note: Green corridors represent higher volumes, yellow corridors represent medium volumes, and red corridors represent lower volumes. The triangles represent the projects proposed in the RIDMP, with red for airport projects, green for one-stop border post projects, blue for port projects, pink for railway projects, and yellow for road projects.

Source: SADC, *Regional Infrastructure Development Master Plan – Transport Sector Plan*, August 2012

Figure 5.2: Projected Trade Flows for 2030 in the SADC RIDMP

5.1.2 Population in Areas of Influence

Considering the serious unemployment situation in Southern Africa, employment creation should be considered as one of the key elements for corridor development.¹ The eight corridors surveyed in this study traverse countries with different populations and population density as well as different GDP per capita as shown in Table 5.4. It is likely that the development of a corridor in areas with higher population and population density will generate greater employment; such corridors generally correspond to those of high priority in the past relevant studies described above.

Table 5.4: Population, Population Density, and GDP per Capita in the Focus Countries

Country	Population (2011) (millions)	Population Density (2010) (persons per km ²)	GDP per capita (2011) (current USD)
Angola	19.6	15.3	5,148
Botswana	2.0	3.5	8,680
Malawi	15.4	158.0	371
Mozambique	23.9	29.7	535
Namibia	2.3	2.8	5,293
South Africa	50.6	41.2	8,070
Zambia	13.5	17.4	1,425
Zimbabwe	12.8	32.5	776

Source: World Bank, *World DataBank*

5.1.3 Potential for Realizing Overall Development Scenarios

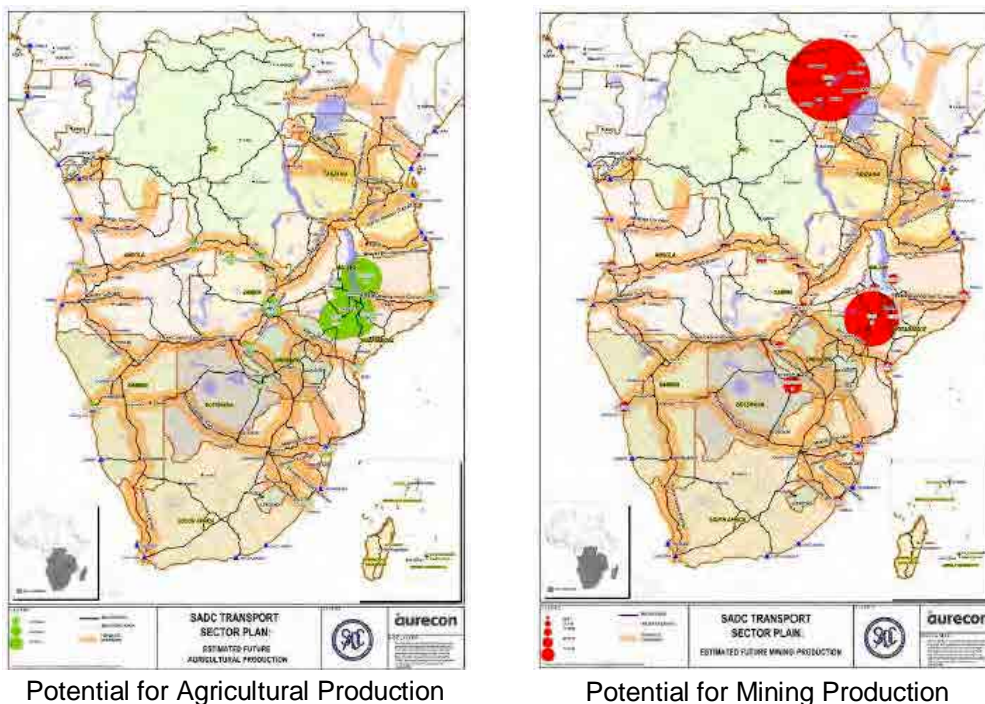
As described in Chapter 2, major forces driving the development of Southern Africa include: (i) agriculture and agro-industry; (ii) mining and downstream industries (especially, the basic materials industries); and to a lesser extent, (iii) light manufacturing. Economic transformation of the region can be accelerated by developing the corridors with greater potential especially for (i) and (ii).

Figure 5.3 illustrates the magnitude of development potential in agriculture and mining in terms of estimated production in tons. The areas with the highest agricultural potential include northern Mozambique, central and southern Malawi, and the areas around the Zambezi Valley in Mozambique. For mining, the province of Tete in Mozambique will generate the highest volume of minerals transport (i.e., coal) of all of the areas covered by the eight corridors.² These areas are located in and around the Beira and Nacala Corridors.

The potential(s) of agriculture and agro-industry as well as of mining and downstream industries along the priority corridors were assessed as part of the overall assessment of the priority corridors undertaken later in this section (see Tables 5.8 and 5.9).

¹ The importance of job creation was stressed by Mr. William Gumede, DBSA Policy Unit, during the Joint DBSA-JICA Workshop at the commencement of the study, in Johannesburg on 30 July 2012.

² The largest red circle in Figure 5.3 corresponds mainly to the production of iron ore in the Lake Albert region of the Democratic Republic of the Congo (DRC), which is outside of the areas surveyed in this study.



Note: The size of the circles represents the projected volume of production in tons.
 Source: SADC, *Regional Infrastructure Development Master Plan – Transport Sector Plan*, August 2012

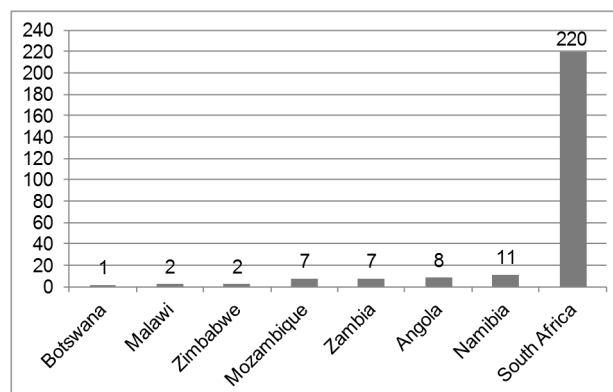
Figure 5.3: Agricultural and Mining Production Estimated in SADC RIDMP

5.1.4 Synergistic Investment by Japanese Enterprises

It has been increasingly important to take into account the potential impacts of JICA-assisted development on the activities of Japanese companies as well as on the beneficiary countries. Private-sector investment from Japan along the corridors that have already attracted, or are starting to attract, Japanese companies is more likely to increase with JICA assistance than along other corridors, which in turn would potentially maximize benefits in the beneficiary countries through win-win cooperation.

As shown in Figure 5.4, Japanese companies in the Southern African region are concentrated in South Africa, which is regarded by a number of the companies as a production and/or marketing base in the region, looking at not only the South African market but also the entire regional market. These companies as well as those planning to invest in South Africa are likely to benefit from the development of the North-South and Maputo Corridors.

On the other hand, the presence of Japanese companies in other countries has been quite limited as shown in the figure. There are, however, companies attempting to expand their operations in the region outside of South Africa. Table 5.5 presents examples of major investment projects outside of South Africa by Japanese companies closely related to the envisioned industrial development along the priority corridors. Although the number of the examples is limited, they indicate the strong interest of large Japanese corporations in investing in opportunities along the Beira and Nacala Corridors. Particularly, once the extraction of natural gas offshore in northern Mozambique becomes successful, there is good potential to attract further investment to develop heavy chemical industries in and around Nacala.



Source: Ministry of Foreign Affairs of Japan, *Annual Report of Statistics on Japanese Nationals Overseas, 2012*

Figure 5.4: Number of Japanese Establishments in the Focus Countries as of October 2011

Table 5.5: Examples of Major Investment Projects Outside of South Africa by Japanese Companies along the Priority Corridors

Country	Existing/Planned Investment Projects	Relevant Corridor
Mozambique	Nippon Steel Corporation, Japan's largest steel manufacturer, holds a stake in the Revuboe coal mining project in Tete Province, which is aiming to commence effective mining by 2014.	Beira Corridor (Nacala Corridor)
	Sumitomo Corporation and Toyo Engineering Corporation conducted a project formulation study (sponsored by the Ministry of Economy, Trade and Industry of Japan) on fertilizer production in the Beira area in 2011-12.	Beira Corridor
	Since 1998, Mitsubishi Corporation jointly with BHP Billiton, the Industrial Development Corporation of South Africa, and the Government of Mozambique, has been operating the Mozal aluminum smelter located in the Maputo area.	Maputo Corridor
	In 2011, Sojitz Corporation (Sōjitsu Kabushiki Gaisha) established Sojitz Maputo Cellulose Limited to construct a plant at the Port of Maputo to produce woodchips for paper production using timber from the Mpumalanga Province, South Africa, and Swaziland. The woodchips to be produced will be exported to Japan from the Port of Maputo.	Maputo Corridor
	In May 2012, a natural gas exploration project where Mitsui & Co., Ltd. has a minority stake (20%) found an offshore gas field in the Rovuma Basin, northern Mozambique, which potentially is the world's largest natural gas reserve. As of December 2012, Mitsui has ordered basic design work for the construction of a liquefied natural gas plant and the installation of facilities for offshore natural gas production.	Nacala Corridor
Zambia	A subsidiary of Hitachi Construction Machinery in Zambia constructed a large factory in Lusaka to remanufacture/recondition used parts and components for heavy duty earthmoving machinery for mining. Construction was completed in June 2012.	North-South, Dar es Salaam (and Nacala) Corridors

Sources: Various news sources on the internet and interviews with some of the companies mentioned in the table

5.1.5 Recent and Ongoing JICA Assistance

Another point to consider is the possibility of generating synergistic effects from a combination of future corridor development and recent and/or ongoing JICA assistance. Table 5.6 presents recent and ongoing JICA-assisted projects and programs that are closely related to the development of the priority corridors. In recent years JICA has been actively providing assistance to develop the Nacala Corridor including the ongoing Project for the Nacala Corridor Economic Development Strategies that is to formulate integrated development strategies for the corridor by sector and area. JICA is also supporting master planning for agricultural development along the corridor in tripartite cooperation among Japan, Mozambique, and Brazil, under the Pro-Savana Development Initiative. Given the agricultural potential along the Nacala Corridor as shown earlier, continued provision of assistance for development of the corridor is expected to generate positive outcomes particularly in Mozambique and Malawi, which lag behind other countries in the region economically.

Active assistance has also been provided for the development of the North-South Corridor and to a lesser extent for the development of the Maputo and Beira Corridors. The recent assistance for the North-South Corridor has been mainly for cross-border transport and trade facilitation in both “hard” and “soft” aspects and for industrial development particularly in Zambia. Support in both areas is still needed for development along this backbone corridor, and JICA’s continued involvement is expected to contribute to its development.

Table 5.6: Recent JICA-Assisted Projects and Programs Closely Related to the Development of Economic Corridors in Southern Africa

Country	Recent Projects/Programs	Relevant Corridors
Botswana	Financial assistance (ODA loan) for the Kazungula Bridge Construction Project, ongoing	North-South Corridor
	Thermal Power Plant Rehabilitation of Mole Pool/Environmental Research Project	North-South Corridor
	Project for the Establishment of the One-Stop Border Post between Botswana and Namibia at the Mamuno/Trans Kalahari Border Post, ongoing	Trans-Kalahari Corridor
Malawi	Project for the Study on Development of the Sena Corridor, Final Report, February 2012	Sena Corridor
	Financial assistance (grant aid) for several road/bridge projects	Nacala Corridor
Mozambique	Project for Nacala Corridor Economic Development Strategies, ongoing	Nacala Corridor
	Support for Agricultural Development Master Plan for Nacala Corridor, ongoing (Pro-Savana Development Initiative)	Nacala Corridor
	Project for Improving Research Capacity for Nacala Corridor Agriculture Development, ongoing	Nacala Corridor
	Financial assistance (ODA loan and grant aid) for several road/bridge projects along the Nacala Corridor	Nacala Corridor
	Project for Improvement of Nacala Port, ongoing	Nacala Corridor
	Project for the Comprehensive Urban Transport Master Plan for Greater Maputo, ongoing	Maputo Corridor
	Financial assistance (grant aid) for the Project for Reinforcement of the Dredging Capabilities for Beira Port, completed	Beira Corridor
	Preparatory Survey on Urea Fertilizer Complex Project, ongoing	Beira Corridor
Namibia	Data Collection Survey on the Power Sector of Mozambique, Final Report, July 2012	Entire country
	Preparatory Survey on the Walvis Bay Port Container Terminal Development Project, Final Report, March 2010	Trans-Caprivi and Trans-Kalahari Corridors
South Africa	Data Collection Survey on the Railway Sector, ongoing	Entire country
Zambia	Financial assistance (ODA loan) for Kazungula Bridge Construction Project, ongoing	North-South Corridor
	Development of Industry Strategy, ongoing	Entire country
	Zambia Investment Promotion Project – Triangle of Hope, completed in 2012	Entire country
	Study for Power System Development Master Plan, Final Report, February 2010	Entire country
	Study on Master Plan of Lusaka South Multi-Facility Economic Zone, Final Report, March 2009	Various corridors
Zambia/ Zimbabwe	Assistance for the introduction of a One-Stop Border Post (OSBP) at Chirundu Bridge, completed (note that Chirundu Bridge was completed in 2002 with grant aid from Japan)	North-South Corridor

Abbreviation: ODA = official development assistance

Source: www.jica.go.jp

5.1.6 Overall Assessment of Priority Economic Corridors

The priority economic corridors were assessed in terms of the following two broad measures: (a) development potential and (b) relationship with Japan, with the latter representing the extent to which JICA assistance is considered suited for corridor development. Based on the findings presented in the previous subsections, the specific measures listed in Table 5.7 were used to assess the corridors.

Table 5.7: Measures Used to Assess the Priority Economic Corridors

Broad Measures	Measures Used for Assessment
(a) Development potential	<p>a-1: results of the corridor analysis in the JICA-assisted Preparatory Survey for Southern Africa Integrated Regional Transport Program (2010)</p> <p>a-2: priority of corridors in the SADC Regional Infrastructure Development Master Plan (2012)</p> <p>a-3: potential for realizing the overall development scenarios formulated in this study, especially for the development of (i) agriculture and agro-industry, and (ii) mining and downstream industries, the key drivers of regional development</p>
(b) Relationship with Japan	<p>b-1: existing and potential investment by Japanese companies, which is more likely to increase with JICA assistance than is investment in other corridors, potentially maximizing benefits in the beneficiary countries</p> <p>b-2: recent/ongoing JICA assistance closely related to corridor development in the region, creating momentum to provide assistance with a longer-term perspective, which is desirable for the development of economic corridors in the region</p>

Source: JICA Study Team

Table 5.8 presents the overall assessment of the priority economic corridors applying the measures listed in Table 5.7. The top-ranked corridors (four corridors) in the 2010 JICA study and the high-priority corridors in the SADC RIDMP are indicated as part of the assessment of development potential(s).

The prospects for realizing the overall development scenarios formulated in this study were assessed as shown in Table 5.9, with the results summarized in Table 5.8 under the heading of “Potential for Realizing Overall Development Scenarios (a-3)”. The corridors were also assessed in terms of the relationship with Japan based on the findings presented in subsections 5.1.4 and 5.1.5.

Taking into account the importance of realizing the overall development scenarios as well as the relationship with Japan, the priority corridors were categorized into four groups (Groups 1-4), as shown in Table 5.8. Programming for development of the corridors in Groups 1 and 2 is presented in the section that follows, and a long list of potential technical assistance projects and infrastructure development initiatives are proposed in Chapter 6.

It should be stressed that these results do not imply that assistance for the development of other corridors (including the corridors in Groups 3 and 4) will not be considered by JICA. In addition, this categorization of the priority corridors will be reviewed by JICA when necessary.

Table 5.8: Overall Assessment of Priority Economic Corridors

Corridor	(a) Development Potential				(b) Relationship with Japan	
	Corridor Analysis in 2010 JICA Study (a-1)	Priority in SADC RIDMP (a-2)	Potential for Realizing Overall Development Scenarios (a-3)		Synergistic Investment by Japanese Firms (b-1)	Recent/Ongoing JICA Assistance (b-2)
			Agriculture and Agro-Industry(i)	Mining and Downstream Industries (ii)		
Beira	Medium		Higher	Higher	Medium	
Dar es Salaam	Medium	High	Higher	Medium		
Lobito			Medium	Medium		
Maputo	Higher	High	Lower	Medium	Higher	
Nacala			Higher	Higher	Higher	Higher
North-South	Higher	High	Higher	Higher	Higher	Medium
Trans-Caprivi			Lower	Medium		
Trans-Kalahari			Lower	Medium		
Basis	Table 5.1	Table 5.3	Table 5.9	Table 5.9	Section 5.1.4	Section 5.1.5

Categorizing the corridors:				
Group	Group 1	Group 2	Group 3	Group 4
Corridors	Nacala and North South	Beira and Dar es Salaam	Maputo	Lobito, Trans-Caprivi, and Trans-Kalahari
Definition	<ul style="list-style-type: none"> • Relatively higher potential for realizing the overall development scenarios • Relatively more closely related to the activities of Japanese firms and JICA 	<ul style="list-style-type: none"> • Relatively higher potential for realizing the overall development scenarios • Less closely related to the activities of Japanese firms and JICA than the Group 1 corridors 	<ul style="list-style-type: none"> • Among the corridors other than the Group 1 and 2 corridors, ranked highest in past relevant studies 	<ul style="list-style-type: none"> • These are the corridors other than those in Groups 1-3.

For Groups 1 and 2:

- Development programming is undertaken in the following section.
- A list of potential technical assistance projects and infrastructure development initiatives is proposed in Chapter 6.

For Groups 3 and 4:

- It is important to note that assistance for the Group 3 and 4 corridors will NOT be ruled out

Note: This categorization of the priority corridors will be reviewed by JICA when necessary.

Source: JICA Study Team

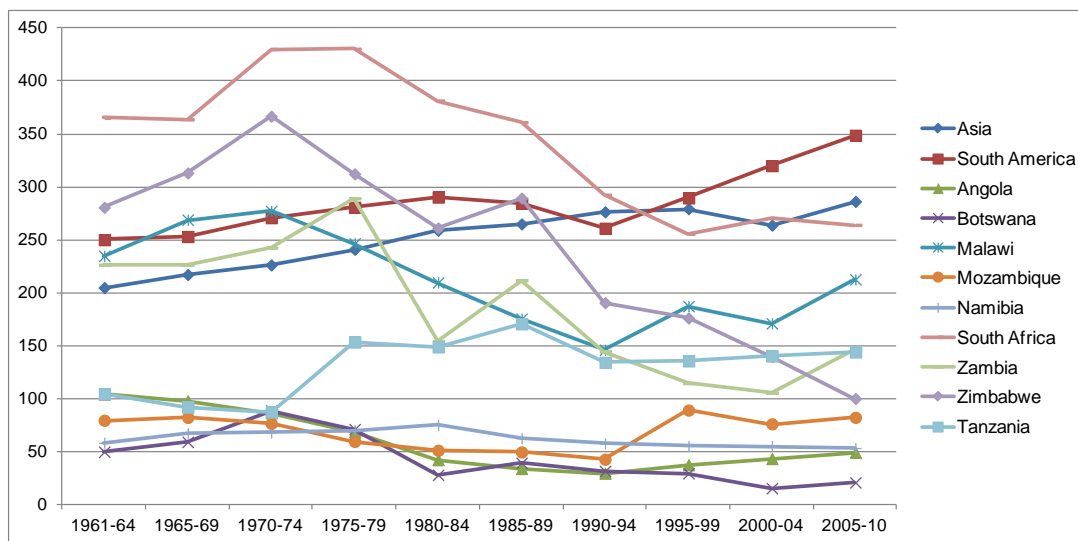
Table 5.9: Potential for Realizing Overall Development Scenarios along the Priority Corridors

Corridor	Agriculture and Agro-Industry		Mining and Downstream Industries	
	Major Development Potentials	Assessment	Major Development Potentials	Assessment
Beira	<ul style="list-style-type: none"> Development along the Beira Agricultural Growth Corridor in Mozambique (see the figure in Box 5.1 showing estimated agricultural production, indicating high potentials for agricultural development in the Zambezi River basin along the corridor) Development in Zimbabwe where agricultural productivity was formerly among the highest in Southern Africa and even higher than that of Asia and South America until the late 1970s, as shown in the first figure in Box 5.1 	Higher	<ul style="list-style-type: none"> Potential for offshore natural gas production in Pande/Temane (Mozambique) and development of downstream industries including fertilizer production in Beira Coal production and coal-fired power generation in Tete Province (Mozambique) (see the figure for estimated mining production in Box 5.1, indicating that Tete will generate the highest volume of minerals transport [i.e., coal] of all of the areas covered in this study) (Re)development of various kinds of minerals and downstream industries in Zimbabwe 	Higher
Dar es Salaam	<ul style="list-style-type: none"> Development along the Southern Africa Growth Corridor of Tanzania, which is drawing attention from local and international investors Development along the corridor in Zambia (in the Northern and Central Provinces) (Note that cereals production per capita in Zambia was formerly much higher than at present as shown in Box 5.1; productivity has been increasing in recent years.) 	Higher	<ul style="list-style-type: none"> Potential for offshore natural gas production in southern Tanzania and development of downstream industries in the Bagamoyo Special Economic Zone Potential for coal and iron ore extraction and development of downstream industries in Ludewa District, Iringa Province (Tanzania) 	Medium
Lobito	<ul style="list-style-type: none"> Development along the corridor particularly in Angola (Malanj, Lunda South, and Moxico) 	Medium	<ul style="list-style-type: none"> Copper and iron ore extraction, and development of downstream industries in multi-facility economic zones and industrial parks in Zambia Copper extraction and development of downstream industries in the DRC (Katanga Province) 	Medium
Maputo	<ul style="list-style-type: none"> Expansion of production of high-value commercial crops in Limpopo Province in South Africa (Note that agricultural development potential along the Maputo Corridor is relatively low due partly to the relatively small area available for agriculture along the corridor.) 	Lower	<ul style="list-style-type: none"> Extraction of platinum group metals, coal, iron ore, and diamonds in South Africa (Limpopo and Mpumalanga Provinces) and development of chemical industries and/or iron and steel production along the corridor Expansion of natural gas extraction and associated fuel production in Maputo 	Medium

Corridor	Agriculture and Agro-Industry		Mining and Downstream Industries	
	Major Development Potentials	Assessment	Major Development Potentials	Assessment
Nacala	<ul style="list-style-type: none"> Development in the Pro-Savana Project area (Mozambique), which has been supported actively by JICA Development in central and southern Malawi (Note that northern Mozambique, central and southern Malawi, and the areas around the Zambezi Valley in Mozambique are among the areas with the highest agricultural potential in the region.) Development along the corridor in Zambia (Note that cereals production per capita in Malawi and Zambia was formerly much higher than at present as shown in Box 5.1. The productivity in Malawi and Zambia has been increasing in recent years.) 	Higher	<ul style="list-style-type: none"> Potential for natural gas production in the Rovuma offshore area (Mozambique), which has the potential to be among the world's largest gas fields, and development of downstream industries Potential for production of various kinds of minerals (e.g., coal, heavy mineral sands) in Malawi and development of downstream industries Coal production in Tete Province (Mozambique), which will generate the highest volume of minerals transport (i.e., coal) of all of the areas covered by this study as shown in the figure for estimated mining production in Box 5.1 Production of copper, iron ore, and coal in Zambia and development of downstream industries 	Higher
North-South	<ul style="list-style-type: none"> Development along the corridor in Zambia, Zimbabwe, northeastern Botswana, and eastern South Africa (Note that cereals production per capita in Zambia and Zimbabwe was formerly much higher than at present as shown in Box 5.1, with high potential for productivity growth.) 	Higher	<ul style="list-style-type: none"> Production of various minerals along the corridor that traverses the countries with high potentials for mining, i.e., Zambia, Zimbabwe, eastern Botswana, and South Africa (e.g., copper, iron ore, nickel, coal, platinum, chrome, manganese, ferrochrome) and development of downstream industries 	Higher
Trans-Caprivi	<ul style="list-style-type: none"> Agro-processing in the Walvis Bay Export Processing Zone in Namibia Development of the South Province of Zambia although the volume of agricultural products to be transported along the corridor is expected to be relatively small due to low transport demand 	Lower	<ul style="list-style-type: none"> Uranium production in the mideastern part of Namibia Copper processing and smelting in the northern part of Namibia Coal production and energy development in the South Province of Zambia (Note that the coal transport from Zambia to the Port of Walvis Bay along the corridor requires the construction of a new rail link of nearly 1,000 km, the realization of which is quite uncertain due to the huge investment required.) 	Medium
Trans-Kalahari	<ul style="list-style-type: none"> Agro-processing in Windhoek and in the Walvis Bay Export Processing Zone in Namibia 	Lower	<ul style="list-style-type: none"> Uranium production in the midwestern part of Namibia Copper fabrication in the vicinity of production areas (Boseto and Ghanzi in Botswana) along the corridor (Note that the development of coal production in Botswana requires the construction of a rail link between Botswana and the Port of Walvis Bay, the realization of which is quite uncertain due to the huge investment required.) 	Medium

Source: JICA Study Team

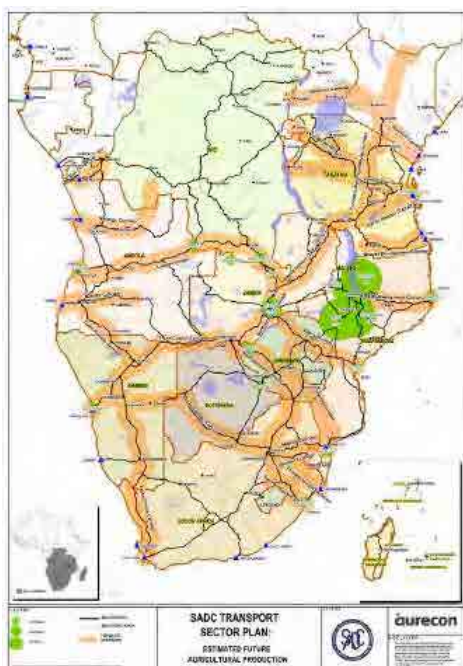
Box 5.1: Selected Data for Assessing Development Potentials for Agriculture and Agro-Industry as well as Mining and Downstream Industries



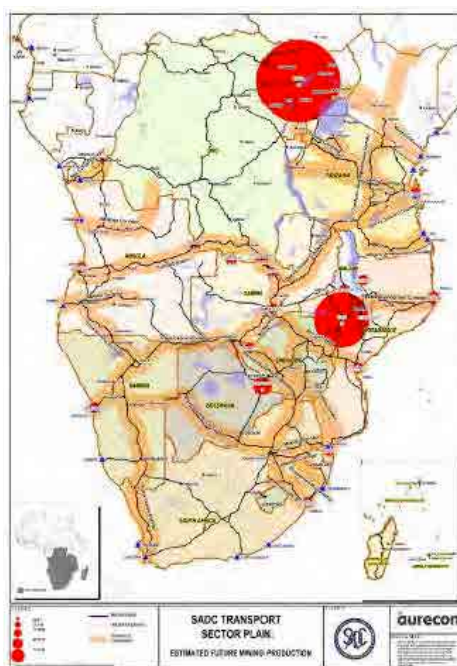
Note: Using the annual data presented in Box 2.2 of Chapter 2, the averages were taken in each period for the focus countries. The data for Tanzania were also added.

Source: Statistics Division, Food and Agricultural Organization (FAOSTAT)

Cereals Production per Capita in the Focus Countries and Tanzania (kg per capita) Compared with Asia and South America, 1961 – 2010



Potential for Agricultural Production



Potential for Mining Production

Note: These figures are the same as those in Figure 5.3. The size of the circles represents the projected volume of production in tons.

Source: SADC, *Regional Infrastructure Development Master Plan – Transport Sector Plan*, August 2012

Agricultural and Mining Production Estimated in SADC RIDMP

5.2 Development Programming for Group 1 and 2 Corridors

5.2.1 Methodology

For each of the corridors in Groups 1 and 2 as categorized in the previous section, programming for corridor development was undertaken, examining the following:

- Identification of potential industrial bases (i.e., areas and locations) and value chains expected to be developed as shown in the first table for each corridor (i.e., Tables 5.10., 5.12, 5.14, and 5.16), which presents: (i) major industries that will be developed, (ii) major products and areas/locations for upstream and downstream production, (iii) major distribution bases, and (iv) major markets; and
- Development programming, presented in the second table for each corridor (i.e., Tables 5.11, 5.13, 5.15, and 5.17) comprising: (i) primary development strategies (focusing on industrial development), (ii) major components of industrial development, (iii) critically needed actions by the public sector for each strategy, and (iv) proposed time frames for the critically needed actions.

These tables were developed taking into account the following:

- Against the background of the overall development scenarios described in Chapter 2, the development of (i) agriculture and agro-industry, (ii) mining and downstream industries, (iii) supporting industry/light manufacturing industries, and (iv) the services industry is envisioned for the corridors in Groups 1 and 2 as indicated in the first table (on potential industrial bases and value chains) for each corridor.
- Regional development scenarios for the priority economic corridors described in Chapter 4, including those for industrial development and infrastructure development (in the transport, power, and water sectors) as well as the infrastructure development issues detailed in the relevant appendices of this report;
- Relevant project information from various sources including (i) the SADC Regional Infrastructure Development Master Plan (RIDMP), August 2012; (ii) the Study on Programme for Infrastructure Development in Africa (PIDA), Final Phase III Report, September 2011; (iii) relevant government agencies in the countries along the Group 1 and 2 corridors; (iv) the Southern African Power Pool (SAPP); (v) the Development Bank for Southern Africa (DBSA); and (vi) various JICA study reports related to development along the Group 1 and 2 corridors³; and
- Regional integration measures discussed in Chapter 3.

The framework considered in developing the second table (i.e., development programming) for each corridor includes the following:

- The development strategies in the first column include development(s) commonly envisioned along major economic corridors in the region, specifically the development of agriculture and agro-industry, mining and downstream industries, and supporting industry/light manufacturing industries as described above as well as the implementation of regional integration strategies and related trade/transport facilitation measures and the

³ A more comprehensive description of the sources of the project information referenced by the JICA Study Team is provided in Chapter 6.

assessment of environmental and social impacts of the development initiatives to be undertaken.

- Critical public sector actions, listed in the third column, include: (i) actions promoting the envisioned industrial development, typically formulation and implementation of strategies/action plans (except for infrastructure development) including promotion of and/or assistance for private sector activities; (ii) infrastructure development including planning and implementation of public investment in the transport, power, and water sectors as well as for regional/industrial zone development; and (iii) capacity development critically needed for effectively undertaking the actions for (i) and (ii) above.
- Actions for the development of telecommunications are also necessary to achieve the envisaged industrial development, but they are not included in this table since this sector was not included in the scope of this study.
- For the proposed time frame, actions (i) and (iii) generally should be initiated as soon as possible since they are essential for industrial development along these corridors by the private sector. Realistic time frames for infrastructure development were proposed taking into account the time required for preparation of projects related to the actions proposed in the table.

For each corridor, major development potentials based on the two tables above are graphically presented in the figure following each of the two tables (i.e., Figures 5.5 to 5.8).

5.2.2 Beira Corridor

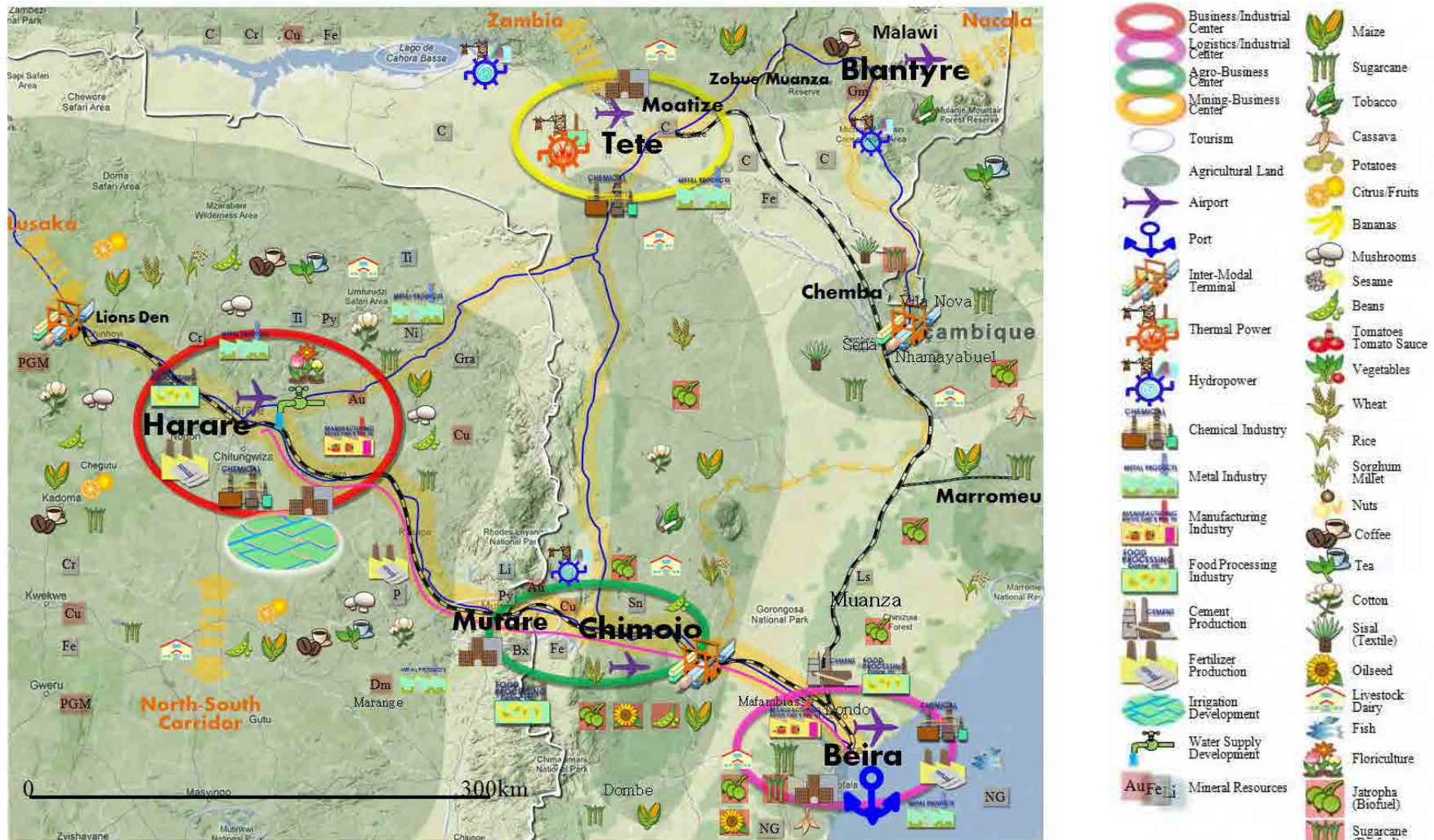
The primary industrial development strategies for the Beira Corridor include:

- (i) development of agriculture and agro-industry along the Beira Agriculture Growth Corridor (BAGC) and in Zimbabwe;
- (ii) regional development in the Tete area (Mozambique), to be promoted mainly with the development of coal mining and downstream industries including power generation and the iron/steel industry;
- (iii) redevelopment/modernization of mining and downstream industries in central Zimbabwe;
- (iv) development of mineral resources and downstream industries in southern Malawi; and
- (v) development of an industrial zone in Beira (Mozambique), which will produce fertilizer, chemicals, plastics, and packaging and other materials, and will function as a gateway to export agricultural and agro-processed products, which are increasingly produced along the corridor.

In order to promote these developments, regional integration initiatives including regional trade/transport facilitation measures will also be implemented.

Figure 5.5 graphically presents major development potentials along the corridor, and Table 5.10 shows potential industrial bases and value chains expected to be developed. Critical public sector actions needed for these developments are proposed in Table 5.11.

In addition, the critical actions listed in Table 5.11 will contribute to the development of services required to achieve the development strategies, leading to further increases in employment opportunities along the corridor. For each development initiative, environmental and social assessment studies should be undertaken prior to implementation, to avoid, minimize, and/or mitigate negative environmental and social impacts.



Note: These are major development potentials envisaged based on the findings of this study. Other potentials may also be identified through further investigations.
 Source: JICA Study Team

Figure 5.5: Major Development Potentials along the Beira Corridor

Au: Gold	Fe: Iron ore	P: Phosphate	Sn: Tin
Ag: Silver	Gm: Gemstones	Pb: Lead	Ta: Tantalum
Bx: Bauxite	Gr: Granite	PGM: Platinum Group Metal	Ti: Titanium
C: Coal	Ls: Limestone	Pv: Pyrite	U: Uranium
Co: Cobalt	Mn: Manganese	RE: Rare Earth	W: Tungsten
Cr: Chromite	NG: Natural Gas	Se: Selenium	Zn: Zinc
Cu: Copper	Li: Lithium		Zr: Zircon
Dm: Diamonds	Ni: Nickel		

Table 5.10: Potential Industrial Bases and Value Chains along the Beira Corridor

Industry	Upstream Production	Downstream Production/ Processing	Distribution Bases	Major Markets		
Agriculture and Agro-Industry	<p>Major products: rice, wheat, maize, soya, livestock, horticultural crops, sugarcane, jatropha</p> <p>Areas in Mozambique: Beira Agricultural Growth Corridor (Manica, Sofala, and Tete Provinces)</p> <p>Areas in Zimbabwe: Harare, Mashonaland Province, Manicaland Province (eastern Zimbabwe)</p>	<p>Major products: maize meal, flour, feedstuff, beef, ethanol, sugar, sweetener, cereals, tea</p> <p>Locations in Mozambique: Chimoiio, Tete, Dombe, Chemba, Dondo, Beira</p> <p>Locations in Zimbabwe: Harare, Mutare</p>	<p>Major bases: Beira including the Port of Beira, Chimoiio (Mozambique), Harare, Mutare (Zimbabwe)</p> <p>Other bases: Mutare/Forbes – Machipanda border area (between Zimbabwe and Mozambique)</p>	<p>Domestic: Beira, Tete (Mozambique), Harare (Zimbabwe)</p> <p>Export: South Africa, Europe, the Middle East, Asia</p>		
Mining and Downstream Industries	<p>Product: natural gas</p> <p>Area: Pande/Temane (offshore)</p> <p>Major minerals: coal, iron ore, magnetic iron, ilmenite, bauxite, heavy mineral sands, platinum, nickel, chrome, phosphates, pyrites</p> <p>Areas: Tete Province, central region of Zimbabwe, southern region of Malawi</p>	<p>Major products: power generation, iron and steel</p> <p>Location: Tete</p> <p>Major products: fertilizer, heavy chemicals</p> <p>Location: Beira</p> <p>Major products: fertilizer, diamond cutting and polishing, stainless steel, chrome ore, platinum processing</p> <p>Locations: Harare, Manicaland Province (eastern Zimbabwe)</p>	<p>Major bases: Beira (including the Port of Beira), Harare</p> <p>(Note that fertilizer to be produced will be used as an input for agricultural production along the corridor as well as in other parts of the region.)</p>	<p>Domestic: Beira, Maputo (Mozambique), Harare (Zimbabwe)</p> <p>Export: Malawi, Zambia, Asia</p>		
Services Industry	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>Input</p> <ul style="list-style-type: none"> • Information and communication technology services • Transport services (including freight forwarding services) • Utilities (power and water) </td> <td style="width: 50%; vertical-align: top;"> <p>Input</p> <ul style="list-style-type: none"> • Distribution systems (including retailing) • Banking, insurance, and other financial services • Construction and other related services </td> </tr> </table>				<p>Input</p> <ul style="list-style-type: none"> • Information and communication technology services • Transport services (including freight forwarding services) • Utilities (power and water) 	<p>Input</p> <ul style="list-style-type: none"> • Distribution systems (including retailing) • Banking, insurance, and other financial services • Construction and other related services
<p>Input</p> <ul style="list-style-type: none"> • Information and communication technology services • Transport services (including freight forwarding services) • Utilities (power and water) 	<p>Input</p> <ul style="list-style-type: none"> • Distribution systems (including retailing) • Banking, insurance, and other financial services • Construction and other related services 					

Note: The development of other manufacturing industries in Zimbabwe is described in the table for the North-South Corridor (Table 5.16) considering that South Africa is expected to be a major market for these industries. Likewise, agricultural development in Malawi is described in the table for the Nacala Corridor (Table 5.14), which is more relevant to Malawi's agriculture than is the Beira Corridor.

Source: JICA Study Team

Table 5.11: Development Programming for the Beira Corridor

Development Strategies	Major Components of Industrial Development	Critical Public Sector Actions (for the Beira Corridor)	Proposed Time Frame
<p>(i) Agricultural productivity enhancement and agro-processing capacity expansion for BAGC (in coordination with the private sector-led BAGC initiative) and in Zimbabwe</p>	<p>Modernization of agriculture and development of agro-industry, including:</p> <ul style="list-style-type: none"> • commercial farming (for crops, livestock, and horticulture) • agro-processing facilities • distribution facilities 	<p><u>Actions promoting the development of agriculture and agro-industry:</u> (Note: Actions to be taken should be in line with the Comprehensive African Agricultural Development Programme [CAADP] and the SADC Regional Agricultural Policy – Priority Policy Issues and Interventions, July 2012.)</p> <ul style="list-style-type: none"> • formulation and implementation of modernization program, taking account of various relevant measures in the SADC Regional Agricultural Policy • investment and (regional) value chain promotion (e.g., benchmarking and gap assessment of value chains, providing intensive production technologies to smallholder farmers, establishing linkages between producers and buyers) • provision of financial and other support for access to inputs • promotion for the development of logistics functions including consolidation facilities as well as cold storage and packing plants at major logistics centers (e.g., in Beira and Chimoio [Mozambique], and in Harare and Mutare [Zimbabwe]) • reduction of tariffs and nontariff barriers for relevant inputs, agricultural products, and related services <p><u>Infrastructure development:</u></p> <ul style="list-style-type: none"> • Irrigation: rehabilitation of the existing irrigation systems and extension of irrigable area in Zimbabwe (Note: Improved utilization of the existing systems that have deteriorated over the past decades and expansion of irrigable areas is essential for agricultural development in Zimbabwe, requiring public investment in these initiatives. For the BAGC initiative, on the other hand, it is expected that the irrigation system will be developed on a commercial basis.) • Road: improvement of the road network (including the development of feeder roads to link farms with markets via major roads) and development of intermodal facilities in the BAGC area to serve the production and distribution of agricultural and agro-industrial products • Rail: rehabilitation of railway systems along the Beira Corridor linking Beira and Harare to accommodate significant increases in mining, agricultural, and other traffic (especially in the transport of bulk commodities and long-distance freight, which are relatively well-suited for rail transport) to/from Zimbabwe with continuing economic development of the country • Port: expansion of the Port of Beira to accommodate significant increases in mining, 	<p>By 2017 for all actions</p> <p>By 2017 for rehabilitation, by 2025 for minor extension, and by 2035 for further extension</p> <p>By 2017 for road actions</p> <p>By 2025 for rail actions By 2020 for port expansion, and by 2035 for new port development</p>

Development Strategies	Major Components of Industrial Development	Critical Public Sector Actions (for the Beira Corridor)	Proposed Time Frame
		agricultural, and other traffic to/from areas along the corridor Capacity development: <ul style="list-style-type: none"> • provision of extension services and technical assistance for small farmers in relevant areas of Mozambique and Zimbabwe • provision of technical/management assistance for leading local farmers in relevant areas of Zimbabwe • capacity development in the railway sector of Mozambique and Zimbabwe considering the increasing importance of revitalizing railways in these countries 	By 2017 for capacity development
(ii) Regional development in the Tete area (Mozambique) building on the growth of coal mining in Tete Province	Development as an inland industrial area, e.g., through development of: <ul style="list-style-type: none"> • power generation plants • iron and steel industry • office, housing, and commercial areas • infrastructure for industrial development 	Planning for regional development: <ul style="list-style-type: none"> • regional and urban development planning in the Tete area Infrastructure development: <ul style="list-style-type: none"> • Power generation: development of power generation plants in the central Zambezi Basin, both hydropower and coal-fired (using coal resources in Tete Province), in order to meet increasing power demand along the corridor and in the Maputo area as well as in South Africa (Note: All of the SADC priority generation projects in Mozambique that were not committed as of August 2012 are located in this area.) • Power transmission: development of the Mozambique regional transmission backbone connecting the power generation areas with the Beira area (and Maputo as well as South Africa) • Other infrastructure: upgrading/capacity expansion of the Sena railway line, and development of other infrastructure adequate for the type of industrial development, which will depend on the progress of coal mining, power generation, and future private sector investment in the Tete area 	By 2025 for planning By 2020 for power generation and transmission By 2030 for other infrastructure

Development Strategies	Major Components of Industrial Development	Critical Public Sector Actions (for the Beira Corridor)	Proposed Time Frame
(iii) Redevelopment and modernization of mining and related industries in Zimbabwe	Development of various kinds of plants, including: <ul style="list-style-type: none"> • mining facilities • smelter and processing plants • iron and steel plants • diamond cutting and polishing facilities • fertilizer plants 	<p><u>Actions for the development of mining and related industries:</u></p> <ul style="list-style-type: none"> • formulation and implementation of redevelopment/modernization program including investment promotion and negotiation with potential investors and developers <p><u>Infrastructure development:</u></p> <ul style="list-style-type: none"> • Transport: the same as the actions for rail and port for strategy (i) above • Water supply: development of water resources for the city of Harare, where water supply (for industrial, commercial, and residential uses) is inadequate in both quantity and quality due to a lack of development funds even though water resources development was planned and approved by the government during the 1990s • Power generation: development of planned power generation plants to fill the substantial power supply and demand gap, which has resulted in a chronic power shortfall in the country (Note: Development of power generation in Zimbabwe is urgently needed regardless of the type of industrial development to be pursued due to the existing gap between supply and demand.) • Pipeline: enhancement of the existing liquid oil pipeline between Beira and Harare to utilize the huge liquid fuel (e.g., diesel, petrol, Jet A-1, and paraffin) storage capacity in Zimbabwe <p><u>Capacity development:</u></p> <ul style="list-style-type: none"> • provision of technical assistance for highly productive and environmentally conscious mining/processing • provision of technical assistance for reduction in non-revenue water and water losses in Harare • capacity development in the railway sector of Zimbabwe considering the increasing importance of revitalizing railways in the country 	By 2025 for these actions For transport, the same as those for (i) above By 2017 for water supply By 2017 for power generation By 2017 for the pipeline By 2020 for capacity development
(iv) Development of mineral resources and downstream industries in Malawi	Development of mining sites, facilities, and related industries	The actions critically needed for this strategy are the same as those for the corresponding strategy (i.e., development of mineral resources and downstream industries in Malawi) described in the table for the Nacala Corridor (Table 5.15).	See the table for the Nacala Corridor
(v) Development of Beira industrial zone	Development of various kinds of plants, including: <ul style="list-style-type: none"> • fertilizer plant • chemicals and plastics 	<p><u>Actions for the industrial development:</u></p> <ul style="list-style-type: none"> • formulation of industrial development policies, strategies, and action plans for concerned provinces (including Sofala Province) incorporating the development of gas fields in the area (including those in Pande and Temane) • formulation of action plans for industrial zone and related development 	By 2017 for all actions

Development Strategies	Major Components of Industrial Development	Critical Public Sector Actions (for the Beira Corridor)	Proposed Time Frame
	<ul style="list-style-type: none"> plants packaging and related materials plants assembling plants for electric appliances 	<p>Infrastructure development:</p> <ul style="list-style-type: none"> Industrial zone: development of industrial zone and related infrastructure Transport: capacity expansion of the Port of Beira Power generation and transmission: the same as the actions for strategy (ii) above <p>Capacity development:</p> <ul style="list-style-type: none"> provision of technical and vocational education and training in relevant areas 	<p>By 2020 for infrastructure development</p> <p>By 2017 for capacity development</p>
(vi) Avoidance/minimization/mitigation of environmental and social impacts	(to be undertaken for each development initiative)	<ul style="list-style-type: none"> Negative environmental and social impacts should be avoided, minimized, and/or mitigated for each development initiative. Mitigation measures should be planned prior to implementation based on environmental and social studies at the different stages of project preparation to meet applicable legislation and guidelines in the countries concerned as well as the guidelines of concerned funding organizations. 	Prior to implementation
Regional Integration	Expected Impacts	Critical Public Sector Actions (for the Beira Corridor)	Proposed Time Frame
(vii) Implementation of regional integration strategies and related trade/transport facilitation measures	<ul style="list-style-type: none"> Reduced border crossing and port clearance time and cost Promotion of intraregional and global trade through creation of a reliable, cost-effective logistics route with positive returns for all stakeholders 	<ul style="list-style-type: none"> Border crossing facilitation at Forbes–Machipanda and Zobue–Mwanza Trade facilitation at the Port of Beira Establishment of a Beira Corridor Authority to address trade/transport facilitation issues Railway transport facilitation (e.g., through an international railway joint operating agreement along the corridor) 	By 2017 for all measures (except by 2025 for railway transport facilitation)
(viii) Development of services needed to achieve the development strategies		Various critical actions proposed above (especially those promoting private sector activities) will contribute to the development of various kinds of services required to achieve the development strategies above.	

Abbreviations: BAGC = Beira Agriculture Growth Corridor, CAADP = Comprehensive African Agricultural Development Programme, SADC = Southern African Development Community

Source: JICA Study Team

5.2.3 Dar es Salaam Corridor

The primary industrial development strategies for the Dar es Salaam Corridor include:

- (i) development of agriculture and agro-industry along the Southern Agricultural Growth Corridor of Tanzania (SAGCOT) and extension of the SAGCOT in Zambia;
- (ii) development and promotion of agribusiness-centered industrial clusters with small and medium enterprises (SMEs) and micro manufacturing enterprises (MMEs) engaged in activities mainly for agribusiness, which will be located in key cities along the corridor in Tanzania and Zambia;
- (iii) development of iron/coal mining and downstream industries in the Ludewa area of Iringa Province in Tanzania; and
- (iv) development of the Bagamoyo Special Economic Zone (SEZ) in Tanzania to be undertaken along with the construction of a new port, leading to development of heavy chemical and other industries.

In order to promote these developments, regional integration initiatives including regional trade/transport facilitation measures will also be implemented.

Figure 5.6 graphically presents major development potentials along the corridor, and Table 5.12 shows potential industrial bases and value chains expected to be developed. Critical public sector actions needed for these developments are proposed in Table 5.13.

In addition, the critical actions listed in Table 5.13 will contribute to the development of services required to achieve the development strategies above, leading to further increases in employment opportunities along the corridor. For each development initiative, environmental and social assessment studies should be undertaken prior to implementation, to avoid, minimize, and/or mitigate negative environmental and social impacts.



Note: These are major development potentials envisaged based on the findings of this study.

Other potentials may also be identified through further investigations.

Source: JICA Study Team

Figure 5.6: Major Development Potentials along the Dar es Salaam Corridor

Table 5.12: Potential Industrial Bases and Value Chains along the Dar es Salaam Corridor

Industry	Upstream Production	Downstream Production/ Processing	Distribution Bases	Major Markets
Agriculture and Agro-Industry	<p>Major products: oilseed crops, livestock, rice, maize, barley, soybeans, wheat, sugarcane, sweet potatoes, horticultural crops, macadamia nuts, tobacco, coffee, tea, cotton</p> <p>Areas in Tanzania: Southern Africa Growth Corridor of Tanzania (SAGCOT) (Pwani, Morogoro, Dodoma, Iringa, and Mbeya Provinces)</p> <p>Areas in Zambia: Northern and Central Provinces</p>	<p>Major products: edible oil, maize meal, flour, tobacco (processed), tomato paste, juice, meat, dairy products, coffee, tea</p> <p>Locations in Tanzania: Morogoro, Kilosa, Iringa, Makanboko, Niombe, Mbeya, Tunduma, Tukuyu, Sumbawanga</p> <p>Locations in Zambia: Nakonde, Mpika, Serenje, Kasama, Kapri Mposhi</p>	<p>Major bases: Dar es Salaam, Dodoma, Morogoro, Mbeya (Tanzania), Mpika, Serenje, Kapri Mposhi (Zambia)</p> <p>Other bases: Tunduma – Nakonde border area (between Tanzania and Zambia)</p>	<p>Domestic: Dar es Salaam and SAGCOT area (Tanzania), Lusaka (Zambia)</p> <p>Export: DRC, EAC countries, Malawi, and South Africa, as well as to Europe, the Middle East, and Asia</p>
Mining and Downstream Industries	<p>Product: natural gas</p> <p>Area: southern coastal area of Tanzania</p> <p>Major minerals: coal and iron ore, among others</p> <p>Area: Ludewa District, Iringa Province (Tanzania)</p>	<p>Major products: fertilizer, heavy chemicals</p> <p>Location: Bagamoyo SEZ (Tanzania)</p> <p>Major products: power generation</p> <p>Location: Mchuchuma-Katewaka in Ludewa District of Iringa Province (Tanzania)</p> <p>Major products: iron and steel</p> <p>Location: Ludewa District in Iringa Province (Tanzania)</p>	<p>Major bases: Dar es Salaam, Mtwara (Note that fertilizer to be produced in the Bagamoyo SEZ will be used as an input for agricultural production along the corridor as well as in other parts of the region.)</p>	<p>Domestic: Ludewa District (electric power for iron production) and the SAGCOT area (fertilizer, chemicals, iron and steel)</p> <p>Export: Malawi, Zambia, DRC, EAC countries as well as to Asia</p>
Supporting Industry/Light Manufacturing Industries	(Note that iron and steel products from Ludewa District in Iringa Province and chemicals products from the Bagamoyo SEZ will be used as major inputs.)	<p>Major products/services: textile and apparel, packaging, leather and footwear, blacksmith and tinsmith products, metal processing, machinery mechanics, automobile repairs, etc.</p> <p>Locations: the same as those indicated above under Downstream Production/Processing for Agriculture and Agro-Industry</p>	The products/services will be located largely in the areas indicated for Downstream Production/Processing for Agriculture and Agro-Industry, where the products/services will be used/consumed.	The products/services will be used/consumed largely in the areas indicated for Downstream Production/Processing for Agriculture and Agro-Industry.

Services Industry	<ul style="list-style-type: none"> • Information and communication technology services • Transport services (including freight forwarding services) • Utilities (power and water) 	<ul style="list-style-type: none"> • Distribution systems (including retailing) • Banking, insurance, and other financial services • Construction and other related services
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Note: Although the mining-related investments including iron and coal mining and downstream industries are near the Mtwara Corridor, they will contribute to development along the Dar es Salaam Corridor in the SAGCOT.

Abbreviations: DRC = Democratic Republic of Congo, EAC = East African Community, SAGCOT = Southern Africa Growth Corridor of Tanzania, SEZ = special economic zone

Source: JICA Study Team

Development Strategies	Major Components of Industrial Development	Critical Public Sector Actions (for the Dar es Salaam Corridor)	Proposed Time Frame
		Tanzania and Zambia • capacity development in the railway sector of Tanzania and Zambia considering the increasing importance of revitalizing railways in these countries	
(ii) Development and promotion of SME/MME clusters in major agro-industry bases along the Dar es Salaam Corridor in Tanzania and Zambia	Development of supporting manufacturing/service industries for agribusiness and light manufacturing, including: <ul style="list-style-type: none"> • agricultural machinery and automobile repairs • packaging • metal processing • leather and footwear • textile and apparel 	<p><u>Actions for the development of SME/MME clusters:</u></p> <ul style="list-style-type: none"> • formulation of strategies and action plans for the development of agri-business centered industrial clusters • improvement of access to credit for SMEs and MMEs • strengthening of business development service providers • investment and value-chain promotion and other relevant actions among those for strategy (i) above <p><u>Infrastructure development:</u></p> <ul style="list-style-type: none"> • Zones for industrial clusters: development of zones for industrial clusters and related infrastructure • Power: enhancement of power supply with development of power generation plants and transmission lines (See the actions on power generation for strategy (iii) below.) • Transport: the same as the actions for strategy (i) above <p><u>Capacity development:</u></p> <ul style="list-style-type: none"> • provision of technical and vocational education and training in relevant areas of Tanzania and Zambia • provision of management skills development education in relevant areas of Tanzania and Zambia • provision of technical assistance for reduction in non-revenue water and water losses in Dar es Salaam and Lusaka • capacity development in the railway sector of Tanzania and Zambia considering the increasing importance of revitalizing railways in these countries 	By 2017 for all actions By 2020 for zone development By 2020 for power For transport, the same as those for (i) above By 2017 for capacity development
(iii) Regional development in the Ludewa area, Iringa Province (Tanzania)	Development of an inland industrial area, e.g., through developing: <ul style="list-style-type: none"> • power generation plants • iron and steel industry • office, housing, and commercial areas 	<p><u>Planning for regional development:</u></p> <ul style="list-style-type: none"> • regional development planning in and around the Ludewa area, taking account of the progress and prospect of mining and related industrial development in and around the area <p><u>Infrastructure development:</u></p> <ul style="list-style-type: none"> • Power generation: development of power generation plants, both hydropower and coal-fired, planned along the corridor in order to meet increasing power demand along the corridor as well as in Tanzania • Power transmission: enhancement of power transmission to the Ludewa and related areas • Other infrastructure: development of other infrastructure adequate for the type of development to be undertaken in and around the area 	By 2020 for planning By 2020 for power generation and transmission By 2025 for other infrastructure

Regional Integration	Expected Impacts	Critical Public Sector Actions (for the Dar es Salaam Corridor)	Proposed Time Frame
(vi) Implementation of regional integration strategies and related trade/transport facilitation measures	<ul style="list-style-type: none"> • Reduced border crossing time and cost • Promotion of intraregional and global trade through creation of a reliable, cost-effective logistics route with positive returns for all stakeholders 	<ul style="list-style-type: none"> • Border crossing facilitation at Nakonde–Tunduma and Songwe–Kasumulo • Technical support for the Dar es Salaam Corridor Coordinating Committee 	By 2017 for all measures
(vii) Development of services needed to achieve the development strategies		Various critical actions proposed above (especially those promoting private sector activities) will contribute to the development of various kinds of services required to achieve the development strategies above.	

Abbreviations: CAADP = Comprehensive African Agricultural Development Programme, MME = micro manufacturing enterprise, SADC = Southern African Development Community, SEZ = special economic zone, SMEs = small and medium enterprises; SAGCOT = Southern Agricultural Growth Corridor of Tanzania

Source: JICA Study Team

5.2.4 Nacala Corridor

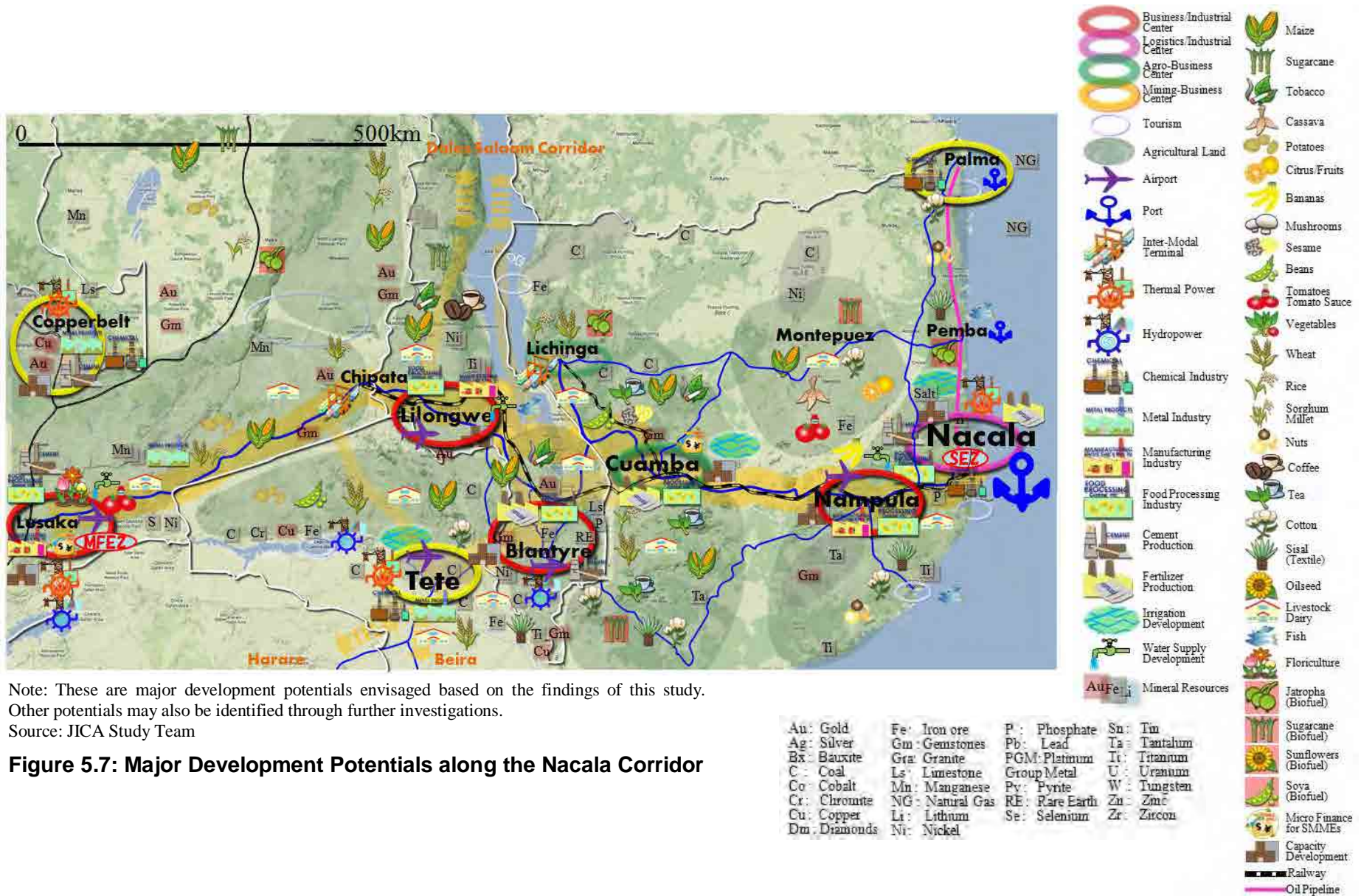
The primary industrial development strategies for the Nacala Corridor include:

- (i) development of agriculture and agro-industry along the corridor in Mozambique, especially in the Pro-Savana area;
- (ii) development of the Nacala Special Economic Zone, transforming it into a large-scale heavy chemicals production base using natural gas to be extracted offshore;
- (iii) further development of agriculture and agro-industry along the corridor in Malawi and Zambia, partly through the promotion of commercial farming;
- (iv) development of mineral resources and downstream industries in Malawi; and
- (v) development of multi-facility economic zones (MFEZs) along/around the corridor in Zambia.

With further expansion including the development of coal and other terminals, the Port of Nacala will function as a gateway to meet growing trade demand from the development of the corridor. In order to promote these developments, regional integration initiatives including regional trade/transport facilitation measures will also be implemented.

Figure 5.7 graphically presents major development potentials along the corridor, and Table 5.14 shows potential industrial bases and value chains expected to be developed. Critical public sector actions needed for these developments are proposed in Table 5.15.

In addition, the critical actions listed in Table 5.15 will contribute to the development of services required to achieve the development strategies above, leading to further increases in employment opportunities along the corridor. For each development initiative, environmental and social assessment studies should be undertaken prior to implementation, to avoid, minimize, and/or mitigate negative environmental and social impacts.



Note: These are major development potentials envisaged based on the findings of this study. Other potentials may also be identified through further investigations.
Source: JICA Study Team

Figure 5.7: Major Development Potentials along the Nacala Corridor

Table 5.15: Development Programming for the Nacala Corridor

Development Strategies	Major Components of Industrial Development	Critical Public Sector Actions (for the Nacala Corridor)	Proposed Time Frame
(i) Agricultural productivity enhancement and agro-processing capacity expansion in the Pro-Savana area (Mozambique)	<p>Modernization of agriculture and development of agro-industry, including:</p> <ul style="list-style-type: none"> • commercial farming (for crops, livestock, and horticulture) • agro-processing facilities • distribution facilities 	<p><u>Actions promoting the development of agriculture and agro-industry:</u> (Note: Actions to be taken should be in line with the Comprehensive African Agricultural Development Programme [CAADP] and the SADC Regional Agricultural Policy – Priority Policy Issues and Interventions, July 2012.)</p> <ul style="list-style-type: none"> • formulation and implementation of modernization program, taking account of various relevant measures in the SADC Regional Agricultural Policy • investment and (regional) value chain promotion (e.g., benchmarking and gap assessment of value chains, providing intensive production technologies to smallholder farmers, and establishing linkages between producers and buyers) • provision of financial and other support for access to inputs • promotion for developing logistics functions including consolidation facilities as well as cold storage and packing plants at major logistics centers (e.g., in Nacala, Nampula, Cuamba) • reduction of tariffs and nontariff barriers for relevant inputs, agricultural products, and related services <p><u>Infrastructure development:</u></p> <ul style="list-style-type: none"> • Irrigation: development of irrigation systems along the corridor in Mozambique • Road: rehabilitation/upgrading of sections in poor condition along the corridor in Mozambique, and development of feeder roads to link farms with markets via major roads • Port: expansion of the existing Port of Nacala and construction of a new port for coal and other fuel in the western part of the bay in order to accommodate significant increases in mining, agricultural, and other traffic to/from areas along the corridor (Note: The extension and rehabilitation of railways will be undertaken by Vale including the construction of a new Moatize (Mozambique)–Nkaya (Malawi) line, rehabilitation of the existing Nkaya–Nacala line, and a connection of the existing line to the new coal terminal at Nacala.) <p><u>Capacity development:</u></p> <ul style="list-style-type: none"> • provision of extension services and technical assistance for small farmers in relevant areas of Mozambique • provision of technical/management assistance for leading local farmers in relevant areas of Mozambique • capacity development in the railway sector of Mozambique considering the increasing importance of revitalizing railways in the country 	<p>By 2017 for all actions</p> <p>By 2020 for irrigation, and by 2030 for further extension By 2017 for road improvement</p> <p>By 2020 for port development</p> <p>By 2017 for capacity development</p>

Development Strategies	Major Components of Industrial Development	Critical Public Sector Actions (for the Nacala Corridor)	Proposed Time Frame
(ii) Development of Nacala SEZ	Development of various kinds of plants and facilities, including: <ul style="list-style-type: none"> • fertilizer plant • chemicals and plastics plants • packaging and related materials plants • oil refinery • coal terminal for export • agro-processing plants • cold storage and packing plants 	<p>Actions for the industrial development:</p> <ul style="list-style-type: none"> • formulation of action plans for the industrial zone and related developments, taking account of the progress in development of offshore gas fields and agricultural and related development potentials <p>Infrastructure development:</p> <ul style="list-style-type: none"> • Special Economic Zone: development of the industrial zone and related infrastructure • Transport: the same as the actions on transport for strategy (i) above • Power transmission: capacity expansion and quality improvement of power transmission systems between Tete and Nacala • Gas pipeline: development of a natural gas pipeline from northern Mozambique to Nacala • Water supply: formulation of a comprehensive water resources development and management plan for corridor development, and development of new water resources for the city of Nacala <p>Capacity development:</p> <ul style="list-style-type: none"> • provision of technical and vocational education and training in relevant areas • capacity development of the railway sector of Mozambique considering the increasing importance of revitalizing railways in the country 	By 2017 for planning By 2020 for zone development, transport, power transmission, pipeline, and water supply actions By 2017 for capacity development
(iii) Agricultural productivity enhancement and agro-processing capacity expansion along the Nacala Corridor in Malawi and Zambia	Modernization of agriculture and development of agro-industry, including: <ul style="list-style-type: none"> • commercial farming (for crops, livestock, and horticulture) • agro-processing facilities • distribution facilities 	<p>Actions promoting the development of agriculture and agro-industry:</p> <ul style="list-style-type: none"> • the same as the actions for strategy (i) above, except for the locations of major logistics centers, which are to be, for example, in Blantyre and Zomba (Malawi), and in Lusaka (Zambia) <p>Infrastructure development:</p> <ul style="list-style-type: none"> • Irrigation: extension of the irrigable area in Malawi especially in the south, and development and extension of irrigation schemes along the corridor in Zambia • Water resources: development of a multipurpose dam to provide water supply for Blantyre and surrounding areas in Malawi for irrigation as well as industrial, commercial, and residential uses, and development of new water source(s) for Lilongwe, which suffers from a low water service rate • Rail: review/amend concession conditions between the Government of Malawi and Central East African Railways (see also the note on railways in strategy (i) above). • Waterborne transport: development of waterborne transport on Lake Malawi • Dry port: development of a dry port, e.g., at Chipata in Zambia (note that the Government of Zambia has undertaken road improvements between Lusaka and Chipata). 	By 2017 for all actions By 2020 for irrigation, and by 2030 for further extension By 2020 for water resources By 2013 for amending the railway concession By 2030 for waterborne transport By 2025 for the dry

Development Strategies	Major Components of Industrial Development	Critical Public Sector Actions (for the Nacala Corridor)	Proposed Time Frame
		<p>Capacity development:</p> <ul style="list-style-type: none"> • provision of extension services and technical assistance for small farmers in Malawi • provision of technical/management assistance for leading local farmers in relevant areas of Zambia • provision of technical assistance for reduction in nonrevenue water and water losses in Lusaka and Lilongwe • capacity development of the railway sector of Malawi and Zambia considering the increasing importance of revitalizing railways in these countries 	<p>port</p> <p>By 2017 for capacity development</p>
(iv) Development of mineral resources and downstream industries in Malawi	<p>Development of mining sites, facilities, and related industries, e.g.,:</p> <ul style="list-style-type: none"> • coal mining • cogeneration with coal liquefaction technology • urea fertilizer • extraction, separation, and smelting of heavy mineral sands 	<p>Actions for mining development:</p> <ul style="list-style-type: none"> • review and improvement of institutional setting including regulations in the mining sector to better promote and accelerate development of the sector • exploration of mineral resources, investment promotion, and negotiation with potential investors and developers <p>Infrastructure development:</p> <ul style="list-style-type: none"> • Power generation: development of new hydropower generation to respond to increasing domestic demand (with generation on the South Rukuku River in northern Malawi) • Power transmission: development of an interconnection transmission line between Mozambique and Malawi to provide sufficient and reliable power for mining as well as for meeting country-wide electricity demand in Malawi • Transport: improvement of roads/railways (and possibly waterways on Lake Malawi) to accommodate successful mineral exploration initiatives <p>Capacity development:</p> <ul style="list-style-type: none"> • capacity development of officials responsible for mineral resources management including provision of necessary facilities and equipment • provision of technical assistance for highly productive and environmentally conscious mining/processing • capacity development of the railway sector of Malawi considering the increasing importance of revitalizing railways in the country 	<p>By 2020 for all actions</p> <p>By 2020 for power generation and transmission</p> <p>By 2025 for transport (except by 2030 for waterborne transport)</p> <p>By 2017 for capacity development</p>
(v) Development of an engineering products industry (Engineering MFEZ) along/around the Nacala Corridor in Zambia	<p>Development of manufacturing facilities, e.g.:</p> <ul style="list-style-type: none"> • copper fabrication plants 	<p>Actions for the development of an Engineering MFEZ:</p> <ul style="list-style-type: none"> • formulation of strategies and action plans for the development of an “engineering products” industry • formulation and implementation of an Engineering MFEZ development plan • investment and value chain promotion (e.g., conducting benchmarking and gap assessment of 	<p>By 2017 for all actions</p>

Development Strategies	Major Components of Industrial Development	Critical Public Sector Actions (for the Nacala Corridor)	Proposed Time Frame
	<ul style="list-style-type: none"> iron and steel plants MFEZ with the above plants and related service industries and facilities 	value chains, providing efficient and sustainable production technologies for SMEs/MMEs, and establishing linkages between manufacturers and buyers) <u>Infrastructure development:</u> <ul style="list-style-type: none"> Zone development: development of economic zone(s) and related infrastructure Other infrastructure: development/improvement of roads, power, water, and other necessary infrastructure appropriate for the type of development to be undertaken <u>Capacity development:</u> <ul style="list-style-type: none"> provision of technical and vocational education and training in relevant areas of Zambia provision of management skills development education in relevant areas of Zambia 	By 2020 for zone and other infrastructure development By 2017 for capacity development
(vi) Avoidance/minimization/mitigation of environmental and social impacts	(to be undertaken for each development initiative)	<ul style="list-style-type: none"> Negative environmental and social impacts should be avoided, minimized, and/or mitigated for each development initiative. Mitigation measures should be planned prior to implementation based on environmental and social studies at the different stages of project preparation to meet applicable legislation and guidelines in the countries concerned as well as the guidelines of concerned funding organizations. 	Prior to implementation
Regional Integration	Expected Impacts	Critical Public Sector Actions (for the Nacala Corridor)	Proposed Time Frame
(vii) Implementation of regional integration strategies and related trade/transport facilitation measures	<ul style="list-style-type: none"> Reduced border crossing and port clearance time and cost Promotion of intraregional and global trade through creation of a reliable, cost-effective logistics route with positive returns for all stakeholders 	<ul style="list-style-type: none"> Border crossing facilitation at Mwami–Mchinji, Chiponde–Mandimba, and Calomue–Dedza Trade facilitation at the Port of Nacala Establishment of a Nacala Corridor Authority to address trade/transport facilitation issues Railway transport facilitation (e.g., through an international railway joint operating agreement along the corridor) 	By 2017 for all measures (except by 2020 for railway transport facilitation)
(viii) Development of services needed to achieve the development strategies		Various critical actions proposed above (especially those promoting private sector activities) will contribute to the development of various kinds of services required to achieve the development strategies above.	

Abbreviations: CAADP = Comprehensive African Agricultural Development Programme, MFEZ = multi-facility economic zone, MME = micro manufacturing enterprise, SADC = Southern African Development Community, SEZ = special economic zone, SMEs = small and medium enterprises

Source: JICA Study Team

5.2.5 North-South Corridor

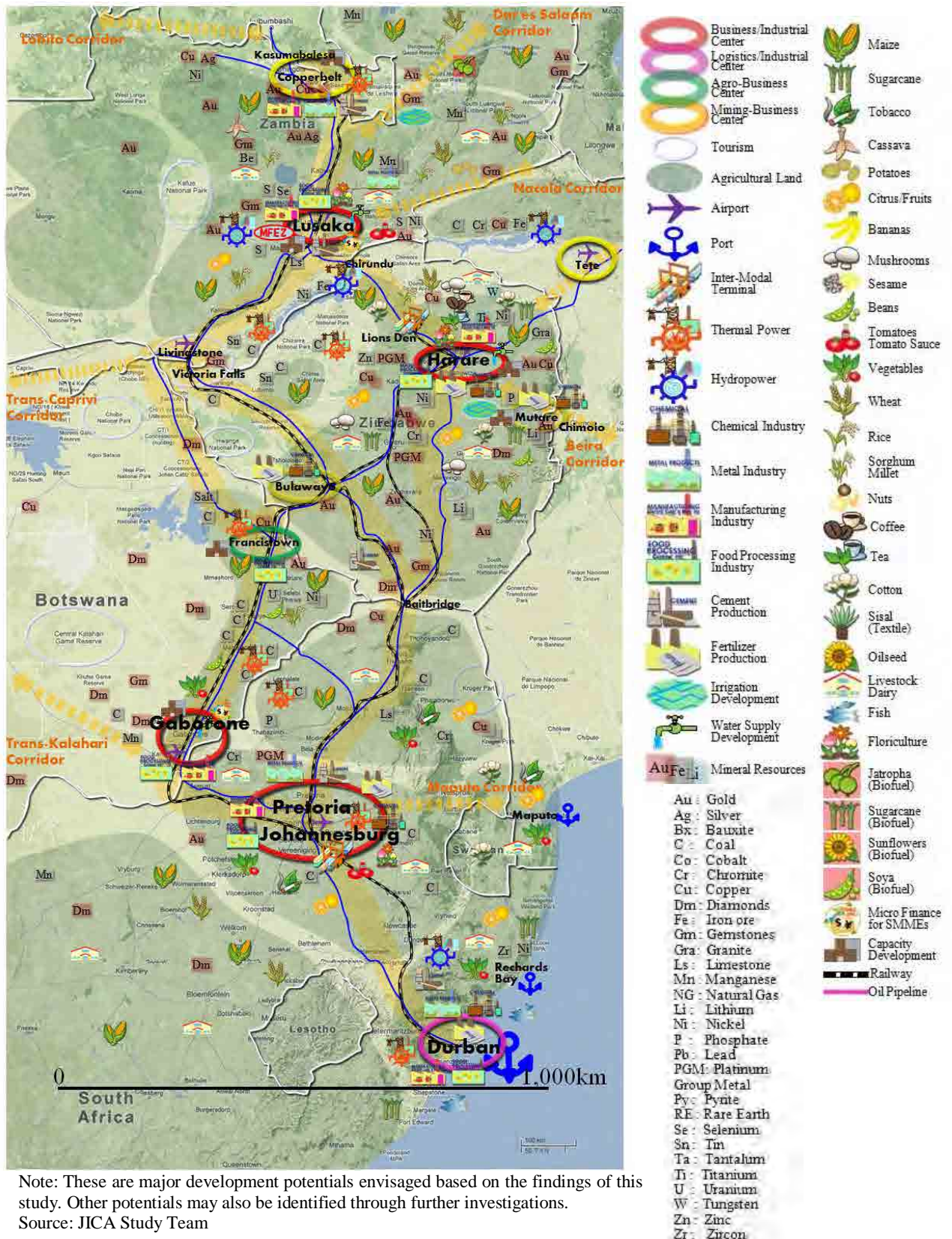
The primary industrial development strategies for the corridor include:

- (i) development of agriculture and agro-industry along the North-South Corridor in Zambia and Zimbabwe;
- (ii) development and promotion of MFEZs mainly targeting agro-industry to be located along the North-South Corridor in Zambia;
- (iii) redevelopment and modernization of mining and related industries in Zimbabwe;
- (iv) development and promotion of industrial clusters in Zimbabwe with SMEs and MMEs engaged mainly in agribusiness and light manufacturing activities;
- (v) development and promotion of industrial clusters in Botswana with SMEs/MMEs engaged mainly in light manufacturing, supporting industries, and services; and
- (vi) further development of industrial clusters toward more advanced manufacturing and mineral processing along the North-South Corridor in South Africa including in the industrial bases in Gauteng Province and the Durban area.

As it expands, the Port of Durban will continue to function as a gateway for the corridor as well as a hub port in Southern Africa. In order to promote these developments, regional integration initiatives including regional trade/transport facilitation measures will also be implemented.

Figure 5.8 graphically presents major development potentials along the corridor, and Table 5.16 shows potential industrial bases and value chains expected to be developed. Critical public sector actions needed for these developments are proposed in Table 5.17.

In addition, the critical actions listed in Table 5.17 will contribute to the development of services required to achieve the development strategies above, leading to further increases in employment opportunities along the corridor. For each development initiative, environmental and social assessment studies should be undertaken prior to implementation, to avoid, minimize, and/or mitigate negative environmental and social impacts.



Note: These are major development potentials envisaged based on the findings of this study. Other potentials may also be identified through further investigations.
Source: JICA Study Team

Figure 5.8: Major Development Potentials along the North-South Corridor

Table 5.16: Potential Industrial Bases and Value Chains along the North-South Corridor

Industry	Upstream Production	Downstream Production/ Processing	Distribution Bases	Major Markets
Agriculture and Agro-Industry	<p>Major products: soybeans, sugarcane, coffee beans, tea, tobacco, cotton, livestock, horticultural and floricultural crops</p> <p>Areas: central, eastern, and southern Zimbabwe; Copperbelt, Central, and South Provinces in Zambia; northeastern Botswana; eastern South Africa</p>	<p>Major products: processed soy products, feedstuffs, sugar, ethanol, coffee, tea, tobacco/cigarettes, cotton products, beef, meat products, horticultural and floricultural products</p> <p>Locations: MFEZs in Zambia, Harare in Zimbabwe, Francistown and Selebi-Phikwe in Botswana, and in eastern South Africa</p>	<p>Major bases: Johannesburg, Durban (South Africa); Harare (Zimbabwe); Lusaka (Zambia)</p> <p>(Note that soybeans grown in eastern Zimbabwe would partly be delivered to MFEZs in Zambia for processed food production.)</p>	<p>Domestic: South Africa; Harare (Zimbabwe); Lusaka (Zambia)</p> <p>Export: Malawi and Mozambique, as well as to Europe, the Middle East, and Asia</p>
Mining and Downstream Industries	<p>Major minerals: copper, iron ore, nickel, coal, platinum, chrome, manganese, ferrochrome</p> <p>Areas: Southern, Central, Lusaka, and Copperbelt Provinces in Zambia; eastern Botswana; central Zimbabwe; northeastern South Africa</p>	<p>Major products: automobile, general machinery, iron and steel production, plastics, rubber and other petrochemicals</p> <p>Locations: Durban and eastern South Africa</p> <p>Major products: fertilizer and chemicals manufacturing, pharmaceuticals</p> <p>Locations: Harare, Bulawayo (rail-centered base), Manicaland Province (Zimbabwe)</p> <p>Products: power generation</p> <p>Location: eastern Botswana (Mmamabula)^a</p>	<p>Major bases: Durban (including the Port of Durban), Harare (Zimbabwe)</p> <p>(Note that fertilizer to be produced in Harare, Bulawayo, and Manicaland Province will be used as an input for agricultural production along the corridor.)</p>	<p>Domestic: South Africa, Harare (Zimbabwe)</p> <p>Export: Mozambique, Europe, Asia</p>
Supporting Industry/Light Manufacturing Industries	<p>(Note that various cross-border value chains will be created, e.g., nickel produced and fabricated in Botswana (Dukwe, Selebi-Phikwe, Francistown) will be exported to South Africa as major inputs for machinery mechanics and automobile parts.)</p>	<p>Major products/services: textile and apparel, package, leather and leather products, furniture, metal processing, machinery mechanics and automobile parts, automobile repairs etc.</p> <p>Location: the same as those indicated above under Downstream Production/Processing for Agriculture and Agro-Industry</p>	<p>The products/service will be distributed largely to areas indicated under Downstream Production/Processing for Agriculture and Agro-Industry where the products/services will be used/consumed.</p>	<p>The products/services will be used/consumed largely in areas indicated under Downstream Production/Processing for Agriculture and Agro-Industry.</p>

Services Industry	<ul style="list-style-type: none"> • Information and communication technology services • Transport services (including freight forwarding services) • Utilities (power and water) 	<ul style="list-style-type: none"> • Distribution systems (including retailing) • Banking, insurance, and other financial services • Construction and other related services
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Note: ^a The Mmamabula energy project to construct a coal-fired thermal power station has been proposed by the Government of Botswana (although the project was not included in the SADC Regional Infrastructure Development Master Plan, August 2012, or in the SAPP priority projects as of December 2011).

Abbreviations: MFEZ = multi-facility economic zone, SAPP = Southern African Power Pool, SADC = Southern African Master Plan

Source: JICA Study Team

Development Strategies	Major Components of Industrial Development	Critical Public Sector Actions (for the North-South Corridor)	Proposed Time Frame
		<p>Capacity development:</p> <ul style="list-style-type: none"> • provision of extension services and technical assistance for small farmers in relevant areas of Zambia and Zimbabwe • provision of technical/management assistance for leading local farmers in relevant areas of Zambia and Zimbabwe • capacity development of the railway sector of Zambia and Zimbabwe considering the increasing importance of revitalizing railways in these countries 	By 2017 for capacity development
(ii) Development of MFEZs along the North-South Corridor in Zambia	<p>Development of agro-industry and feedstock/engineering products production industry:</p> <ul style="list-style-type: none"> • agro-processing facilities • feedstock/engineering products production facilities 	<p>Actions for the development of MFEZs:</p> <ul style="list-style-type: none"> • enhancement and implementation of MFEZ development plan • investment and value chain promotion • improvement of access to credit for small/medium enterprises <p>Infrastructure development:</p> <ul style="list-style-type: none"> • Zone development: development of economic zone(s) and related infrastructure • Other infrastructure: development/improvement of roads, power, water, and other necessary infrastructure appropriate for the type of development to be undertaken <p>Capacity development:</p> <ul style="list-style-type: none"> • provision of technical and vocational education and training in relevant areas of Zambia • provision of management skills development education in relevant areas of Zambia • provision of technical assistance for reduction in non-revenue water and water losses in Lusaka • capacity development of the railway sector of Zambia considering the increasing importance of revitalizing railways in the country 	<p>By 2017 for all actions</p> <p>By 2020 for zone and other infrastructure development</p> <p>By 2017 for capacity development</p>
(iii) Redevelopment and modernization of mining and related industries in Zimbabwe	<p>Development of various kinds of plants, including:</p> <ul style="list-style-type: none"> • mining facilities • smelter and processing plants • iron and steel plants • diamond cutting and polishing facilities • fertilizer plants 	<p>Actions for the development of mining and related industries:</p> <ul style="list-style-type: none"> • formulation and implementation of redevelopment/modernization program including investment promotion and negotiation with potential investors and developers <p>Infrastructure development:</p> <ul style="list-style-type: none"> • Transport: the same as the actions for road and rail for strategy (i) above (those related to Zimbabwe) • Water supply: the same as the actions for the corresponding strategy (i.e., redevelopment and modernization of mining and related industries in Zimbabwe) described in the table for the Beira Corridor (Table 5.11) • Power generation: the same as the actions for the corresponding strategy described in the table for the Beira Corridor • Pipeline: the same as the actions for the corresponding strategy described in the table for the Beira Corridor 	<p>By 2025 for these actions</p> <p>For transport, the same as those for (i) above</p> <p>By 2017 for water supply</p> <p>By 2017 for power generation</p>

Development Strategies	Major Components of Industrial Development	Critical Public Sector Actions (for the North-South Corridor)	Proposed Time Frame
		<p>Capacity development:</p> <ul style="list-style-type: none"> • provision of technical assistance for highly productive and environmentally conscious mining/processing • provision of technical assistance for reduction in non-revenue water and water losses in Harare • capacity development of the railway sector of Zimbabwe considering the increasing importance of revitalizing railways in the country 	<p>By 2017 for the pipeline</p> <p>By 2020 for capacity development</p>
(iv) Development and promotion of SME/MME clusters in Zimbabwe	<p>Development of supporting manufacturing/service industries for agribusiness and light manufacturing, including:</p> <ul style="list-style-type: none"> • agricultural machinery, automobile repairs, and assembly • packaging • metal processing • leather and leather products • textile and apparel 	<p>Actions for the development of SME/MME clusters:</p> <ul style="list-style-type: none"> • formulation of strategies and action plans for development of agri-business centered and light manufacturing centered industrial clusters • improvement of access to credit for SMEs and MMEs • strengthening of business development service providers • investment and value chain promotion and other relevant actions for strategy (i) above <p>Infrastructure development:</p> <ul style="list-style-type: none"> • Zones for industrial clusters: development of zones for industrial clusters and related infrastructure • Water: the same as the actions for strategy (iii) above • Power: the same as the actions for strategy (iii) above • Transport: the same as the actions for strategy (iii) above <p>Capacity development:</p> <ul style="list-style-type: none"> • provision of technical and vocational education and training in relevant areas of Zimbabwe • provision of management skills development education in relevant areas of Zimbabwe • provision of technical assistance for reduction in non-revenue water and water losses in Harare • capacity development of the railway sector of Zimbabwe considering the increasing importance of revitalizing railways in the country 	<p>By 2020 for all actions</p> <p>By 2025 for zone development</p> <p>By 2017 for water and power</p> <p>For transport, the same as those for (i) above</p> <p>By 2020 for capacity development</p>
(v) Development and promotion of SME/MME clusters in Botswana	<p>Development of supporting manufacturing/service industries for light manufacturing, including:</p> <ul style="list-style-type: none"> • machinery mechanics and automobile parts • metal processing 	<p>Actions for the development of SME/MME clusters:</p> <ul style="list-style-type: none"> • formulation of strategies and action plans for development of light manufacturing centered industrial clusters • improvement of access to credit for SMEs and MMEs • strengthening of business development service providers • investment and value-chain promotion and other relevant actions for strategy (i) above <p>Infrastructure development:</p> <ul style="list-style-type: none"> • Zones for industrial clusters: development of zones for industrial clusters and related 	<p>By 2017 for all actions</p> <p>By 2020 for zone and other infrastructure</p>

Development Strategies	Major Components of Industrial Development	Critical Public Sector Actions (for the North-South Corridor)	Proposed Time Frame
	<ul style="list-style-type: none"> • leather and leather products • furniture • textile and apparel • ICT 	<p>infrastructure</p> <ul style="list-style-type: none"> • Other infrastructure: enhancement of power generation and water supply along the corridor <p>Capacity development:</p> <ul style="list-style-type: none"> • provision of technical and vocational education and training in relevant areas of Botswana, including education and training for ICT skills development • provision of management skills development education in relevant areas of Botswana • provision of technical assistance for reduction in non-revenue water and water losses in Gaborone 	<p>development</p> <p>By 2017 for capacity development</p>
(vi) Further development of industrial clusters along the North-South Corridor in South Africa (including in Gauteng Province and in the Durban area)	Development of advanced manufacturing, and downstream minerals processing, including: metals fabrication; capital equipment; transport equipment; iron and steel; petrochemicals; fertilizer; chemicals and plastics products; and various kinds of services (e.g., transport/forwarding, storage/warehousing, retailing, ICT)	<p>Planning closely related to the corridor development:</p> <ul style="list-style-type: none"> • detailed planning for one of the Strategic Integrated Projects (SIPs) launched by the government (SIP 2: Durban–Free State–Gauteng Logistics and Industrial Corridor) <p>Infrastructure development:</p> <ul style="list-style-type: none"> • capacity expansion of the Port of Durban • other important projects to be included in SIP 2. <p>Capacity development:</p> <ul style="list-style-type: none"> • provision of technical and vocational education and training (e.g., for manufacturing, ICT, railway transport, industrial development in rural areas, training for those from neighboring countries as well as for South Africans) • provision of management skills development education 	<p>Planning and implementation of SIP 2 to be undertaken on a continuing basis</p> <p>By 2017 for capacity development</p>
(vii) Avoidance/minimization/mitigation of environmental and social impacts	(to be undertaken for each development initiative)	<ul style="list-style-type: none"> • Negative environmental and social impacts should be avoided, minimized, and/or mitigated for each development initiative. • Mitigation measures should be planned prior to implementation based on environmental and social studies at the different stages of project preparation to meet applicable legislation and guidelines in the countries concerned as well as the guidelines of concerned funding organizations. 	Prior to implementation

Regional Integration	Expected Impacts	Critical Public Sector Actions (for the North-South Corridor)	Proposed Time Frame
(viii) Implementation of regional integration strategies and related trade/transport facilitation measures	<ul style="list-style-type: none"> • Reduced border crossing and port clearance time and cost • Promotion of intraregional and global trade through creation of a reliable, cost-effective logistics route with positive returns for all stakeholders 	<ul style="list-style-type: none"> • Border crossing facilitation at Beitbridge, Chirundu, Kazungula, and/or Kasumabalesa • Technical support for the North-Corridor Management Institution (if and when established) 	By 2017 for all measures
(ix) Development of services needed to achieve the development strategies		Various critical actions proposed above (especially those promoting private sector activities) will contribute to the development of various kinds of services required to achieve the development strategies above.	

Abbreviations: CAADP = Comprehensive African Agricultural Development Programme, ICT = information and communications technology, MFEZ = multi-facility economic zone, MME = micro manufacturing enterprise, SADC = Southern African Development Community, SEZ = special economic zone, SIP = strategic industrial project, SMEs = small and medium enterprises
Source: JICA Study Team

5.3 Expected Environmental and Social Impacts

This study is at the stage of broadly assessing environmental and social impacts in the influence area of corridor development. Development activities include factory/plant construction in the industrial sector; road upgrading, rail/road rehabilitation, and port expansion in the transport sector; irrigation system construction, and water supply system construction in the water sector; and transmission line construction and hydropower plant construction in the power sector. Table 5.18 presents expected environmental and social impacts of these activities based on currently available information. As the development moves toward implementation, a more detailed environmental study for each activity should be undertaken referring to the environmental legislation of the respective countries.

Table 5.18: Expected Environmental and Social Impacts

Sector	Activities	Expected Impacts
Industrial Development	Factories for minerals refining, food processing	<p>Negative Impacts</p> <ul style="list-style-type: none"> • Factory planning and operation <p>Impacts may include the emission/discharge/effluence of industrial waste. Adequate pollution control/waste management should be formulated at the planning stage.</p> <ul style="list-style-type: none"> • Factory construction <p>Land acquisition may be an impact. If the resettlement/land acquisition is required for a project, adequate study should be conducted prior to construction to avoid/minimize impacts.</p> <p>Positive Impacts</p> <ul style="list-style-type: none"> • Factory operation <p>The projects aim to generate employment in the area and improve the livelihoods of area residents.</p>
Transport Development	Road rehabilitation and upgrading(expansion), railway rehabilitation	<p>Negative Impacts</p> <ul style="list-style-type: none"> • Road/railway development <p>In most cases these activities will be conducted along existing alignments. Because the area may already be developed, the impact on the natural environment may be relatively less than the social impacts. In most cases these activities will be along existing rights-of-way. If the affected areas are already developed, the impact on the natural environment may be less, but the social impact may be greater. An assessment is required prior to construction.</p> <ul style="list-style-type: none"> • Bridge upgrading/rehabilitation <p>Impacts on aquatic fauna should be assessed prior to construction.</p> <p>Positive Impacts</p> <ul style="list-style-type: none"> • Road/railway transport <p>Reduced travel times will provide residents with better access to public facilities such as medical services and markets.</p> <ul style="list-style-type: none"> • Bridge upgrading/rehabilitation <p>Bridge improvements with upgraded structures will provide for safer river crossings.</p>

Sector	Activities	Expected Impacts
	Port development (rehabilitation)	<p>Negative Impacts</p> <ul style="list-style-type: none"> • Port construction <p>Socioeconomic and biological impacts on fisheries and aquatic fauna may need to be assessed prior to construction.</p> <p>Positive Impact</p> <ul style="list-style-type: none"> • Port construction <p>Port expansion may increase employment and provide job opportunities for area residents.</p>
Water Development	Water supply projects	<p>Negative impacts</p> <ul style="list-style-type: none"> • Planning and construction of facilities <p>Land may be required for water treatment facilities; impacts on local people should be minimized.</p> <ul style="list-style-type: none"> • Water supply operation <p>Tariffs charged poor people should not adversely affect their livelihoods.</p> <p>Positive impacts</p> <ul style="list-style-type: none"> • Water supply operation <p>Increased access to clean water may reduce the risk of water-related disease.</p>
	Irrigation projects	<p>Negative impacts</p> <ul style="list-style-type: none"> • Irrigation facilities planning and construction <p>Irrigation sometimes changes water regimes in dry areas and causes changes in aquatic ecology. Water-related disease in surrounding areas should be assessed.</p> <p>Positive impacts</p> <ul style="list-style-type: none"> • Irrigation operation <p>Irrigation may increase income and job opportunities.</p>
Power Development	Transmission line projects	<p>Negative impacts</p> <ul style="list-style-type: none"> • Transmission line construction <p>Transmission line construction may have adverse impacts on the natural environment.</p> <p>Positive impacts</p> <ul style="list-style-type: none"> • Transmission line construction and operation <p>These activities may increase income and job opportunities. Also, these activities may increase access to electricity for residents.</p>
	Hydropower construction	<p>Negative impacts</p> <ul style="list-style-type: none"> • Hydropower planning, construction, and operation <p>Hydropower generation sometimes changes river water in the river and causes changes in aquatic ecology downstream. Impacts on river aquatic ecology should be assessed at the environmental study stage.</p> <p>Positive impacts</p> <ul style="list-style-type: none"> • Hydropower operation <p>This may increase income and job opportunities as well as provide access to electricity for residents.</p>

Source: JICA Study Team

6. Long List of Proposed Development Initiatives

6.1 Development of Long List

In accordance with the categorization of the priority corridors presented in Chapter 5 (i.e., Groups 1 to 4 as shown in Table 5.8), the JICA Study Team developed a long list of potential technical assistance projects and a long list of infrastructure development initiatives (in the transport, power/energy, and water sectors) to contribute to the development of the corridors in Groups 1 and 2. Both potential technical assistance projects and infrastructure development initiatives were selected based on the critically needed public sector actions indicated in the development programming tables for the Group 1 and 2 corridors presented in Chapter 5.

More specifically, each of the long lists was developed as follows:

- The long list of potential technical assistance projects was prepared based on the following three types of non-investment initiatives among the critically needed actions by the public sector: (i) actions promoting the envisioned industrial development (e.g., those for the development of agriculture and agro-industry, mining, and related industries, and SME/MME clusters); (ii) implementation of regional integration strategies and related trade/transport facilitation measures; and (iii) capacity development.
- The long list of infrastructure development initiatives was prepared based on the actions indicated under infrastructure development among the critically needed actions by the public sector, including those in the transport, power/energy, and water sectors.

In developing the long lists, the following points were also considered:

- The initiatives in the long lists will be among potential candidates for future JICA technical or financial assistance. Accordingly, initiatives for which assistance is expected from other development partners, multilateral or bilateral, as well as those to be undertaken by the private sector, were generally not included in the long lists.¹
- The long lists include initiatives that are relatively broad, based on discussions with JICA during the course of this study. These broad options for potential future assistance may later be refined or developed by JICA.

The initiatives proposed in this chapter contribute to corridor development from a regional perspective while other relevant JICA studies ongoing or planned in each of the focus countries (e.g., the ongoing Project for Nacala Corridor Economic Development Strategies in Mozambique) will propose projects/programs intended mainly for the development of the country in which the study is conducted. Accordingly, the initiatives proposed in this study and those to be proposed in other relevant JICA studies will complement each other rather than compete as candidates for future JICA assistance.

6.2 Potential Technical Assistance

Table 6.1 presents a long list of potential technical assistance projects for the Group 1 and 2 corridors. As described above, these projects were selected from the three types of non-investment initiatives in the development programming tables in Chapter 5. In Table 6.1, these selected projects are categorized as follows: (i) agriculture and agro-industry; (ii) mining,

¹ An exception is where the amount of assistance required may be greater than that which one development partner may be willing or able to provide.

downstream industries, and other manufacturing; (iii) regional integration; and (iv) infrastructure development. The potential technical assistance projects for infrastructure development are focused on relevant capacity development; planning for physical infrastructure is included in the infrastructure development initiatives proposed in the section that follows. In addition, the proposed time frame for the non-investment initiatives in the development programming tables in Chapter 5 is generally short term. Therefore, all of the projects listed in Table 6.1 are short-term projects. Some of these projects may also be suited for the development of other corridors including those in Groups 3 and 4.

Table 6.1: Long List of Potential Technical Assistance Projects

No.	Corridor(s)	Country/ Countries	Sector/ Sub-sector	Proposed Technical Assistance	Objectives
Agriculture and Agro-Industry					
1	Group 1 and 2 corridors	Each country along the Group 1 and 2 corridors	Agriculture and agro-industry	Formulation and implementation of modernization program, taking into account relevant measures in the SADC Regional Agricultural Policy	Productivity enhancement, quality improvement, and diversification of agriculture and agro-industry as well as promotion of intraregional trade of agricultural and processed products, e.g., through investment and value-chain promotion (including promotion of regional value chains); provision of financial and other support for access to inputs; assistance for developing logistics functions along relevant corridors and reducing tariffs and nontariff barriers for relevant inputs, agricultural products, and related services.
2	Group 1 and 2 corridors	Each country along the Group 1 and 2 corridors	Agriculture	Extension services and technical assistance for small farmers	Extension services for building capacity of rural farmers (including female farmers) to identify and take advantage of technical and economic opportunities and to cope more effectively with risk and adversity. Such technical assistance will help small farmers act as outgrowers to produce according to company specifications and realize yields and quality that will benefit both outgrowers and companies.
3	Group 1 and 2 corridors	Each country along the Group 1 and 2 corridors	Agriculture	Technical/management assistance for leading local farmers	Technical/management assistance for improvement of commercial agriculture that involves investment of a complex nature, by providing support, e.g., in technical aspects of high productivity production, business model development concerned with particular commodities, development of organizational capability in administrative and financial management, and relationship enhancement with various stakeholders such as relevant value chains, staff, local leaders, and community representatives. The use of knowledge and knowhow of exiled Zimbabwean farmers should be considered in designing the assistance.
Mining, Downstream Industries, and Other Manufacturing					
4	Beira, Nacala, and North-South Corridors	Malawi, Zimbabwe	Mining and processing	Technical assistance for highly productive and environmentally conscious mining/processing	Technical assistance to meet global requirements for the mining industry to adopt clean and efficient mining practices, e.g., use of “clean coal technology”, various mine security and mine pollution control technologies, and smelting, refining and recycling technologies for the metals industry available in Japan.
5	Group 1 and 2 corridors	Each country along the Group 1 and 2 corridors	Chemical and other industries expected to be developed	Technical and vocational education and training (TVET)	Human resource development aimed at providing skills and knowledge necessary for carrying out productive activities that lead to employment or entrepreneurship, mainly through the “pre-service” training for middle-level technicians with the provision of technical and material assistance to vocational training centers, or implemented as part of public education system from the

No.	Corridor(s)	Country/ Countries	Sector/ Sub-sector	Proposed Technical Assistance	Objectives
					upper secondary level.
6	Group 1 and 2 corridors	Each country along the Group 1 and 2 corridors	Light manufacturing (including agro-industry) and other SMEs/MMEs	Management skills development education	Training to improve business and management skills in these sectors including knowledge and skills to upgrade various aspects including product lines, production system, value-chain management, quality control, marketing, financial management, and staff training, thereby allowing industrial clusters to achieve profitability and growth in an increasingly competitive environment.
7	Group 1 and 2 corridors	Each country along the Group 1 and 2 corridors	Regional and/or industrial zone development	Planning for regional and/or industrial zone/clusters development	Formulation of strategies and action plans for regional and/or industrial zone/clusters development (including the development of logistics functions) in areas along the corridors with potential for mineral resources-based industrial development, incorporating progress and prospects for the development of mining and related industries.
Regional Integration					
8	Group 1 and 2 corridors/ Region-wide	Each country along the Group 1 and 2 corridors/other countries in the region	Transport/trade facilitation (regional integration)	Assistance for implementation of improved corridor transit, coordinated border management, one-stop border posts, port facilitation, and railway transport facilitation, including related policy/regulatory framework interventions	Reduced corridor transit, border crossing, and port clearance time and cost, in order to promote intraregional and global trade through creation of a reliable, cost-effective logistics routes with positive returns for all stakeholders.
9	Group 1 and 2 corridors/ Region-wide	Each country along the Group 1 and 2 corridors/other countries in the region	Transport/trade facilitation (regional integration)	Assistance for corridor management bodies, and ultimately (perhaps) for establishment of a regional corridor management system	Improved management of corridors, through coordinated and integrated development efforts.
10	Region-wide	Regional	Trade (regional integration)	Assistance for implementation of deep integration, including a full-fledged customs union, common market, monetary union, and single currency	Coordination, rationalization, and harmonization of macroeconomic policies to achieve regional integration, at REC, Tripartite, and eventually continent-wide levels, the latter as foreseen in the Abuja Treaty of 1991, leading to economic prosperity and peace consolidation throughout Africa.

No.	Corridor(s)	Country/ Countries	Sector/ Sub-sector	Proposed Technical Assistance	Objectives
Infrastructure Development					
11	Group 1 and 2 corridors	Malawi, Mozambique, South Africa, Zimbabwe	Transport (railway)	Capacity development in the railway sector ^a	Development of managerial and operational capabilities (including capabilities in investment planning and management of railway concessions) of public officials responsible for the railway sector in the transport ministry as well as senior officials of the national railways. Such capacity development in these countries is essential in view of the increasing importance of revitalizing railways in the region in order to help achieve development envisaged along the relevant corridors.
12	Group 1 and 2 corridors	Each country along the Group 1 and 2 corridors	Water (water supply)	Reduction in non-revenue water and water losses in capital cities of the region	Assessment of the level of non-revenue water, water losses, and water reuse in capital cities of the region, and formulation and implementation of appropriate actions to be taken for each city to reduce the volume of water to be purified by reducing water losses and non-revenue water and to achieve greater water use efficiency with measures including appropriate metering, and monitoring and data analysis to identify and record volumes delivered, actually provided, and used.
13	Region-wide	Regional	Power (power trade)	Capacity development of the Southern African Power Pool	Capacity development for transmission line interconnection between countries in the region, including consultancy and advisory services to design a regional institutional framework/strategy for financing regional transmission systems that are underdeveloped due to a lack of funds, and to define a regional institutional framework for common carrier transmission across two regional areas (e.g., between the SAPP and East Africa Power Pool regions). Such capacity development will help promote critical regional energy interconnections that will increase electricity trade and lower the cost of electricity.

Abbreviations: MME = micro manufacturing enterprise, REC = regional economic community, RIDMP = Regional Infrastructure Development Master Plan, SAPP = Southern African Power Pool, SADC = Southern African Development Community, SME = small and medium enterprises

Note: ^a Railways will become increasingly important in Southern Africa as the envisaged industrial development increases the demand for the transport of bulk commodities and long-distance freight that are relatively well-suited to rail transport. While continued investment in road infrastructure is essential, such a division of roles between rail and road should be pursued in the region, thereby developing more efficient transport systems to help achieve the envisaged industrial development.

Source: JICA Study Team

6.3 Infrastructure Development Initiatives for Potential Financial Assistance

Table 6.2 presents a long list of infrastructure development initiatives for potential JICA financial assistance. As described in section 6.1, the list was prepared based on the infrastructure development actions among the critically needed actions in the development programming tables in Chapter 5. In Table 6.2, these selected initiatives are categorized by infrastructure sector (i.e., transport, power/energy, and water, the infrastructure sectors addressed in this study). For each sector, the proposed initiatives are listed in alphabetical order by country. As mentioned, the list consists of initiatives that are relatively broadly defined, based on the discussions with JICA, thereby leaving broader options for potential future JICA assistance.

In preparing the long list, the JICA Study Team obtained and took into account project information from various sources including the following:

- the SADC Regional Infrastructure Development Master Plan (RIDMP), August 2012;
- the Study on Programme for Infrastructure Development in Africa (PIDA), Final Phase III Report, September 2011;
- relevant government agencies in the focus countries;
- the Southern African Power Pool (SAPP);
- the Development Bank for Southern Africa (DBSA);
- various JICA study reports closely related to the development of the priority corridors;²
- other relevant reports;³ and
- private sector entities interviewed in the focus countries during the field surveys and in Japan.

² The JICA reports reviewed include: (i) *Project for Nacala Corridor Economic Development Strategies in the Republic of Mozambique, Progress Report*, September 2012; (ii) *Status Quo Analysis of Regional Infrastructure Development in Southern Africa and Identification of Major Bottlenecks, Final Report*, August 2012; (iii) *Data Collection Survey for the Electric Power Sector in Mozambique, Final Report* (in Japanese), July 2012; (iv) *Project for the Study on Development of the Sena Corridor in the Republic of Malawi, Final Report*, February 2012; (v) *Support of Agriculture Development Master Plan for Nacala Corridor in Mozambique (PROSAVANA-PD), Interim Report (1)*, August 2012..

³ The reports reviewed include: (i) *Beira Agricultural Growth Corridor: Delivering the Potential*, 2010; (ii) Tripartite Task Force by TradeMark Southern Africa, *Report on North-South Corridor Projects, Draft Report*, May 2011; (iii) World Bank, *Enabling Private Sector Development in the Landlocked Regions of the North-South Corridor*, June 2010; (iv) UK Department for International Development and COMESA, *Mozambique Regional Gateway Programme, Situation Analysis and Roadmap*, May 2012; and (v) *An Economic Development Strategy for the Trans-Kalahari Corridor*, May 2011; and (v) *Definition and Investment Strategy for a Core Strategic Transport Network for Eastern and Southern Africa, Final Report*, October 2011, prepared for the World Bank.

Table 6.2: Long List of Proposed Infrastructure Development Initiatives for Potential Financial Assistance

No.	Corridor(s)	Country/ Countries ^a	Sector/ sub-sector	Proposed Infrastructure Development Initiative	Objectives	Time Frame
Transport						
1	Beira, Dar es Salaam, Nacala, North-South	Malawi, Mozambique, Tanzania, Zambia, Zimbabwe	Transport (road)	Upgrading of selected road sections along the corridors	To improve/upgrade road sections in poor condition along the corridors to serve the production and distribution of agricultural, agro-industrial, and other products; the initiative may include the development of feeder roads to link farms with markets via major roads.	Largely by 2020 (partly by 2025)
2	Nacala, Dar es Salaam	Malawi	Transport (waterway)	Development of a dry port and waterborne transportation	To modernize logistics by developing a dry port and waterborne transportation on Lake Malawi to promote the development of agriculture, mining, and mineral resources-based industries in Malawi	By 2030
3	Nacala	Mozambique	Transport (port)	Expansion of the Port of Nacala	To expand the existing port as well as develop a new port along with a special economic zone to accommodate significant increases in mining, agricultural, and other traffic envisaged to/from areas along the corridor	By 2020
4	Beira, North-South	Zimbabwe	Transport (railway)	Revitalization of National Railways of Zimbabwe ^b	To revitalize the national railways (including facilitation of intermodal transport to/from Zambia), which have deteriorated over the past decades, thereby responding to the expected significant increases in intraregional trade of agricultural, mineral, and downstream products as well as exports of these products to global markets	By 2025 for critical sections and minimum rolling stock requirements
Power/Energy						
5	Nacala	Malawi	Power (hydropower)	Development of new hydropower	To supply electricity to respond to increasing domestic demand	By 2020
6	Beira, Nacala, North-South	Mozambique	Power (transmission)	Development of new transmission line(s) in central and southern Mozambique	To provide for transmission of the new power to be generated in the Zambezi Valley to markets in central and southern Mozambique and in South Africa	By 2020
7	Beira, Nacala, North-South	Mozambique	Power (hydropower)	Development of new hydropower generation on the Zambezi River	To supply electricity, not only to Mozambique, but also to the rest of the interconnected grid in Southern Africa; the project will be developed in conjunction with the Mozambique Transmission Backbone	By 2020

No.	Corridor(s)	Country/ Countries ^a	Sector/ sub-sector	Proposed Infrastructure Development Initiative	Objectives	Time Frame
8	Dar es Salaam	Tanzania, Zambia	Power (transmission)	Development of new interconnection transmission	To connect Tanzania to the SAPP power grid via Zambia to supply power for Tanzania mainly from the Zambezi Valley	By 2017
9	Beira, North-South	Zimbabwe	Energy (liquid fuel transmission)	Enhancement of liquid fuel pipeline	To enhance liquid fuel transmission capacity to Harare from the Port of Beira, and make Zimbabwe a distribution center for diesel, petro, jet A1 fuel, and paraffin, which will be supplied to both the domestic market and neighboring countries	By 2017
Water						
10	Nacala	Malawi	Water (irrigation)	Extension of the irrigation area	Extension of the irrigated area in the southern part of Malawi	Partly by 2020, and by 2030 for the remainder
11	Nacala, North-South	Zambia	Water (irrigation/ environment)	Climate change adaptation for drought in farmlands of Agro Ecological Region I	To reduce the vulnerability of persons dependent on rainfed agricultural practices to anticipate rainfall shortages in the face of climate change with measures including introduction of irrigation and water management systems, training, capacity building of farmers on water management practices, marketing support, and provision of finance credit facilities	For irrigation, partly by 2020, and by 2030 for the remainder (for “soft” measures, by 2017)
12	North-South	Zimbabwe	Water (irrigation)	Rehabilitation and development of irrigation systems along the corridor	To rehabilitate existing irrigation systems as well as extend the irrigated areas, implementing priority projects, e.g., the Zhovhe Irrigation Project in Matabeleland South Province, the Biri Irrigation Project in Mashonaland West Province	Partly by 2017, and by 2030 for the remainder

Abbreviation: SAPP = Southern African Power Pool

Note: ^a For each sector (transport, power/energy, or water), the proposed initiatives are listed in the alphabetical order by country. ^b Railways will become increasingly important in Southern Africa as the envisaged industrial development increases the demand for the transport of bulk commodities and long-distance freight that are relatively well-suited to rail transport. While continued investment in road infrastructure is essential, such a division of roles between rail and road should be pursued in the region, thereby developing more efficient transport systems to help achieve the envisaged industrial development.

Source: JICA Study Team